

# DRAFT AMENDMENT 11 TO THE 2006 CONSOLIDATED ATLANTIC HIGHLY MIGRATORY SPECIES FISHERY MANAGEMENT PLAN

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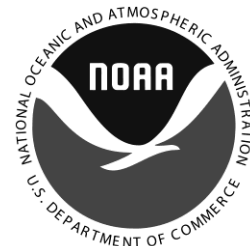
A Draft Environmental Impact Statement,  
A Draft Regulatory Impact Review,  
An Initial Regulatory Flexibility Analysis,  
A Draft Social Impact Analysis



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Highly Migratory Species Management Division  
Office of Sustainable Fisheries  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, Maryland 20910



## **Amendment 11 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan**

- Actions:** Implement management measures to address overfishing and establish the foundation for rebuilding North Atlantic shortfin mako sharks consistent with the 2017 ICCAT stock assessment and ICCAT Recommendation 17-08.
- Type of Statement:** Draft Environmental Impact Statement; Initial Regulatory Impact Review; Initial Regulatory Flexibility Analysis; Initial Social Impact Statement
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- Abstract:** The National Marine Fisheries Service (NMFS) is amending the 2006 Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan (FMP) based on the new stock assessment for shortfin mako sharks (*Isurus oxyrinchus*) and measures required by the International Commission for the Conservation of Atlantic Tunas (ICCAT). The stock assessment indicated that the North Atlantic population of shortfin mako sharks is overfished and experiencing overfishing. In November 2017, ICCAT adopted management measures in Recommendation 17-08 to address overfishing and establish a timeline for rebuilding North Atlantic shortfin mako sharks. ICCAT will review the effectiveness of these measures from the first six months of 2018 and again in 2019. NMFS published an emergency interim final rule in response to this Recommendation to meet U.S. obligations at ICCAT and under the Atlantic Tunas Convention Act, and the Magnuson-Stevens Fishery Conservation and Management Act. The proposed measures in this action are intended to reduce fishing mortality on North Atlantic shortfin mako sharks to address the U.S. contribution to overfishing and to take steps toward rebuilding the stock. The cumulative ecological impacts of the preferred alternatives are expected to be minor and beneficial, while the socioeconomic impacts are expected to be minor and adverse.

## EXECUTIVE SUMMARY

The National Marine Fisheries Service (NMFS) is considering conservation and management measures to address overfishing and establish a foundation for rebuilding North Atlantic shortfin mako shark stock.

Atlantic Highly Migratory Species (HMS) fisheries are managed under the dual authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and the Atlantic Tunas Convention Act (ATCA). Under the Magnuson-Stevens Act, NMFS must, consistent with ten National Standards, manage fisheries to maintain optimum yield on a continuing basis while preventing overfishing. ATCA authorizes the Secretary of Commerce (Secretary) to promulgate regulations, as may be necessary and appropriate to carry out recommendations of the International Commission for the Conservation of Atlantic Tunas (ICCAT). The authority to issue regulations under the Magnuson-Stevens Act and ATCA has been delegated from the Secretary to the Assistant Administrator for Fisheries. The measures proposed in this amendment and associated rulemaking are taken under the authority of the Magnuson-Stevens Act and ATCA. Currently, Atlantic sharks, tunas, swordfish, and billfish are managed under the 2006 Consolidated Atlantic HMS Fishery Management Plan (2006 Consolidated HMS FMP) and its amendments.

On December 13, 2017, based on the results of ICCAT's stock assessment on the North Atlantic shortfin mako shark, NMFS determined the stock to be overfished with overfishing occurring. Through an interim final rule using emergency Magnuson-Stevens Act authority, NMFS temporarily and immediately implemented commercial and recreational measures consistent with ICCAT Recommendation 17-08 focused on maximizing live releases of shortfin mako sharks, allowing retention only in certain circumstances, increasing minimum size limits, and improving data collection in ICCAT fisheries (83 FR 8946; March 2, 2018). The temporary regulations initially may remain in effect for up to 180 days, but may be extended for an additional 186 days as described in section 305(c) of the Magnuson-Stevens Act. As the interim final rule could only be effective for at most 366 days, NMFS also announced its intent to prepare an Environmental Impact Statement (EIS) for Amendment 11 to the 2006 Atlantic Consolidated HMS FMP (Amendment 5) (83 FR 9255; March 5, 2018).

On March 5, 2018, NMFS also released an Issues and Options document presenting options for long-term conservation and management of the stock (<https://www.fisheries.noaa.gov/bulletin/submit-comments-options-address-overfishing-north-atlantic-shortfin-mako-sharks>). To facilitate discussions and input from the public and others during the development of Amendment 11, NMFS examined an initial range of options to meet specified objectives and National Environmental Policy Act (NEPA) requirements, and invited the public to comment on those options and on whether additional options should be examined. The comments received during the scoping phase helped NMFS develop the range of alternatives to analyze in a draft EIS and the proposed rule. As a result of additional public comment on these document, NMFS may make changes in Final Amendment 11 by modifying the preferred alternatives, selecting different alternatives, or adding new measures, to meet the same purpose and need of the Amendment.

In this document, we consider a reasonable range of alternative management measures to address overfishing and establish a foundation for rebuilding the shortfin mako shark stock, including: no action; modifying the commercial retention restrictions; using electronic monitoring and/or observers for verification of status of boarded sharks and size limit; prohibiting commercial and recreational retention; modifying the recreational size limit by sex and seasonal retention; expanding the requirement of the use of circle hooks by recreational shark fishermen; establishing a recreational tagging program; mandatory reporting on vessel monitoring systems; mandatory reporting of recreational catches; establishing a domestic rebuilding plan without ICCAT; foundation for an international rebuilding plan; species specific quota if established by ICCAT; and area management if established by ICCAT.

Consistent with the regulations published by the Council on Environmental Quality, 40 C.F.R. 1501-1508 (CEQ Regulations), we have identified our preferred alternatives. A full description and analysis of the different alternatives can be found in Chapters 2.0 and 4.0 of this document. We have identified preferred alternatives that would address overfishing and establish a foundation to rebuild North Atlantic shortfin mako sharks, consistent with the 2017 ICCAT stock assessment and ICCAT Recommendation 17-08, while appropriately considering the needs of fishermen and communities and maximizing sustainable fishing opportunities. The list of preferred alternatives can be found below (Table 0.1); the list of the full range of alternatives considered can be found in Chapter 2.0. The cumulative ecological impacts of the preferred alternatives are expected to be minor and beneficial, while the socioeconomic impacts are expected to be minor and adverse.

NMFS will take public comment into consideration before finalizing any alternatives, and the proposed measures may be altered or different alternatives may be adopted at the final rule stage. The CEQ regulations direct Federal agencies to the full extent possible to integrate the requirements of NEPA with other planning and environmental review procedures required by law or by agency practice so that all procedures run concurrently rather than consecutively. To that end, this document integrates the Draft Environmental Impact Statement (DEIS) required by NEPA with the fisheries planning and management requirements associated with proposed amendment to an FMP under the Magnuson-Stevens Act, the Initial Regulatory Flexibility Analysis required under the Regulatory Flexibility Act, 5 U.S.C. §§601-603; and the Regulatory Impact Review prepared in accordance with Executive Order 12866, “Regulatory Planning and Review.”

**Table 0.1 The preferred alternatives in the DEIS for Amendment 11 to the 2006 Consolidated HMS FMP**

<b>Preferred Alternatives in DEIS</b>	
Commercial Measures	<i>Alternative A2</i> Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and there is a functional electronic monitoring system on board the vessel
Recreational Measures	<i>Alternative B3</i> Increase the minimum size of all shortfin mako sharks from 54 inches FL to 83 inches (210 cm) FL
	<i>Alternative B9</i> Require the use of circle hooks for recreational shark fishing
Monitoring Measures	<i>Alternative C1</i> No action. Do not require reporting of shortfin mako sharks outside of current reporting systems
Rebuilding Measures	<i>Alternative D3</i> Establish the foundation for developing an international rebuilding plan for shortfin mako sharks

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## 1.0 Introduction

Atlantic highly migratory species<sup>1</sup> (HMS) are managed under the dual authority of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (Magnuson-Stevens Act) and the Atlantic Tunas Convention Act (ATCA). Under the Magnuson-Stevens Act, the National Marine Fisheries Service (NMFS) must, consistent with ten National Standards, manage fisheries to maintain optimum yield on a continuing basis while preventing overfishing. Under ATCA, the Secretary of Commerce is required to promulgate regulations as may be necessary and appropriate to carry out recommendations by the International Commission for the Conservation of Atlantic Tunas (ICCAT). The conservation and management measures proposed for this Fishery Management Plan (FMP) amendment and associated rulemaking, which address North Atlantic shortfin mako sharks, are taken under the authority of the Magnuson-Stevens Act and ATCA. Management measures must also be consistent with other applicable laws including, but not limited to, the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), and the Coastal Zone Management Act (CZMA). This document is prepared, in part, to comply with our responsibilities under NEPA, as implemented by the regulations published by the Council on Environmental Quality, 50 C.F.R. Parts 1501-1508, and NOAA Administrative Order 216-6A.

In August 2017, ICCAT's Standing Committee on Research and Statistics (SCRS) conducted a new benchmark stock assessment on the North Atlantic shortfin mako shark stock. In November 2017 at its annual meeting, ICCAT accepted this stock assessment and its results. On December 13, 2017, based on the results of this assessment, NMFS determined the stock to be overfished with overfishing occurring.

In November 2017 at its annual meeting, ICCAT adopted new management measures for shortfin mako sharks (ICCAT Recommendation 17-08). These measures largely focus on maximizing live releases of shortfin mako sharks, allowing retention only under specified conditions in limited circumstances, increasing minimum size limits, and improving data collection in ICCAT fisheries. ICCAT stated that the measures in the Recommendation "are expected to prevent the population from decreasing further, stop overfishing and begin to rebuild the stock" with a commitment to "immediately taking actions to end overfishing of the North Atlantic shortfin mako stock with a high probability, as the first step in the development of a rebuilding plan." The Recommendation requires ICCAT parties that authorize retention to provide to ICCAT "the amount of North Atlantic shortfin mako caught and retained on board as well as dead discards during the first six months in 2018 by one month prior to the 2018 Commission annual meeting." The Recommendation specifies that at its annual meeting in November 2018, ICCAT will review the catches from the first six months of 2018 and decide whether the measures contained in the recommendation should be modified. In 2019, the SCRS will evaluate the effectiveness of these measures in ending overfishing and beginning to rebuild the stock. The SCRS will also provide rebuilding information that reflects rebuilding timeframes of at least two mean generation times, taking into consideration the slow reproductive biology of

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<sup>1</sup>The Magnuson-Stevens Act, at 16 U.S.C. 1802(14), defines the term "highly migratory species" as tuna species, marlin (*Tetrapturus* spp. and *Makaira* spp.), oceanic sharks, sailfishes (*Istiophorus* spp.), and swordfish (*Xiphias gladius*).

sharks and other factors. The Recommendation provides that in 2019, ICCAT will establish a rebuilding plan with a high probability of avoiding overfishing and rebuilding the stock to  $B_{MSY}$  within a timeframe that takes into account the biology of the stock.

NMFS published an emergency interim final rule to implement measures in HMS recreational and commercial fisheries, consistent with ICCAT Recommendation 17-08, in order to address overfishing of shortfin mako sharks and the ICCAT six-month reporting requirement for 2018 (83 FR 8946; March 2, 2018). These emergency measures will be effective until August 29, 2018, with a possible extension for up to an additional 186 days (through March 3, 2019). When the emergency measures expire, they would be replaced by long-term measures implemented through this rulemaking.

In accordance with the requirements of NEPA, NMFS announced its intent to prepare an Environmental Impact Statement (EIS) for Amendment 11 to the 2006 Atlantic Consolidated HMS FMP on March 5, 2018 (83 FR 9255) and provided notice of the availability of an Issues and Options document for scoping. In the Issues and Options paper, NMFS presented for discussion and public consideration a range of potential management measures for North Atlantic shortfin mako sharks (*Isurus oxyrinchus*) to address overfishing of shortfin mako sharks, to develop and implement measures consistent with ICCAT Recommendation 17-08, and to take steps towards rebuilding the shortfin mako shark stock. NMFS requested public comments on potential commercial and recreational management measures to assist the Agency in analyzing alternatives for meeting the need for the Amendment. During the comment period, NMFS conducted four public scoping meetings (Florida, North Carolina, New Jersey, and Massachusetts) and a public webinar. In addition, NMFS presented information about the planned Amendment and scoping document to the Atlantic HMS Advisory Panel, three Atlantic Regional Fishery Management Councils (the New England, Mid-Atlantic, and Gulf of Mexico Fishery Management Councils), and the Atlantic and Gulf States Marine Fisheries Commissions.

The Issues and Options document for Amendment 11 described a number of potential alternatives for commercial, recreational, monitoring, and rebuilding measures. Some of these alternatives were based on the requirements of ICCAT Recommendation 17-08 as reflected in the emergency interim final rule, while others may not have been specifically included in the ICCAT recommendation. The commercial measures in the Issues and Options document included no action, requiring live release, creating new shark management quotas, allowing additional shortfin mako shark landings by non-pelagic longline gear, and prohibiting commercial retention of shortfin mako sharks. The recreational measures included no action, creating a catch and release fishery for shortfin mako sharks, increasing the minimum size to 83 inches fork length (FL) or greater, restricting landings to tournaments or tagging program, revising the circle hook requirement, and establishing a variable inseason minimum size restriction. The monitoring measures included improve reporting by establishing mandatory reporting through the vessel monitoring system (VMS) for commercial fishermen and establishing mandatory reporting for recreationally landed shortfin mako sharks during tournaments or outside of tournaments. The rebuilding measures included pursuing a domestic rebuilding plan without ICCAT and establishing a foundation for rebuilding the shortfin mako shark stock by ending overfishing, by adopting and implementing management measures from ICCAT, and by working with international partners at ICCAT to work together to develop an international rebuilding program with a high probability of avoiding overfishing of shortfin mako

sharks and rebuilding the stock to within a timeframe that takes into account the biology of the stock. The Issues and Options document stated that the goal of Amendment 11 is to address overfishing and take steps toward rebuilding the shortfin mako shark stock.

The comment period for the scoping phase of this rule was open for 63 days and closed on May 7, 2018. During the comment period, NMFS received significant public comment and feedback on the measures in the Issues and Options document. These comments included opposition to any management measures based on the stock assessment due to perceived uncertainties with the assessment and data reported to ICCAT from other countries. Some commenters expressed concern that the conversion factors used by the United States improperly inflated the reported U.S. landings and that, as a result, the United States is held accountable for a greater share of overall landings. Other commenters expressed support for the management measures in the ICCAT Recommendation, while others commented that NMFS should prohibit the retention of shortfin mako sharks, implement additional monitoring or methods to “control and cap” mortality, and conduct more data collection and reporting. Regarding potential commercial measures, there was concern about potential impacts to the commercial fleet and using electronic monitoring as a tool to verify dead haulback of shortfin mako sharks. Regarding potential recreational measures, there was concern about possible effects on recreational harvest if the minimum size for retention is increased and the subsequent safety implications for anglers. NMFS received comments on seasonal measures for tournament and non-tournament fishermen, allowing retention of male shortfin mako sharks only, or limits to the number of shortfin mako sharks allowed per person per year. Some commenters supported extending the management area for circle hooks, while others did not support extending circle hooks in the recreational fishery due to the unknown benefits for shortfin mako sharks and the unknown conservation benefits the current circle hook area is having on the recreational measures.

Based on the comments received on the Issues and Options document for Amendment 11, the emergency interim final rule, consultation with the HMS Advisory Panel, and input from the regulated community and public, NMFS has now developed Draft Amendment 11. Some of the alternatives included in the Issues and Options document for Amendment 11 are included in this draft Amendment; however, other alternatives have been changed or added based on public comment.

The alternatives would affect the commercial and recreational HMS fisheries and the alternatives are listed in four categories (commercial, recreational, monitoring, and rebuilding) for ease of understanding. NMFS considers a range of alternatives for each category that would meet the purpose and need of this amendment, which includes, among other things, addressing overfishing on and assist with rebuilding shortfin mako sharks. The alternatives are all described in detail in Chapter 2.0.

## **1.1 Brief Management History**

The following is a brief overview of HMS management, focusing on management relevant to shortfin mako sharks. A more detailed description of the management history of shortfin mako sharks is available in Chapter 3.

In 1989, the Regional Fishery Management Councils requested that the Secretary of Commerce manage Atlantic sharks. On November 28, 1990, the President of the United States signed into law the Fishery Conservation Amendments of 1990 (Pub. L. 101-627). This law amended the Magnuson Fishery Conservation and Management Act (later renamed the Magnuson-Stevens Fishery Conservation and Management Act or Magnuson-Stevens Act) and gave the Secretary the authority (effective January 1, 1992) to manage HMS in the exclusive economic zone of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea under authority of the Magnuson-Stevens Act (16 U.S.C. §1811). This law also transferred from the Fishery Management Councils to the Secretary, effective November 28, 1990, the management authority for HMS in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea (16 U.S.C. §1854(f)(3)). At this time, the Secretary delegated authority to manage Atlantic HMS to NMFS.

NMFS finalized the first Atlantic Shark FMP in 1993. The 1993 FMP established many of the management measures still in place today including permitting and reporting requirements, management complexes, commercial quotas, and recreational bag limits. In 1999, NMFS revised the 1993 FMP and included swordfish and tunas in the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks (NMFS 1999). The 1999 FMP included several shark conservation and management measures including maintaining a commercial pelagic shark quota, which includes shortfin mako sharks, at 580 mt dw, which was first established in the 1993 FMP. The 1999 FMP also established a recreational bag limit and size limit of 1 shark (any species) per vessel per trip with a minimum size of 54 inches fork length; this bag limit and size limit applied to most shark species including shortfin mako sharks. The 1999 FMP was amended in 2003, and in 2006, NMFS consolidated the Atlantic tunas, swordfish, and shark FMP and its amendments and the Atlantic billfish FMP and its amendments into the 2006 Consolidated HMS FMP. Since then, the 2006 Consolidated HMS FMP has been amended several times.

Of relevance to this action, in 2008, ICCAT's SCRS conducted a stock assessment for North Atlantic shortfin mako sharks. The stock assessment found that the North Atlantic shortfin mako shark was experiencing overfishing and were not overfished. As a result of the 2008 assessment, along with several other shark stock assessments that had been recently conducted, NMFS developed Amendment 3 to the 2006 Consolidated HMS FMP (75 FR 30483). In Amendment 3, NMFS, among other things, committed to taking action at an international level to end overfishing of shortfin mako given its Atlantic-wide range and the number of countries fishing on the stock, and promoted in the domestic fishery the release of shortfin mako sharks brought to commercial and recreational fishing vessels alive. In 2012, the SCRS conducted another stock assessment with updated data and relative time series and abundance information. Based on these results, in 2012, NMFS determined that North Atlantic shortfin mako sharks were no longer approaching an overfished condition and were not experiencing overfishing. Given the improved stock status, NMFS decided new measures were not needed and instead continued to encourage the release of shortfin mako sharks brought to commercial and recreational vessels alive.

Under the Magnuson-Stevens Act, NMFS is responsible for managing Atlantic HMS and must comply with all applicable provisions of the Act when it prepares and amends its FMP and issues implementing regulations (16 U.S.C. §1852(a)(3)). NMFS must maintain optimal yield of each fishery while preventing overfishing (16 U.S.C. §1851(a)(1)). Where a fishery is determined to



be in or approaching an overfished condition, NMFS must include in its FMP conservation and management measures to prevent or end overfishing and rebuild the fishery, stock or species (16 U.S.C. §§1853(a)(10); 1854(e)). In preparing and amending an FMP, NMFS must, among other things, consider the Magnuson-Stevens Act's ten National Standards, including a requirement to use the best scientific information available as well as to consider potential impacts on residents of different States, efficiency, costs, fishing communities, bycatch, and safety at sea (16 U.S.C. §1851 (a)(1-10)). The Magnuson-Stevens Act also has a specific provisions that address preparing and implementing FMPs for Atlantic HMS (16 U.S.C. §1854(g)(1)(A-G)). In summary, the provisions addressing Atlantic HMS include, but are not limited to, requirements to:

- Consult with and consider the views of affected Councils, Commissions, and advisory groups;
- Evaluate the likely effects of conservation and management measures on participants and minimize, to the extent practicable, any disadvantage to U.S. fishermen in relation to foreign competitors;
- Provide fishing vessels with a reasonable opportunity to harvest any allocation or quota authorized under an international fishery agreement;
- Diligently pursue, through international entities (such as the International Commission for the Conservation of Atlantic Tunas), comparable international fishery management measures; and,
- Ensure that conservation and management measures promote international conservation of the affected fishery, take into consideration traditional fishing patterns of fishing vessels, are fair and equitable in allocating fishing privileges among U.S. fishermen and do not have economic allocation as the sole purpose, and promote, to the extent practicable, implementation of scientific research programs that include the tagging and release of Atlantic HMS.

## **1.2 Addressing Overfishing and Rebuilding North Atlantic Shortfin Mako Sharks**

In August 2017, ICCAT's SCRS conducted a new benchmark stock assessment on the North Atlantic shortfin mako stock. At its November 2017 annual meeting, ICCAT accepted this stock assessment and determined the stock to be overfished, with overfishing occurring. On December 13, 2017, based on the results of this assessment, NMFS applied domestic stock status determination criteria to determine that the stock was overfished with overfishing occurring. The 2017 assessment estimated that total North Atlantic shortfin mako catches across all ICCAT parties are currently between 3,600 and 4,750 mt per year, and that total catches would have to be at 1,000 mt or below (72-79 percent reductions) to prevent further population declines, and that catches of 500 mt or less currently are expected to stop overfishing and begin to rebuild the stock. Based on this information, ICCAT adopted new management measures for Atlantic shortfin mako in Recommendation 17-08, which the United States must implement as necessary and appropriate under ATCA. These measures largely focus on maximizing live releases of Atlantic shortfin mako sharks, allowing retention only in certain limited circumstances, increasing minimum size limits, and improving data collection in ICCAT fisheries. In November 2018, ICCAT will review the catches from the first six months of 2018 and decide

whether these measures should be modified. In 2019, the SCRS will evaluate the effectiveness of these measures in ending overfishing and beginning to rebuild the stock. SCRS will also provide rebuilding information that reflects rebuilding timeframes of at least two mean generation times. Also in 2019, ICCAT will establish a rebuilding plan that will have a high probability of avoiding overfishing and rebuilding the stock to  $B_{MSY}$  within a timeframe that takes into account the biology of the stock.

NMFS initially implemented measures consistent with ICCAT Recommendation 17-08 through an interim final rule using emergency Magnuson-Stevens Act authority. The rule temporarily and immediately implemented commercial and recreational measures (83 FR 8946; March 2, 2018) to have an immediate impact on overfishing and to ensure that data considered by ICCAT in November 2018 reflects the new measures. The temporary regulations may remain in effect for no more than 180 days but may be extended for an additional 186 days as described in section 305(c) of the Magnuson-Stevens Act. As the interim final rule may only be effective for up to 366 days, NMFS also initiated development of a new regulatory amendment to the 2006 Consolidated HMS FMP to consider and evaluate additional management options to address longer-term the U.S. contribution to overfishing and rebuild the North Atlantic shortfin mako shark stock. NMFS published a notice of intent to prepare this environmental impact assessment (EIS) and conducted scoping on relevant issues (83 FR 9255; March 5, 2018). The comment period for scoping closed on May 7, 2018. Following scoping, this Draft Amendment is the next step in the FMP amendment process.

### **1.3 Social and Economic Concerns**

To satisfy mandates of NEPA and the Magnuson-Stevens Act subsections summarized below, this document identifies and evaluates the direct, indirect, and cumulative impacts of the proposed action on the social and economic elements of the human environment. These provisions are outlined in greater detail in Chapters 4.0 through 7.0.

The Magnuson-Stevens Act subsection 303(a)(9) requires any FMP to include a fishery impact statement which shall assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures for:

- Participants in the fisheries and fishing communities affected by the plan or amendment;
- Participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants; and,
- The safety of human life at sea, including whether and to what extent such measure may affect the safety of participants in the fishery.

A similar analysis using much of the same economic and social data is included to ensure consistency with the Magnuson-Stevens Act National Standard 8 (MSA sec. 301(a)(8)), which requires that conservation and management measures, including those developed to end overfishing and rebuild fisheries:

- Take into account the importance of fishery resources to fishing communities in order to provide for their sustained participation; and,

- To the extent practicable, minimize the adverse economic impacts on such communities.

Additionally, paragraph 304(g)(1)(C) requires the Secretary to:

- Evaluate the likely effects, if any, of conservation and management measures on participants in the affected fisheries; and,
- Minimize, to the extent practicable, any disadvantage to U.S. fishermen in relation to foreign competitors.

## 1.4 Scope and Organization of this Document

In considering the proposed management measures outlined in this document, NMFS is responsible for complying with a number of Federal statutes, including NEPA. Under NEPA, Federal agencies prepare an Environmental Impact Statement (EIS) if a proposed major federal action is determined to significantly affect the quality of the human environment. An EIS is an analytical document that provides full and fair discussion of significant environmental impacts and informs decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment. This EIS assesses potential impacts on the biological and human environments associated with the establishment under Federal regulation of various management measures for the recreational and commercial fisheries that interact with shortfin mako sharks. In developing this document, NMFS adhered to the procedural requirements of NEPA; the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations (CFR) 1500-1508) 28, and NOAA's procedures for implementing NEPA, including NOAA Administrative Order (NAO) 216-6A and the accompanying Companion Manual

Section 304(i) of the Magnuson-Stevens Act required the Secretary of Commerce to revise and update agency procedures for compliance with NEPA in the context of fishery management actions developed pursuant to the Magnuson-Stevens Act 16 U.S.C. § 1854(i). In compliance with that statutory provision, NOAA and NMFS established a line-office supplement to NAO 216-6, entitled, "Revised and Updated NEPA Procedures for Magnuson-Stevens Fishery Management Actions" (See 79 FR 36726, Jun. 30, 2014, and 81 FR 8920, Feb. 23, 2016). As stated in NAO 216-6A, section 6, this supplement remains in effect. The supplement sets forth the policies and procedures for NEPA compliance for such actions.

The following definitions were generally used to characterize the nature of the various impacts evaluated with this EIS.

- *Short-term or long-term impacts.* These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period. Long-term impacts are those that are more likely to be persistent and chronic.
- *Direct or indirect impacts.* A direct impact is caused by a proposed action and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters in the vicinity of the action,

whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.

- *Minor, moderate, or major impacts.* These relative terms are used to characterize the magnitude of an impact. Minor impacts are generally those that might be perceptible but, in their context, are not amenable to measurement because of their relatively minor character. Moderate impacts are those that are more perceptible and, typically, more amenable to quantification or measurement. Major impacts are those that, in their context and due to their intensity (severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27) and, thus, warrant heightened attention and examination for potential means for mitigation to fulfill the requirements of NEPA.
- *Adverse or beneficial impacts.* An adverse impact is one having adverse, unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.
- *Cumulative impacts.* CEQ regulations implementing NEPA define cumulative impacts as the “impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.” (40 CFR 1508.7) Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time within a geographic area.

In addition to NEPA, NMFS must comply with other Federal statutes and requirements such as the Magnuson-Stevens Act, Executive Order 12866, and the Regulatory Flexibility Act. This document comprehensively analyzes the alternatives considered for all these requirements. Chapters 4.0, 6.0, and 7.0 provide the economic analyses; Chapter 6.0 meets the requirements under Executive Order 12866; Chapter 7.0 provides the Initial Regulatory Flexibility Analysis required under the Regulatory Flexibility Act; Chapters 8.0 and 9.0 also provide additional information that is required under various statutes. While some of the chapters were written in a way to comply with the specific requirements under these various statutes and requirements, it is the document as a whole that meets these requirements and not any individual chapter.

## **1.5 Purpose, Need, and Objectives**

The purpose of Amendment 11 is to develop and implement management measures that would address overfishing and will take steps towards rebuilding and establish a foundation for rebuilding the North Atlantic shortfin mako shark stock. Consistent with the provisions of the Magnuson-Stevens Act and ATCA, NMFS proposes to modify the 2006 Atlantic HMS FMP in response to ICCAT Recommendation 17-08 and the stock status determination for shortfin mako sharks.

The need for Amendment 11 is to implement management measures consistent with the requirements of ATCA, the Magnuson-Stevens Act, and other statutes. On December 13, 2017, NMFS determined that North Atlantic shortfin mako sharks are overfished with overfishing occurring. NMFS, as required by Magnuson-Stevens Act on behalf of the Secretary, must take action to end overfishing immediately and to implement conservation and management measures to rebuild overfished stocks within two years of making this determination. However, Sections 102 and 304(i) of the Magnuson-Stevens Act states that in managing any fisheries under an international fisheries agreement to which the United States is a party, the Secretary shall take into account the traditional participation in the fishery, relative to other nations, by fishermen of the United States on fishing vessels of the United States and develop recommendations for domestic regulations. To address overfishing and to ensure that timely data is provided to ICCAT under a provision in Recommendation 17-08, an interim final rule was published to implement management measures for North Atlantic shortfin mako sharks based on the measures in the ICCAT Recommendation and using NMFS' authority to issue emergency regulations under the Magnuson-Stevens Act. Under this authority, temporary regulations may remain in effect for no more than 180 days but may be extended for an additional 186 days as described in section 305(c) of the Magnuson-Stevens Act. Since the emergency rule may only be effective for up to 366 days, NMFS needs to develop an amendment to the 2006 Consolidated HMS Fishery Management Plan that will consider and evaluate longer-term management options to address overfishing and to establish a foundation for rebuilding the North Atlantic shortfin mako shark stock. This amendment is expected to be implemented prior to the expiration of the emergency rule.

The goal of this Draft Amendment 11 is to examine potential alternatives to address overfishing and establish a foundation for rebuilding the Atlantic shortfin mako stock, and to request additional information and input from consulting parties and the public, prior to development of a DEIS and proposed rule.

To achieve this purpose and to comply with existing statutes such as the Magnuson-Stevens Act and its objectives, NMFS has identified the following objectives with regard to this proposed action:

- Address overfishing of shortfin mako sharks;
- Develop and implement management measures consistent with the ICCAT Recommendation 17-08; and
- Take steps to establish a foundation for rebuilding the shortfin mako shark stock.

## **1.6 References**

NMFS. 1999. Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division, Silver Spring, MD. Public Document.

## 2.0 Summary of the Alternatives

NEPA requires that any Federal agency proposing a major federal action consider all reasonable alternatives, in addition to the proposed action. The evaluation of alternatives in an EIS assists NMFS in ensuring that any unnecessary impacts are avoided through an assessment of alternative ways to achieve the underlying purpose of the project that may result in less environmental harm.

To warrant detailed evaluation, an alternative must be reasonable<sup>2</sup> and meet the purpose and need of the action (see Chapter 1.0). Screening criteria are used to determine whether an alternative is reasonable. The following discussion identifies the screening criteria used in this EIS to evaluate whether an alternative is reasonable; evaluates various alternatives against the screening criteria (including the proposed measures) and identifies those alternatives found to be reasonable; identifies those alternatives found not to be reasonable; and for the latter, the basis for this finding.

Screening Criteria – To be considered “reasonable” for purposes of this EIS, an alternative must be designed to meet the purpose and need for action described in Chapter 1.0 and meet the following criteria:

- *An alternative must be consistent with the 10 National Standards set forth in the Magnuson-Stevens Act*
- *An alternative must be administratively feasible. The costs associated with implementing an alternative cannot be prohibitively exorbitant or require unattainable infrastructure.*
- *An alternative cannot violate other laws (e.g., Atlantic Tunas Convention Act, Endangered Species Act, Marine Mammal Protection Act, etc.).*
- *An alternative must be consistent with the 2006 Consolidated HMS FMP and its amendments.*
- *An alternative must be consistent with ICCAT recommendations, which the United States is legally obligated to implement as necessary and appropriate*
- *An alternative must be consistent with the Terms and Conditions of the 2012 Shark Biological Opinion (BiOp) and the Terms and Conditions and Reasonable and Prudent Alternatives of the 2004 PLL BiOp.*

This chapter includes a full range of reasonable alternatives designed to meet the purpose and need for action described in Chapter 1.0. The environmental, economic, and social impacts of these alternatives are discussed in later chapters.

This EIS includes a wide range of alternatives and prefers a set of alternatives that will achieve the objectives of Amendment 11: address overfishing of North Atlantic shortfin mako sharks and take steps toward rebuilding the stock. As described in Chapter 1, NMFS developed a range of

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<sup>2</sup> “Section 1502.14 (of NEPA) requires the EIS to examine all reasonable alternatives to the proposal . . . Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the [proponent].” (CEQ, “NEPA’s Forty Most Asked Questions” (available at <http://ceq.hss.doe.gov/nepa/regs/40/40P1.HTM>) (emphasis added))

alternatives considering commercial retention restrictions and the 83 inch FL recreational minimum size limit now temporarily in place through the emergency interim final rule, public comments received on that rule, other conservation and management measures that have been implemented in the HMS fisheries since 2008 that have affected shark fisheries or shark bycatch in other fisheries, and public comments received on the Amendment 11 Issues and Options paper, including comments provided at the March 2018 HMS Advisory Panel meeting. In response to public comment on this draft EIS and the proposed rule, NMFS may make changes in Final Amendment 11 by modifying the preferred measures, selecting different alternatives, or adding new measures, to meet the same purpose and need.

## 2.1 Commercial Alternatives

**Alternative A1: No Action. Keep the non-emergency rule regulations for shortfin mako sharks.**

Under Alternative A1, NMFS would not implement any new management measures in commercial HMS fisheries. Once the emergency interim final rule for shortfin mako sharks expires, management measures would revert to those in effect prior to March 2, 2018 (e.g., no requirement to release shortfin mako sharks that are alive at haulback). Directed and incidental shark limited access permit (LAP) holders would continue to be allowed to land and sell shortfin mako sharks to an authorized dealer, subject to current limits, including the pelagic shark commercial quota.

**Alternative A2: *Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and there is a functional electronic monitoring system on board the vessel. – Preferred Alternative***

Under Alternative A2, the preferred alternative, retention of shortfin mako sharks would only be allowed if the following three criteria are met: 1) the vessel has been issued a Directed or Incidental shark LAP, 2) the shark is dead at haulback, and 3) there is a functional electronic monitoring system on board the vessel. This alternative is designed to be consistent with one of the limited provisions allowing retention of shortfin mako sharks under ICCAT Recommendation 17-08. Under the current HMS regulations, all HMS permitted vessels that fish with pelagic longline gear are already required to have a functional electronic monitoring system (79 FR 71510; December 2, 2014), which are currently used in relation to the bluefin tuna IBQ program, and either a Directed or an Incidental shark LAP. Vessels utilizing other gear types (i.e., gillnet or bottom longline) are not required to have an electronic monitoring system under current regulations but could choose to install one if the operator wishes to retain shortfin mako sharks that are dead at haulback and if the vessel holds a commercial shark LAP. Under this alternative, the electronic monitoring system would be used to verify the disposition of shortfin mako sharks at haulback to ensure that only sharks dead at haulback were retained.

**Alternative A3: Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and only if the permit holder agrees to allow the Agency to use electronic monitoring to verify landings of shortfin mako sharks.**

This alternative is similar to Alternative A2 except that the ability to retain dead shortfin mako sharks would be limited to permit holders that opt in to a program that would use the existing electronic monitoring systems, which are currently used in relation to the bluefin tuna IBQ program, also to verify the disposition of shortfin mako sharks at haulback. In other words, this alternative would allow for retention of shortfin mako sharks that are dead at haulback by persons with a Directed or Incidental shark LAP only if permit holders opt in to enhanced electronic monitoring coverage. If the permit holder does not opt in to the enhanced electronic monitoring coverage, they could not retain any shortfin mako sharks.

Under the current HMS regulations at 50 CFR § 635.9, all HMS permitted vessels that use pelagic longline gear are required to have an electronic monitoring system on board the vessel (79 FR 71510; December 2, 2014). These regulations were established to verify the disposition of bluefin tuna. Under this alternative, if commercial vessels with other gear types, such as bottom longline, gillnet, or handgear, would like to land shortfin mako sharks then they would need to install an electronic monitoring system and agree that NMFS will use them to verify sharks are dead at haulback.

Under Alternative A3, any commercial fisherman that wishes to retain dead shortfin mako sharks would need to opt in to a program allowing the electronic monitoring system's use to be expanded to include shortfin mako sharks. If the permit holder opts in to the enhanced program, video footage obtained through the electronic monitoring system would be reviewed for shortfin mako shark regulation compliance in a manner similar to that performed for bluefin tuna regulation compliance verification. The permit holder would be required to ensure any shortfin mako sharks are brought within the rail and processing area to verify disposition of both discarded and retained shortfin mako sharks. If a pelagic longline permit holder does not want to expand the use of the vessel's electronic monitoring system to include other species, they would simply not opt in to the expanded program.

**Alternative A4: Allow retention of live or dead shortfin mako sharks by persons with a Directed or Incidental shark LAP only if the shark is over 83 inches FL and there is a functional electronic monitoring system or observer on board the vessel to verify the fork length of the shark before the shark is dressed.**

This alternative would establish a commercial minimum size of 83 inches FL (210 cm FL) for retention of shortfin mako sharks caught incidentally during fishing for other species, whether the shark is dead or alive at haulback and regardless of sex. Currently, there are no commercial minimum size restrictions for sharks because any such restriction would require the head and tail to remain attached to the carcass. Under this alternative, before dressing the shark or removing the head, vessel operators would need to either allow an observer to measure the shortfin mako shark or place the shortfin mako shark in a certain location with measuring markers that would



be recorded on video with the electronic monitoring system. Once either of these actions are taken, which would allow the Agency to verify the size of the shark, fishermen could fully dress the shark, including removing the head and the viscera, as long as the fins remain naturally attached to the carcass.

**Alternative A5: Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and there is an observer on board the vessel to verify the shark was dead at haulback.**

This alternative would allow permit holders to retain shortfin mako sharks caught on any commercial gear (e.g., pelagic longline, bottom longline, gillnet, handgear) provided that an observer is on board that can verify that the shark was dead at haulback. Under this alternative, electronic monitoring would not be used to verify the disposition of shortfin mako sharks caught on pelagic longline gear, but instead pelagic longline vessels could only retain shortfin mako sharks when the sharks are dead at haulback and an observer is on board. This alternative does not include minimum size requirements for retained shortfin mako sharks.

**Alternative A6: Prohibit the commercial retention of all shortfin mako sharks, live or dead.**

This alternative would place shortfin mako sharks on the prohibited sharks list (Table 1 of Appendix A to 50 CFR Part 635) to prohibit the retention, possession, landing, sale, or purchase of shortfin mako sharks in commercial HMS fisheries.

## 2.2 Recreational Alternatives

**Alternative B1: No Action. Keep the non-emergency rule regulations for shortfin mako sharks.**

Under this alternative, NMFS would maintain the non-emergency rule recreational regulations that pertain to shortfin mako sharks established in the 2006 Consolidated HMS FMP and amendments. Recreational fishermen would continue to be limited to one authorized shark species greater than 54 inches FL (including shortfin mako sharks) or one hammerhead shark (great, scalloped, or smooth) greater than 78 inches FL per vessel per trip along with one Atlantic sharpnose and bonnethead shark per person and an unlimited number of smoothhound sharks per trip.

**Alternative B2: Increase the minimum size limit for the retention of shortfin mako sharks from 54 inches FL to 71 inches FL (180 cm FL) for male and 83 inches FL (210 cm FL) for female shortfin mako sharks.**

Under Alternative B2, recreational HMS permit holders (those who hold HMS Angling or Charter/Headboat permits, and Atlantic Tunas General category and Swordfish General Commercial permits when participating in a registered HMS tournament) would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL (180 cm FL) and female

shortfin mako sharks that measure at least 83 inches FL (210 cm FL), reducing the amount of recreational landings. These size limits were recommended by ICCAT on the basis that 71 inches FL is the size at which 50 percent of male North Atlantic shortfin mako sharks are estimated to have reached full maturity, and 83 inches FL is the lower bound size at which female North Atlantic shortfin mako sharks begin to reach maturity.

**Alternative B3: Increase the minimum size of all shortfin mako sharks from 54 inches FL to 83 inches FL. – Preferred Alternative**

Under Alternative B3, the preferred alternative, HMS recreational permit holders could only land shortfin mako sharks, male or female, that are at least 83 inches FL. This alternative matches the minimum size limit implemented in the emergency interim final rule (83 FR 8946; March 2, 2018).

**Alternative B4: Increase the minimum size limit for the retention of shortfin mako sharks from 54 inches FL to 71 inches FL for male and 108 inches FL for female shortfin mako sharks.**

Under Alternative B4, HMS recreational permit holders would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL (180 cm FL) and female shortfin mako sharks that measure at least 108 inches FL (274 cm FL). Similar to the 71 inches FL size limit for male sharks, 108 inches FL would set the minimum size limit for female shortfin mako sharks to be equal to the size at which 50 percent of female shortfin mako sharks are estimated to have reached maturity (Natanson et al. 2006).

**Alternative B5: Increase the minimum size limit for the retention of shortfin mako sharks from 54 inches FL to 71 inches FL for male and 120 inches FL for female shortfin mako sharks.**

Under Alternative B5, HMS recreational permit holders would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL (180 cm FL) and female shortfin mako sharks that measure at least 120 inches FL (305 cm FL). The 120-inch FL size limit for female shortfin mako sharks is equal to the size at which 100 percent of female shortfin mako sharks are estimated to have reached maturity and would allow only record sized female shortfin mako sharks to be landed.

**Alternative B6: Allow seasonal retention of shortfin mako sharks with different minimum size limits for males and females depending on the season length. Retention of any shortfin mako sharks outside of the season would be restricted to greater than 120 inches FL.**

Under Alternative B6 and its sub-alternatives, NMFS would implement fishing seasons of varying lengths for shortfin mako sharks combined with different minimum size limits for males and females depending on the season length. In each sub-alternative, the minimum size limit for male shortfin mako sharks is set to 71 inches FL, while the size limit for females varies with the season length. The combination of season length and minimum size limits under each sub-

alternative is an outgrowth of public comments received during the public scoping process, while each consecutive combination of season lengths and minimum size limits is designed to meet the objective of this action. As such, longer seasons are paired with more restrictive female minimum size limits while shorter seasons are paired with less restrictive female minimum size limits ranging from 83 to 100 inches FL. Outside of these seasons, the minimum size limit for shortfin mako sharks would be greater than 120 inches FL for both males and females. This size limit would be equal to the size at which 100 percent of female shortfin mako sharks are estimated to have reached maturity. This would allow recreational anglers to retain potential record sized sharks while having minimal impact on overall recreational landings of shortfin mako sharks.

**Alternative B6a: Seasonal retention of shortfin mako sharks from May through October at 71 inches FL for males and 83 inches FL for females.**

During the scoping process, NMFS received public comment suggesting the establishment of a shortfin mako shark fishing season from May 1 through October 31 combined with sex-specific minimum size limits matching the ICCAT recommendation (71 inches FL for males and 83 inches FL for females). As such, this alternative would establish a seasonal retention limit from May through October for shortfin mako sharks that are 71 inches FL for males and 83 inches FL for females.

**Alternative B6b: Seasonal retention of shortfin mako sharks from June through August at 71 inches FL for males and 100 inches FL for females.**

Under Alternative B6b, NMFS would establish a three-month fishing season for shortfin mako sharks spanning the summer months of June 1 through August 31. This season would be combined with a 71 inches FL minimum size limit for males and 100 inches FL minimum size limit for females.

**Alternative B6c: Seasonal retention of shortfin mako sharks from June through July at 71 inches FL for males and 90 inches FL for females.**

Under Alternative B6c, NMFS would establish a two-month fishing season for shortfin mako sharks spanning the summer months of June 1 and July 31. This season would be combined with a 71 inches FL minimum size limit for males and 90 inches FL minimum size limit for females.

**Alternative B6d: Seasonal retention of shortfin mako sharks in June only at 71 inches FL for males and 83 inches FL for females.**

Under Alternative B6d, NMFS would establish a one-month fishing season for shortfin mako sharks for the month of June. This season would be combined with a 71 inches FL minimum size limit for males and 83 inches FL minimum size limit for females.

**Alternative B6e:      Establish a process for seasonal retention and minimum size limits for shortfin mako sharks based on certain criteria.**

Under Alternative B6e, NMFS would establish a process and criteria for determining season dates and minimum size limits for shortfin mako sharks on an annual basis through inseason actions. This process would be similar to how the agency sets season openings and retention limits for the commercial shark fisheries and the Atlantic Tunas General category fishery. NMFS would review data such as recreational landings, catch rates, and effort levels for shortfin mako sharks from previous years, and establish season dates and minimum size limits that would be expected to achieve the reduction targets established by this action and the objectives of the 2006 Consolidated HMS FMP and its amendments.

**Alternative B7            Establish a slot limit for the recreational retention of male and female shortfin mako sharks**

Under this alternative, NMFS would implement a “slot limit” for shortfin mako sharks in the recreational fishery. Under a slot limit, recreational fishermen would only be allowed to retain shortfin mako sharks within a narrow size range (e.g., between 71 and 83 inches FL) with no retention above or below that slot. Any slot limit would have to be above the ICCAT Recommendation sizes for each sex (i.e., at least 71 inches FL for males and 83 inches FL for females) or would have to be above 83 inches FL for both male and female shortfin mako sharks.

**Alternative B8:        Establish a tagging program to land shortfin mako sharks greater than the minimum sizes.**

Under Alternative B8, NMFS would establish a landing tag program to allow for the recreational landing of shortfin mako sharks greater than the minimum size limit. Vessels participating in registered HMS tournaments would be excluded from the requirement to tag and would still be allowed to retain shortfin mako sharks greater than the minimum size. For this alternative, permitted HMS vessels with a shark endorsement on their permit allowing retention of sharks would be able to request two shortfin mako shark landing tags each year when applying for their annual permit.

HMS recreational permit holders who receive a tag would be able to land one shortfin mako shark per tag, provided the length of each shark is greater than the minimum size restriction. Landing tags would be valid for one year from the date of issuance, valid for the same period as their current HMS permit and shark endorsement. The landing tag would be required to be affixed to the shark at time of retention and would be required to be reported online within 48 hours of landing, with additional information on the shark (e.g., sex, length, weight, girth and area of harvest), fishing technique, bait, and the trip (e.g., port/location of landing, timing, etc.). This would greatly increase the availability of data on shortfin mako shark landings. Unused landing tags, after the date of expiration, would be required to be mailed back to NMFS within 14 days. Failure to comply could jeopardize the ability for constituents to receive landing tags in the future. Under this alternative, NMFS would initially restrict landings to two sharks per vessel per year. If landings needed to be further restricted to meet ICCAT objectives related to ending overfishing or, later, the rebuilding plan, NMFS could reduce the number of landing tags

issued or implement a lottery system to distribute tags. Through such a lottery system, landing tags could be randomly assigned to vessels that requested a landing tag when they applied for a permit. NMFS could also adjust the minimum size limit for these tags if necessary to meet objectives.

***Alternative B9***      ***Require the use of circle hooks for recreational shark fishing. – Preferred Alternative***

Alternative B9 would require the use of non-offset, non-stainless steel circle hooks by HMS recreational permit holders with a shark endorsement when fishing for sharks recreationally, except when fishing with flies or artificial lures, in federal waters. The current regulatory requirement for such hooks applies to shark fishing in federal waters, as well as to Federal HMS permit holders fishing in state waters, south of 41° 43' N latitude (near Chatham, Massachusetts), as implemented in Amendment 5b to the 2006 Consolidated HMS FMP. This option would remove the boundary line, requiring HMS permit holders with a shark endorsement to use circle hooks in all areas.

***Alternative B10***      ***Prohibit landing of shortfin mako sharks in the HMS recreational fishery (catch and release only).***

This alternative would place shortfin mako sharks on the prohibited sharks list (Table 1 of Appendix A to 50 CFR Part 635) to prohibit the retention of shortfin mako sharks in recreational HMS fisheries. HMS permit holders would be prohibited from retaining or landing shortfin mako sharks recreationally. HMS recreational fishermen would only be authorized to catch and release shortfin mako sharks. This requirement would be similar to the white shark catch and release requirement. Currently, recreational fishermen may target white sharks, but must release any white sharks caught in a manner that maximizes the chance of survival without removing the shark from the water.

## **2.3 Monitoring Alternatives**

***Alternative C1***      ***No Action. Do not require reporting of shortfin mako sharks outside of current commercial and recreational reporting systems. – Preferred Alternative***

Under Alternative C1, the preferred alternative, no additional requirements would be implemented related to reporting of shortfin mako shark landings in HMS fisheries. HMS commercial fishermen would continue to report through vessel logbooks along with dealer reporting. HMS recreational anglers fishing from Maine to Virginia would continue to be required to report shortfin mako landings and release if intercepted by the Large Pelagic Survey (LPS), and data would continue to be collected on shortfin mako shark catches by the Access-Point Angler Intercept Survey (APAIS), which is part of Marine Recreational Information Program (MRIP). Existing regulations at 50 CFR 635.5(d) require Atlantic HMS tournament operators to register their tournaments with NMFS and authorize NMFS to select HMS tournaments for reporting. NMFS plans to expand current swordfish and billfish tournament

reporting to include selection of registered shark tournaments for reporting of landings, discards, and other information.

**Alternative C2      Establish mandatory commercial reporting of shortfin mako shark catches (landings and discards) on VMS.**

This alternative would require vessels with a Directed or Incidental shark LAP to report daily the number of shortfin mako sharks retained and discarded as well as fishing effort (number of sets and number of hooks) on a Vessel Monitoring System (VMS). Currently, commercial vessels are required to report shortfin mako shark catches in the HMS logbook. This alternative would support timely inseason monitoring of catch, which would support implementation of certain other management options (e.g., a shortfin mako-specific shark quota) and provide another source of data to verify data from electronic monitoring, observers, logbooks, or dealers.

**Alternative C3      Implement mandatory reporting of all recreationally landed and discarded shortfin mako sharks (e.g., app, website, Vessel Trip Reports).**

Under Alternative C3, NMFS would implement mandatory reporting of all recreational interactions (landings and discards) of shortfin mako sharks in HMS fisheries. Currently, HMS Angling and Charter/Headboat permit holders are required to report each individual recreational landing of bluefin tuna, billfish, and swordfish within 24 hours to facilitate quota monitoring. Recreational shark landings are also reported through Maryland and North Carolina Catch Card programs. Under this alternative, NMFS would expand mandatory landings reports to include shortfin mako sharks. HMS permit holders would have a variety of options for reporting shortfin mako shark landings including a phone-in system, internet website, and/or a smartphone app. However, shortfin mako sharks landed in Maryland would continue to be reported through the required state reporting stations where anglers submit a state landings report (catch card) and obtain a fish tag. The State of North Carolina has a similar HMS Catch Card program that allows for voluntary reporting of shark landings, but currently does not require them. Under this alternative, anglers in North Carolina would be required to report their shortfin mako shark landings through either the NMFS reporting options, or the State of North Carolina HMS Catch Card reporting program.

## **2.4 Rebuilding Alternatives**

**Alternative D1      No Action. Do not establish a rebuilding plan for shortfin mako sharks.**

Under Alternative D1, NMFS would not establish a rebuilding plan or a foundation for rebuilding the shortfin mako shark stock. NMFS would still implement management measures in the HMS recreational and commercial fisheries to end overfishing consistent with the Magnuson-Stevens Act and with ICCAT Recommendation 17-08 and our obligations under ATCA.

**Alternative D2            Establish a domestic rebuilding plan for shortfin mako sharks unilaterally (i.e., without ICCAT).**

This alternative would establish a domestic rebuilding plan independent of ICCAT. This alternative would only apply to U.S. fishermen and to the small percentage of shortfin mako mortality attributable to U.S. vessels.

**Alternative D3            *Establish the foundation for developing an international rebuilding plan for shortfin mako sharks. – Preferred Alternative***

Under Alternative D3, the preferred alternative, NMFS would take preliminary action toward rebuilding by adopting measures to end overfishing to establish a foundation for a rebuilding plan. NMFS would then take action at the international level through ICCAT to develop a rebuilding plan for shortfin mako sharks. ICCAT is planning to establish a rebuilding plan for shortfin mako sharks in 2019, and this rebuilding plan would encompass the objectives set forth by ICCAT based on scientific advice from the SCRS. Any international management recommendations adopted by ICCAT to address shortfin mako shark rebuilding and to reduce mortality would be implemented domestically consistent with ATCA, including measures described in this amendment.

**Alternative D4            Remove shortfin mako sharks from the pelagic shark management group and that group’s quota; implement a U.S. shortfin mako shark-specific quota if established by ICCAT, and adjust the pelagic shark quota accordingly.**

Under this alternative, NMFS would remove shortfin mako sharks from the commercial pelagic shark management group and implement a species-specific quota for shortfin mako sharks if established by ICCAT. A shortfin mako-specific quota would likely include both commercial and recreational catches, as do other ICCAT established quotas. In addition, NMFS would establish a new commercial pelagic shark species quota for common thresher and oceanic whitetip sharks based on recent landings. No quotas were established under the current ICCAT recommendation on shortfin mako sharks, and thus further detail on implementation of such a quota is not available at this time. ICCAT could establish North Atlantic shortfin mako shark quotas for member countries if the SCRS provides scientific advice recommending a certain total allowable catch for this species in order to rebuild the stock.

Currently, the annual commercial quota for common thresher, oceanic whitetip, and shortfin mako is 488 mt dw. The 1999 FMP for Atlantic Tunas, Swordfish, and Sharks established a species-specific quota for porbeagle sharks at 10 percent higher than recent landings, reduced the pelagic shark quota by the porbeagle quota, established a quota for blue sharks, and reduced the pelagic shark quota by any overage of the blue shark quota. There is currently no recreational quota for shortfin mako sharks. Under this alternative, the commercial quotas for blue and porbeagle sharks would not change and would remain at 273 mt dw and 1.7 mt dw, respectively. Regulations regarding overharvest and underharvest of pelagic shark quota and retention limits for pelagic sharks would remain the same.

**Alternative D5      Implement area management for shortfin mako sharks if established by ICCAT.**

The current ICCAT recommendation calls on the SCRS to provide additional scientific advice in 2019 that takes into account a spatial/temporal analysis of North Atlantic shortfin mako shark catches in order to identify areas with high interactions. If the scientific advice recommends implementing area-based management measures for this stock, and if that area management is established by ICCAT in a future recommendation, under this alternative, NMFS would take steps to implement area-based management measures domestically. No area management was established under the current ICCAT recommendation on shortfin mako sharks, and thus further detail on implementation of such a measure is not available at this time.

**Alternative D6      Establish bycatch caps in all fisheries that interact with shortfin mako sharks**

Under this alternative, NMFS would annually allocate a specific number of “allowable” dead discards of shortfin mako sharks as a bycatch cap or sub-annual catch limit (ACL) that would apply to all fisheries, not just HMS fisheries. When that cap is reached, then NMFS would close the associated directed fisheries for the remainder of the fishing year. For example, if the Gulf of Mexico snapper-group fishery catches the shortfin mako shark bycatch cap, then the Gulf of Mexico snapper-grouper would be closed. If the bycatch cap is exceeded in a particular year, accountability measures would be applied to that fishery to prevent additional overharvests.

## **2.5 References**

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. *Environmental Biology of Fishes* 77(3-4): 367-383.



## 3.0 Description of Affected Environment

This chapter describes the affected environment (the fishery, the gears used, the communities involved, *etc.*), and provides a view of the current condition of the fishery, which serves as a baseline against which to compare potential impacts of the different alternatives. This chapter also provides a summary of information concerning the biological status of the shortfin mako shark stock, the marine ecosystems in the fishery management unit, the social and economic condition of the fishing interests, fishing communities, and fish processing industries, and the best available scientific information concerning the past, present, and possible future condition of shark stocks, ecosystems, and fisheries.

### 3.1 Summary of Atlantic Highly Migratory Species Management

The authority to manage Atlantic HMS fisheries was designated to NMFS by the Secretary of Commerce. The HMS Management Division develops regulations for Atlantic HMS fisheries within NMFS. HMS fisheries require management at the international, national, and state levels because of their highly migratory nature. NMFS manages HMS fisheries in federal waters (domestic) and the high seas (international), while individual states establish regulations for some HMS in their own waters. However, there are exceptions to this generalization. For example, as a condition of their permit, federally-permitted shark fishermen are required to follow federal regulations in all waters, including state waters, unless the state has more restrictive regulations, in which case the state regulations prevail. Additionally, in 2005, the Atlantic States Marine Fisheries Commission (ASMFC) agreed to develop an interstate coastal shark Fishery Management Plan (FMP). This interstate FMP coordinates management measures among all states along the Atlantic coast (Florida to Maine) and coordinates management activities between state and federal waters to promote complementary regulations throughout the species' range. NMFS participated in the development of this interstate shark FMP, which became effective in 2010.

While NMFS does not generally manage HMS fisheries in state waters, states are invited to send representatives to HMS Advisory Panel (AP) meetings and to participate in stock assessments, public hearings, or other fora. NMFS continues to work on improving its communication and coordination with state agencies and welcomes comments from states about various shark measures. NMFS will share this proposed FMP amendment with the Atlantic, Gulf of Mexico, and Caribbean states and territories and will work with states, and the Atlantic and Gulf States Marine Fisheries Commissions, to the extent practicable, to ensure complementary regulations.

On the international level, NMFS participates in the stock assessments conducted by SCRS and in ICCAT meetings. NMFS implements conservation and management measures adopted through ICCAT and through other relevant international agreements, consistent with ATCA and the Magnuson-Stevens Act. ICCAT has assessed the Atlantic blue and shortfin mako shark stocks, participated with the International Council for the Exploration of the Sea (ICES) on a joint porbeagle assessment, and has conducted several ecosystem risk assessments for various shark species, among other things. Stock assessments and management recommendations or resolutions are listed on ICCAT's website at <http://www.iccat.int>. As described below, in recent

years ICCAT has adopted several shark-specific recommendations, to address sharks caught in association with ICCAT fisheries.

NMFS also actively participates in other international bodies that could affect U.S. shark fishermen and the shark industry including the Convention on International Trade in Endangered Species (CITES) and the Food and Agriculture Organization (FAO). Several shark species, including white, basking, oceanic whitetip, porbeagle, and hammerhead sharks, have been listed under Appendix II under CITES. Under Appendix II, international trade is monitored and tracked. Dealers wishing to import or export shark species listed must obtain certain permits and follow reporting requirements as established by the U.S. Fish and Wildlife Service.

### **3.1.1 Summary of Domestic Shark Management**

Sharks are managed along with other Atlantic HMS species. Thus, management of the shark fishery is presented in FMPs along with Atlantic billfish, Atlantic tunas, and Atlantic swordfish. This section provides a brief history of fisheries management of Atlantic sharks. For more information on the complete HMS management history as it relates to sharks, please refer to the 2006 Consolidated HMS FMP (NMFS 2006a) and Amendments 2, 3, 5a, 5b, 6, and 9 to the 2006 Consolidated HMS FMP, which address shark conservation and management. Relevant proposed rules, final rules, and other official notices can also be found in the Federal Register at: <https://www.federalregister.gov/>. Supporting documents, including the original FMPs, can be found on the HMS Management Division's webpage at <https://www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species>. Documents can also be requested by calling the HMS Management Division at (301) 427-8503.

Seventy-three species of sharks are known to inhabit the waters along the U.S. Atlantic coast, including the Gulf of Mexico and the waters around Puerto Rico and the U.S. Virgin Islands. Forty-two species are managed by NMFS' HMS Management Division based upon their need for conservation and management. Based on ecology and fishery dynamics, NMFS divided HMS sharks into five species groups or complexes for purposes of HMS management: (1) large coastal sharks (LCS), (2) small coastal sharks (SCS), (3) pelagic sharks, (4) prohibited species, and (5) smoothhound sharks (Table 3.1). Shortfin mako sharks are included in the pelagic shark complex.

**Table 3.1 Common names of shark species included within the five species complexes.**

Species Complex	Shark Species Included
LCS (11)	Sandbar+, silky*, tiger, blacktip, bull, spinner, lemon, nurse, smooth hammerhead*^, scalloped hammerhead*^, and great hammerhead*^ sharks
SCS (4)	Atlantic sharpnose, blacknose, finetooth, and bonnethead sharks
Pelagic Sharks (5)	Shortfin mako, thresher, oceanic whitetip*^, porbeagle^\$, and blue sharks
Prohibited Species (19)	Whale^, basking^, sand tiger, bigeye sand tiger, white^, dusky, night, bignose, Galapagos, Caribbean reef, narrowtooth, longfin mako, bigeye thresher, sevengill, sixgill, bigeye sixgill, Caribbean sharpnose, smalltail, and Atlantic angel sharks
Smoothhound Sharks (3)	Smooth dogfish, Florida smoothhound, and Gulf smoothhound

\*Prohibited from commercial retention on pelagic longline gear and recreationally if swordfish, tunas, and/or billfish are also retained

+ Prohibited from retention with the exception of vessels selected to participate in the shark research fishery

° Distinct population segment (DPS) in the central and southwest Atlantic Ocean listed as threatened under the Endangered Species Act

^ Listed under CITES Appendix II

\$ Must be released when caught alive on pelagic longline gear and recreationally if swordfish, tunas, and/or billfish are also retained

### 3.1.2 Existing State Regulations

Please refer to Chapter 1 of the 2017 HMS SAFE Report

(<https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly>) for the existing State regulations in Atlantic, Gulf of Mexico, and Caribbean states and territories, as of November 1, 2017, with regard to shark species. While the HMS Management Division updates this table periodically, persons interested in the current regulations for any state should contact each state directly.

## 3.2 Summary of Atlantic Shortfin Mako Shark Management and Stock Status

### 3.2.1 International Shortfin Mako Shark Management

ICCAT recommendations are binding instruments for Contracting Parties, while ICCAT resolutions are non-binding and express the will of the Commission. All ICCAT recommendations and resolutions are available on the ICCAT website at <http://www.iccat.int>. Under ATCA, NMFS is required to promulgate regulations as necessary and appropriate to implement binding ICCAT measures. ICCAT generally manages tuna and tuna-like fisheries and bycatch in those fisheries but also conducts research and has adopted measures related to shark species caught in association with ICCAT fisheries.

In 2008, an updated stock assessment for blue and shortfin mako sharks was conducted by ICCAT's SCRS. The SCRS determined that while the quantity and quality of the data available for use in the stock assessment had improved since the 2004 assessment, they were still uninformative and did not provide a consistent signal to inform the models used in the 2008 assessment. The SCRS noted that if these data issues could not be resolved in the future, their ability to determine stock status for these and other species would continue to be uncertain. The SCRS assessed blue and shortfin mako sharks as three different stocks: North Atlantic, South Atlantic, and Mediterranean. However, the Mediterranean data was considered insufficient to conduct the quantitative assessments for these species. In 2012, the SCRS conducted another stock assessment for shortfin mako sharks. The results indicated that both the North and South Atlantic stocks of shortfin mako sharks were healthy and the probability of overfishing was low. However, the high uncertainty in past catch estimates and deficiency of some important biological parameters, particularly for the Southern stock, were still obstacles for obtaining reliable estimates of current status of the stocks.

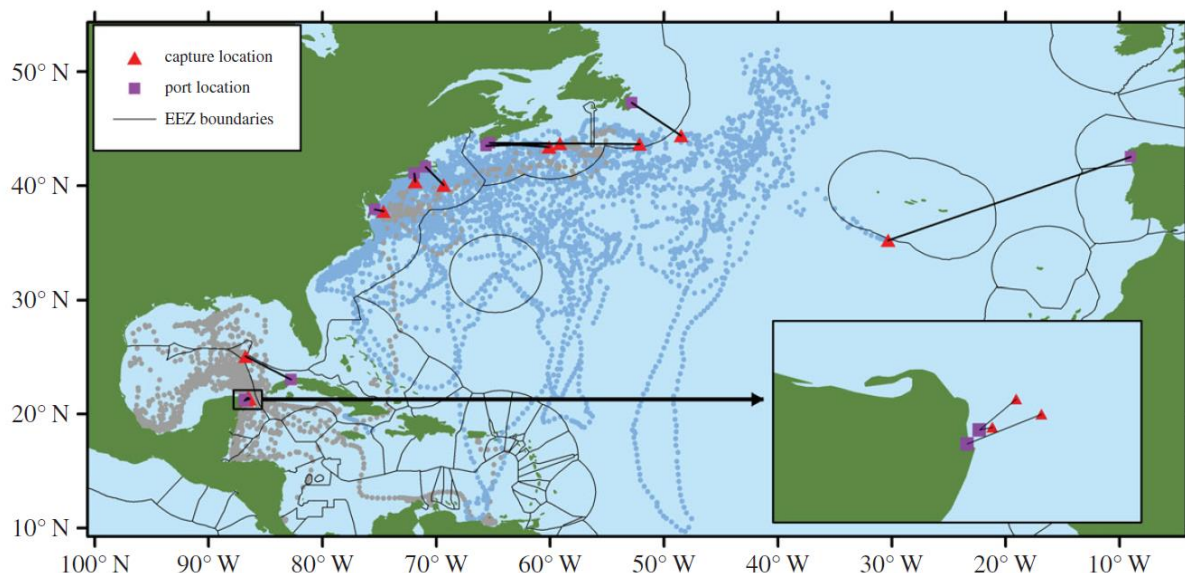
In August 2017, the SCRS conducted a new benchmark stock assessment on the Atlantic shortfin mako shark stock. In November 2017 at its annual meeting, ICCAT accepted this stock assessment and its results. In response to the new stock assessment, ICCAT adopted new management measures for shortfin mako sharks (ICCAT Recommendation 17-08). These measures largely focus on maximizing live releases of shortfin mako sharks, allowing retention only under limited circumstances, increasing minimum size limits, and improving data collection in ICCAT fisheries. ICCAT stated that the measures in the Recommendation “are expected to prevent the population from decreasing further, stop overfishing and begin to rebuild the stock” with a commitment to “immediately taking actions to end overfishing of the North Atlantic shortfin mako stock with a high probability, as the first step in the development of a rebuilding plan.” The Recommendation requires ICCAT parties that authorize retention to provide to ICCAT “the amount of North Atlantic shortfin mako caught and retained on board as well as dead discards during the first six months in 2018 by one month prior to the 2018 Commission annual meeting.” The Recommendation specifies that at its annual meeting in November 2018, ICCAT will review the catches from the first six months of 2018 and decide whether the measures contained in the recommendation should be modified. In 2019, the SCRS will evaluate the effectiveness of these measures in ending overfishing and beginning to rebuild the stock. The SCRS will also provide rebuilding information that reflects rebuilding timeframes of at least two mean generation times, taking into consideration the slow reproductive biology of sharks and other factors. The Recommendation provides that in 2019, ICCAT will establish a rebuilding plan with a high probability of avoiding overfishing and rebuilding the stock to  $B_{MSY}$  within a timeframe that takes into account the biology of the stock. More detail on stock status is provided in Section 3.3 below.

### **3.2.2 Status of the North Atlantic Shortfin Mako Shark Stock**

The thresholds used to determine the status of Atlantic HMS are presented in Chapter 2 of the 2017 HMS SAFE Report (<https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly>). Atlantic shark stock assessments for large coastal sharks and small coastal sharks are generally completed by the SouthEast Data, Assessment, and Review (SEDAR) process. All SEDAR reports are available at

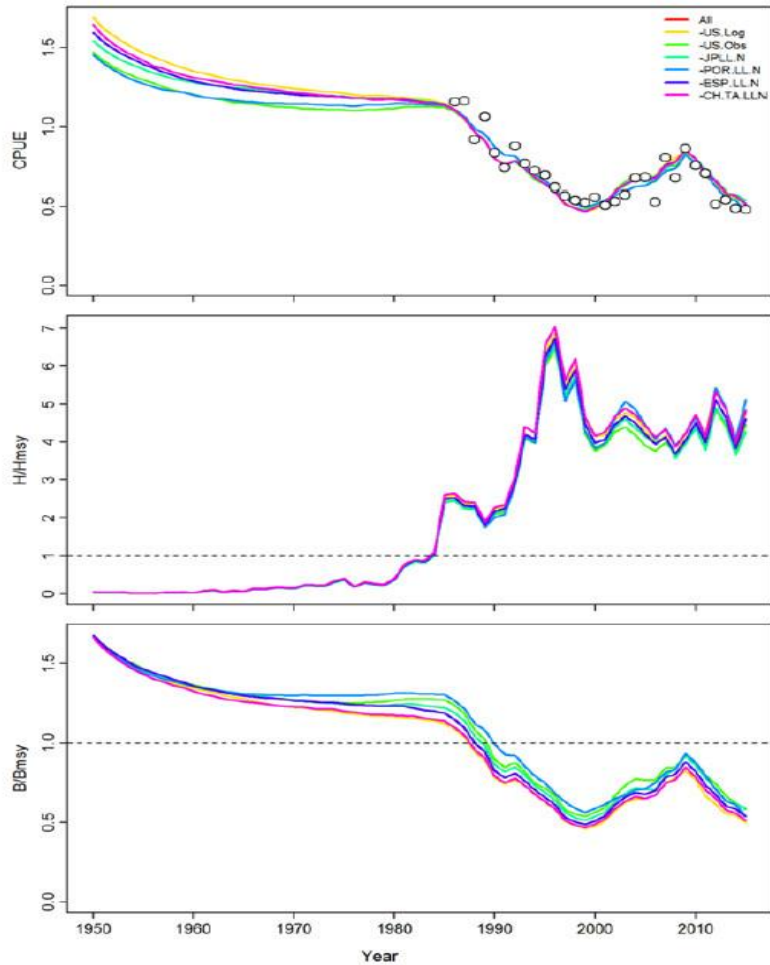
<http://sedarweb.org/>. ICCAT's SCRS has assessed blue, shortfin mako, and porbeagle sharks. All SCRS final stock assessment reports can be found at [www.iccat.int/en/assess.htm](http://www.iccat.int/en/assess.htm). The shortfin mako ICCAT SCRS report from 2017 can be found at [http://iccat.int/Documents/Meetings/Docs/2017\\_SCRS\\_REP\\_ENG.pdf](http://iccat.int/Documents/Meetings/Docs/2017_SCRS_REP_ENG.pdf).

The 2017 stock assessment included significant updates to inputs and model structures compared to the 2012 shortfin mako shark assessment. In addition to including a new model structure, the new assessment also used improved and longer catch time series (1950-2015), sex-specific biological parameters, updated length composition data, and new tagging data. One of the primary changes in data for the new stock assessment was a new estimate of the fishing mortality rate largely derived from satellite tagging research (Byrne et al. 2017). For this research, forty shortfin mako sharks were tagged and then tracked in the North Atlantic between 2013 and 2016 for periods of 81-754 days. Of these tagged sharks, 12 (30 percent) were captured by fishing vessels (Figure 3.1). These direct observations of mortality resulted in fishing mortality rate estimates of 0.19-0.53, which are significantly higher than the estimates of 0.015-0.024 used in previous assessments (SCRS 2012).



**Figure 3.1** Tracks (dots) and capture locations (triangles) of 40 satellite tagged shortfin mako sharks from Byrne et al. (2017).

In November 2017 at its annual meeting, ICCAT accepted this stock assessment and its results. On December 13, 2017, based on the results of this assessment, NMFS determined the stock to be overfished with overfishing occurring. The assessment specifically indicated that  $B_{2015}$  is substantially less than  $B_{MSY}$  for eight of the nine models ( $B_{2015}/B_{MSY} = 0.57-0.85$ ). In the ninth model, spawning stock fecundity (SSF) was less than  $SSF_{MSY}$  ( $SSF_{2015}/SSF_{MSY} = 0.95$ ). Additionally, the assessment indicated that  $F_{2015}$  was greater than  $F_{MSY}$  (1.93-4.38), with a combined 90-percent probability from all models that the population is overfished with overfishing occurring (Figure 3.2).



**Figure 3.2 Trends in North Atlantic shortfin mako shark CPUE,  $H/H_{MSY}$  (the harvest rate relative to harvest at  $MSY$ , which is equivalent to  $F/F_{MSY}$ ) and  $B/B_{MSY}$  using the C1 catch scenario used in the 2017 stock assessment. Circles denote U.S. pelagic longline CPUE.**

The 2017 assessment estimated that total North Atlantic shortfin mako shark catches across all nations are currently between 3,600 and 4,750 mt per year, and that total catches would have to be reduced below 1,000 mt (72-79 percent reduction) to prevent further population declines. The projections indicate that a total allowable catch of 0 mt would produce a greater than 50-percent probability of rebuilding the stock by the year 2040, which is approximately equal to one mean generation time. The stock assessment report stated that while research indicates that post-release survival rates of Atlantic shortfin mako sharks are high (70 percent), the assessment could not determine if requiring live releases alone would reduce landings sufficiently to end overfishing and rebuild the stock. The stock assessment did not evaluate rebuilding times greater than one mean generation time, although shark stocks generally take longer than one mean generation time to rebuild given their slow reproductive biology and other factors.

### 3.2.3 Domestic Implementation of Shortfin Mako Shark Measures

On December 13, 2017, based on the results of the ICCAT stock assessment for shortfin mako sharks, NMFS determined the stock to be overfished with overfishing occurring. On March 2,



2018, NMFS published an emergency interim final rule in response to the new stock assessment, consistent with Recommendation 17-08. These measures largely focus on maximizing live releases of shortfin mako sharks, allowing retention only in certain circumstances, increasing minimum size limits, and improving data collection in ICCAT fisheries. These emergency measures are effective for 180 days from publication of the emergency rule, with a possible extension of up to 186 days.

On March 5, 2018, NMFS published a Notice of Intent to prepare an EIS for Amendment 11 to the 2006 Consolidated HMS FMP, as well as notice of the availability of an Issues and Options document for scoping (83 FR 9255). The comment period for the Notice of Intent and Issues and Options document ended May 7, 2018. During the comment period, NMFS conducted four public scoping meetings (Florida, North Carolina, New Jersey, and Massachusetts) and a public webinar. In addition, NMFS presented at the Atlantic HMS Advisory Panel, three Atlantic Regional Fishery Management Councils (the New England, Mid-Atlantic, and Gulf of Mexico Fishery Management Councils), and the Atlantic and Gulf States Marine Fisheries Commissions. NMFS received approximately 33 written comments during the scoping period; refer to Appendix 1 for a summary of the comments received.

### **3.3 Shortfin Mako Shark Biology and Habitat**

#### **3.3.1 Shortfin Mako Shark Biology**

The shortfin mako shark is an oceanic, pelagic species found in warm and warm-temperate waters throughout all oceans. Size at birth is 60-70 cm, and the species reaches a maximum total length of approximately 400 cm (Compagno 2002). Heist et al. (1996) found considerable intraspecific genetic variation and significant partitioning of haplotypes between the North Atlantic and other regions; however, there was no evidence of multiple subspecies of shortfin mako, nor of any past genetic isolation between shortfin mako populations. Tagging studies indicate that shortfin mako sharks tagged off the coast of North America range widely across the North Atlantic, with confirmed recaptures from the coasts of South America, Europe, and Africa (Kohler et al. 2002, Byrne et al. 2017).

The shortfin mako shark feeds on fast-moving fishes such as swordfish, tuna, and other sharks (Castro 1983) as well as clupeids, needlefishes, crustaceans and cephalopods (Maia et al. 2007a). MacNeil et al. (2005) found evidence of a cephalopod to bluefish diet switch in the spring. In the northwest Atlantic, Wood et al. (2009) found that bluefish represented approximately 93% of the diet by weight, extrapolating that an average shortfin mako shark consumes about 500 kg of bluefish per year.

There has been some variation in the characterization of age, growth, and reproduction in North Atlantic shortfin mako sharks. According to Pratt and Casey (1983), females mature at about 7 years of age; however, Campana et al. (2002) using radiocarbon assays found that the estimate may be incorrect. Natanson et al. (2006) estimated size at 50% maturity to be 185 cm FL for males (8 years) and 275 cm FL for females (18 years), revealing that the species matures later than suggested in previous studies. In Maia et al. (2007), length at maturity for males was estimated at 180 cm FL, which is similar to the size of Natanson et al. (2006); size at female

maturity could not be estimated because no female sharks between 210-290 cm FL were sampled, although this appears to be the interval where maturation occurs.

Litter size ranges from 4 to 25, and size at birth is approximately 70 cm TL (Mollet et al. 2000). Gestation period was estimated at 15-18 months and the reproductive cycle at 3 years. Based on cohort analysis of fish in the eastern North Atlantic, average growth was determined as 61.1 cm/year for the first year and 40.6 cm/year for the second year (Maia et al. 2007). There was a marked seasonality in growth, with average monthly rates of 5.0 cm/month in summer and 2.1 cm/month in winter. Lack of sex differences in cohort analysis for the first years of life is in accordance with previous studies reporting that male and female mako sharks grow at the same rate until they reach about 200 cm FL (Casey and Kohler, 1992; Campana et al. 2005). Life span estimates vary and have been published as 11.5 years (Pratt and Casey 1983), 25 years for females (Cailliet and Mollet 1997), 29 and 28 years for males and females (Bishop et al. 2006). Natanson et al. (2006) validated the age and growth of North Atlantic shortfin mako sharks using bomb radiocarbon and oxytetracycline marking techniques, and estimated longevity at 21 years for males and 38 years for females.

### **3.3.2 Essential Fish Habitat**

Section 303(a)(7) of the Magnuson-Stevens Act requires FMPs to describe and identify essential fish habitat (EFH), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat. The Magnuson-Stevens Act defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.” (16 U.S.C. § 1802(10)). Implementing regulations for EFH provisions are at 50 C.F.R. 600, Subpart J.

Adverse effects from fishing may include physical, chemical, or biological alterations of the substrate, and loss of, or injury to, benthic organisms, prey species, and their habitat, and other components of the ecosystem. Based on an assessment of the potential adverse effects of all fishing equipment types used within an area identified as EFH, NMFS must propose measures to minimize fishing effects if there is evidence that a fishing practice is having more than a minimal and not temporary adverse effect on EFH.

To determine if fishing gears may adversely affect EFH and if that effect can be minimized, NMFS must consider: (1) whether, and to what extent, the fishing activity is adversely impacting EFH and the fishery; (2) the nature and extent of the adverse effect on EFH; and (3) whether the management measures are practicable, taking into consideration the long- and short-term costs as well as the benefits to the fishery and its EFH, along with other appropriate factors consistent with National Standards of the Magnuson-Stevens Act. The best scientific information available must be used as well as other appropriate information, as available.

NMFS originally described and identified EFH and related EFH regulatory elements for all HMS in the management unit in the 1999 FMPs, which were updated in Amendment 1 to the 1999 Tunas, Swordfish, and Shark FMP in 2003 (NMFS 1999; NMFS 2003). EFH boundaries published in Amendment 1 have been updated in Final Amendment 10 to the 2006 Consolidated HMS FMP (NMFS 2017). Amendment 10 included a complete review and update of the 10



components of EFH, which includes updates to EFH boundaries and text descriptions and an updated review of fishing and non-fishing impacts to EFH. Information presented in this section is summarized from Amendment 10, which reflects the best scientific information available. Amendment 10 incorporates by reference several analyses that were completed in earlier Atlantic HMS FMP amendments. An EFH impacts analysis of all Atlantic HMS gears was completed for the 2006 Consolidated HMS FMP and is shown in Table 3.2.

**Table 3.2** Impact assessment of HMS fishing gear on HMS and non-HMS EFH. ‘-’ indicates that the gear type is not used in these habitat types. Habitat impacts are as follows: negligible = 0, low = +, medium = ++, high = +++, unknown=?, and a blank indicates not evaluated. Source: Symbols before the slash are from the Caribbean FEIS, 2004 (Table 3.15a). The symbols after the slash are taken from Barnette, 2001.

HMS Gear Type	Contacts Bottom	SAV	Coral Reef	Hard Bottom	Sand/Shell	Soft Bottom	HMS EFH Water column
Bandit Gear				/+			0
Bottom Longline	X	0/	+/	+/+	0/+	0/+	0
Handline		0/	+/	+/+	0/	0/	0
Harpoon							0
Gillnet, Anchored	X	+/+	++/	+/+	+/+	0/+	0
Gillnet/Strikenet							0
Pelagic Longline		0/0	0/0	0/0	0/0	0/0	0
Purse Seine, Tuna		0/?	0/	0/	0/+	0/+	0
Rod and Reel		0/	+/	+/+	0/	0/	0
Tuna Trap/Fish Weir	X	++/++	-	-	0/?	0/?	0

#### *Pelagic Longline Fishing Impacts on EFH*

Most HMS reside in the upper part of the water column and habitat preferences are likely influenced by oceanic factors such as areas of convergence or oceanographic fronts (e.g., those found over submarine canyons, continental shelf edges, or boundary currents), temperature convergence zones (e.g., boundaries of currents or features that influence currents including landforms such as Cape Hatteras or undersea features like the Charleston Bump), or surface structure (e.g., floating *Sargassum* mats). Although there is no substrate or hard structure in the traditional sense, these water column habitats can be characterized by their physical, chemical and biological parameters. The water column can be defined by a horizontal and vertical component. Horizontally, salinity gradients strongly influence the distribution of biota. Horizontal gradients of nutrients, decreasing seaward, affect primarily the distribution of phytoplankton and, secondarily, the organisms that depend on this primary productivity. Vertically, the water column may be stratified by salinity, oxygen content, and nutrients. The water column is especially important to larval transport. While the water column is relatively difficult to precisely define in terms of habitat characteristics, it is no less important since it is the medium of transport for nutrients and migrating organisms between estuarine, inshore, and offshore waters.

NMFS completed reviews of fishing gear impacts in the 1999 FMP, Amendment 1 to the 1988 Billfish FMP, the 2006 Consolidated HMS FMP, and Amendments 1 and 10 to the 2006 Consolidated HMS FMP. These analyses determined that the majority of HMS gears are fished within the water column and do not make contact with the sea floor. Because of the magnitude

of water column structures and the processes that create them, there is little effect expected from the HMS fishing activities with pelagic longline gear undertaken to pursue these animals. Excessive dead discards could induce minor, localized increases in biological oxygen demand (BOD). However, deployment of pelagic longline gear is not anticipated to permanently affect the physical characteristics that define HMS EFH such as salinity, temperature, dissolved oxygen, and depth. Because pelagic longline gear is fished in the water column and does not come in contact with the benthic environment, the pelagic longline fishery is anticipated to have minimal to no impact on EFH (for Atlantic HMS or for other species managed under Council FMPs) associated with the benthic environment.

### *Recreational Rod and Reel Gear Impacts on EFH*

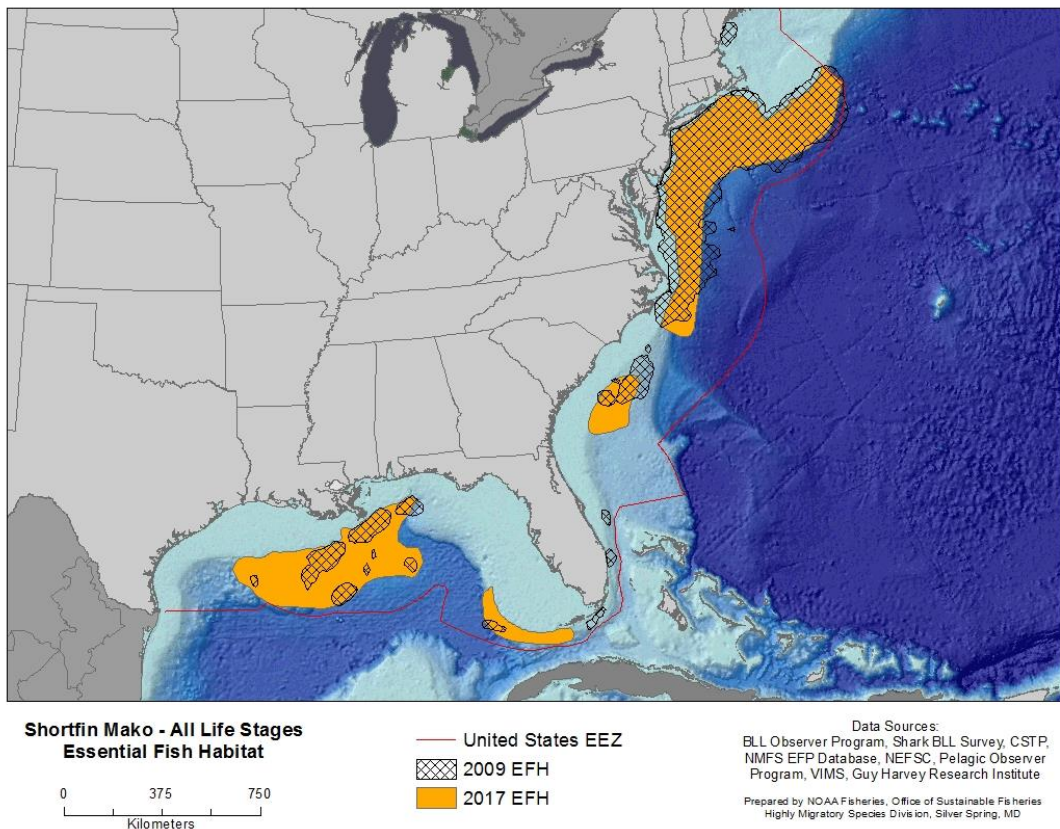
Depending on target species, some recreational HMS gears are fished within the water column and do not make contact with the sea floor. Because of the magnitude of water column structures and the processes that create them, there is little effect expected from HMS fishing activities in the pelagic environment with recreational rod and reel / handline. Excessive dead discards could induce minor, localized increases in biological oxygen demand (BOD). However, the use of rod and reel gear is generally selective and fishermen are required and/or will voluntarily undertake efforts to return HMS not retained to the water with minimal harm (e.g., keeping fish in the water while removing gear or for photographs, use of circle hooks to prevent gut hooking). Rod and reel gear is not anticipated to permanently affect the physical characteristics that define HMS EFH such as salinity, temperature, dissolved oxygen, and depth. Therefore, recreational fishing gear used in pelagic HMS fisheries is not anticipated to adversely affect pelagic HMS EFH (Table 3.2).

In some cases, rod and reel or handlines may come in contact with the bottom and are used in areas with coral reefs and/or hardbottom structure. Impacts from these gears may include entanglement and minor degradation of benthic species from line abrasion and the use of weights (sinkers) (Table 3.2). Schleyer and Tomalin (2000) noted that discarded or lost fishing line appeared to entangle readily on branching and digitate corals and was accompanied by progressive algal growth. This subsequent fouling eventually overgrows and kills the coral, becoming an amorphous lump once accreted by coralline algae (Schleyer and Tomalin, 2000). Lines entangled among fragile coral may break delicate gorgonians and similar species. Due to the widespread use of weights over coral reef or hardbottom habitat and the concentration of effort over these habitat areas from recreational and commercial fishermen, the cumulative effect may lead to impacts on EFH resulting from the use of these gear types (Barnette, 2001). The preferred alternatives were therefore analyzed to determine whether they might result in an increase in the contact of rod and reel gear with sensitive bottom habitats.

### **3.3.3 Shortfin Mako Shark EFH**

EFH for shortfin mako sharks in the Atlantic Ocean includes pelagic habitats seaward of the continental shelf break between the seaward extent of the U.S. Exclusive Economic Zone (EEZ) boundary on Georges Bank (off Massachusetts) to Cape Cod (seaward of the 200m bathymetric line); coastal and offshore habitats between Cape Cod and Cape Lookout, North Carolina; and localized habitats off South Carolina and Georgia (Figure 3.3). EFH in the Gulf of Mexico is seaward of the 200 m isobaths in the Gulf of Mexico, although in some areas (e.g., northern Gulf

of Mexico by the Mississippi delta) EFH extends closer to shore. EFH in the Gulf of Mexico is located along the edge of the continental shelf off Fort Meyers to Key West (southern West Florida Shelf), and also extends from the northern central Gulf of Mexico around Desoto Canyon and the Mississippi Delta to pelagic habitats of the western Gulf of Mexico that are roughly in line with the Texas/Louisiana border (Figure 3.3). In Amendment 10 to the 2006 Consolidated HMS FMP, EFH boundaries for all life stages of shortfin mako shark were adjusted off southern Maine and off South Carolina and expanded in the Gulf of Mexico and west of the Florida Keys, due to the incorporation of new data into the models (both regions) and recommendations from the SEFSC (Gulf of Mexico only) (Figure 3.3). For more information, please refer to Final Amendment 10 at <https://www.fisheries.noaa.gov/action/amendment-10-2006-consolidated-hms-fishery-management-plan-essential-fish-habitat>.



**Figure 3.3 All life stages combined essential fish habitat for shortfin mako sharks.**

### 3.4 Shortfin Mako Shark Fisheries Data

While shark fishermen generally target particular species, the non-selective nature of many fishing gears warrants analysis and management on a gear-by-gear basis. For this reason, shark fishery data are typically analyzed by gear type. Additionally, bycatch and safety issues are also better addressed separately by gear type.

Authorized gear types routinely used in Atlantic shark fisheries include:

- Pelagic longline fishery – longline (commercial)
- Shark gillnet fishery – gillnet (commercial)
- Shark bottom longline fishery – longline (commercial)
- Shark handgear fishery – rod and reel, handline, bandit gear (commercial)
- Shark recreational fishery – rod and reel, handline (recreational)

The vast majority of shortfin mako sharks are caught incidentally using pelagic longline (commercial) or rod and reel (recreational). In the commercial fishery, shortfin mako sharks are rarely targeted, but caught incidentally on sets targeting tunas and swordfish. For more details on the species composition of catches in the pelagic longline and rod and reel fisheries, refer to the 2017 HMS SAFE Report (<https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly>). This section focuses on characterizing shortfin mako shark catches in these fisheries. In recent years, on average, total catches between the recreational and commercial fisheries have been nearly evenly split (Table 3.3).

**Table 3.3**      **Reported U.S. shortfin mako shark harvest to ICCAT, 2010-2016.** Note: Commercial mortality is reported landings and dead discards, while recreational harvest is sharks kept. The United States recently changed the 2015 reported estimate to ICCAT from 532 mt ww to 320 mt ww. Source: ICCAT TASK 1 tables.

Year	Commercial Mortality (mt ww)	Recreational Landings (mt ww)	Total (mt ww)
2010	226	168	394
2011	214	178	392
2012	201	229	430
2013	192	219	411
2014	208	201	409
2015	131	189	320
2016	137	163	300
Average	187	192	379

### 3.4.1 U.S. Commercial Fisheries

Commercial landings of shortfin mako sharks and the percentage of the overall pelagic shark landings are presented below. Additional information on all gear types, recent catch, landings, and discard data of HMS species can be found in Chapter 5 of 2017 HMS SAFE Report (<https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly>). Based on landings reported on a weekly basis by dealers, 181,085 lb dw of shortfin mako sharks were landed annually on average from 2013-2017 (Table 3.4). This represents on average 71 percent of the U.S. commercial pelagic shark landings.

**Table 3.4 Commercial Landings of Shortfin Mako Sharks and Percentage of the Pelagic Shark Landings, 2013-2017.** Source: HMS eDealer database.

Year	Commercial Landings (lb dw)	Percentage of Pelagic Shark Landings
2013	199,177	77%
2014	218,295	61%
2015	141,720	66%
2016	160,829	67%
2017	185,403	75%
Average	181,085	71%

Pelagic longline gear is the primary commercial gear used to land pelagic shark species, including shortfin mako sharks, although such catch is incidental to catch in target fisheries for other species. Based on HMS logbook data, 85 percent of shortfin mako sharks caught are kept and landed by commercial pelagic longline fishermen, while 14 percent are discarded alive and 1 percent are discarded dead (Table 3.5). Based on HMS logbook data, the majority of the shortfin mako shark interactions and shortfin mako sharks landed occur in the Mid-Atlantic Bight. The Northeast central and Northeast distant waters are the other top locations for shortfin mako interactions (Table 3.6 and Figure 3.4).

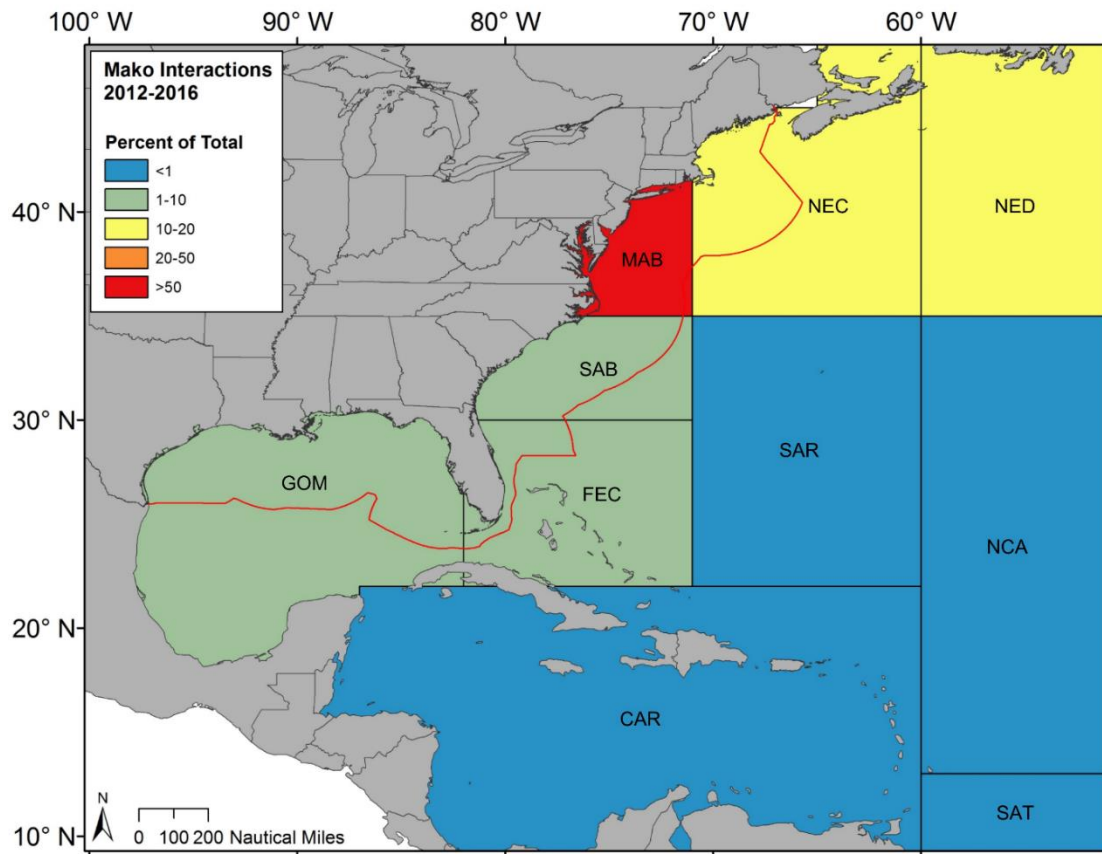
**Table 3.5 Shortfin mako shark interactions in the pelagic longline fishery, 2012-2016.** Source: Fisheries Logbook System (pelagic longline)

Year	Total Number of Vessels	Total Number of Trips	Number of Vessels Reporting Shortfin Mako Sharks	Number of Trips with Shortfin Mako Shark Interactions	Number of Shortfin Mako Sharks Kept	Number of Shortfin Mako Sharks Discarded Dead	Number of Shortfin Mako Sharks Discarded Live	Total Shortfin Mako Shark Interactions
2012	112	1,592	108	659	2,226	58	367	2,651
2013	115	1,558	103	663	2,941	24	407	3,372
2014	110	1,422	90	508	3,117	17	388	3,522
2015	104	1,185	81	434	2,007	16	483	2,506
2016	85	1,025	70	402	2,062	49	347	2,458
AVG	107	1,356	90	533	2,471	33	398	2,902

**Table 3.6 Shortfin mako shark interactions in the pelagic longline fishery by region, 2012-2016.** Note: CAR – Caribbean; GOM - Gulf of Mexico; FEC - Florida East Coast; SAB - South Atlantic Bight; MAB - Mid-Atlantic Bight; NEC - Northeast Coastal; NED - Northeast Distant; SAR - Sargasso; NCA - North Central Atlantic; SAT - Tuna North & Tuna South. Source: Fisheries Logbook System (pelagic longline)

Year	Region	Number of Shortfin Mako Sharks Kept	Number of Shortfin Mako Sharks Discarded Dead	Number of Shortfin Mako Sharks Discarded Live	Total Shortfin Mako Shark Interactions	Percentage of Overall Shortfin Mako Interactions
2012	CAR	2	0	0	2	0.1%
	FEC	124	1	19	144	5.4%
	GOM	116	24	101	241	9.1%
	MAB	1,310	22	91	1,423	53.7%
	NCA	1	0	0	1	<0.1%
	NEC	412	9	61	482	18.2%
	NED	63	0	79	142	5.4%
	SAB	175	2	13	190	7.2%
	SAR	23	0	2	25	0.9%
SAT	0	0	1	1	<0.1%	
2013	CAR	0	0	0	0	0%
	FEC	123	0	5	128	3.8%
	GOM	145	5	85	235	7.0%
	MAB	1,874	6	109	1,989	59.0%
	NCA	1	0	0	1	<0.1%
	NEC	319	4	54	377	11.2%
	NED	307	9	126	442	13.1%
	SAB	157	0	25	182	5.4%
	SAR	14	0	1	15	0.4%
SAT	1	0	2	3	0.1%	
2014	CAR	0	0	0	0	0%
	FEC	69	0	7	76	2.2%
	GOM	75	5	45	125	3.5%
	MAB	2,209	7	108	2,324	66.0%
	NCA	0	0	0	0	0%
	NEC	307	0	22	329	9.3%
	NED	313	3	178	494	14.0%
	SAB	109	2	21	132	3.7%
	SAR	35	0	7	42	1.2%
SAT	0	0	0	0	0%	
2015	CAR	1	0	0	1	<0.1%
	FEC	69	0	12	81	3.2%
	GOM	27	6	58	91	3.6%
	MAB	1,131	7	108	1,246	49.7%
	NCA	0	0	0	0	0%
	NEC	487	1	56	544	21.7%
	NED	174	0	230	404	16.1%
	SAB	90	1	15	106	4.2%
	SAR	28	0	4	32	1.3%
SAT	0	1	0	1	<0.1%	
2016	CAR	2	0	0	2	0.1%
	FEC	52	0	16	68	2.8%
	GOM	18	3	53	74	3.0%
	MAB	1,208	19	96	1,323	53.8%
	NCA	0	0	0	0	0%

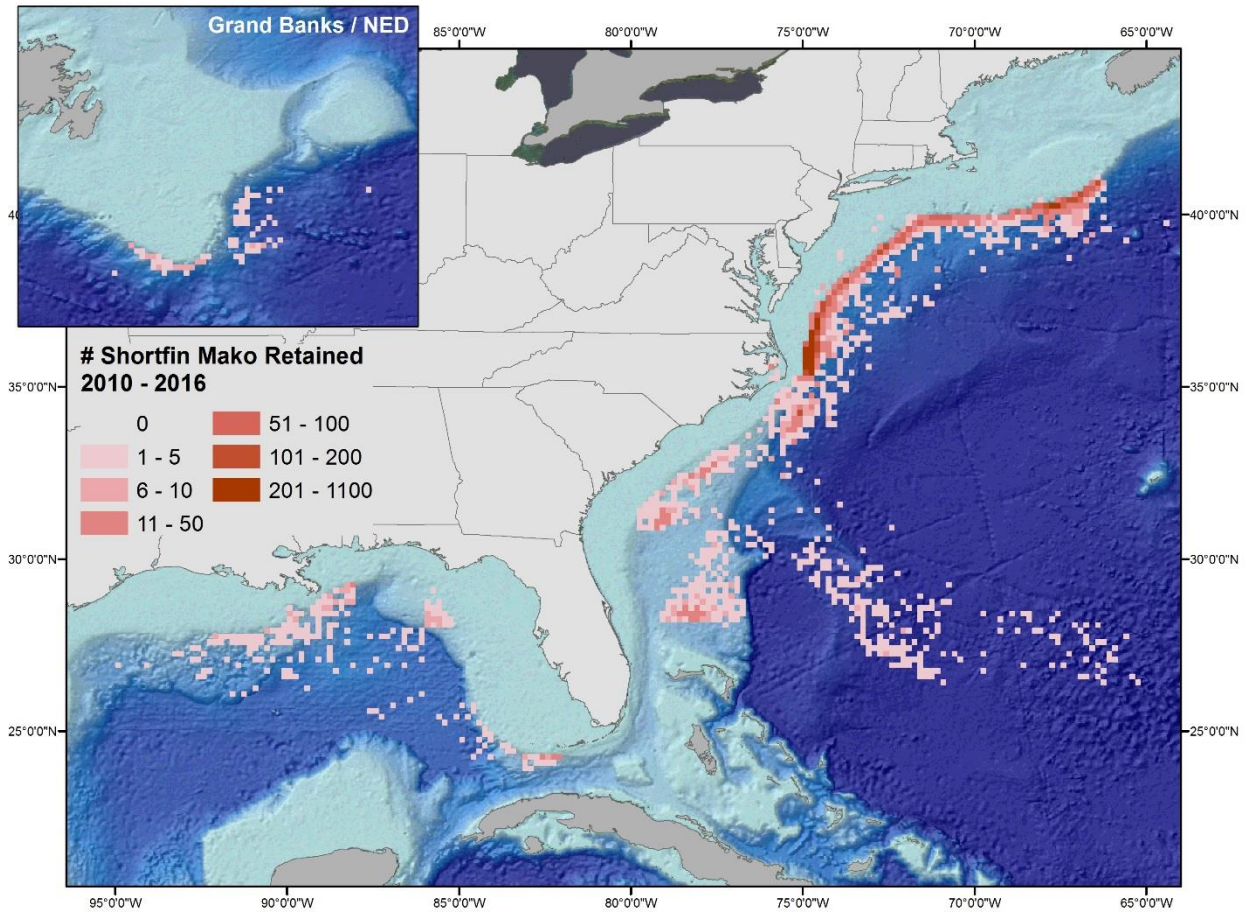
	NEC	487	16	84	587	23.9%
	NED	161	5	61	227	9.2%
	SAB	120	5	35	160	6.5%
	SAR	10	0	0	10	0.4%
	SAT	4	1	2	7	0.3%
AVG		2,471	33	398	2,902	



**Figure 3.4 Shortfin mako shark interactions, 2012-2016.** Source: Fisheries Logbook System (pelagic longline)

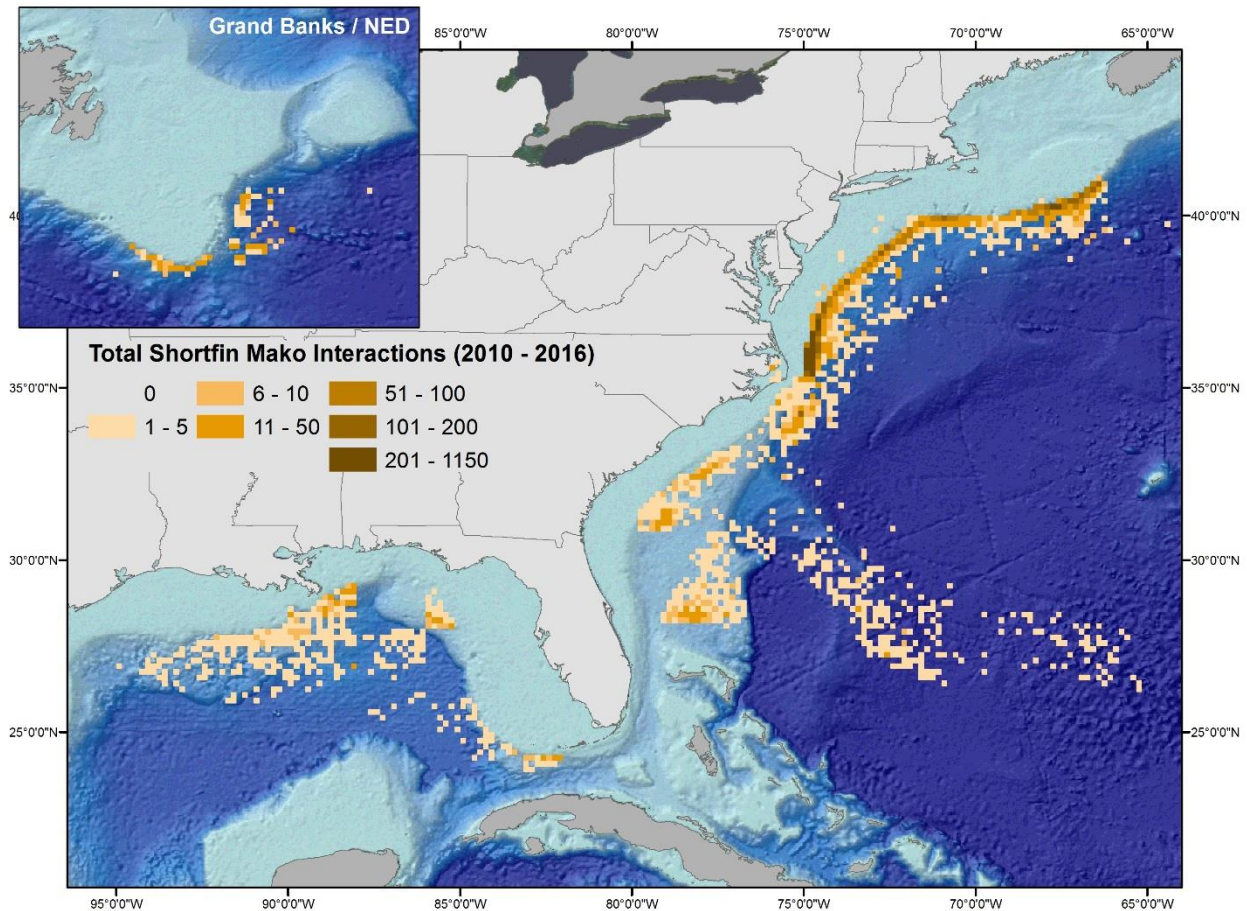
Figure 3.5 and Figure 3.6 show the sum of shortfin mako retained and total interactions of shortfin mako by the pelagic longline fleet, respectively, aggregated in a 10' x 10' grid cell. Data are aggregated to protect confidentiality, therefore grid cells that contain fewer than 3 sets or reflect the activity of fewer than 3 vessels are not shown. For example, data from the U.S. Caribbean and off South America reflects activity from a small number of vessels and are not shown. Approximately 80 percent of shortfin mako retained were captured between Cape Hatteras, North Carolina, continental shelf pelagic habitats associated with the continental shelf at the boundary of the U.S. EEZ near Georges Bank, and adjacent high seas fishing grounds (Figure 3.5). Total shortfin mako interactions by the U.S. pelagic longline fleet show a similar spatial distribution (Figure 3.6). Approximately 48 percent of the shortfin mako interactions by the pelagic longline fleet occur in the region between Cape Hatteras and the mouth of Chesapeake Bay in pelagic habitats associated with the edge of the continental shelf.





**Figure 3.5** Total reported shortfin mako retained by the pelagic longline fleet per 10' x 10' grid cell (2010-2016).





**Figure 3.6** Total shortfin mako interactions per 10' x 10' grid cell, as reported by the Atlantic HMS pelagic longline fleet (2010-2016).

Even though pelagic longline gear is the primary commercial gear used to land shortfin mako sharks, other gear types also interact with this species. Based on HMS logbook data, an average of ten vessels that used gear other than pelagic longline gear interacted with shortfin mako sharks (Table 3.7). On average, only 18 shortfin mako sharks were interacted with annually on non-pelagic longline gear and only 14 shortfin mako sharks were kept annually. This represents less than 1 percent of the total shortfin mako shark interactions in the HMS logbook data.

**Table 3.7 Shortfin mako shark interactions in non-pelagic longline fisheries, 2012-2016.** Source: Fisheries Logbook System.

Year	Total Number of Vessels	Total Number of Trips	Number of Vessels Reporting Shortfin Mako Sharks	Number of Trips with Shortfin Mako Shark Interactions	Number of Shortfin Mako Sharks Kept	Number of Shortfin Mako Sharks Discarded Dead	Number of Shortfin Mako Sharks Discarded Live	Total Shortfin Mako Shark Interactions
2012	123	1,136	14	23	17	0	6	23
2013	92	844	8	19	15	0	6	21
2014	88	751	12	19	13	0	8	21
2015	89	640	7	8	7	0	7	8
2016	87	538	10	15	18	0	1	19
AVG	96	782	10	17	14	0	6	18

To better understand and comprehensively describe the scope of shortfin mako shark interactions, reported observer data from several primary, but not all, fisheries were compiled from 2012-2016 (Table 3.8). These data by year include the data source, the total number of vessels reporting an interaction, number of shortfin mako sharks kept, number of shortfin mako sharks discarded dead, number of shortfin mako sharks discarded alive, and total number of interactions. These data show that in commercial fisheries the vast majority (98.5 percent) of shortfin mako sharks have been observed on pelagic longline gear. This result corresponds with the logbook data (Tables 3.5, 3.6, and 3.7). As a result, for commercial fisheries, this document focuses on the pelagic longline fishery unless otherwise noted.

**Table 3.8 Summary of all available observed shortfin mako shark interactions by data source, 2012-2016.**

Year	Data Source	Number of Vessels	Number of Shortfin Mako Kept	Number of Shortfin Mako Discarded Dead	Number of Shortfin Mako Discarded Alive	Total
2012	NEFSC Northeast Fisheries Observer Program	3	0	3	0	3
	Atlantic Pelagic Observer Program (PLL)	66	167	56	153	376
	SEFSC Bottom Longline Observer Program Targeting Sharks	1	0	0	1	1
	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0	0
2013	NEFSC Northeast Fisheries Observer Program	2	0	2	0	2
	Atlantic Pelagic Observer Program (PLL)	75	213	52	204	469
	SEFSC Bottom Longline Observer Program Targeting Sharks	0	0	0	0	0
	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0	0
2014	NEFSC Northeast Fisheries Observer Program	9	9	4	1	14

	Atlantic Pelagic Observer Program (PLL)	56	206	31	105	342
	SEFSC Bottom Longline Observer Program Targeting Sharks	0	0	0	0	0
	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0	0
2015	NEFSC Northeast Fisheries Observer Program	8	3	5	0	8
	Atlantic Pelagic Observer Program (PLL)	54	271	26	131	428
	SEFSC Bottom Longline Observer Program Targeting Sharks	0	0	0	0	0
	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0	0
2016	NEFSC Northeast Fisheries Observer Program	4	5	0	1	6
	Atlantic Pelagic Observer Program (PLL)	50	691	27	143	861
	SEFSC Bottom Longline Observer Program Targeting Sharks	2	2	1	0	3
	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0	0

Since most of the observed interactions occurred in the pelagic longline observer program, we analyzed the disposition of the shark at the time of interaction (Table 3.9). These observer records vary somewhat from the logbook data shown in Table 3.5. Based on the observer data, over 70 percent of the shortfin mako sharks interacted with were alive at the vessel. Also, the percent of live shortfin mako sharks being discarded alive has declined since 2013, from 60.7 percent to 15.3 percent.

**Table 3.9 Atlantic Pelagic Observer Program disposition of shortfin mako shark interactions, 2013-2016.**

Year	Number of Shortfin Mako Discarded Alive	Number of Shortfin Mako Discarded Dead	Number of Shortfin Mako Kept (Alive at Vessel)	Number of Shortfin Mako Kept (Dead at Vessel)	Total	Percent of Shortfin Mako Alive at Vessel	Percent of Shortfin Mako Discarded Alive
2013	204	52	132	81	469	71.6%	60.7%
2014	105	31	137	31	304	79.6%	43.4%
2015	128	27	212	59	426	79.8%	37.6%
2016	87	30	480	211	808	70.2%	15.3%
AVG	131	35	240	96	502	75.3%	39.3%

### 3.4.2 International Commercial Fisheries

Pelagic longline fisheries for Atlantic HMS primarily target swordfish and tunas. Directed pelagic longline fisheries in the Atlantic have been operated by Spain, the United States, and

Canada since the late 1950s or early 1960s. The Japanese pelagic longline tuna fishery started in 1956 and has operated throughout the Atlantic since then (NMFS, 1999). Many of the 50 other ICCAT parties now also operate pelagic longline vessels. A detailed description of how ICCAT collects fishery data can be found in Chapter 5 of 2017 HMS SAFE Report (<https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly>). ICCAT requests that all countries/entities or fishing entities which operate tuna and tuna-like fisheries in the Atlantic report nominal annual catch of tuna and tuna-like species by region, gear, flag, and species. Catches should be reported in kilograms, round (live) weight.

The U.S. pelagic longline fleet represents a small fraction of the international pelagic longline fleet that competes on the high seas for catches of tunas and swordfish. In recent years, the proportion of U.S. pelagic longline landings of HMS, for the fisheries in which the United States participates, has remained relatively stable in proportion to international landings. Historically, the U.S. pelagic longline fleet has accounted for less than 0.5 percent of the landings of swordfish and tuna from the Atlantic Ocean south of 5° N. Lat. and does not operate at all in the Mediterranean Sea.

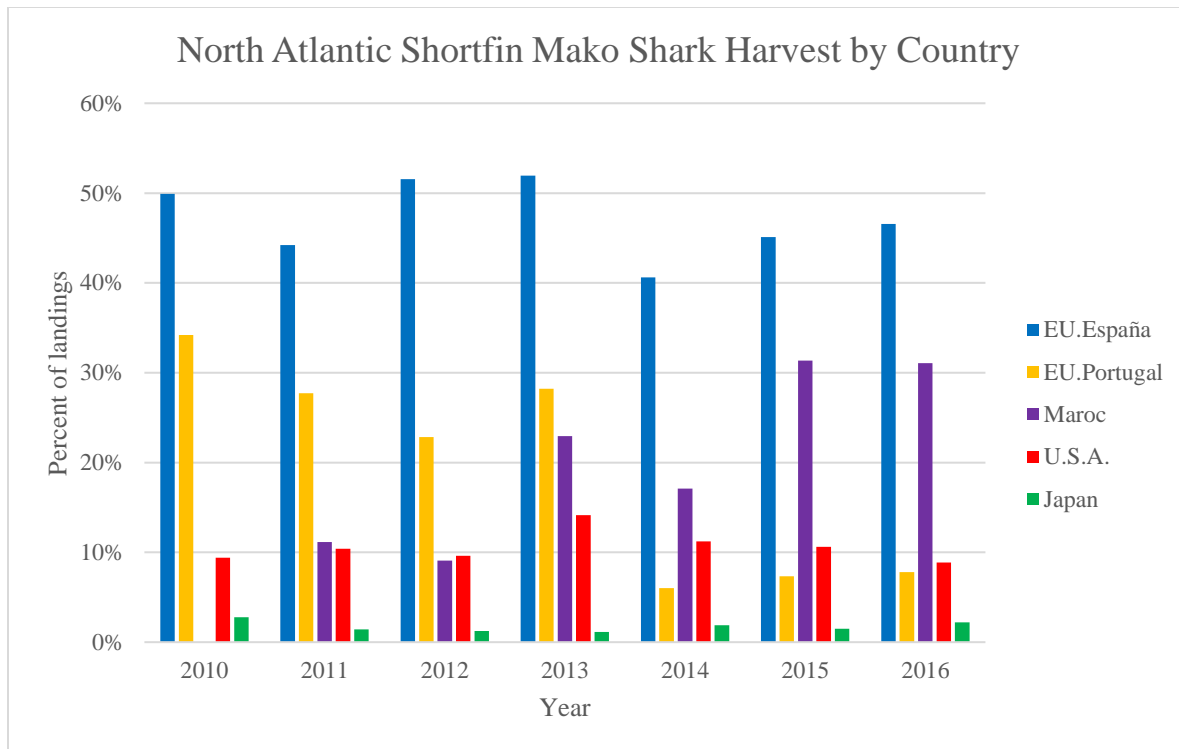
The United States reports landings and dead discards from pelagic longline and rod and reel gears to ICCAT. Pelagic longline catches include commercial landings and dead discards of shortfin mako sharks. Rod and reel landings are the recreational harvest of shortfin mako reported through the LPS and the North Carolina catch card program. The countries/regions with the highest average landings of shortfin mako sharks are listed in Table 3.10. Landings of shortfin mako by the United States have ranged from 392 to 430 metric ton (mt) whole weight (ww) per year with peaks in 2012 and 2013.

**Table 3.10** Reported ICCAT data from TASK 1 tables of North Atlantic shortfin mako sharks. Note: All data are in mt ww. Countries with less than 1 mt ww landed annually not listed. Percentage of harvest compared to the total harvest are in parentheses. The U.S. has changed the 2015 reported estimate to ICCAT from 532 mt ww to 320 mt ww.

Country	2010	2011	2012	2013	2014	2015	2016	Average (Percentage of Overall)
EU.España (Spain)	2,091 (49.9%)	1,667 (44.2%)	2,308 (51.5%)	1,509 (41.4%)	1,481 (51.0%)	1,362 (45.1%)	1,574 (46.6%)	1,713 (47.2%)
EU.Portugal	1,432 (34.2%)	1,045 (27.7%)	1,023 (22.8%)	820 (22.5%)	219 (7.5%)	222 (7.4%)	264 (7.8%)	718 (19.8%)
Maroc (Morocco)	0	420 (11.1%)	406 (9.1%)	667 (18.3%)	624 (21.5%)	947 (31.4%)	1,050 (31.1%)	588 (16.2%)
U.S.A.	394 (9.4%)	392 (10.4%)	430 (9.6%)	411 (14.1%)	409 (11.2%)	320 (10.6%)	300 (8.9%)	379 (10.5%)
Japan	116 (2.8%)	53 (1.4%)	56 (1.3%)	33 (0.9%)	69 (2.4%)	45 (1.5%)	75 (2.2%)	64 (1.8%)
Belize	28 (0.7%)	69 (1.8%)	114 (2.5%)	99 (2.7%)	1 (<0.1%)	1 (<0.1%)	1 (<0.1%)	45 (1.2%)

Canada	41 (1.0%)	37 (1.0%)	29 (0.6%)	35 (1.0%)	55 (1.9%)	85 (2.8%)	83 (2.5%)	52 (1.4%)
Venezuela	27 (0.6%)	20 (0.5%)	33 (0.7%)	9 (0.2%)	13 (0.4%)	7 (0.3%)	7 (0.2%)	17 (0.5%)
China PR	29 (0.7%)	18 (0.5%)	24 (0.5%)	11 (0.3%)	5 (0.2%)	2 (0.1%)	4 (0.1%)	13 (0.4%)
Korea Rep.	0	27 (0.7%)	27 (0.6%)	15 (0.4%)	8 (0.3%)	3 (0.1%)	1 ( $<0.1\%$ )	12 (0.3%)
Chinese Taipei	14 (0.3%)	13 (0.3%)	15 (0.3%)	8 (0.2%)	4 (0.1%)	15 (0.5%)	8 (0.2%)	11 (0.3%)
Mexico	8 (0.2%)	8 (0.2%)	8 (0.2%)	4 (0.1%)	4 (0.1%)	4 (0.1%)	4 (0.1%)	6 (0.2%)
Panama	0	0	0	19 (0.5%)	7 (0.2%)	0	0	4 (0.1%)
Barbados	0	0	0	0	0	4 (0.1%)	3 (0.1%)	1 ( $<0.1\%$ )
EU.France	2 ( $<0.1\%$ )	0	0	0	1 ( $<0.1\%$ )	1 ( $<0.1\%$ )	2 (0.1%)	1 ( $<0.1\%$ )
FR.St Pierre et Miquelon	4 (0.1%)	0	0	4 (0.1%)	0	0	0	1 ( $<0.1\%$ )
Senegal	0	0	2 ( $<0.1\%$ )	0	2 (0.1%)	2 ( $<0.1\%$ )	2 (0.1%)	1 ( $<0.1\%$ )
Trinidad and Tobago	1 ( $<0.1\%$ )	0	2 ( $<0.1\%$ )	1 ( $<0.1\%$ )	1 ( $<0.1\%$ )	1 ( $<0.1\%$ )	1 ( $<0.1\%$ )	1 ( $<0.1\%$ )
Mauritania	0	0	0	0	0	0	2 (0.1%)	$<1$ ( $<0.1\%$ )
Total	4,188	3,771	4,478	3,646	2,904	3,020	3,380	3,627

On average, Spain and Portugal reported the highest harvest of shortfin mako sharks from 2010-2016. The top five countries reporting shortfin mako shark harvest are Spain, Portugal, Morocco, United States, and Japan. Below are the percentages of North Atlantic shortfin mako shark harvest by country (Figure 3.7). The reported harvest from Spain has been consistent from 2010-2016, while harvest reported from Portugal has declined from an average of 1,080 mt ww from 2010-2013 to 235 mt ww from 2014-2016. Morocco harvest has increased through the years and surpassed the reported harvest from Portugal to become the second highest harvester in recent years. On average, the U.S. accounted for 10.5 percent of the total harvest of North Atlantic shortfin mako sharks from 2010-2016.



**Figure 3.7** Percentage of North Atlantic shortfin mako shark landings by country, 2010-2016. Note: The overall average top 5 countries from 2010-2016 are presented.

### 3.4.3 U.S. Recreational Fishery

The HMS handgear (rod and reel, handline, buoy gear, and harpoon) fishery includes both commercial and recreational fisheries and is described fully in Chapter 5 of 2017 HMS SAFE Report (<https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly>). The recreational landings database for Atlantic sharks consists of information obtained through surveys including the LPS, MRIP, the North Carolina catch card program, Southeast Headboat Survey (HBS), and the Texas Headboat Survey. LPS was designed to survey recreational fishing activity on rare event species, and surveys activities primarily that occur offshore, from Virginia to Maine during June through October. MRIP was designed to survey recreational harvest in coastal waters from Maine through Mississippi and NMFS used catch estimates from MRIP for those areas not covered by the LPS (North Carolina through Mississippi). Additional harvest figures are reported to MRIP by the Southeast Regional Headboat Survey and Texas Parks and Wildlife Department. For more information on these surveys, please look in the 2006 Consolidated HMS FMP (NMFS 2006a) and Chapter 5 of 2017 HMS SAFE Report.

Recreational harvest of sharks is an important component of HMS fisheries. Recreational shark fishing with rod and reel is a popular sport and, depending upon the species, sharks can be caught virtually anywhere in salt water. Recreational shark fisheries often occur in nearshore waters accessible to private vessels and charter/headboats; however, shore-based and offshore fishing also occur. Since 2003, the recreational fishery has been limited to rod and reel and handline gear only. Similar state regulations along the Atlantic seaboard are implemented

through an ASMFC interstate FMP (ASMFC 2008). Unlike billfish or bluefin tuna, recreational shark harvest is not required to be reported to NMFS unless an angler is required to participate in the LPS or MRIP.

Significant variability exists between the recreational estimates (Table 3.11). The LPS shows more consistent landings on an annual basis since it provides raw observed numbers of shark interactions based on a survey specific to rare-event Atlantic HMS. LPS provides more precise estimates of shortfin mako shark recreational harvest, and is used to report recreational landings to ICCAT. In the LPS database, NMFS reports the estimated recreational release of shortfin mako sharks (Table 3.12). Unless otherwise stated, all recreational estimates presented in this document use LPS. MRIP shows more variable harvest data from year to year since it provides estimated (i.e., extrapolated) numbers of shark interactions based on data provided by anglers and captains. Recently, NMFS released revised MRIP recreational catch and effort estimates for 1981 to 2017, as part of its recent transition from the Coastal Household Telephone Survey (CHTS) to the new, mail-based Fishing Effort Survey (FES). The implications of the revised estimates on all managed species will not be fully understood for several years until they are incorporated into the stock assessment processes over the next several years. The ICCAT stock assessment remains the best scientific information available for the stock.

**Table 3.11 Annual recreational harvest of shortfin mako sharks by data source, 2012-2016.** Note: All recreational harvest are sharks kept and figures are in mt ww. Percent standard error (PSE) expresses the standard error of an estimate as a percentage of the estimate and is a measure of precision. MRIP estimates are the old estimates and not the most recently released estimates.

Year	LPS (ME - VA)	LPS PSE	MRIP (NC - TX)	MRIP PSE (NC - TX)
2012	200.5	11.5	0.3	61.1
2013	218.4	10.1	1.3	78.6
2014	179.0	9.0	1.3	94.9
2015	138.2	10.9	6.5	81.1
2016	149.7	10.5	1.5	-
Average	177.2	10.4	2.2	78.9

**Table 3.12 Recreational releases of shortfin mako sharks estimated by LPS, 2012-2016.**

Year	Released Alive	Percent Standard Error (PSE)
2012	3,993	12.2
2013	3,842	15.2
2014	3,666	10.8
2015	6,652	11.2
2016	1,933	15.5

HMS tournaments are an important aspect of the HMS recreational fishery. On average, there are 250 HMS tournaments each year with 73 tournaments indicating pelagic sharks as a prize category, which would include shortfin mako sharks (Table 3.13). The Gulf of Mexico and Mid-Atlantic regions have the most HMS tournaments each year indicating pelagic sharks as a

category. Overall, tournaments indicating pelagic sharks as a prize category have been the highest in 2014 and 2015 with 84 tournaments. However, 2016 showed a decrease in the number of these tournaments.

**Table 3.13 HMS tournaments targeting shortfin mako and pelagic shark species, 2012-2016.**

Year	Total Number of HMS Tournaments	Number of HMS Tournaments that Indicated Pelagic Sharks as Target Species (Sharks in General)	HMS Tournaments with Pelagic Sharks as Category by Area	
			Area	Number of Tournaments
2012	218	53 (71)	Gulf of Mexico (Caribbean)	25 (2)
			South Atlantic (Keys to SC)	9
			Mid-Atlantic (NC to NY)	16
			North Atlantic (CT to ME)	3
2013	212	74 (80)	Gulf of Mexico (Caribbean)	34 (1)
			South Atlantic (Keys to SC)	8
			Mid-Atlantic (NC to NY)	27
			North Atlantic (CT to ME)	5
2014	274	84 (85)	Gulf of Mexico	24
			South Atlantic (Keys to SC)	7
			Mid-Atlantic (NC to NY)	39
			North Atlantic (CT to ME)	14
2015	279	84 (92)	Gulf of Mexico	27
			South Atlantic (Keys to SC)	12
			Mid-Atlantic (NC to NY)	33
			North Atlantic (CT to ME)	12
2016	267	72 (77)	Gulf of Mexico	20
			South Atlantic (Keys to SC)	3
			Mid-Atlantic (NC to NY)	41
			North Atlantic (CT to ME)	8
Average	250	73 (81)		

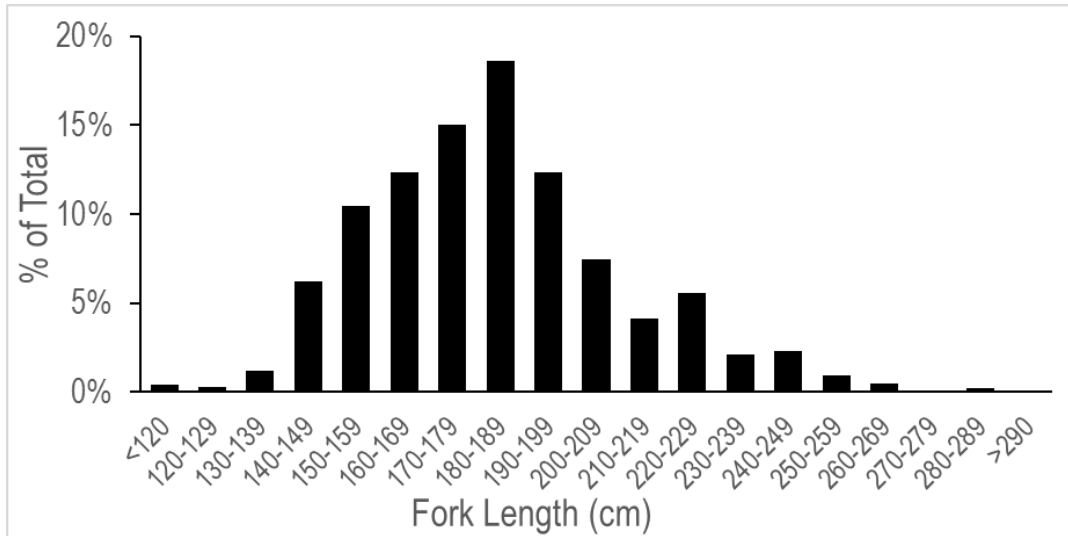
Based on the LPS data, it is a relatively equal split between shortfin mako shark interactions during a tournament versus a non-tournament trip (Table 3.14). Overall, the majority of the shortfin mako sharks that are interacted with are kept. However, there is a higher likelihood that the shark will be released during a non-tournament trip.



**Table 3.14 Shortfin mako shark observations (numbers and percent) in the Large Pelagic Survey by Tournament and Non-Tournament trips, and their disposition for each trip type, 2010-2017.**

Year	Trip Type	Number of Shortfin Mako Interactions (Percentage of Overall)	Number of Shortfin Mako Kept (Percentage of Overall)	Number of Shortfin Mako Released (Percentage of Overall)
2010	Tournament	205 (48.3)	80 (51.3)	125 (46.6)
	Non-Tournament	219 (51.7)	76 (48.7)	143 (53.4)
2011	Tournament	216 (54.7)	90 (52.6)	126 (56.3)
	Non-Tournament	179 (45.3)	81 (47.4)	98 (43.8)
2012	Tournament	223 (57.3)	100 (66.2)	123 (51.7)
	Non-Tournament	166 (42.7)	51 (33.8)	115 (48.3)
2013	Tournament	215 (55.8)	103 (57.5)	112 (54.4)
	Non-Tournament	170 (44.2)	76 (42.5)	94 (45.6)
2014	Tournament	206 (49.4)	86 (47.8)	120 (50.6)
	Non-Tournament	211 (50.6)	94 (52.2)	117 (49.4)
2015	Tournament	339 (63.1)	78 (51.3)	261 (67.8)
	Non-Tournament	198 (36.9)	74 (48.7)	124 (32.2)
2016	Tournament	134 (52.1)	69 (53.5)	65 (50.8)
	Non-Tournament	123 (47.9)	60 (46.5)	63 (49.2)
2017	Tournament	138 (47.4)	66 (45.2)	72 (49.7)
	Non-Tournament	153 (52.6)	80 (54.8)	73 (50.3)
Total	Tournament	1,676 (54.2)	672 (53.2)	1,004 (54.8)
	Non-Tournament	1,419 (45.8)	592 (46.8)	827 (45.2)

The minimum size limit for shortfin mako sharks in the recreational fishery was 54 in (137 cm) FL, prior to implementation of the emergency interim final rule on March 2, 2018. According to 2012-2016 LPS data, most landed shortfin mako sharks are 140-230 cm (55-91 in) FL (Figure 3.8). According to NMFS Northeast Fisheries Science Center tournament data (Table 3.15), the minimum size limit under the preferred alternative may not greatly impact tournament landings of shortfin mako sharks, where most of the largest sharks landed were above the 83 in (210 cm) FL minimum size limit.



**Figure 3.8** Length distribution of shortfin mako shark landings in the recreational fishery, 2012-2016 (N=12,166). Source: Large Pelagics Survey.

**Table 3.15** Weights and lengths of the five largest shortfin mako sharks landed at Northeast shark tournaments, 2012-2016. Source: NEFSC Apex Predators Program

Year	Mean weight of 5 largest sharks (lb)	Fork Length (in)	Fork Length (cm)	Largest male (lb)	Fork Length (in)	Fork Length (cm)
2012	349	95	241.3	368	96	243.84
2013	329.16	93	236.22	311	91	231.14
2014	319.14	92	233.68	294.4	90	228.6
2015	415.8	100	254	349	95	241.3
2016	443.8	102	259.08	507	107	271.78

### 3.5 HMS Permits and Tournaments

A full description of HMS permits and tournaments can be found in the 2017 HMS SAFE Report (<https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly>). This section focuses on information for shark fisheries and tournaments, as well as shark dealer permits.

#### 3.5.1 HMS Permits

##### *Limited Access Permits*

The LAP program includes six vessel permits: Swordfish Directed, Swordfish Incidental, Swordfish Handgear, Shark Directed, Shark Incidental, and Atlantic Tunas Longline. The Swordfish Directed and Incidental permits are valid only if the permit holder also holds an Atlantic Tunas Longline and a shark permit. Similarly, the Atlantic Tunas Longline permit is valid only if the permit holder also holds a swordfish (Directed or Incidental, not Handgear) and a shark permit. No additional LAPs are required to make a Swordfish Handgear or the shark permits valid. The number of LAPs issued is tabulated by state in Table 3.16.

**Table 3.16 Number of Limited Access Shark, Swordfish, and Atlantic Tunas Longline Vessel Permits and Permit Holders by State (2012-2017).**

Permits by State - 2017							
State	Swordfish Permits			Shark Permits		Tunas Longline Permit	Permit Holders / Permits
	Directed	Incidental	Handgear	Directed	Incidental		
ME	3	1	2	1	6	4	9 / 17
MA	6	3	7	3	11	11	23 / 41
RI	-	-	12	1	3	1	13 / 17
CT	1	1	1	-	2	2	3 / 7
NY	14	3	5	10	12	18	26 / 62
PA	2	-	-	1	2	2	3 / 7
NJ	28	10	3	23	26	41	55 / 131
DE	2	-	1	2	2	2	5 / 9
MD	4	-	-	2	2	4	4 / 12
VA	1	1	-	1	3	4	6 / 10
NC	11	5	-	20	9	16	28 / 61
SC	5	2	-	7	11	7	18 / 32
GA	-	1	-	3	3	1	6 / 8
FL	77	34	51	118	129	118	299 / 527
AL	-	-	-	4	2	-	6 / 6
MS	-	-	-	-	1	-	1 / 1
LA	28	4	1	23	32	36	62 / 124
TX	1	7	-	3	11	10	17 / 32
HI	1	-	-	-	1	1	1/3
OR	-	-	-	-	1	-	1 / 1
Canada	-	-	-	-	-	1	1 / 1
Trinidad/ Tobago	1	-	-	1	-	1	1 / 3
Annual Totals for 2012-2017							
2017*	185	72	83	221	269	280	588 / 1,110
2016	186	72	83	223	271	280	540 / 1,115
2015	188	72	83	224	275	280	540 / 1,122
2014	183	66	77	206	258	246	536 / 1,036
2013	185	71	81	220	265	252	556 / 1,074
2012	184	73	77	215	271	253	555 / 1,073

\* As of October 2017. Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire.

#### *HMS Charter/Headboat Permit*

The Atlantic HMS Charter/Headboat permit is open access and authorizes recreational fishing for all Atlantic HMS, commercial fishing for Atlantic tunas under certain conditions, and commercial fishing for North Atlantic swordfish only on non for-hire trips. The distribution of 2017 Atlantic HMS Charter/Headboat permits is presented in Table 3.17. Starting in 2018,

anyone holding an Atlantic HMS Charter/Headboat permit that wishes to target and retain sharks must have a Shark Endorsement on their permit. As of June 2018, 1,941 HMS Charter/Headboat permit holders have acquired a Shark Endorsement on their permit.

**Table 3.17 Number of Atlantic HMS Charter/Headboat Permits by State (as of October 2017).**

State/Territory	HMS CHB Permits	State/Territory	HMS CHB Permits
AL	67	NH	105
CT	73	NJ	443
DE	91	NY	292
FL	638	OH	1
GA	38	OK	1
ID	1	PA	14
IL	2	PR	19
KY	1	RI	130
LA	92	SC	127
MA	674	TN	1
MD	109	TX	98
ME	116	VA	93
MI	1	VI	18
MS	29	WV	1
NC	343	-	-
<b>2017 Total</b>		<b>3,618</b>	
2016 Total		3,594	

### *HMS Angling Permit*

The HMS Angling Permit is open access and required to recreationally fish for, retain, or possess (including catch-and-release fishing) any federally-regulated HMS, including sharks, swordfish, white and blue marlin, sailfish, spearfish, bluefin tuna, and BAYS tunas. It does not authorize the sale or transfer of HMS to any person for a commercial purpose. Atlantic HMS Angling permit distribution is reported in Table 3.18. Starting in 2018, anyone holding an Atlantic HMS angling permit that wishes to target and retain sharks must have a Shark Endorsement on their permit. As of June 2018, 6,670 HMS Angling permit holders have acquired a Shark Endorsement on their permit.

**Table 3.18 Number of Atlantic HMS Angling Permits by State or Country (as of October 2017).**

State/Country	Permits by Home Port*	Permits by Residence**	State/Country	Permits by Home Port*	Permits by Residence**
AK	1	-	ND	1	1
AL	434	385	NE	-	1
AR	5	11	NH	214	269
AZ	-	4	NJ	2,860	2,475
CA	1	13	NV	2	9
CO	1	6	NY	1,807	1,878
CT	627	714	OH	13	28
DC	4	6	OK	13	19
DE	857	556	OR	1	-
FL	4,016	3,701	PA	177	1,027
GA	109	197	PR	399	405
HI	1	1	RI	556	372
IA	1	3	SC	483	463
ID	-	-	SD	1	5
IL	12	28	TN	19	44
IN	6	17	TX	643	672
KS	2	3	UT	1	1
KY	5	14	VA	833	928
LA	645	634	VI	38	22
MA	2,408	2,408	VT	16	26
MD	1,105	1,026	WA	5	10
ME	402	334	WI	7	9
MI	28	37	WV	9	12
MN	5	10	WY	1	2
MO	6	14			
MS	207	237	Canada	6	2
MT	-	2	British VI		1
NC	1,345	1,259	Not Reported	-	32
<b>2017 Total</b>				<b>20,338</b>	<b>20,338</b>
2016 Total				20,020	20,020

\* The vessel port or other storage location. \*\* The permit holder's billing address.

*Atlantic Tunas, Swordfish, and Shark Dealer Permits*

HMS Dealer permits are open access and required for the “first receiver” of Atlantic tunas, swordfish, and sharks. A first receiver is any entity, person, or company that takes, for commercial purposes (other than solely for transport), immediate possession of the fish, or any part of the fish, as the fish are offloaded from a fishing vessel. Atlantic tunas, swordfish and sharks dealer permits (by state) are reported in Table 3.19.

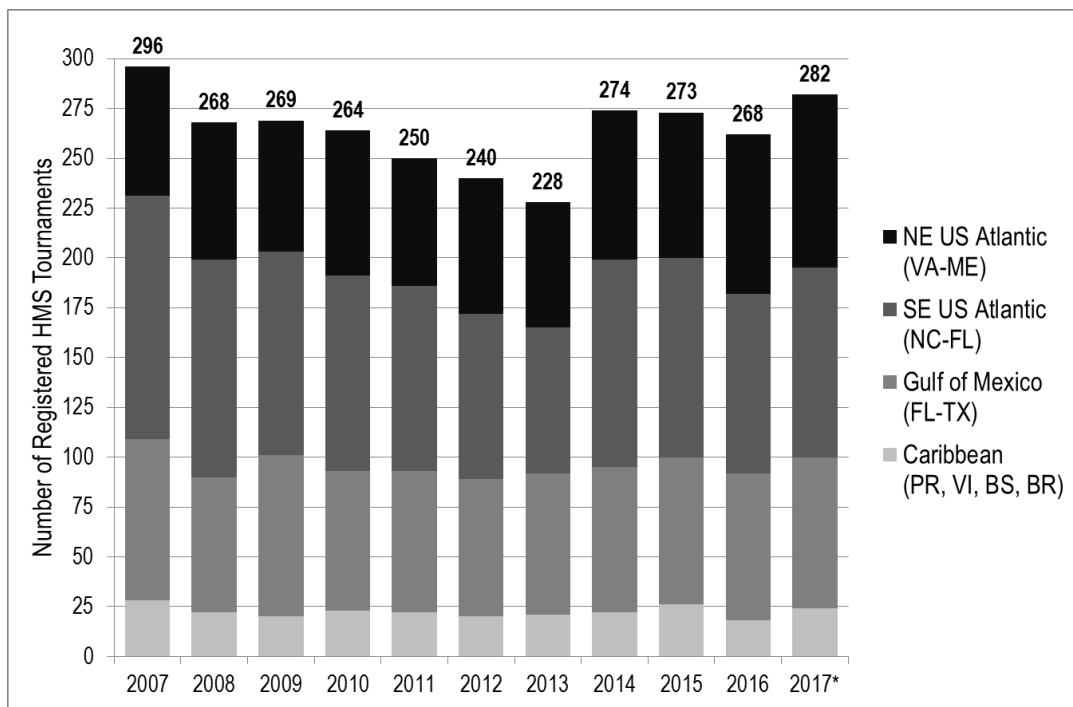
**Table 3.19 Number of Domestic Atlantic Tunas, Swordfish, and Sharks Dealer Permits (2017 by State; 2012-2017 Totals by Permit).**

<b>Permits by State - 2017</b>						
<b>State/Territory</b>	<b>Bluefin Only</b>	<b>BAYS Only</b>	<b>Bluefin and BAYS</b>	<b>Atlantic Swordfish</b>	<b>Atlantic Sharks</b>	<b>Total</b>
AL	-	1	3	5	2	11
CA	2	-	-	1	-	3
CT	-	1	3	1	-	5
DE	-	2	4	1	-	7
FL	1	7	17	86	31	142
IL	-	-	-	1	-	1
GA	-	-	1	-	1	2
HI	-	-	2	-	-	2
LA	-	-	7	7	7	21
MA	6	11	77	17	6	117
MD	-	-	6	2	2	10
ME	14	-	17	1	1	33
MO	-	-	-	1	-	1
NC	3	3	22	19	20	67
NH	2	-	7	1	-	10
NJ	-	11	37	11	10	69
NY	4	18	43	8	13	86
PA	-	-	3	1	-	4
PR	-	1	2	1	-	4
RI	-	4	22	9	6	41
SC	-	-	4	9	9	22
TX	-	4	1	5	1	11
VA	-	5	11	2	4	22
VI	-	2	1	-	-	3
VT	-	-	1	-	-	1
<b>Annual Totals 2012-2017</b>						
2017*	32	70	291	189	113	695
2016	29	74	291	182	111	687
2015	33	79	289	184	102	687
2014	32	79	308	195	96	710
2013	35	72	318	183	97	705
2012	30	67	313	179	92	681

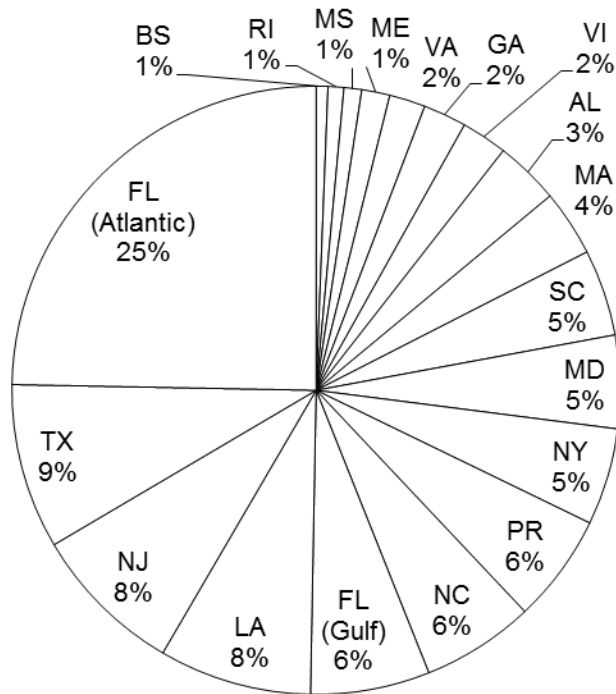
\* As of October 2017. The actual number of permits per state may change as permit holders move or sell their businesses.

### 3.5.2 HMS Tournaments

The number of HMS tournaments that registered from 2007 to 2017 is reported in Figure 3.9. Since 2007, an average of 265 HMS tournaments have registered each year. The highest number of HMS tournament registrations was received in 2007. The number of registered tournaments in 2017 was the highest since 2007, possibly due to increased outreach and compliance monitoring, and may have been influenced by an improving U.S. economy and lower fuel prices. The following tables and figures are summary data from the HMS Atlantic Tournament Registration and Reporting (ATR) database. The average distribution of HMS fishing tournaments along the Atlantic and Gulf of Mexico coastal states and the U.S. Caribbean is represented in Figure 3.10.



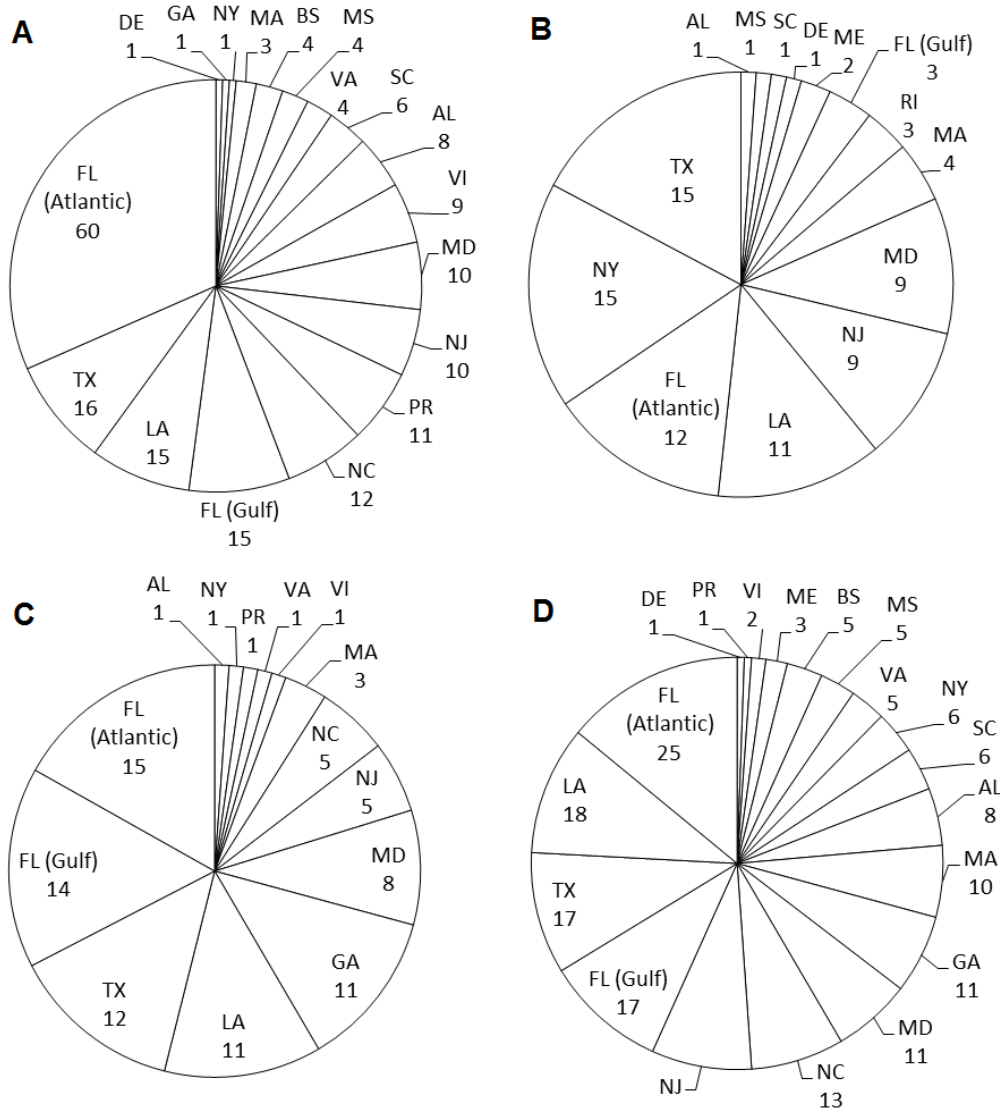
**Figure 3.9 Annual Number of Registered Atlantic HMS Tournaments by Region (2007-2017).** Note: The 2017 numbers are through October of that year. Source: ATR database.



**Figure 3.10** Percent of Atlantic HMS Tournaments Held in each State from 2007 to 2017. Number of tournaments: 2,762; Areas excluded (< 1%) are Bermuda (0%), Connecticut (0.07%), and Delaware (0.33%). Source: ATR database.

Participants may target one or more HMS in a tournament. Most tournaments register to catch multiple HMS; however, in 2016, 43 percent registered for only one species group, of which the majority were tunas, followed by swordfish, sharks, and billfish. There were 20 tournaments that targeted only sailfish in 2016. Often, there is a primary species targeted in the tournament, and other species are caught for entry in separate categories. Overall, there is a regional trend toward species that are present during the local fishing season. Figure 3.11 gives a breakdown of the number of tournaments in each state that registered for billfish, sharks, swordfish, or tuna species in 2016.





**Figure 3.11** Number of Tournaments in each State that Registered for (A) Billfish, (B) Shark, (C) Swordfish, or (D) Tuna Species (2016). Note: Total numbers of tournaments divided by state were 182 (A), 73 (B), 71 (C), and 184 (D). Source: ATR database.

Table 3.20 provides the total numbers of HMS tournaments in 2015 and 2016 that registered to award points or prizes for the catch or landing of each HMS.

**Table 3.20**

**Number of Atlantic HMS Tournaments per Species (2015-2016).** Note: Smoothhound includes smooth dogfish, Florida smoothhound, and Gulf smoothhound. Source: ATR database

Species		2015	2016
Billfishes	Blue marlin	161	157
	White marlin	146	143
	Longbill spearfish	67	55
	Roundscale spearfish	61	45
	Sailfish	161	154
Swordfish		89	71
Tunas	Bluefin tuna	96	98
	Bigeye tuna	75	78
	Albacore tuna	48	41
	Yellowfin tuna	166	171
	Skipjack tuna	38	41
Sharks	Smoothhounds	--	0
	Small coastal sharks	16	12
	Large Coastal Sharks	32	27
	Pelagic sharks	79	72

### 3.6 Economic and Social Environment

For more information on the overall economic status of HMS fisheries, please see Chapter 6 of the 2017 HMS SAFE Report (<https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly>).

#### 3.6.1 Commercial Fisheries

The top overall landings port for shortfin mako sharks is Wanchese, NC (Table 3.21). Shortfin mako sharks are a minor source of economic revenue to the overall HMS commercial fisheries, but may be a significant source of seasonal revenue to individual fishermen. Shortfin mako shark ex-vessel revenue accounts for over 15 percent of the total shark ex-vessel revenue, but only 1 percent of overall HMS ex-vessel revenue (Table 3.22). On average, there are 37 seafood dealers along the U.S. east coast that purchase shortfin mako sharks each year (Table 3.23).

**Table 3.21 Top five ports reporting shortfin mako shark landings, 2013-2017.** Note: All commercial landings are in lb dw. Source: HMS eDealer database.

Port	State	Total Commercial Landings of Shortfin Mako Shark	Percentage of Total Shortfin Mako Shark Landings
Wanchese	NC	336,793	37.2%
Fairhaven	MA	98,843	10.9%
Barnegat Light	NJ	56,992	6.3%
Ocean City Harbor	MD	41,407	4.6%
New Bedford	MA	34,282	3.8%
Fort Pierce	FL	34,260	3.8%
Newfoundland and Labrador	CN	33,762	3.7%
Beaufort	NC	32,468	3.6%
Islip	NY	27,090	3.0%
Wadmalaw Island	SC	20,979	2.3%

**Table 3.22 Average shortfin mako shark ex-vessel prices, and overall percentage of total shark ex-vessel revenue, 2013-2017.** Note: Annual landings and ex-vessel value are available for 2017, but the comparison to the overall shark or overall HMS value are not available at this time. Sources: HMS eDealer database, 2017 SAFE Report.

Year	Shortfin Mako	Annual landings (lb dw)	AVG Ex-Vessel Price	Ex-Vessel Annual Revenue	Percentage of Overall Shark Ex-Vessel Revenue	Percentage of Overall HMS Ex-Vessel Revenue
2013	Meat	199,177	\$1.92	\$382,420	20.3%	1.0%
	Fins	6,573	\$6.05	\$39,766		
	Total			\$422,186		
2014	Meat	218,295	\$1.97	\$430,041	19.4%	1.0%
	Fins	5,894	\$2.34	\$13,792		
	Total			\$443,833		
2015	Meat	141,720	\$1.92	\$272,102	9.4%	0.8%
	Fins	4,393	\$2.93	\$12,872		
	Total			\$284,975		
2016	Meat	160,829	\$2.07	\$332,916	13.8%	0.9%
	Fins	4,342	\$3.58	\$15,546		
	Total			\$348,462		
2017	Meat	184,993	\$1.86	\$344,087	-	-
	Fins	4,993	\$4.17	\$20,820		
	Total			\$364,908		

**Table 3.23** Number of Dealers that Reported Buying Shortfin Mako Sharks from pelagic longline vessels, 2013-2017. Source: HMS eDealer database.

Year	Number of Dealers
2013	43
2014	38
2015	34
2016	33
2017	36
Average	37

### 3.6.2 Recreational Fisheries

HMS recreational fishing provides significant positive economic impacts to coastal communities that are derived from individual angler expenditures, recreational charters, tournaments, and the shoreside businesses that support those activities.

A report summarizing the results of the 2016 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation was released in September 2017. This report, which is the 13<sup>th</sup> regarding a series of surveys that has been conducted about every 5 years since 1955, provides relevant information such as the number of anglers, expenditures by type of fishing activity, number of participants and days of participation by animal sought, and demographic characteristics of participants. The survey estimated that 8.3 million Americans participated in saltwater recreational fishing in 2016, and spent over 75 million days fishing in saltwater. This was down from 8.9 million participants, and 99 million days of recreational saltwater fishing in 2011. More information on the 2016 national survey is available at [https://wsfrprograms.fws.gov/subpages/nationalsurvey/2016\\_Survey.html](https://wsfrprograms.fws.gov/subpages/nationalsurvey/2016_Survey.html).

In 2011, NMFS conducted the National Marine Recreational Fishing Expenditure Survey (NES) to collect national level data on trip and durable good expenditures related to marine recreational fishing, and estimate the associated economic impact (Lovell et al., 2013). Nationally, marine anglers were estimated to have spent \$4.4 billion on trip related expenses (e.g., fuel, ice, bait), and \$19 billion on fishing equipment and durable goods (e.g., fishing rods, tackle, boats). Using regional input-output models, these expenditures were estimated to have generated \$56 billion in total economic impacts, and supported 364 thousand jobs in the United States in 2011. This survey also included a separate survey of HMS Angling permit holders from the LPS region (Maine to Virginia) plus North Carolina (Hutt et al., 2014). Estimated trip-related expenditures and the resulting economic impacts for HMS recreational fishing trips are presented in Table 3.24.

**Table 3.24 HMS Recreational Fishing Trip Related Expenditures and Economic Impacts for Directed HMS Private Boat Trips (ME - NC, 2011).** Sources: 2011 mail survey of Atlantic HMS Angling permit holders and \*LPS.

Variable	Tuna Trips	Billfish Trips	Shark Trips	All HMS Trips
Sample size by species targeted	1,001	88	105	1,194
Average trip expenditures	\$534	\$900	\$567	\$587
Total directed HMS private boat trips *	27,648	5,123	6,669	39,440
Total trip-related expenditures	\$14,775,000	\$4,612,000	\$3,781,000	\$23,168,000
Total economic output	\$19,864,000	\$6,036,000	\$5,443,000	\$31,343,000
Employment (Full time job equivalents)	136	39	41	216

For the HMS Angler Expenditure Survey, randomly selected HMS Angling permit holders were surveyed every two months, and asked to provide data on the most recent fishing trip in which they targeted HMS. Anglers were asked to identify the primary HMS they targeted, and their expenditures related to the trip. Of the 2,068 HMS anglers that returned a survey, 1,001 anglers indicated they targeted a species of tuna (i.e., bluefin, yellowfin, bigeye, or albacore tuna) on their most recent private boat trip, or simply indicated they fished for tuna in general without identifying a specific species. Of the rest of those surveyed, 88 reported on trips targeting billfish (i.e., blue marlin, white marlin, sailfish), 105 reported on trips targeting shark (i.e., shortfin mako, thresher shark, blacktip shark), and 874 either reported on trips that did not target HMS or failed to indicate what species they targeted. Average trip expenditures ranged from \$534/trip for tuna trips to \$900 for billfish trips. Boat fuel was the largest trip-related expenditure for all HMS trips, and made up about 73 percent of trip costs for billfish trips, which is not unexpected given the predominance of trolling as a fishing method for billfish species such as marlin.

Total trip-related expenditures for 2011 were estimated by expanding average trip-related expenditures by estimates of total directed boat trips per species group from the LPS and MRIP. Total expenditures were then divided among the appropriate economic sectors, and entered into an input-output model to estimate total economic output and employment supported by the expenditures within the study region (coastal states from Maine to North Carolina). Overall, \$23.2 million of HMS angling trip-related expenditures generated approximately \$31.3 million in economic output and supported 216 full time jobs from Maine to North Carolina in 2011. An updated trip expenditures survey of Atlantic HMS Angling Permit holders from Maine to Texas is currently being conducted for 2016, and a final report will be issued in spring 2018.

In 2014, NMFS conducted a partial update of the NES that collected data on marine angler expenditures on fishing equipment and durable goods related to recreational fishing (e.g., boats, vehicles, tackle, electronics, second homes). This survey covered Atlantic HMS anglers from Maine to Texas. HMS anglers in the Northeast (Maine to Virginia) were found to spend \$12,913 on average for durable goods and services related to marine recreational fishing, of which \$5,284 could be attributed to HMS angling (based on their ratio of HMS trips to total marine angling trips). The largest expenditures items for marine angler durable goods among HMS anglers in the Northeast were for new boats (\$3,305), used boats (\$2,835), boat maintenance (\$1,532), and boat storage (\$1,486). HMS anglers in the Northeast were estimated to have spent a total of \$61 million on durable goods for HMS angling which in turn were estimated to generate \$73 million in economic output, and support 697 jobs from Maine to Virginia in 2014 (Lovell et al. 2016). HMS anglers in the Southeast (North Carolina to Texas) were found to spend \$29,532 on

average for durable goods and services related to marine recreational fishing, of which \$15,296 could be attributed to HMS angling (based on their ratio of HMS trips to total marine angling trips). The largest expenditures items for marine angler durable goods among HMS anglers were for new boats (\$8,954), used boats (\$6,579), boat maintenance (\$3,028), boat storage (\$1,813), and rods and reels (\$1,608). HMS anglers were estimated to have spent a total of \$108 million on durable goods for HMS angling which in turn were estimated to generate \$152 million in economic output, and support 1,331 jobs from North Carolina to Texas in 2014 (Lovell et al. 2016).

### **3.6.3 International Trade**

Several Regional Fishery Management Organizations (RFMO), including ICCAT, have taken steps to improve the collection of international trade data in order to estimate landings related to these fisheries, and to identify potential compliance problems with certain RFMO management measures. This section describes the international HMS trade programs, a review of U.S. HMS export activity, a review of U.S. HMS import activity, and trade data use in HMS management.

#### *International HMS Trade Programs*

The United States collects general trade monitoring data through the International Trade Data System (ITDS) of the U.S. Bureau of Customs and Border Protection (CBP; imports) and the U.S. Bureau of the Census (Census Bureau; exports and imports). These programs collect data on the amount and value of imports and exports categorized under the Harmonized Tariff Schedule (HTS). Many HMS have distinct HTS codes, and some species are further subdivided by product (e.g., fresh or frozen, fillets, steaks). NMFS provides Census Bureau trade data for marine fish products online for the public at <http://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/>. Some species are combined into groups (e.g., sharks), which can limit the value of these data for fisheries management when species-specific information is required. Often the utility of these data are further limited if the ocean area of origin for each product is not distinguished. For example, the HTS code for Atlantic, Pacific, and Indian Ocean bigeye tuna is the same.

#### *HMS Trade Documentation Programs*

NMFS implemented the HMS International Trade Program (ITP) in 2005 (69 FR 67268, November 17, 2004) to identify importers and exporters of HMS products that require trade monitoring documentation (i.e., bluefin tuna, swordfish, and frozen bigeye tuna). Under the ITP, traders in these species and shark fins were required to obtain the International Trade Permit. On August 3, 2016 (81 FR 514126) NMFS replaced the International Trade Permit with the International Fisheries Trade Permit (IFTP), and expanded its scope to include dolphin-safe tuna imports covered by the Tuna Tracking and Verification Program (<https://www.fisheries.noaa.gov/dolphin-safe>) and the trade of Patagonia/Antarctic toothfish, also known as Chilean sea bass (<https://www.fisheries.noaa.gov/national/international-affairs/importing-and-exporting-antarctic-marine-living-resources-and>). This rulemaking also implemented mandatory electronic reporting of import and export documentation per the SAFE Port Act of 2006. On April 1, 2016 (81 FR 18796), NMFS implemented the electronic version of the trade ICCAT bluefin tuna catch documentation (eBCD) program for Atlantic bluefin tuna.

On December 9, 2016, (81 FR 88975) NMFS promulgated the Seafood Import Monitoring Program (SIMP), which added shark and tuna importers to the list of traders required to obtain the IFTP and report trade data to NMFS via ITDS (effective January 1, 2018). Trade monitoring programs established by NMFS for HMS are described in greater detail in the 2011 HMS SAFE Report. Further information on the IFTP and associated reporting requirements is available on the HMS website.

*Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)*

CITES is an international agreement that regulates the global trade in endangered plants and wildlife. The goal of CITES is to protect and regulate species of animals and plants to ensure that commercial demand does not threaten their survival in the wild. Countries cooperate through a system of permits and certificates that confirm the trade of specific species is legal. Species listed on Appendix I of CITES are considered to be at risk of extinction, and are prohibited from international commercial trade, except in special circumstances. Species listed on Appendix II are those that are vulnerable to overexploitation, but not at risk of extinction. In every case of an import or export of an Appendix II species, an export/import permit may only be issued if the export/import will not be detrimental to the survival of the species, the specimen was legally acquired (in accordance with the national wildlife protection laws), and any live specimen will be shipped in a manner which will not cause it any damage. Appendix III includes species for which a country has asked other CITES Parties to help in controlling international trade. The three appendices of CITES can be found on the CITES website: <https://cites.org/>.

Trade in Appendix II species is regulated using CITES export permits issued by the country that listed the species in Appendix II, and certificates of origin issued by all other countries. Changes to the lists of species in Appendix I and II and to CITES resolutions and decisions are made at meetings of the Conference of Parties, which are convened every two to three years. Countries may list species for which they have domestic regulation in Appendix III at any time.

During the seventeenth Conference of the Parties to CITES (CoP17; September 24-October 5, 2016), silky and thresher sharks were added to Appendix II. The listings have a 12 month delayed effective period in order to ensure smooth implementation and went into effect October 2017. During CITES (CoP16), the United States and Brazil cosponsored a successful Columbian proposal to list oceanic whitetip shark under Appendix II. The United States cosponsored this listing because of concerns that over-exploitation to supply the international fin trade negatively affects the population status of this species. Three species of hammerhead shark (scalloped, smooth, and great) were also added to Appendix II during CoP16, where they joined oceanic whitetip shark, along with previously listed whale, basking, and great white sharks. These Appendix II listings were effective September 14, 2014.

On June 27, 2012, the CITES Secretariat sent a notification to the parties regarding the inclusion of two shark species, scalloped hammerhead and porbeagle, in CITES Appendix III, requiring member parties to issue CITES permits or certificates for the import, export, and re-export of these species (or any of their parts or products). It also means that any U.S. import, export, or re-export of these species requires a declaration to and clearance from the U.S. Fish and Wildlife Service. In accordance with provisions of Article XVI paragraph 2 of the CITES Convention,

the inclusion of these species in Appendix III took effect 90 days after the notification (i.e., effective as of September 25, 2012).

### *U.S. Exports of HMS*

“Exports” may include merchandise of both domestic and foreign origin. The Census Bureau defines exports of "domestic" merchandise to include commodities that are grown, produced, or manufactured in the United States (e.g., fish caught by U.S. fishermen). For statistical purposes, domestic exports also include commodities of foreign origin which have been altered in the United States from the form in which they were imported, or which have been enhanced in value by further manufacture in the United States. The value of an export is the FAS (free alongside ship) value defined as the value at the port of export based on a transaction price including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier. It excludes the cost of loading the merchandise, freight, insurance, and other charges or transportation costs beyond the port of export.

### *Shark Exports*

Export data for sharks are gathered by the U.S. Census Bureau, and include trade data for sharks from any ocean area of origin. Shark exports are not categorized to the species level, with the exception of spiny dogfish, and are not identified by specific product code other than fresh or frozen meat and fins. Due to the popular trade in shark fins and their high relative value compared to shark meat, a specific HTS code was assigned to shark fins in 1998. It should be noted that there is no tracking of other shark products besides meat and fins. Therefore, NMFS cannot track trade in shark leather, oil, or shark cartilage products.

Table 3.25 indicates the magnitude and value of shark exports by the United States from 2006 – 2016 (not including smoothhound sharks). The amount and value of exports has been relatively high since 2011, due mostly to large amounts of frozen product. The price per kg for frozen product consistently rose from 2010 to 2014, and reached a high for the time series in 2014. Exports of shark fins were highest in 2009 (56 mt) but have been much lower since then, ranging between 11 and 19 mt for 2011-2016. The price of shark fins was greatest in 2011 (\$100.67/kg).



**Table 3.25 Amount and Value of U.S. Shark Products Exported (2006–2016).** \$ MM – millions of dollars.  
 Note: Exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change. Source: U.S. Census Bureau

Year	Dried Shark Fins			Non-specified Fresh Shark			Non-specified Frozen Shark			Total for All Exports	
	Amount (mt)	Value (\$ MM)	Value (\$/kg)	Amount (mt)	Value (\$ MM)	Value (\$/kg)	Amount (mt)	Value (\$ MM)	Value (\$/kg)	Amount (mt)	Value (\$ MM)
2006	34	3.17	94.66	816	1.62	1.99	747	1.38	1.85	1,597	6.17
2007	19	1.78	93.68	502	1.05	2.09	695	1.35	1.94	1,216	4.18
2008	11	0.69	63.00	559	1.21	2.16	4,122	7.21	1.75	4,692	9.11
2009	56	2.82	50.36	254	0.72	2.83	320	1.33	4.16	630	4.87
2010	36	2.89	80.28	222	0.67	3.02	244	0.52	2.11	502	4.08
2011	15	1.51	100.67	333	0.89	2.66	59	0.22	3.77	407	2.62
2012	11	0.99	91.75	436	1.08	2.47	1,054	4.52	4.28	1,501	6.58
2013	12	0.79	65.63	196	0.57	2.90	1,043	5.21	5.00	1,250	6.57
2014	19	0.98	52.74	218	0.57	2.64	828	5.31	6.41	1,064	6.86
2015	18	1.02	57.97	273	0.66	2.43	930	4.92	5.28	1,221	6.60
2016	11	0.84	46.67	285	0.61	2.14	1,498	7.38	5.10	1,794	8.83

### *U.S. Imports of HMS*

All import shipments must be reported to and cleared by CBP. “General” imports are reported when a commodity enters the country, and “consumption” imports consist of entries into the United States for immediate consumption combined with withdrawals from CBP bonded warehouses. “Consumption” import data reflect the actual entry of commodities originating outside the United States into U.S. channels of consumption. As discussed previously, CBP data for certain products are provided to NMFS for use in implementing consignment document programs. U.S. Census Bureau import data are used by NMFS as well.

### *Shark Imports*

Similar to HMS imports other than bluefin tuna, swordfish, and frozen bigeye tuna, NMFS does not require shark importers to collect and submit information regarding the ocean area of catch. Shark imports are not categorized by species, and lack specific product information on imported shark meat such as the proportion of fillets and steaks. The condition of shark fin imports (e.g., wet, dried, or further processed products such as canned shark fin soup) is not collected. There is no longer a separate tariff code for shark leather, so its trade is not tracked by CBP or Census Bureau data.

Table 3.26 summarizes Census Bureau data on shark imports for 2005 through 2015. Imports of fresh and frozen shark have generally decreased over the time series, but increased slightly in 2016. Imports of shark fins have been variable between a range of 21 mt and 63 mt, and the 2016 amount of 56 mt is the third highest in the time series. As of July 2, 2008, shark fin importers, exporters, and re-exporters are required to be permitted under NMFS’ HMS International Trade Program (ITP) regulations (73 FR 31380). Permitting of shark fin traders was implemented to assist in enforcement and monitoring trade of this valuable commodity.

**Table 3.26 U.S. Imports of Shark Products from All Ocean Areas Combined (2006–2016).** Note: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change. \* In 2012, the product classification “shark fin, dried” in the HTS was renamed “shark fins.” Source: U.S. Census Bureau.

Year	Shark Fins Dried		Non-specified Fresh Shark		Non-specified Frozen Shark		Total for All Imports	
	(mt)	(\$ million)	(mt)	(\$ million)	(mt)	(\$ million)	(mt)	(\$ million)
2006	28	1.38	338	0.68	93	1.35	459	3.41
2007	29	1.68	548	1.03	174	1.04	751	3.75
2008	29	1.74	348	0.72	189	1.88	566	4.34
2009	21	0.97	180	0.37	125	1.50	326	2.83
2010	34	1.18	114	0.33	34	1.16	182	2.66
2011	58	1.79	72	0.22	32	1.20	162	3.21
2012*	43	0.77	88	0.30	9	0.07	141	1.14
2013	63	0.74	153	0.46	3	0.05	219	1.25
2014	35	0.45	105	0.35	8	0.20	146	0.99
2015	24	0.29	88	0.32	21	0.26	133	0.87
2016	56	0.69	67	0.23	108	0.60	231	1.52

### 3.7 Protected Species Interactions and Bycatch in HMS Fisheries

This section summarizes information on protected species and Atlantic HMS fisheries. The 2017 HMS SAFE Report (<https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly>) provides additional information on species protected under the Marine Mammal Protection Act, Endangered Species Act, and Migratory Bird Treaty Act, including a description of the Pelagic Longline Take Reduction Team (<http://www.nmfs.noaa.gov/pr/interactions/trt/pl-trt.html>), Take Reduction Plan, and measures to address protected species concerns. The interaction of seabirds and longline fisheries are also considered under the United States “National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries” (NPOA – Seabirds). Bycatch of HMS in other fisheries is also discussed in the 2017 HMS SAFE Report.

#### 3.7.1 Protected Species – Reinitiation of ESA Section 7 Consultation in HMS Fisheries

On March 31, 2014, NMFS requested reinitiation of Section 7 consultation under the Endangered Species Act (ESA) on the Atlantic pelagic longline fishery. Despite sea turtle takes that were lower than specified in the ITS, leatherback mortality rates and total mortality levels had exceeded the level specified in the reasonable and prudent alternatives (RPAs) in the 2004 biological opinion. Additionally, new information has become available about leatherback and loggerhead sea turtle populations and sea turtle mortality. While the mortality rate measure will be re-evaluated during consultation, the overall ability of the RPA to avoid jeopardy is not affected, and NMFS is continuing to comply with the terms and conditions of the RPA and RPMs pending completion of consultation. NMFS also has confirmed that there will be no irreversible or irretrievable commitment of resources that would foreclose the formulation or

implementation of any reasonable and prudent alternative measures pending completion of consultation, consistent with section 7(d) of the Act.

On July 3, 2014, NMFS issued the final determination to list the Central and Southwest Atlantic Distinct Population Segment (DPS) of scalloped hammerhead shark (*Sphyrna lewini*) as threatened species pursuant to the ESA. On August 27, 2014, NMFS published a final rule to list the following 20 coral species as threatened: five in the Caribbean including Florida and the Gulf of Mexico (*Dendrogyra cylindrus*, *Orbicella annularis*, *O. faveolata*, *O. franksi*, and *Mycetophyllia ferox*); and 15 in the Indo-Pacific (*Acropora globiceps*, *A. jacquelineae*, *A. lokani*, *A. pharaonis*, *A. retusa*, *A. rudis*, *A. speciosa*, *A. tenella*, *Anacropora spinosa*, *Euphyllia paradivisa*, *Isopora crateriformis*, *Montipora australiensis*, *Pavona diffluens*, *Porites napopora*, and *Seriatopora aculeata*). Additionally, in that August 2014 rule, two species that had been previously listed as threatened (*A. cervicornis* and *A. palmata*) in the Caribbean were found to still warrant listing as threatened.

The Central and Southwest Atlantic DPS of scalloped hammerhead sharks and seven Caribbean species of corals have been determined to occur within the management area of Atlantic HMS fisheries. Therefore, on October 30, 2014, NMFS requested reinitiation of ESA Section 7 consultation on the continued operation and use of several HMS gear types (bandit gear, bottom longline, buoy gear, handline, and rod and reel) and associated fisheries management actions in the 2006 Consolidated HMS FMP and its amendments. These management actions were previously consulted on in the 2001 Atlantic HMS biological opinion and the 2012 Shark and Smoothhound biological opinion, to assess potential adverse effects of these gear types on the Central and Southwest DPS of scalloped hammerhead sharks and seven threatened coral species. NMFS has preliminarily determined that the ongoing operation of the fisheries is consistent with existing biological opinions and is not likely to jeopardize the continued existence or result in an irreversible or irretrievable commitment of resources which would foreclose formulation or implementation of any reasonable and prudent alternative measures on the threatened coral species.

With regard to the ongoing reinitiation of ESA Section 7 consultation on the Atlantic pelagic longline fishery, the effects of HMS fishery interactions with the Central and Southwest Atlantic DPS of scalloped hammerhead shark and the seven threatened coral species will be considered in the ongoing pelagic longline consultation. This will most effectively evaluate the effects of the pelagic longline fishery on all listed species in the action area.

### **3.7.2 Interactions and the MMPA**

The MMPA of 1972 as amended is one of the principal Federal statutes guiding marine mammal species protection and conservation policy. In the 1994 amendments, section 118 established the goal that the incidental mortality or serious injury of marine mammals occurring during the course of commercial fishing operations be reduced to insignificant levels approaching a zero mortality rate goal (ZMRG) and serious injury rate within seven years of enactment (*i.e.*, April 30, 2001). In addition, the amendments established a three-part strategy to govern interactions between marine mammals and commercial fishing operations. These include the preparation of marine mammal stock assessment reports, a registration and marine mammal mortality

monitoring program for certain commercial fisheries (Category I and II), and the preparation and implementation of take reduction plans (TRP).

NMFS relies on both fishery-dependent and fishery-independent data to produce stock assessments for marine mammals in the Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea. Draft stock assessment reports are typically published in January and final reports are typically published in the fall. Final stock assessment reports can be obtained on the web at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments> while draft stock assessment reports are available at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports>.

The following list of species outlines the marine mammal species that occur off the Atlantic and Gulf Coasts that are or could be of concern with respect to potential interactions with HMS fisheries.

<b><u>Common Name</u></b>	<b><u>Scientific Name</u></b>
Atlantic spotted dolphin	<i>Stenella frontalis</i>
Blue whale	<i>Balaenoptera musculus</i>
Bottlenose dolphin	<i>Tursiops truncatus</i>
Common dolphin	<i>Delphinis delphis</i>
Fin whale	<i>Balaenoptera physalus</i>
Harbor porpoise	<i>Phocoena</i>
Humpback whale	<i>Megaptera novaeangliae</i>
Killer whale	<i>Orcinus orca</i>
Long-finned pilot whale	<i>Globicephela melas</i>
Minke whale	<i>Balaenoptera acutorostrata</i>
Northern bottlenose whale	<i>Hyperoodon ampullatus</i>
Northern right whale	<i>Eubalaena glacialis</i>
Pantropical spotted dolphin	<i>Stenella attenuata</i>
Pygmy sperm whale	<i>Kogia breviceps</i>
Risso's dolphin	<i>Grampus griseus</i>
Sei whale	<i>Balaenoptera borealis</i>
Short-beaked spinner dolphin	<i>Stenella clymene</i>
Short-finned pilot whale	<i>Globicephela macrorhynchus</i>
Sperm whale	<i>Physeter macrocephalus</i>
Spinner dolphin	<i>Stenella longirostris</i>
Striped dolphin	<i>Stenella coeruleoalba</i>
White-sided dolphin	<i>Lagenorhynchus acutus</i>

Under MMPA requirements, NMFS produces an annual list of fisheries (LOF) that classifies domestic commercial fisheries, by gear type, relative to their rates of incidental mortality or serious injury of marine mammals. The LOF includes three classifications:

1. Category I fisheries are those with frequent serious injury or incidental mortality to marine mammals;
2. Category II fisheries are those with occasional serious injury or incidental mortality; and
3. Category III fisheries are those with remote likelihood of serious injury or known incidental mortality to marine mammals.

The final 2017 MMPA LOF was published on January 12, 2017 (82 FR 3655). The Atlantic Ocean, Caribbean, and Gulf of Mexico large pelagic longline fishery is classified as Category I (frequent serious injuries and mortalities incidental to commercial fishing) and the southeastern Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities). The following Atlantic HMS fisheries are classified as Category III (remote likelihood or no known serious injuries or mortalities): Atlantic tuna purse seine; Gulf of Maine and Mid-Atlantic tuna, shark and swordfish, hook-and-line/harpoon; southeastern Mid-Atlantic and Gulf of Mexico shark bottom longline; and Mid-Atlantic, southeastern Atlantic, and Gulf of Mexico pelagic hook-and-line/harpoon fisheries. Commercial passenger fishing vessel (charter/headboat) fisheries are subject to Section 118 and are listed as a Category III fishery. Recreational vessels are not categorized since they are not considered commercial fishing vessels.

Fishermen participating in Category I or II fisheries are required to register under the MMPA and to accommodate an observer aboard their vessels if requested. Vessel owners or operators, or fishermen, in Category I, II, or III fisheries must report all incidental mortalities and serious injuries of marine mammals during the course of commercial fishing operations to NMFS. There are currently no regulations requiring recreational fishermen to report takes, nor are they authorized to have incidental takes (*i.e.*, they are illegal).

The Pelagic Longline Take Reduction Team (PLTRT) was formed to address the incidental mortality and serious injury of long-finned pilot whales (*Globicephala melas*) and short-finned pilot whales (*Globicephala macrorhynchus*) in the mid-Atlantic region of the Atlantic pelagic longline fishery. Under section 118 of the MMPA, the PLTRT is charged with developing a TRP to reduce bycatch of pilot whales in the Atlantic pelagic longline fishery to a level approaching a zero mortality rate within 5 years of implementation of the plan. The PLTRT developed a final TRP (May 19, 2009, 74 FR 23349) effective June 18, 2009. The TRP implemented a suite of management strategies to reduce mortality and serious injury of pilot whales and Risso's dolphins in the Atlantic pelagic longline fishery. NMFS finalized the following three regulatory measures: (1) establish a Cape Hatteras Special Research Area (CHSRA), with specific observer and research participation requirements for fishermen operating in that area; (2) set a 20-nm (37.02-km) upper limit on mainline length for all pelagic longline sets within the MAB; and (3) require an informational placard on handling and release of marine mammals be displayed both in the wheelhouse and on the working deck of all active pelagic longline vessels in the Atlantic fishery. NMFS also finalized the following non-regulatory measures: (1) increased observer coverage in the MAB to 12-15 percent to ensure representative sampling of pilot whales and

Risso's dolphins; (2) encourage vessel operators to maintain daily communication with other local vessel operators regarding protected species interactions throughout the pelagic longline fishery with the goal of identifying and exchanging information relevant to avoiding protected species bycatch; (3) recommending that NMFS update the guidelines for handling and releasing marine mammals and NMFS and the industry to develop new technologies, equipment, and methods for safer and more effective handling and release of marine mammals; and (4) recommending NMFS pursue research and data collection goals in the PLTRT regarding pilot whales and Risso's dolphins. More information on the PLTRT can be found at <http://www.nmfs.noaa.gov/pr/interactions/trt/pl-trt.html>. The PLTRT last met via webinar in October 2016 to discuss progress on a proposed rule that would modify the take reduction plan.

### **3.7.3 Interactions and the ESA**

The ESA of 1973, as amended (16 U.S.C. 1531 *et seq.*), provides for the conservation and recovery of endangered and threatened species of fish, wildlife, and plants. The listing of a species is based on the status of the species throughout its range or in a specific portion of its range in some instances. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. § 1532(20)] if no action is taken to stop the decline of the species. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. § 1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NMFS, is authorized to list marine and anadromous fish species, marine mammals (except for walrus and sea otter), marine reptiles (such as sea turtles), and marine plants. The Secretary of the Interior, acting through the USFWS, is authorized to list walrus and sea otter, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species.

In addition to listing species under the ESA, the service agency (NMFS or USFWS) generally must designate critical habitat for listed species concurrently with the listing decision to the "maximum extent prudent and determinable" [16 U.S.C. §1533(a)(3)]. The ESA defines critical habitat as those specific areas that are occupied by the species at the time it is listed that are essential to the conservation of a listed species and that may be in need of special consideration, as well as those specific areas that are not occupied by the species that are essential to their conservation. Federal agencies are prohibited from undertaking actions that are likely to destroy or adversely modify designated critical habitat. Below is the list of ESA-listed species within the action area for this action and with which the HMS fisheries that are the subject of this proposed action may interact.

### **Marine Mammals**

	<b><u>Status</u></b>
Blue whale ( <i>Balaenoptera musculus</i> )	Endangered
Fin whale ( <i>Balaenoptera physalus</i> )	Endangered
Humpback whale ( <i>Megaptera novaeangliae</i> )	Endangered
Northern right whale ( <i>Eubalaena glacialis</i> )	Endangered
Sei whale ( <i>Balaenoptera borealis</i> )	Endangered
Sperm whale ( <i>Physeter macrocephalus</i> )	Endangered

### **Sea Turtles**

Green turtle ( <i>Chelonia mydas</i> )	*Endangered/Threatened
Hawksbill sea turtle ( <i>Eretmochelys imbricata</i> )	Endangered
Kemp's ridley sea turtle ( <i>Lepidochelys kempii</i> )	Endangered
Leatherback sea turtle ( <i>Dermochelys coriacea</i> )	Endangered
Loggerhead sea turtle ( <i>Caretta caretta</i> )	Threatened
Olive ridley sea turtle ( <i>Lepidochelys olivacea</i> )	Threatened

### **Critical Habitat**

Northern right whale ( <i>Eubalaena glacialis</i> )	Endangered
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### **Finfish**

Smalltooth sawfish ( <i>Pristis pectinata</i> )	Endangered
Atlantic Sturgeon ( <i>Acipenser oxyrinchus oxyrinchus</i> )	**Endangered/Threatened
Scalloped Hammerhead Shark ( <i>Sphyrna lewini</i> )	***Threatened
Oceanic Whitetip Shark ( <i>Carcharhinus longimanus</i> )	Proposed Threatened
Giant Manta Ray ( <i>Mobula birostris</i> )	Proposed Threatened

\*Green sea turtles in U.S. waters are listed as threatened except for the Florida breeding population, which is listed as endangered. Due to the inability to distinguish between the populations away from the nesting beaches, green sea turtles are considered endangered wherever they occur in U.S. waters.

\*\* Atlantic sturgeon have five distinct population segments. The population in the Gulf of Mexico is considered threatened. The other populations in the New York bight, Chesapeake Bay, Carolina, and South Atlantic are all considered endangered.

\*\*\*Refers to the Central and Southwest Atlantic distinct population segment, the only population of this species that may interact with U.S. Atlantic HMS fisheries.

## **3.7.4 Sea Turtles**

NMFS has taken several significant steps to reduce sea turtle bycatch and bycatch mortality in domestic longline fisheries. On March 30, 2001, NMFS implemented via interim final rule requirements for U.S. flagged vessels with pelagic longline gear on board to have line clippers and dipnets to remove gear on incidentally captured sea turtles (66 FR 17370). Specific handling and release guidelines designed to minimize injury to sea turtles were also implemented. NMFS published a final report which provides the detailed guidelines and protocols (NMFS, 2008c) and a copy can be found at [http://www.sefsc.noaa.gov/turtles/TM\\_NMFS\\_SEFSC\\_580.pdf](http://www.sefsc.noaa.gov/turtles/TM_NMFS_SEFSC_580.pdf).

A biological opinion (BiOp) completed on June 14, 2001, found that the continued operation of the pelagic longline fishery as proposed were likely to jeopardize the continued existence of loggerhead and leatherback sea turtles. It contained RPAs and RPMs to avoid jeopardy and an

incidental take statement identified limited allowable take of listed species. NMFS implemented the RPAs and RPMs/terms and conditions.

On November 28, 2003, based on the conclusion of a three-year experiment in the Northeast Distant (NED) area, and preliminary data that indicated that the Atlantic pelagic longline fishery may have exceeded the Incidental Take Statement in the June 14, 2001 BiOp, NMFS published a Notice of Intent to prepare an SEIS to assess the potential effects on the human environment of proposed alternatives and actions under a proposed rule to reduce sea turtle bycatch (68 FR 66783). A new BiOp for the Atlantic pelagic longline fishery was completed on June 1, 2004 (NMFS, 2004b). The BiOp concluded that long-term continued operation of the Atlantic pelagic longline fishery, authorized under the 1999 FMP, was not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or olive ridley sea turtles; and was likely to jeopardize the continued existence of leatherback sea turtles.

On July 6, 2004, NMFS implemented additional regulations for the Atlantic pelagic longline fishery to further reduce the mortality of incidentally caught sea turtles (69 FR 40734). These measures include requirements on hook type, hook size, bait type, dipnets, line clippers, and safe handling guidelines for the release of incidentally caught sea turtles. These requirements were developed based on the results of the 2001 – 2003 NED experiment (Watson *et al.*, 2003; Watson *et al.*, 2004; Shah *et al.*, 2004). These requirements are predicted to decrease the number of total interactions, as well as the number of mortalities, of both leatherback and loggerhead sea turtles (NMFS, 2004c). Post-release mortality rates are expected to decline due to a decrease in the number of turtles that swallow hooks which engage in the gut or throat, a decrease in the number of turtles that are foul-hooked and improved handling and gear removal protocols. NMFS is working to export this new technology to pelagic longline fleets of other nations to reduce global sea turtle bycatch and bycatch mortality. U.S gear experts have presented this bycatch reduction technology and data from research activities at approximately 15 international events that included fishing communities and resource managers between 2002 and mid-2005 (NMFS, 2005a).

On February 7, 2007, NMFS published a rule that required bottom longline vessels to carry the same dehooking equipment as the pelagic longline vessels. To date, all bottom and pelagic longline vessels with commercial shark permits are required to have NMFS-approved sea turtle dehooking equipment onboard (pelagic longline: July 6, 2004, 69 FR 40734; BLL: February 7, 2007, 72 FR 5639).

A May 20, 2008 BiOp issued under Section 7 of the ESA for Amendment 2 concluded, based on the best available scientific information, that Amendment 2 was 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.

On March 31, 2014, the Office of Sustainable Fisheries (OSF) requested reinitiation of consultation on the pelagic longline BiOp due to new information on mortality rates and total mortality estimates for leatherback turtles that exceed those specified in the reasonable and prudent alternative (RPA); changes in information about leatherback and loggerhead populations; and new information on sea turtle mortality. On October 30, 2014, NMFS



requested reinitiation of ESA Section 7 consultation on the continued operation and use of several HMS gear types (bandit gear, bottom longline, buoy gear, handline, and rod and reel) and associated fisheries management actions in the 2006 Consolidated HMS FMP and its amendments, after Central and Southwest Atlantic DPS of scalloped hammerhead sharks and seven Caribbean species of corals were determined to occur within the management area of Atlantic HMS fisheries. See above in this section for more information on reinitiation of ESA Section 7 consultation in HMS fisheries.

Internationally, the United States is pursuing sea turtle conservation through international, regional, and bilateral organizations such as ICCAT, the Asia Pacific Fishery Commission, and FAO Committee on Fisheries (COFI). At the 24<sup>th</sup> session of COFI held in 2001, the United States distributed a concept paper for an international technical experts meeting to evaluate existing information on turtle bycatch, to facilitate and standardize collection of data, to exchange information on research, and to identify and consider solutions to reduce turtle bycatch. COFI agreed that an international technical meeting could be useful despite the lack of agreement on the specific scope of that meeting. The United States has developed a prospectus for a technical workshop to address sea turtle bycatch in longline fisheries as a first step. Other gear-specific international workshops may be considered in the future. More information on sea turtle bycatch mitigation can be found in Chapter 8 of the 2017 HMS SAFE Report (<https://www.fisheries.noaa.gov/resource/document/2017-stock-assessment-and-fishery-evaluation-safe-report-atlantic-highly>).

### **3.7.5 Interactions with Seabirds**

Gannets, gulls, greater shearwaters, and storm petrels are occasionally hooked by Atlantic pelagic longline gear. These species and all other seabirds are protected under the Migratory Bird Treaty Act. The majority of longline interactions with seabirds occur as the gear is being set. The birds eat the bait and become hooked on the line. The line then sinks and the birds are subsequently drowned.

The NPOA-Seabirds (<https://www.st.nmfs.noaa.gov/Assets/nationalseabirdprogram/npoa.pdf>) was released in February 2001, and calls for detailed assessments of longline fisheries, and, if a problem is found to exist within a longline fishery, for measures to reduce seabird bycatch within two years. Because interactions appear to be relatively low in Atlantic HMS fisheries, such measures have not been necessary. The 2014 Report on the Implementation of the United States National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries was submitted to the UN FAO in June 2014 and can be found at [https://www.st.nmfs.noaa.gov/Assets/nationalseabirdprogram/longline\\_fisheries.pdf](https://www.st.nmfs.noaa.gov/Assets/nationalseabirdprogram/longline_fisheries.pdf).

### **3.7.6 Effectiveness of Existing Time/Area Closures in Reducing Bycatch**

Since 2000, NMFS has implemented a number of time/area closures and gear restrictions in the Atlantic Ocean and Gulf of Mexico to reduce discards and bycatch of a number of species (e.g., juvenile swordfish, bluefin tuna, billfish, sharks, sea turtles) in the pelagic longline fishery. Circle hooks are required for the entire pelagic longline fishery since July 2004. In the Gulf of

Mexico, only “weak” circle hooks may be used in order to reduce the bycatch of spawning bluefin tuna. The effectiveness of the closures and combined closures and circle hook requirement, as evidenced by the amount of bycatch, are summarized in this section. A brief summary of the prohibition of live bait in the Gulf of Mexico pelagic longline fishery is available in the 2011 HMS SAFE Report. Amendment 7, effective January 1, 2015, implemented GRAs for the pelagic longline fishery in the Gulf of Mexico and Atlantic in order to reduce interactions between pelagic longline gear and bluefin tuna. The Amendment 7 Gulf of Mexico GRAs prohibit the use of pelagic longline gear during April and May, and the Amendment 7 Cape Hatteras GRA provides conditional access to the area for vessels fishing with pelagic longline during December through April.

The combined effects of the individual area closures and gear restrictions were examined by comparing the reported catch and discards from 2005-2016 to the averages for 1997-1999 throughout the entire U.S. Atlantic fishery. Previous analyses attempted to examine the effectiveness of the time/area closures only by comparing the 2001-2003 reported catch and discards to the base period (1997-1999) chosen and are included here as well for reference. The percent changes in the reported numbers of fish caught and discarded were compared to the predicted changes from the analyses in Regulatory Amendment 1 to the 1999 FMP (NMFS 2000).

The reported distribution of effort by area over the same time periods was also examined for changes in fishing behavior (Table 3.27). Overall, total reported effort decreased by 25.3 percent from 1997-1999 to 2005-2016. Increases in the number of hooks set were noted in three areas. The Sargasso (SAR) area exhibited increases in reported effort more than ten-fold from the period 1997-1999; however, this effort represents only 2.8 percent of the overall effort reported in the fishery. Effort increased in the Florida East Coast (FEC) area by 14.4 percent and in the South Atlantic Bight (SAB) by 9.5 percent. The reported effort in the Mid-Atlantic Bight (MAB) decreased slightly from what was reported in 1997-99 (2.2 percent decrease). Reported effort declined by 32 – 91 percent in all other areas. Large declines of 62.9 percent in the Tuna North and Tuna South combined area (SAT) and 80.6 percent in the Caribbean (CAR) were reported; however these represent less than three percent and less than one percent of total reported effort, respectively. The Gulf of Mexico (GOM), representing almost 35 percent of the total reported effort, declined 33.9 percent after a brief increase of reported hooks set between 2012 and 2014.

The percent changes in the reported numbers of fish caught and discarded were compared to the predicted changes from the analyses in Regulatory Amendment 1 to the 1999 FMP (NMFS 2000). Declines were noted in both the numbers of kept and discards of almost all species examined including swordfish, tunas, sharks, billfish, and sea turtles. The only positive changes from the base period were the numbers of bluefin tuna and dolphin kept and bluefin tuna, large coastal sharks, and spearfish discards (Table 3.28 and Table 3.29). The reported number of bluefin tuna kept increased by 56.2 percent for 2005-2016 compared to 1997-1999 (Table 3.28). The number of reported discards (live and dead) of bluefin tuna decreased by 5.9 percent between the same time periods, which is less than the predicted 10.7 percent increase from the analyses in Regulatory Amendment 1. The number of dolphin kept increasing by 10.4 percent between time periods (Table 3.29). Reported billfish (blue and white marlin, sailfish) discards

decreased by 37-60 percent from 1997-1999 to 2005-2016 (Table 3.29). The reported discards of spearfish increased by 55.4 percent, although the absolute number of discards was low. The reported number of turtle interactions decreased by 70.8 percent from 1997-1999 to 2005-2016 (Table 3.29). The reported declines in swordfish kept and discarded, large coastal sharks kept, and BAYS tunas kept decreased more than the predicted values developed for Regulatory Amendment 1. Reported discards of pelagic sharks, all billfish (with the exception of spearfish for which no predicted change was developed in Regulatory Amendment 1), and turtle interactions also declined more than the predicted values. The number of LCS discards increased by 12.9 percent from 1997-1999 to 2005-2016 (Table 3.29).

Concern over the status of bluefin tuna and the effects of the pelagic longline fishery on bluefin tuna led to a re-examination of a previous analysis that compared the reported catch and discards of select species or species groups from the MAB and Northeast Coastal (NEC) areas to that reported from the rest of the fishing areas (Table 3.30 and Table 3.31). The number of bluefin tuna discards reported from the MAB/NEC increased from 2006-2010 but decreased beginning in 2011 and has remained low through 2015. However, the reported number of bluefin tuna kept in these areas increased in 2016 to 245 and the reported discards also increased (Table 3.30). There appears to be an inverse relationship of the number of bluefin kept and discarded in the MAB/NEC compared to the reported hooks set from 2015 to 2016. Reported effort (hooks set) decreased 21.1 percent from 2015 to 2016, while the number of bluefin kept increased from 74 to 245 and discards increased from 146 to 449. Reporting accuracy may also have improved with the implementation of electronic monitoring under Amendment 7.

The time/area closures and live bait prohibition in the Gulf of Mexico have been successful at reducing bycatch in the HMS pelagic longline fishery. Reported discards of all species of billfish except spearfish have declined. The reported number of turtles caught, swordfish discarded, and pelagic and large coastal shark discards have also declined. However, the number of bluefin tuna kept and discarded (live and dead) has increased in 2016. Declines were noted for both the numbers of kept and discards of almost all species examined including swordfish, tunas, pelagic sharks, billfish, and sea turtles. The only positive changes from the base period were the numbers of bluefin tuna and dolphin kept, and spearfish and large coastal shark discards. Declines were noted for both the numbers of kept and discards of almost all species examined including swordfish, tunas, pelagic sharks, billfish, and sea turtles. The only positive changes from the base period were the numbers of bluefin tuna and dolphin kept, and spearfish and large coastal shark discards.

**Table 3.27**      **Reported distribution of hooks set by area, 1997-2016, and percent change since 1997-99.** Note: (A) and (B) are average values for the years indicated. CAR – Caribbean; GOM - Gulf of Mexico; FEC - Florida East Coast; SAB - South Atlantic Bight; MAB - Mid-Atlantic Bight; NEC - Northeast Coastal; NED - Northeast Distant; SAR - Sargasso; NCA - North Central Atlantic; SAT - Tuna North & Tuna South. Source: HMS Logbook.

Year	CAR	GOM	FEC	SAB	MAB	NEC	NED	SAR	NCA	SAT	Total
<b>1997-99</b>	328,110	3,346,298	722,580	813,111	1,267,409	901,593	511,431	14,312	191,478	436,826	8,533,148
<b>(A) 2001-03</b>	175,195	3,682,536	488,838	569,965	944,929	624,497	452,430	76,130	222,070	127,497	7,364,086
<b>2004</b>	298,129	4,118,468	264,524	672,973	856,521	462,171	455,862	128,582	20,990	47,730	7,325,950
<b>2005</b>	180,885	3,037,968	323,551	467,680	835,091	356,696	462,490	110,107	55,716	92,382	5,922,566
<b>2006</b>	73,774	2,577,231	281,239	544,647	1,085,640	406,199	339,586	135,575	64,500	153,620	5,662,011
<b>2007</b>	32,650	2,914,475	345,486	737,873	1,319,056	326,532	285,827	100,336	11,409	207,598	6,281,242
<b>2008</b>	87,190	2,368,381	642,846	846,984	1,423,136	579,244	224,635	147,969	16,148	152,763	6,489,246
<b>2009</b>	34,783	3,037,197	830,348	847,525	1,199,657	481,110	262,003	107,172	0	179,152	6,978,947
<b>2010</b>	77,710	1,005,764	1,097,9	1,002,7	1,295,242	657,892	211,465	141,713	3,096	235,553	5,729,112
<b>2011</b>	29,600	1,247,892	1,129,5	984,858	1,330,542	665,706	173,038	206,923	11,270	135,069	5,914,453
<b>2012</b>	7,200	2,655,468	1,285,0	937,946	1,513,367	787,681	127,044	171,177	3,300	190,211	7,678,454
<b>2013</b>	38,090	2,304,802	1,239,3	1,185,4	1,450,434	516,159	152,896	242,920	11,758	164,079	7,305,897
<b>2014</b>	21,390	2,219,684	1,171,4	1,133,6	1,232,857	507,525	343,220	367,598	10,530	117,377	7,125,223
<b>2015</b>	30,435	1,465,502	926,512	1,046,0	1,207,746	519,349	225,011	277,506	13,250	144,648	5,855,977
<b>2016</b>	158,359	1,618,640	625,484	947,527	982,870	378,990	210,031	116,920	17,650	161,116	5,217,547
<b>(B) 2005-16</b>	64,356	2,212,261	85426.7	890,390	1,240,155	515,305	267,784	177,460	17,811	162,183	6,374,484
<b>% diff (A)</b>	-46.6	10.0	-32.3	-29.9	-25.4	-30.7	-11.5	431.9	16.0	-70.8	-13.7
<b>% diff (B)</b>	-80.4	-33.9	14.4	9.5	-2.2	-42.8	-47.6	1,140.0	-90.7	-62.9	-25.3

**Table 3.28** Number of swordfish, bluefin tuna, yellowfin tuna, bigeye tuna, total BAYS (bigeye, albacore, yellowfin and skipjack tuna), reported landed or discarded in the U.S. Atlantic pelagic longline fishery, 1997 – 2016, and percent change from 1997-99. Note: (A) and (B) are average values for the years indicated. Predicted values from Regulatory Amendment 1, where Pred <sup>1</sup> = without redistribution of effort, Pred <sup>2</sup> = with redistribution of effort. Source: HMS Logbook.

Year	Number of Hooks Set (x1000)	Swordfish Kept	Swordfish Discards	Bluefin Tuna Kept	Bluefin Tuna Discards	Yellowfin Tuna Kept	Yellowfin Tuna Discards	Bigeye Tuna Kept	Bigeye Tuna Discards	Total BAYS Kept	Total BAYS Discards
<b>1997-99</b>	8,533.1	69,131	21,519	238	877	72,342	2,489	21,308	1,133	101,477	4,224
<b>(A) 2001-03</b>	7,364.1	50,838	13,240	212	607	55,166	1,827	13,524	395	76,116	3,069
<b>2004</b>	7,325.9	46,950	10,704	476	1,031	64,128	1,736	8,266	486	77,989	3,452
<b>2005</b>	5,922.6	41,239	11,158	376	766	43,833	1,316	8,383	369	57,237	2,545
<b>2006</b>	5,662.0	38,241	8,900	261	833	55,821	1,426	12,491	257	73,058	2,865
<b>2007</b>	6,290.6	45,933	11,823	357	1,345	56,062	1,452	8,913	249	70,390	3,031
<b>2008</b>	6,498.1	48,000	11,194	343	1,417	33,774	1,717	11,254	356	50,108	3,427
<b>2009</b>	6,978.9	45,378	7,484	629	1,290	40,912	1,701	10,379	397	57,461	3,555
<b>2010</b>	5,729.1	33,813	6,107	392	1,488	32,567	748	12,561	476	51,786	1,590
<b>2011</b>	5,914.5	38,012	8,510	355	764	40,993	728	16,338	453	68,401	2,850
<b>2012</b>	7,678.5	51,544	7,996	392	563	59,188	1,046	14,841	459	84,707	3,113
<b>2013</b>	7,305.9	44,556	4,765	273	266	39,988	941	15,472	513	67,073	2,376
<b>2014</b>	7,125.2	32,908	4,655	379	380	41,799	647	17,020	459	73,339	1,973
<b>2015</b>	5,855.9	27,730	5,382	320	210	28,346	1,412	16,236	519	54,734	3,117
<b>2016</b>	5,217.6	24,456	4,427	411	582	36,807	3,658	11,835	1,064	56,978	7,898
<b>(B) 2005-16</b>	6,374.5	39,171	7,729	372	826	42,600	1,399	12,986	464	63,885	3,198
<b>% dif (A)</b>	-13.7	-26.5	-38.5	-10.9	-30.8	-23.7	-26.6	-36.5	-65.1	-25.0	-27.3
<b>% dif (B)</b>	-25.3	-43.3	-64.1	56.2	-5.9	-41.1	-43.8	-39.1	-59.0	-37.0	-24.3
<b>Pred <sup>1</sup></b>		-24.6	-41.5		-1.0					-5.2	
<b>Pred <sup>2</sup></b>		-13.0	-31.4		10.7					10.0	

**Table 3.29** Number of pelagic sharks, large coastal sharks, dolphinfish, and wahoo reported landed or discarded and number of billfish (blue and white marlin, sailfish, spearfish) and sea turtles reported caught and discarded in the U.S. Atlantic pelagic longline fishery, 1997 – 2015, and percent changes since 1997-99. Note: (A) and (B) are average values for the years indicated. Predicted values from Regulatory Amendment 1 where Pred <sup>1</sup> = without redistribution of effort, Pred <sup>2</sup> = with redistribution of effort. Source: HMS Logbook.

Year	Pelagic Sharks Kept	Pelagic Shark Discards	Large Coastal Sharks Kept	Large Coastal Shark Discards	Dolphinfish Kept	Dolphinfish Discards	Wahoo Kept	Wahoo Discards	Blue Marlin Discards	White Marlin Discards	Sailfish Discards	Spearfish Discards	Sea Turtles
<b>1997-99</b>	3,898	52,093	8,860	6,308	39,711	608	5,172	175	1,621	1,973	1,342	213	596
<b>(A) 2001-03</b>	3,237	23,017	5,306	4,581	29,361	322	3,776	74	815	1,045	341	139	429
<b>2004</b>	3,460	25,414	2,304	5,144	39,561	295	4,674	35	713	1,060	425	172	370
<b>2005</b>	3,150	21,560	3,365	5,881	25,709	556	3,360	280	569	990	367	155	154
<b>2006</b>	2,098	24,113	1,768	5,326	25,658	1,041	3,608	100	439	557	277	142	128
<b>2007</b>	3,504	27,478	546	7,133	68,124	467	3,073	52	611	744	321	147	300
<b>2008</b>	3,500	28,786	115	6,732	43,511	404	2,571	82	686	669	505	196	476
<b>2009</b>	3,060	33,721	403	6,672	62,701	433	2,648	81	1,013	1,064	774	335	137
<b>2010</b>	3,872	45,511	434	6,726	30,454	174	749	26	504	605	312	212	94
<b>2011</b>	3,694	43,778	130	6,085	29,442	335	1,848	50	539	921	556	281	66
<b>2012</b>	2,794	23,038	86	7,716	42,445	432	3,121	92	843	1,432	767	270	61
<b>2013</b>	3,394	28,800	50	8,629	34,250	181	2,721	59	844	1,239	456	342	92
<b>2014</b>	3,851	38,496	47	5,880	63,217	205	3,235	74	718	1,580	445	306	93
<b>2015</b>	2,208	45,082	50	8,839	53,526	1,413	1,563	163	990	2,855	715	837	357
<b>2016</b>	2,172	27,900	50	9,549	46,376	1,108	1,766	180	1,050	2,153	855	745	228
<b>(B) 2005-16</b>	3,142	34,701	587	4,025	43,846	564	2,528	104	739	1,236	533	331	174
<b>% diff (A)</b>	-17.0	-55.8	-40.1	-27.4	-26.1	-47.0	-27.0	-57.7	-49.7	-47.0	-74.6	-34.7	-28.0
<b>% diff (B)</b>	-19.4	-33.4	-93.4	-36.2	10.4	-7.3	-51.1	-40.6	-54.4	-37.3	-60.3	66.4	-70.8
<b>Pred <sup>1</sup></b>	-9.5	-2.0	-32.1	-42.5	-29.3				-12.0	-6.4	-29.6		-1.9
<b>Pred <sup>2</sup></b>	4.1	8.4	-18.5	-33.3	-17.8				6.5	10.8	-14.0		7.1

**Table 3.30** Number of Bluefin Tuna, Swordfish, Pelagic and Large Coastal Sharks, Billfish, and Sea Turtles Reported Kept and/or Discarded in the Mid-Atlantic Bight and Northeast Coastal Areas Combined (1997-2016). Note: BFT - Bluefin tuna; SWO – Swordfish; PEL – Pelagic sharks; LCS - Large coastal sharks; MAB - Mid-Atlantic Bight; NEC - Northeast Coastal. Source: HMS Logbook.

Year	Hooks Set (x1000)	BFT Kept	BFT Discards	SWO Kept	SWO Discards	PEL Shark Kept	PEL Shark Discards	LCS Kept	LCS Discards	Billfish Discards	Sea Turtle Interactions
1997	2,441.1	96	583	6,330	3,663	3,062	40,515	6,670	958	803	52
1998	2,207.4	94	1,157	9,684	4,923	2,143	28,579	1,781	890	401	57
1999	1,858.5	70	335	8,213	4,331	1,680	12,479	1,966	736	818	174
2000	1,645.4	26	356	8,748	2,846	2,099	13,083	4,744	1,407	240	30
2001	1,975.3	45	200	10,661	4,000	2,537	9,013	4,383	997	310	69
2002	1,582.3	18	389	10,986	4,219	2,378	7,308	2,331	1,207	311	41
2003	1,150.7	67	471	10,888	3,022	2,222	6,929	2,787	1,429	172	42
2004	1,318.7	128	709	8,486	2,463	2,323	7,594	923	1,488	219	54
2005	1,191.8	96	575	9,184	2,420	1,912	7,026	2,512	2,433	473	44
2006	1,491.8	124	737	10,278	2,564	1,428	7,547	1,279	2,180	266	28
2007	1,645.6	137	1,148	14,102	3,082	2,313	8,169	431	2,861	407	55
2008	2,002.5	143	1,133	13,208	3,199	2,695	9,541	63	1,781	320	100
2009	1,608.8	137	952	12,657	1,896	2,256	14,113	206	2,210	299	16
2010	1,953.1	155	1,301	9,090	1,546	3,326	17,033	408	2,293	376	32
2011	1,996.3	168	583	9,995	2,474	2,793	19,867	90	1,809	497	28
2012	2,301.1	102	270	12,597	1,396	2,199	13,535	9	1,972	650	16
2013	1,966.6	55	107	9,806	2,766	2,711	17,958	9	1,366	693	31
2014	1,740.4	104	122	5,027	1,015	3,115	16,405	6	1,050	710	18
2015	1,727.1	74	146	6,637	2,235	1,795	17,625	8	3,668	1,888	256
2016	1,361.9	245	449	4,707	1,489	1,799	15,046	19	4,170	1,023	98

**Table 3.31** Number of Bluefin Tuna, Swordfish, Pelagic and Large Coastal Sharks, Billfish, and Sea Turtles Reported Kept and/or Discarded in All Areas Other than the Mid-Atlantic Bight and Northeast Coastal (1997-2016). Note: BFT - Bluefin tuna; SWO – Swordfish; PEL – Pelagic sharks; LCS - Large coastal sharks; MAB - Mid-Atlantic Bight; NEC - Northeast Coastal. Source: Fisheries Logbook System.

Year	Hooks Set (x1000)	BFT Kept	BFT Discards	SWO Kept	SWO Discards	PEL Shark Kept	PEL Shark Discards	LCS Kept	LCS Discards	Billfish Discards	Turtle Interactions
1997	7,233.5	111	123	62,892	16,892	2,048	41,507	7,076	6,911	6,091	215
1998	5,823.9	143	164	60,943	18,422	1,588	16,682	4,677	4,687	3,364	833
1999	6,035.1	200	269	59,331	16,325	1,172	16,516	4,409	4,741	3,968	458
2000	6,376.5	210	382	54,787	13,860	969	14,965	3,014	5,320	3,394	241
2001	5,767.0	138	148	38,575	10,448	974	14,941	2,127	3,895	1,723	352
2002	5,647.3	160	204	39,453	8,963	693	15,160	1,746	2,761	2,866	426
2003	5,969.7	208	410	41,950	9,067	907	14,842	2,565	3,453	1,641	357
2004	6,007.3	348	322	38,464	8,241	1,137	17,820	1,381	3,656	2,151	316
2005	4,730.8	280	191	32,055	8,738	1,238	14,534	853	3,448	1,608	110
2006	4,170.2	137	96	27,963	6,336	670	16,566	489	3,146	1,149	100
2007	4,645.1	200	197	31,831	8,741	1,191	19,309	115	4,272	1,416	245
2008	4,495.7	200	284	29,592	7,995	805	19,245	52	4,951	1,736	376
2009	5,298.2	492	338	32,721	5,588	804	16,608	197	4,462	2,887	121
2010	3,775.9	237	187	24,723	4,561	546	28,478	26	4,433	1,257	62
2011	3,918.2	187	181	28,017	6,036	901	23,911	40	4,276	1,800	38
2012	5,377.4	290	293	38,947	6,600	595	9,503	77	5,744	2,743	45
2013	5,339.3	218	159	34,750	2,583	683	9,842	41	7,263	2,190	61
2014	5,384.8	275	258	27,881	3,640	689	22,101	41	4,855	2,339	77
2015	4,128.9	246	64	21,093	3,147	413	27,457	42	5,171	3,509	101
2016	3,855.7	166	133	19,749	2,938	373	12,854	31	5,379	3,780	130



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## 4.0 Environmental Consequences of Alternatives

As described earlier, NMFS has developed management measures in this EIS to address overfishing of shortfin mako sharks, develop and implement management measures consistent with ICCAT Recommendation 17-08, and take steps towards rebuilding the shortfin mako shark stock. This chapter details the environmental effects of the alternatives.

### 4.1 Ecological Evaluation

#### 4.1.1 Commercial Alternatives

NMFS is considering and analyzing several commercial alternatives that would reduce shortfin mako shark mortality and meet the objectives stated in Chapter 1.0. The alternatives, which are listed below, range from maintaining the status quo under the No Action alternative to prohibiting commercial shortfin mako shark landings.

Alternative A1: No Action. Keep the non-emergency rule regulations for shortfin mako sharks.

*Alternative A2: Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and there is a functional electronic monitoring system on board the vessel. – Preferred Alternative*

Alternative A3: Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and only if the permit holder agrees to allow the Agency to use electronic monitoring to verify landings of shortfin mako sharks.

Alternative A4: Allow retention of live or dead shortfin mako sharks by persons with a Directed or Incidental shark LAP only if the shark is over 83 inches FL and there is a functional electronic monitoring system or observer on board the vessel to verify the fork length of the shark before the shark is dressed.

Alternative A5: Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and there is an observer on board the vessel to verify the shark was dead at haulback

Alternative A6: Prohibit the commercial landing of all shortfin mako sharks, live or dead.

#### **Alternative A1**

Under Alternative A1, NMFS would not implement any new management measures in commercial HMS fisheries. Once the emergency interim final rule for shortfin mako sharks expires, management measures would revert to those in effect prior to March 2, 2018 (e.g., no requirement to release shortfin mako sharks that are alive at haulback). Directed and incidental shark limited access permit (LAP) holders would continue to be allowed to land and sell shortfin

mako sharks to an authorized dealer, subject to current limits, including the pelagic shark commercial quota.

Based on the results of the 2017 stock assessment, NMFS has determined that North Atlantic shortfin mako sharks are overfished and experiencing overfishing. If no management measures are implemented to reduce fishing mortality, overfishing would continue and the stock could not begin to rebuild. Thus, Alternative A1 would result in short- and long-term direct minor adverse ecological impacts to the North Atlantic shortfin mako stock. Recommendation 17-08, based on input from the SCRS, states that shortfin mako shark catches of 500 mt or less would stop overfishing and begin to rebuild the stock. Since the United States is responsible for approximately 11 percent (379 mt ww) of Atlantic-wide shortfin mako fishing mortality, overfishing cannot be stopped solely through domestic regulations. However, if the United States does not reduce fishing mortality in domestic commercial fisheries, overall rebuilding efforts could be hampered. If stock health continues to decline, future stock assessments may advise no fishing mortality immediately, which could result in severely reduced access to the stock for U.S. fishermen and restrictions in fisheries that interact with the species. Furthermore, failure to implement Recommendation 17-08 and address overfishing of shortfin mako sharks would be inconsistent with ATCA and may result in ICCAT penalties or restrictions specific to the United States for non-compliance. Lack of action would also be inconsistent with the Magnuson-Stevens Act requirement to end overfishing and to implement a rebuilding plan within two years of determining a species is overfished and experiencing overfishing.

Indirect short- and long-term ecological impacts to other species caught in the relevant fisheries would likely be neutral. The primary gears associated with the capture of shortfin mako sharks are pelagic longline and rod and reel, and no changes would occur under the No Action alternative. Thus, cumulative ecological impacts would be minor adverse. Because this alternative would not reduce the U.S. contribution to shortfin mako shark mortality, NMFS does not prefer this alternative at this time.

#### **Alternative A2– Preferred Alternative**

Under Alternative A2, the preferred alternative, retention of shortfin mako sharks would only be allowed if the following three criteria are met: 1) the vessel has been issued a Directed or Incidental shark LAP, 2) the shark is dead at haulback, and 3) there is a functional electronic monitoring system on board the vessel. This alternative is designed to be consistent with one of the limited provisions allowing retention of shortfin mako sharks under ICCAT Recommendation 17-08. Under the current HMS regulations, all HMS permitted vessels that fish with pelagic longline gear are already required to have a functional electronic monitoring system (79 FR 71510; December 2, 2014) and either a Directed or an Incidental shark LAP. Vessels utilizing other gear types (i.e., gillnet or bottom longline) are not required to have an electronic monitoring system under current regulations but could choose to install one if the operator wishes to retain shortfin mako sharks that are dead at haulback and if the vessel holds a commercial shark LAP. Under this alternative, the electronic monitoring system would be used to verify the disposition of shortfin mako sharks at haulback to ensure that only sharks dead at haulback were retained.

This alternative would reduce the number of landings by pelagic longline vessels on average by 75 percent, based on Pelagic Observer Program data showing that on average 75 percent of

shortfin mako sharks are alive upon capture on pelagic longline vessels (Table 3.9). However, Alternative A2 would not reduce the number of shortfin mako shark interactions by commercial pelagic longline gear. On average, pelagic longline vessels interact annually with 2,902 shortfin mako sharks (Table 3.5). Under Alternative A2, fishermen would be required to release all shortfin mako sharks that are brought to the vessel alive.

Based on HMS logbook data, 85 percent of shortfin mako sharks caught are kept and landed by fishermen with pelagic longline gear, while 14 percent are discarded alive and 1 percent are discarded dead (Table 3.5). This Alternative would require fishermen with pelagic longline gear to release the majority of the shortfin mako sharks caught; only a small portion of shortfin mako sharks could be retained (those that are dead at haulback). These landings reductions are not directly reflective of the total mortality reduction that could be expected from these measures. The mortality reductions would be less than the percentages identified once post-release mortality is considered. The post-release mortality rate for pelagic longline gear has been estimated to be approximately 30 percent (Campana et al., 2016; SCRS 2017). This means that approximately 30 percent of the individuals released from pelagic longline gear are expected to die as a result of the interaction. NMFS does not have post-release mortality rate estimates for other gears.

Alternative A2 would likely result in short- and long-term direct minor beneficial ecological impacts because shortfin mako sharks caught by U.S. fishermen on pelagic longline that are alive at capture would be released. Additionally, indirect short- and long-term ecological impacts to other species caught in the relevant fisheries would likely be neutral because pelagic longline fishermen target those species and would continue targeting them regardless of this alternative. Thus, no change to overall effort is expected and indirect ecological impacts are likely neutral. When considered in the context of management measures in the past, present, and foreseeable future, and the fact that U.S. shortfin mako shark landings are a small percentage of total North Atlantic-wide landings, the cumulative impacts of Alternative A2 would be minor and beneficial. The analysis above takes into account past and present management measures while discussing ecological impacts. Because this alternative reduces shortfin mako shark mortality without having any negative ecological impacts, NMFS prefers this alternative at this time.

### **Alternative A3**

Alternative A3 is similar to Alternative A2 except that the ability to retain dead shortfin mako sharks would be limited to permit holders that opt in to a program that would use the existing electronic monitoring systems, which are currently used in relation to the bluefin tuna IBQ program, also to verify the disposition of shortfin mako sharks at haulback. In other words, this alternative would allow for retention of shortfin mako sharks that are dead at haulback by persons with a Directed or Incidental shark LAP only if permit holders opt in to enhanced electronic monitoring coverage. If the permit holder does not opt in to the enhanced electronic monitoring coverage, they could not retain any shortfin mako sharks.

Based on observer data, an average of 75 percent of shortfin mako sharks are alive at haulback (Table 3.9). Thus, this alternative would reduce landings of shortfin mako sharks in the pelagic longline fishery by 75 percent, under current fishing practices. NMFS does not expect the

fishing practices or interaction rate to change in the pelagic longline fishery. In addition, if some commercial vessels do not opt into the program, those vessels would not be able to retain any shortfin mako sharks, and landings would be further reduced.

Commercial vessels with other gear types, such as bottom longline, gillnet, or handgear, could land shortfin mako sharks only if they opt into using an electronic monitoring system to verify sharks are dead at haulback. However, the magnitude of shortfin mako landings by these gear types is very small (less than 1 percent of total landings, or approximately 3 percent combined) compared to pelagic longline (Table 4.1). Based on observer and logbook data, nearly all longline landings of shortfin mako sharks are from fishermen using pelagic longline gear, rather than bottom longline gear (Table 3.8 and Table 4.1). Due to the high cost of electronic monitoring compared to the relatively low number of shortfin mako sharks that are even caught on these other gear types, it is reasonable to expect that fishermen using these other gear types will not install electronic monitoring cameras and therefore would not be able to retain shortfin mako sharks under this alternative. Thus, this measure would reduce commercial landings an additional 3 percent, bringing the total commercial landings reduction under this alternative to approximately 77 percent.

**Table 4.1** Shortfin mako shark commercial landings by gear type, 2013-2016. Source: HMS eDealer database, which includes some uncertainty in gear type reporting.

Gear Type	Total Landed Weight (lb dw)	Percent of Total
Longline (Pelagic and Bottom)	700,263	97.26%
Gillnets	7,914	1.10%
Hook and Line	7,180	1.00%
Hand Line	2,758	0.38%
Other/Unknown	1,906	0.26%

As described under Alternative A1, these landings reductions are not directly reflective of the total mortality reduction that could be expected from these measures given post-release mortality. The post-release mortality rate for pelagic longline gear has been estimated to be approximately 30 percent (Campana et al., 2016; SCRS 2017), but is unknown in other gear types.

This alternative would likely result in short- and long-term direct minor beneficial ecological impacts, similar to the preferred alternative (Alternative A2). This alternative would result in large numbers of live releases of shortfin mako sharks that would otherwise have been retained and landed. Indirect short and long-term ecological impacts to other species caught in the relevant fisheries would likely be neutral. The primary gears associated with the capture of shortfin mako sharks are pelagic longline and rod and reel, shortfin mako sharks are rarely targeted in the commercial fisheries. Thus, no change to overall effort is expected and indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, and the fact that U.S. shortfin mako shark landings are a small percentage of total North



Atlantic-wide landings, the cumulative impacts of Alternative A3 would be minor and beneficial. The analysis above takes into account past and present management measures while discussing ecological impacts.

This alternative would remove, from a portion of pelagic longline vessels, the ability to retain dead shortfin mako sharks as a benefit of running required electronic monitoring systems. Requiring commercial fishermen to opt in or out of an electronic monitoring program for shortfin mako sharks would be an additional burden on the fishermen that would not have any measurable conservation or management benefits. The program would also be complicated to administer and would create two separate data streams from within the fleet, as some vessels and catch would be compared and analyzed differently due to different regulatory restrictions. Because of these complications and because the ecological impacts of this Alternative is similar to that of Alternative A2, NMFS does not prefer this alternative at this time.

#### **Alternative A4**

This alternative would establish a commercial minimum size of 83 inches FL (210 cm FL) for retention of shortfin mako sharks caught incidentally during fishing for other species, whether the shark is dead or alive at haulback and regardless of sex.

The majority of commercial shortfin mako shark interactions occur in the pelagic longline fishery, but commercial gillnet, bottom longline, and handgear fisheries also interact with shortfin mako sharks (Table 3.8 and Table 4.1). As described above, all HMS permitted pelagic longline vessels are required to have an electronic monitoring system on board the vessel. In the case of an electronic monitoring system, the vessel owner or operator would be required to designate a measuring area on the vessel with to assist with validating the 83 inch FL minimum size for shortfin mako sharks, which must be in view of the processing area camera. Commercial vessels with other gear types, such as bottom longline, gillnet, or handgear, could land shortfin mako sharks greater than 83 inches FL when there is an observer on board the vessel to measure the shark or if the vessel has a functioning electronic monitoring system installed.

Based on observer data, shortfin mako sharks greater than or equal to 83 inches FL account for 8 percent of shortfin mako sharks caught on pelagic longline gear, 43 percent caught on bottom longline gear, and 0 percent caught using gillnets (Table 4.2). This would account for a reduction of 92 percent for pelagic longline fishermen and 57 percent reduction for bottom longline fishermen. Data is limited for the handgear fisheries, however the interaction rate is assumed to be low since shortfin mako sharks are not commercially targeted in the handgear fisheries. This alternative protects juvenile female mako sharks from harvest before they enter maturity. This additionally protects a very high percentage of mako shark biomass from exploitation annually.

**Table 4.2 Summary of observed retained shortfin mako sharks by data source based on the minimum size.** Note: The years are different because so few shortfin mako sharks are caught on bottom longline and gillnet gears; as a result, NMFS had to increase the years to try to ensure an adequate number for calculations. Source: Observer Program Data.

Years	Gear Type	Total Number Less Than 83 Inches FL	Total Number Greater Than or Equal To 83 Inches FL	Total Number of Interactions	Percentage of Reduction
2013-2016	Atlantic Pelagic Observer Program (PLL)	1,272	136	1,380	92%
2008-2016	SEFSC Bottom Longline Observer Program Targeting Sharks	4	3	7	43%
2008-2016	SEFSC Gillnet Observer Program Targeting Sharks	0	0	0	0%

These landings reductions are not directly reflective of the total mortality reduction that could be expected from these measures. The mortality reductions would be less than the percentages identified once post-release mortality is considered. The post-release mortality rate for pelagic longline gear has been estimated to be approximately 30 percent (Campana et al., 2016; SCRS 2017), but is unknown in other gear types.

This alternative would likely result in short- and long-term direct minor beneficial ecological impacts, similar to the preferred alternative. The measures would result in large numbers of releases of juvenile shortfin mako sharks that would otherwise have been retained and landed. Indirect short and long-term ecological impacts to other species caught in the relevant fisheries would likely be neutral. The primary gears associated with the capture of shortfin mako sharks are pelagic longline and rod and reel, and shortfin mako sharks are rarely targeted in the commercial fisheries. Thus, no change to overall effort is expected and indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, and the fact that U.S. shortfin mako shark landings are a small percentage of total North Atlantic-wide landings, the cumulative impacts of Alternative A4 would be minor and beneficial. The analysis above takes into account past and present management measures while discussing ecological impacts.

While this alternative could allow for more bottom longline fishermen to land shortfin mako sharks, this alternative would place more restrictive limits on fishermen, particularly pelagic longline fishermen, than allowing retention of shortfin mako sharks that are dead at haulback under the preferred alternative (Alternative A2), which would achieve the suggested mortality reduction without such restrictions. This alternative would also be unlikely to have any greater ecological benefit than Alternatives A2 or A3. Therefore, NMFS does not prefer this alternative at this time.

## **Alternative A5**

This alternative would allow permit holders to retain shortfin mako sharks caught on any commercial gear (e.g., pelagic longline, bottom longline, gillnet, handgear) provided that an observer is on board that can verify that the shark was dead at haulback. Under this alternative, electronic monitoring would not be used to verify the disposition of shortfin mako sharks caught on pelagic longline gear, but instead pelagic longline vessels could only retain shortfin mako sharks when the sharks are dead at haulback and an observer is on board. This alternative does not include minimum size requirements for retained shortfin mako sharks. Currently, observer coverage in the pelagic longline fishery is 9-18 percent, with increased coverage in certain areas at certain times of year (e.g., Mid-Atlantic Bight in December through April). Observer coverage in the bottom longline shark research fishery is 100 percent and bottom longline observer coverage outside the shark research fishery is 5-10 percent. Observer coverage in the shark gillnet fishery is 4-11 percent.

This alternative would likely result in in short- and long-term direct minor beneficial ecological impacts, similar to the preferred alternative. Based on observer data, pelagic longline fishermen on observed trips would be able to retain an average of 131 shortfin mako sharks per year under this alternative (Table 3.9), compared to an average of 2,471 shortfin mako sharks retained per year in 2012 through 2016 (Table 3.5), representing a 95 percent reduction in number of shortfin mako sharks retained.

Based on observer data, observed non-pelagic longline vessels retained an average of seven shortfin mako sharks per year in 2012 through 2016 (Table 3.8), of which they would only be able to retain those dead at haulback under this alternative. For comparison, non-pelagic longline vessels retained an average of 14 shortfin mako sharks per year in 2012 through 2016 (Table 3.7). The reduction in shortfin mako shark landings by non-pelagic commercial vessels would represent a very small added benefit.

Indirect short- and long-term ecological impacts to other species caught in the relevant fisheries would likely be neutral. The primary gears associated with the capture of shortfin mako sharks are pelagic longline and rod and reel, and shortfin mako sharks are rarely targeted in the commercial fisheries. Thus, no change to overall effort is expected and indirect ecological impacts are likely neutral. When considered in the context of management measures in the past, present, and foreseeable future, and the fact that U.S. shortfin mako shark landings are a small percentage of total North Atlantic-wide landings, the cumulative impacts of Alternative A5 would be minor and beneficial. The analysis above takes into account past and present management measures while discussing ecological impacts.

This alternative would place more restrictive limits on fisherman, particularly pelagic longline fishermen, than allowing retention of shortfin mako sharks that are dead at haulback when there is an electronic monitoring system on board the vessel under Alternatives A2 and A3. The required electronic monitoring systems provide the benefit of allowing pelagic longline fishermen to retain shortfin mako sharks on a greater number of trips. Therefore, NMFS does not prefer this alternative at this time.

## **Alternative A6**

This alternative would place shortfin mako sharks on the prohibited sharks list (Table 1 of Appendix A to 50 CFR Part 635) to prohibit the retention, possession, landing, sale, or purchase of shortfin mako sharks in commercial HMS fisheries. Total landings of shortfin mako sharks would be reduced from their current levels to zero. On average, 181,085 lb dw (82.1 mt dw) of shortfin mako sharks were landed annually from 2013 through 2017 (Table 3.4). Interactions with shortfin mako sharks would still occur in commercial fisheries, so the only remaining source of mortality would be from post-release mortality (30 percent for pelagic longline gear, unknown for other gears).

Current regulations provide four criteria for NMFS to consider when placing a species on the prohibited species list. These criteria are:

- 1) Biological information indicates that the stock warrants protection.
- 2) Information indicates that the species is rarely encountered or observed caught in HMS fisheries.
- 3) Information indicates that the species is not commonly encountered or observed caught as bycatch in fishing operations for species other than HMS.
- 4) The species is difficult to distinguish from other prohibited species.

At this time, shortfin mako sharks meet the first and third criteria in that the assessment indicates that mortality needs to be reduced between 72 and 79 percent to end overfishing and few shortfin mako sharks are seen in non-HMS fisheries. Shortfin mako sharks do not meet the second or fourth criteria as they are often seen in the HMS pelagic longline fishery, and can be identified relatively easily compared to some other shark species. Species do not need to meet all four criteria to be placed on the prohibited list.

This alternative would likely result in short- and long-term direct minor beneficial ecological impacts, similar to the preferred alternative. Other short- and long-term indirect ecological impacts, including to other species caught in the relevant fisheries, would likely be neutral if fishing operations to not change, or minor beneficial if fishing effort declines as a result of reduced landing opportunities for shortfin mako sharks.

When considered in the context of management measures in the past, present, and foreseeable future, and the fact that U.S. shortfin mako shark landings are a small percentage of total North Atlantic-wide landings, the cumulative impacts of Alternative A6 would be minor and beneficial. The analysis above takes into account past and present management measures while discussing ecological impacts.

At this time, while shortfin mako sharks meet two of the four prohibited species criteria, NMFS does not feel it is appropriate to add shortfin mako sharks to the prohibited species list for several reasons. First, this alternative would place more restrictive limits and disadvantage U.S. fishermen compared to fishermen in other ICCAT nations that implement the ICCAT recommendation verbatim, beyond some of the derogations provided in Recommendation 17-08. Additionally, the shortfin mako shark mortality associated with current U.S. landings is minimal when compared to the total North Atlantic shortfin mako shark mortality. Furthermore, reducing U.S. shortfin mako shark landings in this manner may not be consistent with Magnuson-Stevens

Act §304(g)(1)(d) and ATCA, under which NMFS must provide fishing vessels of the U.S. with a reasonable opportunity to harvest an allocation, quota, or fishing mortality authorized under an international fishery agreement. Therefore, NMFS does not prefer this alternative at this time.

#### **4.1.2 Recreational Alternatives**

NMFS is considering several recreational alternatives that would reduce shortfin mako shark mortality and meet the objectives described in Chapter 1.0. The alternatives, which are listed below, range from maintaining the status quo under the No Action alternative to allowing only catch and release recreational shark fishing.

Alternative B1: No Action. Keep the non-emergency rule regulations for shortfin mako sharks.

Alternative B2: Increase the minimum size limit for the retention of shortfin mako sharks from 54 inches FL to 71 inches FL (180 cm FL) for male and 83 inches FL (210 cm FL) for female shortfin mako sharks.

*Alternative B3: Increase the minimum size of all shortfin mako sharks from 54 inches FL to 83 inches FL. – Preferred Alternative*

Alternative B4: Increase the minimum size limit for the retention of shortfin mako sharks from 54 inches FL to 71 inches FL for male and 108 inches FL for female shortfin mako sharks.

Alternative B5: Increase the minimum size limit for the retention of male shortfin mako sharks to 71 inches FL and greater than 120 inches FL for females.

Alternative B6: Allow seasonal retention of shortfin mako sharks with different minimum size limits for males and females depending on the season length. Retention of any shortfin mako sharks outside of the season would be restricted to greater than 120 inches FL.

Alternative B6a: Seasonal retention of shortfin mako sharks from May through October at 71 inches FL for males and 83 inches FL for females.

Alternative B6b: Seasonal retention of shortfin mako sharks from June through August at 71 inches FL for males and 100 inches FL for females.

Alternative B6c: Seasonal retention of shortfin mako sharks from June through July at 71 inches FL for males and 90 inches FL for females.

Alternative B6d: Seasonal retention of shortfin mako sharks in June only at 71 inches FL for males and 83 inches FL for females.

Alternative B6e: Establish a process for seasonal retention and minimum size limits for shortfin mako sharks based on certain criteria.

Alternative B7: Establish a slot limit for the recreational retention of male and female shortfin mako sharks

Alternative B8: Establish a tagging or lottery program to land shortfin mako sharks greater than the minimum sizes.

*Alternative B9: Require use of circle hooks for recreational shark fishing – Preferred Alternative*

Alternative B10: Prohibit landing of shortfin mako sharks in the HMS recreational fishery (catch and release only).

### **Alternative B1**

Alternative B1 would not implement any management measures in the recreational shark fishery to decrease mortality of shortfin mako sharks, likely resulting in direct, short- and long-term, minor adverse ecological impacts. Based on the results of the 2017 ICCAT stock assessment, NMFS has determined that shortfin mako sharks are overfished and experiencing overfishing. If no management measures are implemented to reduce shortfin mako shark mortality in the recreational fishery, the U.S. contribution to overfishing would continue, potentially further reducing the stock size and complicating rebuilding efforts. If stock health continues to decline, future stock assessments may advocate for no fishing mortality, which could result in reduced access to the resource for U.S. fishermen and restrictions in fisheries that interact with the species.

Furthermore, this alternative would not implement Recommendation 17-08, which requires contracting parties to reduce mortality of shortfin mako sharks and includes several measures that largely focus on maximizing live releases of shortfin mako sharks. Failing to implement the ICCAT recommendation and address overfishing of shortfin mako sharks would be inconsistent with ATCA and may result in ICCAT penalties or restrictions specific to the United States. The no action alternative would also be inconsistent with the Magnuson-Stevens Act requirement to end overfishing and to implement a rebuilding plan within two years of determining a species is overfished and experiencing overfishing.

Indirect short- and long-term ecological impacts to incidentally caught species and EFH would likely be neutral. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B1 would be minor and adverse, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. NMFS does not prefer this

alternative at this time, as it would allow overfishing to continue and fail to meet our obligations under ATCA.

### **Alternative B2**

Under Alternative B2, recreational HMS permit holders (those who hold HMS Angling or Charter/Headboat permits, and Atlantic Tunas General category and Swordfish General Commercial permits when participating in a registered HMS tournament) would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL (180 cm FL) and female shortfin mako sharks that measure at least 83 inches FL (210 cm FL), reducing the amount of recreational landings. This minimum size would match one of the derogations in the ICCAT recommendation. According to length composition information from the Large Pelagics Survey (LPS) from 2012 through 2016, this alternative would reduce the number of recreational landings of male shortfin mako sharks by up to 44 percent and female shortfin mako sharks by up to 78 percent for a combined reduction of 64 percent (Table 4.3). Conversely, the total reduction in landings by weight in kilograms (kg) whole weight (ww) would be significantly less at 49 percent, which falls well below the ICCAT desired target of a 72 to 79 percent reduction for all shortfin mako shark landings. As such, the U.S. contribution to overfishing may continue in the recreational fishery if the increased size limits are not accompanied by a significant decrease in directed fishing effort. As approximately two-thirds of shortfin mako sharks are landed during targeted trips as opposed to incidentally while targeting other species, a reduction in directed fishing effort could significantly increase the reduction in landings under this alternative. Thus, this alternative would have short- and long-term minor beneficial ecological impacts.

**Table 4.3** Estimated shortfin mako shark harvest by numbers and weight (kg ww) over a four year period under the various minimum size alternatives, 2012-2016. Note: Weight estimates were derived from length frequency data collected by the Large Pelagic Survey on observed harvested sharks and length-weight equations developed by Kohler et al. 1996. Source: Large Pelagic Survey.

Alternative	Size Limits (inches FL)	Estimated Number of Males Harvested as a result of the size limit	Estimated Number of Females Harvested as a result of the size limit	Percentage of Number Reduction	Estimated Weight of Males Harvested as a result of the size limit	Estimated Weight of Females Harvested as a result of the size limit	Percentage of Weight Reduction
B1	Both: 54	5,081	7,084	0	350,526	551,575	0
B2	Male: 71 Female: 83	2,845	1,539	-64.0%	243,791	214,132	-49.2%
B3 (Preferred)	Both: 83	552	1,539	-82.8%	70,564	214,132	-68.4%
B4	Male: 71 Female: 108	2,845	29	-76.4%	243,791	8,033	-72.1%
B5	Male: 71 Female: 120	2,845	0	-76.6%	243,791	0	-73.0%



Shortfin mako sharks below those minimum sizes would likely still be caught and released by recreational fishermen, but only 56 percent of males and 22 percent of females that are typically caught are expected to be large enough to retain under this alternative (Table 4.4). However, the actual retention of shortfin mako sharks under this alternative is likely to be somewhat less than estimated here as the increased minimum size limits are likely to result in recreational fishermen taking fewer trips to target shortfin mako sharks. Based on the LPS data from 2012-2016, shortfin mako sharks were the primary target species in approximately 67 percent of trips that caught and 75 percent of trips that harvested them.

**Table 4.4** Size composition of sampled male and female mako sharks in the recreational fishery, 2010-2016 (N=581). Source: Large Pelagics Survey.

Fork Length Category	Percent of Total Males	Percent of Total Females
<54 in (137 cm)	0	1
54-71 in (137-180 cm)	44	38
71-83 in (180-210 cm)	45	39
>83 in (210 cm)	11	22

In addition to potentially affecting directed fishing effort for shortfin mako sharks, the increase in the minimum size limit under this Alternative could also result in fishing effort shifting towards other similar species. Recreational fishermen wishing to retain a shark may shift their effort towards similar species that would still be managed under the 54 inches FL size limit. The most obvious species recreational fishermen may turn towards are common thresher sharks and blue sharks both of which are pelagic sharks that can often be caught in the same waters and times of year as shortfin mako sharks. For anglers desiring to harvest a shark, common thresher sharks may be particularly appealing as they have a reputation for more edible flesh like the shortfin mako shark. Common thresher shark have not undergone a stock assessment so it is difficult to determine how an increase in targeted fishing effort directed towards them would affect their population. However, there are some indications that common thresher sharks may need additional management measures to ensure optimum yield (Young et al., 2015). North Atlantic blue sharks were assessed by ICCAT in 2015, and were found to not be overfished with no overfishing. Blue sharks have a sizable commercial quota (273 mt dw) only a fraction of which is landed each year, so any increased fishing pressure from recreational fishermen should have minor ecological impacts. Alternatively, recreational anglers, including those in tournaments, may opt for catch-and-release of sharks. Switching to catch-and-release would result in little change of effort but would still reduce mortalities as fishermen would not be retaining any sharks. Post-release mortality of shortfin mako sharks in recreational fisheries has been shown to be acceptably low. A study by French et al. (2015) found only 10 percent of released shortfin mako sharks caught on rod and reel did not survive post-release, and two-thirds of post-release mortalities were sharks caught on J-hooks which have already been prohibited from use when targeting sharks in U.S. federal waters south of Chatham, MA, except when fishing with artificial lures or flies.

Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B2. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually

released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B2 would be minor and beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. NMFS does not prefer this alternative at this time, as it does not reach the ICCAT desired target of a 72 to 79 percent reduction for all shortfin mako shark landings by weight. Additionally, NMFS does not prefer this alternative at this time as it would require fishermen to identify the sex of very large and potentially active shortfin mako sharks at boatside. NMFS heard during scoping that some anglers had safety concerns regarding catching large sharks and then needing to determine the sex of the shark before deciding if they could keep it. Other anglers, presumably those used to dealing with large sharks, did not share these concerns and supported separate sizes by sex. While the anatomy of mature sharks makes sex identification relatively easy for experienced anglers to tell the difference, sex specific regulations in recreational fisheries management is very rare, and is likely to increase confusion among recreational anglers and complicate enforcement efforts.

### **Alternative B3 – Preferred Alternative**

Under Alternative B3, the preferred alternative, HMS recreational permit holders could only land shortfin mako sharks, male or female, that are at least 83 inches FL. This alternative would implement the same requirements that are currently in effect under the emergency interim final rule. According to length composition information from the Large Pelagics Survey, this preferred recreational minimum size limit would reduce the number of shortfin mako sharks landed by approximately 83 percent in the HMS recreational fishery, and would reduce the weight (kg ww) of landings by at least 68 percent (Table 4.3). This would represent a significant reduction in landings, but would not reach the target of 72 to 79 percent reductions in weight landed recommended by ICCAT. However, it would be unlikely that such a large increase in the minimum size limit for all shortfin mako sharks would not be accompanied by a decrease in directed fishing effort. As approximately two-thirds of shortfin mako sharks are landed during targeted trips as opposed to incidentally while targeting other species, a reduction in directed fishing effort could easily increase the reduction in landings under this alternative to a level that achieves the ICCAT recommended reduction of 72 to 79 percent. NMFS is aware that at least one registered HMS tournament that targets pelagic sharks opted to cancel their 2018 event due to the 83 inch FL size limit implemented by the emergency interim final rule. Approximately 44 percent of harvested shortfin mako sharks are landed during registered HMS fishing tournaments, so any cancellations of shark tournaments are likely to have a significant effect on estimated landings. As such, the direct ecological impacts of this alternative would be expected to be minor, beneficial in the short- and long-term.

As described under Alternative B2, in addition to potentially affecting directed fishing effort for shortfin mako sharks, the increase in the minimum size limit under this Alternative could also result in fishing effort shifting towards other similar species such as blue or common thresher sharks. Alternatively, this Alternative could result in increased catch-and-release of pelagic

sharks by anglers; however, studies have shown post-release mortality among recreationally caught shortfin mako sharks to be relatively low (French et al., 2015).

Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B3. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually released quickly in a manner that maximizes the chance for survival.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B3 would be minor and beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts.

Alternative B3 is a preferred recreational alternative at this time both because it is more likely to achieve the landings reduction goal suggested by ICCAT, and because it does not require fishermen to identify the sex of very large and potentially active shortfin mako sharks at boatside. While we received conflicting comments during scoping, several anglers did express concerns about their ability to safely distinguish the sex of live sharks at boatside. While the anatomy of mature sharks makes sex identification relatively easy for experienced anglers to tell the difference, sex specific regulations in recreational fisheries management is very rare, and is likely to increase confusion among recreational anglers and complicate enforcement efforts.

#### **Alternative B4**

Under Alternative B4, HMS recreational permit holders would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL (180 cm FL) and female shortfin mako sharks that measure at least 108 inches FL (274 cm FL). Similar to the 71 inches FL size limit for male sharks, 108 inches FL would set the minimum size limit for female shortfin mako sharks to be equal to the size at which 50 percent of female shortfin mako sharks are estimated to have reached maturity (Natanson et al. 2006). It is estimated that this combination of size limits would reduce recreational landings of shortfin mako sharks by at least 72 percent, which is the lower limit of the ICCAT targeted reduction of 72 to 79 percent (Table 4.3). At the same time, it would allow for the annual retention of nearly 157 more shortfin mako sharks than the preferred Alternative B3 (83 inches FL). As such, the reduction in targeted trips should not be as great as recreational shark fishermen will have a greater chance of retaining a male shortfin mako shark while still having the opportunity to land a record size shortfin mako shark if it is a female shark.

This alternative would represent a significant reduction in U.S. landings to help achieve the target of 72 to 79 percent reductions in weight landed recommended by ICCAT. As such, Alternative B4 should help to achieve the U.S. contribution to ending overfishing of the shortfin mako shark stock even if the increased minimum size limits do not result in a reduction in directed fishing effort. As approximately two-thirds of shortfin mako sharks are landed during targeted trips as opposed to incidentally while targeting other species, a reduction in directed fishing effort could significantly increase the reduction in landings under this alternative. As such, the direct ecological impacts of this alternative would be expected to be minor, beneficial in the short- and long-term.

In addition, as described above, increase in the minimum size limit could also result in fishing effort shifting towards other similar species or to catch-and-release of pelagic sharks; however, studies have shown post-release mortality among recreationally caught shortfin mako sharks to be relatively low (French et al., 2015).

Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B4. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B4 would be minor and beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts.

Despite this estimated increase in the number of shortfin mako sharks that could be retained, this combination of minimum size limits still offers a greater weight reduction in weight landed due to the larger average sizes of female sharks. Furthermore, this alternative would reduce female shortfin mako landings to only one percent of total harvest, while females would make up approximately 75 percent of shortfin mako harvest under Alternative B3. However, NMFS does not prefer this alternative at this time as it would require fishermen to identify the sex of very large and potentially active shortfin mako sharks at boatside. While the anatomy of mature sharks makes sex identification relatively easy for experienced anglers to tell the difference, sex specific regulations in recreational fisheries management is very rare, and is likely to increase confusion among recreational anglers and complicate enforcement efforts.

### **Alternative B5**

Under Alternative B5, HMS recreational permit holders would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL (180 cm FL) and female shortfin mako sharks that measure at least 120 inches FL (305 cm FL), effectively limiting the harvest of female sharks to record-size specimens. It is estimated that this combination of minimum size limits would reduce U.S. recreational landings of shortfin mako sharks by at least 73 percent, which is within the ICCAT targeted reduction (Table 4.3). At the same time, it would allow for the annual retention of approximately 150 more shortfin mako sharks than the 83 inches FL size limit implemented for both sexes under the emergency interim final rule. As such, the reduction in targeted trips should not be as great as shark anglers will have a greater chance of retaining a male shortfin mako while still having the opportunity to land a record size shortfin mako if it is a female shark.

This would represent a significant reduction in landings that would achieve the target of 72 to 79 percent reductions in weight landed recommended by ICCAT. As such, Alternative B5 should help to achieve an end to overfishing in the shortfin mako shark stock even if the increased minimum size limits do not result in a reduction in directed fishing effort. As approximately two-thirds of shortfin mako sharks are landed during targeted trips as opposed to incidentally

while targeting other species, a reduction in directed fishing effort could significantly increase the reduction in landings under this alternative.

In addition, as described above, increasing the minimum size limit could also result in fishing effort shifting towards other similar species or to catch-and-release of pelagic sharks; however, studies have shown post-release mortality among recreationally caught shortfin mako sharks to be relatively low (French et al., 2015). As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B5. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B5 would be minor and beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts.

Despite this estimated increase in the number of shortfin mako sharks that could be retained, this combination of minimum size limits still offers a greater weight reduction in weight landed due to the larger average sizes of female sharks. Furthermore, this alternative would essentially eliminate female shortfin mako landings in most years, while females would make up approximately 75 percent of shortfin mako harvest under Alternative B3. However, NMFS does not prefer this alternative at this time as it would require fishermen to identify the sex of shortfin mako sharks at boatside. While we received conflicting comments during scoping, several anglers did express concerns about their ability to safely distinguish the sex of live sharks at boatside. While the anatomy of mature sharks makes sex identification relatively easy for experienced anglers to tell the difference, sex specific regulations in recreational fisheries management is very rare, and is likely to increase confusion among recreational anglers and complicate enforcement efforts.

### **Alternative B6a**

Under Alternative B6a, the minimum size limit for the retention of shortfin mako sharks would be increased from 54 inches FL to 71 inches FL for male and 83 inches FL for female shortfin mako sharks, and a recreational fishing season for shortfin mako sharks lasting from May 1 through October 31 would be established. This season would fully encompass the time period in which shortfin mako shark landings are observed in the New England and Mid-Atlantic regions through MRIP or the LPS, and would result in no difference in landings reduction estimates (49 percent) within those regions compared to the year-around season proposed under Alternative B2 (Table 4.5). However, this season would prevent some landings in North Carolina where MRIP has observed sporadic landings from January through April in recent years. While sporadic reports of shortfin mako shark landings in states south of North Carolina occasionally are reported, no landings in these states have been observed in the APAIS since 2007. In addition, the seasonal approach to a shortfin mako shark recreational fishery would impact the timing of

tournaments. In 2017, 27 registered HMS tournaments held indicated pelagic sharks as a target species and only species for the tournaments (Table 4.6). This is a concern since the minimum size for shortfin mako sharks increases and might turn the focus on other species, as described above. This suggests there is potential for redistribution of fishing effort within the region if a season is established. As such, NMFS expects any season length to have minimal effect on recreational fisheries in the South Atlantic and Gulf of Mexico regions.

**Table 4.5** Estimated shortfin mako shark harvest by numbers and weight (kg ww) for the season lengths and minimum size limits in Alternatives B1 and B6a through B6d, 2012-2016. Note: Weight estimates were derived from length frequency data collected by the Large Pelagic Survey on observed harvested sharks and length-weight equations developed by Kohler et al. 1996. Source: Large Pelagic Survey.

Alternative or Sub-Alternative	Season	Size Limits (inches FL)	Estimated Number of Males Harvested as a result of the size limit	Estimated Number of Females Harvested as a result of the size limit	Percentage of Number Reduction	Estimated Weight of Males Harvested as a result of the size limit	Estimated Weight of Females Harvested as a result of the size limit	Percentage of Weight Reduction
B1	January-December	Both: 54	5,081	7,084	0	350,526	551,575	0
B6a	May-October	Male: 71 Female: 83	2,845	1,539	-64.0%	243,791	214,132	-49.2%
B6b	June-August	Male: 71 Female: 100	2,483	169	-78.2%	186,324	31,513	-75.9%
B6c	June-July	Male: 71 Female: 90	2,148	652	-77.0%	144,941	86,325	-74.4%
B6d	June only	Male: 71 Female: 83	1,683	930	-78.9%	100,938	96,059	-78.2%

**Table 4.6** Number of HMS tournaments targeting only pelagic sharks by state and month, 2017. Note: There are other HMS registered tournaments during these months. The tournaments listed in this table are the only ones that report targeting sharks exclusively. Source: Atlantic Tournament Registration and Reporting.

State	May	June	July	August	September	October	Total
Maine	0	0	0	1	0	0	1
Massachusetts	0	0	1	0	0	0	1
Rhode Island	0	0	2	0	0	0	2
Connecticut	0	0	1	0	0	0	1
New York	0	9	1	0	0	0	10
New Jersey	1	9	0	0	0	0	10
Maryland	0	1	0	0	0	0	1
South Carolina	0	1	0	0	0	0	1
Total	1	20	5	1	0	0	27

Alternative B6a would result in a significant reduction in landings, but would not reach the target of 72 to 79 percent reductions in weight landed recommended by ICCAT. As such, the recreational fishery may not sufficiently contribute to addressing overfishing if the increased size limits are not accompanied by a significant decrease in directed fishing effort. As approximately two-thirds of shortfin mako sharks are landed during targeted trips as opposed to incidentally while targeting other species, a reduction in directed fishing effort could significantly increase the reduction in landings under this alternative. As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

In addition, as described above, increasing the minimum size limit could also result in fishing effort shifting towards other similar species or to catch-and-release of pelagic sharks; however, studies have shown post-release mortality among recreationally caught shortfin mako sharks to be relatively low (French et al., 2015). As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B6a. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B6a would be minor and beneficial, the same as the



direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. NMFS does not prefer this alternative at this time, as it does not reach the ICCAT desired target of a 72 to 79 percent reduction for all shortfin mako shark landings by weight.

**Alternative B6b**

Under Alternative B6b, the minimum size limit for the retention of shortfin mako sharks would be increased from 54 inches FL to 71 inches FL for male and 100 inches FL for female shortfin mako sharks, and a recreational fishing season for shortfin mako sharks lasting from June through August would be established. Assuming no redistribution of fishing effort, the establishment of a June through August fishing season should reduce directed recreational trips targeting shortfin mako sharks in the Northeast (Maine to Virginia) by approximately 10 percent (Table 4.7). In 2017, 26 registered HMS tournaments held indicated pelagic sharks as a target species (Table 4.6). This suggests there is little potential for redistribution of fishing effort within the region if a season is established. Assuming this increase in the size limit has minimal effect on fishing effort directly towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 78 percent reduction in the number of sharks landed, and a 76 percent reduction in the weight of sharks landed (Table 4.5). This would represent a significant reduction in landings that would achieve the target of 72 to 79 percent reductions in weight landed recommended by ICCAT. As such, Alternative B6b should help to achieve an end to overfishing in the shortfin mako shark stock even if the increased minimum size limits do not result in a reduction in directed fishing effort. As approximately two-thirds of shortfin mako sharks are landed during targeted trips as opposed to incidentally while targeting other species, a reduction in directed fishing effort could significantly increase the reduction in landings under this alternative. As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

**Table 4.7 Average number of directed recreational fishing trips targeting shortfin mako sharks in the LPS region (Maine to Virginia) by month and tournament fishing status, 2012-2016.** Source: Large Pelagic Survey.

Targeted Trip	June	July	August	September	October	Total
Total LPS Trips	7,661	15,360	17,943	12,190	5,634	58,788
Total Shortfin Mako	2,368	1,171	789	318	157	4,803
Tournament	1,820	440	301	16	6	2,583
Non-Tournament	548	731	488	302	151	2,220

In addition, as described above, increasing the minimum size limit could also result in fishing effort shifting towards other similar species or to catch-and-release of pelagic sharks; however, studies have shown post-release mortality among recreationally caught shortfin mako sharks to be relatively low (French et al., 2015). As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B6b. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually

released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B6b would be minor and beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. NMFS does not prefer this alternative at this time as it would require fishermen to identify the sex of shortfin mako sharks at boatside. As described above, while we received conflicting comments during scoping, several anglers did express concerns about their ability to safely distinguish the sex of live sharks at boatside. While the anatomy of mature sharks makes sex identification relatively easy for experienced anglers to tell the difference, sex specific regulations in recreational fisheries management is very rare, and is likely to increase confusion among recreational anglers and complicate enforcement efforts. Furthermore, the establishment of a shortfin mako shark fishing season has the potential to create regional inequalities in access to the fishery given its wide spatial and temporal nature as a highly migratory species.

### **Alternative B6c**

Under Alternative B6c, the minimum size limit for the retention of shortfin mako sharks would be increased from 54 inches FL to 71 inches FL for male and 90 inches FL for female shortfin mako sharks, and a recreational fishing season for shortfin mako sharks lasting from June through July would be established. Assuming no redistribution of fishing effort, the establishment of a June through July fishing season should reduce directed recreational trips targeting shortfin mako sharks in the Northeast (Maine to Virginia) by approximately 26 percent (Table 4.7). In 2017, 25 registered HMS tournaments indicated pelagic sharks were the exclusive target species for the tournament (Table 4.6). This suggests there would be some potential for redistribution of fishing effort within the region if a June through July season is established especially if any tournaments opt to reschedule in future years. Assuming the increase in the size limit has minimal effect on fishing effort directly towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 77 percent reduction in the number of sharks landed, and a 74 percent reduction in the weight of sharks landed (Table 4.5). This would represent a significant reduction in U.S. landings that would achieve the target of 72 to 79 percent reductions in weight landed recommended by ICCAT. As such, Alternative B6c should help to achieve an end to the U.S. contribution to overfishing of the shortfin mako shark stock even if the increased minimum size limits do not result in a reduction in directed fishing effort. As approximately two-thirds of shortfin mako sharks are landed during targeted trips as opposed to incidentally while targeting other species, a reduction in directed fishing effort could significantly increase the reduction in landings under this alternative. As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the-short- and long-term.

In addition, as described above, increasing the minimum size limit could also result in fishing effort shifting towards other similar species or to catch-and-release of pelagic sharks; however, studies have shown post-release mortality among recreationally caught shortfin mako sharks to be relatively low (French et al., 2015). As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B6c. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B6c would be minor and beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. NMFS does not prefer this alternative at this time as it would require fishermen to identify the sex of shortfin mako sharks at boatside. As described above, while we received conflicting comments during scoping, several anglers did express concerns about their ability to safely distinguish the sex of live sharks at boatside. While the anatomy of mature sharks makes sex identification relatively easy for experienced anglers to tell the difference, sex specific regulations in recreational fisheries management is very rare, and is likely to increase confusion among recreational anglers and complicate enforcement efforts. Furthermore, the establishment of a shortfin mako shark fishing season has the potential to create regional inequalities in access to the fishery given its wide spatial and temporal nature as a highly migratory species.

### **Alternative B6d**

Under Alternative B6d, the minimum size limit for the retention of shortfin mako sharks would be increased from 54 inches FL to 71 inches FL for male and 83 inches FL for female shortfin mako sharks, and a recreational fishing season for shortfin mako sharks for the month of June would be established. Assuming no redistribution of fishing effort, the establishment of a June only fishing season would reduce directed recreational trips targeting shortfin mako sharks in the Northeast (Maine to Virginia) by approximately 50 percent (Table 4.7). Currently, approximately 70 percent of fishing effort directed at shortfin mako sharks in the month of June is related to fishing tournaments, and some redistribution of effort would be expected as tournaments traditionally scheduled outside of June may reschedule to occur during the proposed season. In 2017, 20 registered HMS tournaments indicated pelagic sharks were the exclusive target species for the tournament (Table 4.6). This suggests there would be significant potential for redistribution of fishing effort within the region if a June only season is established which could reduce the projected reduction in landings under this alternative, especially if tournaments traditional held in July are rescheduled for June. Assuming the increase in the size limit has minimal effect on fishing effort directed towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 79 percent reduction in the number of sharks landed, and a 78 percent reduction in the weight of sharks landed (Table 4.5). This would represent a significant reduction in landings that would achieve the target of 72 to 79 percent reductions in weight landed recommended by ICCAT. As such, Alternative B6d should help end the U.S. contribution to overfishing of the shortfin mako shark stock even if the increased minimum size limits do not result in a reduction in directed fishing effort. As approximately two-thirds of shortfin mako sharks are landed during targeted trips as opposed to incidentally while targeting other species, a reduction in directed fishing effort could significantly increase the reduction in landings under this alternative. As such, the direct

ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

In addition, as described above, increasing the minimum size limit could also result in fishing effort shifting towards other similar species or to catch-and-release of pelagic sharks; however, studies have shown post-release mortality among recreationally caught shortfin mako sharks to be relatively low (French et al., 2015). As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B4. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B6d would be minor and beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. NMFS does not prefer this alternative at this time as it would require fishermen to identify the sex of shortfin mako sharks at boatside. As described above, while we received conflicting comments during scoping, several anglers did express concerns about their ability to safely distinguish the sex of live sharks at boatside. While the anatomy of mature sharks makes sex identification relatively easy for experienced anglers to tell the difference, sex specific regulations in recreational fisheries management is very rare, and is likely to increase confusion among recreational anglers and complicate enforcement efforts.

### **Alternative B6e**

Under Alternative B6e, the minimum size limit and season for the retention of shortfin mako sharks would be determined based on a set of criteria and a process that considers landings in previous years to take inseason actions to establish the season and size limits that should achieve the ICCAT landings reduction target of 72 to 79 percent. This alternative would provide NMFS the flexibility to make adjustments to the recreational management of shortfin mako sharks in the event that new restrictions on the recreational fishery result in significant declines in fishing effort for the species, or in the event that another ICCAT recommendation adopted, which would change NMFS could review landings data for the fishery and establish a rebuilding plan. As such, Alternative B6e should help to achieve an end to the U.S. contribution to overfishing of the shortfin mako shark stock even if the increased minimum size limits do not result in a reduction in directed fishing effort. As approximately two-thirds of shortfin mako sharks are landed during targeted trips as opposed to incidentally while targeting other species, a reduction in directed fishing effort could significantly increase the reduction in landings under this alternative. As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

In addition, as described above, increasing the minimum size limit could also result in fishing effort shifting towards other similar species or to catch-and-release of pelagic sharks; however,

studies have shown post-release mortality among recreationally caught shortfin mako sharks to be relatively low (French et al., 2015). As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B6e. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B6e would be minor and beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. NMFS does not prefer this alternative at this time as it would require fishermen to identify the sex of shortfin mako sharks at boatside. As described above, while we received conflicting comments during scoping, several anglers did express concerns about their ability to safely distinguish the sex of live sharks at boatside. While the anatomy of mature sharks makes sex identification relatively easy for experienced anglers to tell the difference, sex specific regulations in recreational fisheries management is very rare, and is likely to increase confusion among recreational anglers and complicate enforcement efforts.

### **Alternative B7**

Under this alternative, NMFS would implement a “slot limit” for shortfin mako sharks in the recreational fishery. Under a slot limit, recreational fishermen would only be allowed to retain shortfin mako sharks within a narrow size range (e.g., between 71 and 83 inches FL) with no retention above or below that slot. Slot limits can be very effective in fisheries targeting highly fecund species for which there is an abundance of juvenile fish, and a need to protect mature brood stock. However, there is little evidence to suggest they are an effective conservation tool for fish populations that are late to mature and have low fecundity. Furthermore, implementing a slot limit for shortfin mako sharks would be complicated by the need to implement the ICCAT recommendation calling for minimum size limits of at least 71 inches FL for males (which is the size of 50 percent maturity for males) and 83 inches FL for females (which is the lower limit of size of maturity for females). As such, any slot limit could have either one of these sizes as a minimum size for each sex, respectively, accompanied by a maximum size for each sex as well (which would essentially establish two slot limits), or be above 83 inches FL for both male and female shortfin mako sharks (which would mean one slot limit for both sexes). Either option would be a complicated regulation to communicate to fishermen and enforce, and would not provide significantly better conservation benefits than any of the other analyzed recreational alternatives that would implement various minimum size limits (Table 4.3). Studies have also indicated that protecting sub-adult sharks is key to conserving and rebuilding shark populations (Cortes 2002). Sub-adults are generally those juvenile sharks that are a year or two away from becoming mature adults. While any slot limit would focus on the adult stage for males, it may also end up focusing on the sub-adult stage for females (depending on where the minimum size is chosen). As such, the direct ecological impacts of this alternative would be expected to be minor, beneficial in the short- and long-term.

In addition, as described above, increase in the minimum size limit could also result in fishing effort shifting towards other similar species or to catch-and-release of pelagic sharks. Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B7. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually released quickly in a manner that maximizes the chance for survival.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B7 would be minor and beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. NMFS does not prefer this alternative at this time as it would require fishermen to identify the sex of shortfin mako sharks at boatside. As described above, while we received conflicting comments during scoping, several anglers did express concerns about their ability to safely distinguish the sex of live sharks at boatside. While the anatomy of mature sharks makes sex identification relatively easy for experienced anglers to tell the difference, sex specific regulations in recreational fisheries management is very rare, and is likely to increase confusion among recreational anglers and complicate enforcement efforts.

### **Alternative B8**

Under Alternative B8, NMFS would establish a landings tag program for shortfin mako sharks. Annually, anglers would be issued a set number of landings tags, which would be required to be attached to any retained shortfin mako sharks. The number of tags issued to each angler would determine the number of shortfin mako sharks that could be retained with an initial limit of two tags per permitted HMS vessel with a shark endorsement on an annual basis. NMFS would hold the ability to adjust the number of tags available in a year, and the minimum size restrictions associated with the tags. It is likely that an increase in the minimum size considered in the other alternatives, and a limit on yearly landings per vessel would directly affect fishing efforts. Based on length comparisons from the LPS, increasing the size limit to 83 inches FL (Alternative B3, the preferred alternative) would reduce the weight of landings by 68 percent (Table 4.3). However, it is expected that the size increase to 83 inches FL alone would reduce landings more than 68 percent, due to a decrease in targeted trips, and the cancellation of tournaments. The increase in size limit, in unison with a tagging program, would likely bring the total reduction in harvest by weight more than the ICCAT goal of 72 to 79 percent. This alternative would give NMFS a high level of flexibility to adjust the total landings of the shortfin mako shark fishery, by having the power to adjust the number of tags available each year, and the minimum size restrictions for these tags. Thus, an annual total maximum number of recreational shortfin mako shark landings could be established and enforced. This would result in short- and long-term, direct beneficial ecological impacts by reducing U.S recreational landings of this species in line with ICCAT recommendations, and having the control to adjust landing levels as additional science becomes available.

Indirect short- and long-term ecological impacts for this alternative would be neutral. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually released quickly in

a manner that maximizes the chance for survival. Thus, cumulative ecological impacts are likely to be minor beneficial.

In addition to affecting recreational fishing effort for shortfin mako sharks, the potential increase in the minimum size limit, and yearly retention limits could also result in fishing effort shifting towards other similar species or to catch-and-release of pelagic sharks; however, studies have shown post-release mortality among recreationally caught shortfin mako sharks to be relatively low (French et al., 2015). As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

NMFS does not prefer this alternative at this time due to the potential levels of landings. As of May 2018 there are 7,790 permitted vessels with the shark endorsement. At two tags per vessel, this could allow for 15,580 shortfin mako sharks landed above the minimum size, a number that far exceeds the current average annual harvest of shortfin mako sharks under the 54 inches FL size limit (Table 3.11). Furthermore, this alternative does not affect tournaments, therefore having no effect or reduction on about 50 percent of the shortfin mako landings each year. Although these high levels of landings would be unlikely at the minimum size, based on historical landings, this alternative has a potential to allow for large numbers of landings. The potential for a large number of landings in addition to greatly increased administrative duties to manage and monitor a landings tag program, makes this alternative not preferred at this time.

#### **Alternative B9 – Preferred Alternative**

Alternative B9 would require the use of non-offset, non-stainless steel circle hooks by HMS recreational permit holders with a shark endorsement when fishing for sharks recreationally, except when fishing with flies or artificial lures, in federal waters. The current regulatory requirement for such hooks applies to shark fishing in federal waters, as well as to Federal HMS permit holders fishing in state waters, south of 41° 43' N latitude (near Chatham, Massachusetts), as implemented in Amendment 5b to the 2006 Consolidated HMS FMP. This option would remove the boundary line, requiring HMS permit holders with a shark endorsement to use circle hooks in all areas.

Alternative B9 could result in short- and long-term minor direct beneficial ecological impacts due to the reduction in post release mortality attributable to circle hook use. Circle hooks are a bycatch mortality mitigation tool that have shown promise in a number of fisheries for various species including sharks (e.g., Godin et al. 2012, Willey et al. 2016, Poisson et al. 2016). Most evidence suggests that circle hooks reduce shark at-vessel and post-release mortality rates without reducing catchability compared to J-hooks, although it varies by species, gear configuration, bait, and other factors. By design, these hooks tend to hook sharks in the jaw more frequently and less frequently in the throat or gut (deep-hooking), thereby reducing injury and associated mortality (Godin et al. 2012, Campana et al. 2009). For these and other reasons (e.g., endangered species interactions), circle hooks are already required in the pelagic longline fishery.

For shortfin mako sharks specifically, research shows that the use of circle hooks reduces gut-hooking and increases post-release survival. French et al. (2015) examined the effects of recreational fishing techniques, including hook type, on shortfin mako sharks and found that

circle hooks were more likely to hook shortfin mako sharks in the jaw compared to J-hooks. In the study, circle hooks were most likely to hook in the jaw (83 percent of the time) while J-hooks most commonly hooked in the throat (33 percent of the time) or gut (27 percent of the time). J-hooks only hooked in the jaw of shortfin mako shark 20 percent of the time. Jaw-hooking is correlated with an increased odds of post release survival. For this reason, Alternative A8 would result in minor direct beneficial ecological impacts, in the short- and long-term, because of the increased geographic scope of the circle hook requirement. Targeting of shortfin mako sharks south of the current boundary already require circle hook use, and this alternative would expand the requirement north.

Minor indirect short- and long-term beneficial ecological impacts would result from Alternative B8. Other sharks besides shortfin mako sharks would benefit from circle hook use. Target and incidental teleost catch would also benefit from this alternative since circle hooks are less likely to foul hook many species. Thus, the cumulative impacts for this alternative would be minor beneficial and NMFS prefers this alternative at this time.

### **Alternative B10**

This alternative would place shortfin mako sharks on the prohibited sharks list (Table 1 of Appendix A to 50 CFR Part 635) to prohibit the retention of shortfin mako sharks in recreational HMS fisheries. HMS permit holders would be prohibited from retaining or landing shortfin mako sharks recreationally. HMS recreational fishermen would only be authorized to catch and release shortfin mako sharks. This requirement would be similar to the white shark catch and release requirement. Currently, recreational fishermen may target white sharks, but must release any white sharks caught in a manner that maximizes the chance of survival without removing the shark from the water.

Alternative B9 would likely result in short- and long-term direct minor ecological impacts. In the recreational shark fishery, shortfin mako sharks are often targeted and sometimes retained. Based on LPS data from 2012-2016, the average annual shortfin mako shark catch (recreational harvest plus live release) was 6,450 sharks (Table 3.11 and Table 3.12). Of these sharks, an annual average of 2,433 shortfin mako sharks were retained which equates to approximately 37 percent of the total annual average catch. As a result, shortfin mako shark harvest in the recreational fishery would be reduced by 100 percent, far exceeding the target of 72 to 79 percent reductions in weight landed recommended by ICCAT.

In addition, similar to as described above, prohibiting retention of shortfin mako sharks could also result in fishing effort shifting towards other similar species or to catch-and-release of pelagic sharks; however, studies have shown post-release mortality among recreationally caught shortfin mako sharks to be relatively low (French et al., 2015). As such, the direct ecological impacts of this alternative would be expected to be minor and beneficial in the short- and long-term.

Indirect short- and long-term minor beneficial ecological impacts would be expected from Alternative B10. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat. Furthermore, the gear is actively managed and non-target species are usually



released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B10 would be minor and beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. However, NMFS does not prefer this alternative at this time as it would prohibit all retention of shortfin mako sharks in the recreational fishery. As such, Alternative B10 would create unnecessary inequalities between the commercial and recreational fishing sectors when other alternatives are available that can achieve the ICCAT recommended landings reduction in a more equitable fashion.

### **4.1.3 Monitoring Alternatives**

NMFS is considering several monitoring alternatives that would help improve data collection for shortfin mako sharks and meet the objectives stated in Chapter 1.0. The alternatives, which are listed below, range from maintaining the status quo under the No Action alternative, extending VMS reporting requirements, and implementing mandatory reporting of all recreationally landed and discarded shortfin mako sharks. The alternatives examined below all represent potential administrative changes to improve data collection of shortfin mako shark interactions. Because the commercial pelagic shark species quota, which includes shortfin mako shark, established in the 2006 Consolidated HMS FMP and its amendments would remain the same, none of these alternatives are expected to have an impact on the current level of fishing, catch rates, or distribution of fishing effort.

*Alternative C1: No action. Do not require reporting of shortfin mako sharks outside of current commercial and recreational reporting systems. – Preferred Alternative*

Alternative C2: Establish mandatory commercial reporting of shortfin mako shark catches (landings and discards) on VMS.

Alternative C3: Implement mandatory reporting of all recreationally landed and discarded shortfin mako sharks (e.g., app, website, Vessel Trip Reports).

#### **Alternative C1– Preferred Alternative**

Alternative C1, the preferred and no action alternative, would make no changes to the current reporting requirements applicable to shortfin mako sharks in HMS fisheries. This alternative would likely result in direct, short- and long-term, neutral ecological impacts. HMS commercial fishermen would continue to report shortfin mako catches through vessel logbooks along with dealer reporting of landings. HMS recreational anglers fishing from Maine to Virginia would continue to be required to report shortfin mako shark landings and releases if intercepted by the Large Pelagic Survey, and data would continue to be collected on shortfin mako shark catches by the APAIS, which is part of MRIP. Thus, no additional reporting requirements would be placed on HMS Angling and HMS Charter/Headboat permit holders who land shortfin mako sharks on non-tournament trips. Tournament operators would not be required to report landings associated with shark tournaments unless selected.

Under this alternative, NMFS would make one change to existing regulatory reporting requirements. Specifically, existing regulations at 50 CFR 635.5(d) require Atlantic HMS tournament operators to register their tournaments with NMFS and authorize NMFS to select HMS tournaments for reporting. Currently, only billfish and swordfish tournaments are selected for reporting. Under this alternative, NMFS will also select shark tournaments. The billfish or swordfish tournaments that are selected report catches of all HMS. From 2016 to 2017, 49 percent of shark tournaments were already reporting to NMFS as those tournaments were also targeting, and therefore selected to report, billfish or swordfish (Table 4.8). The expansion of tournament selection to include sharks would increase reporting to an average of 40 additional shark tournaments (51 percent increase). NMFS consulted with the Atlantic HMS Advisory Panel, at its Spring 2018 meeting, about selecting HMS tournaments for reporting. During public scoping on measures regarding shortfin mako rebuilding, NMFS also requested comment on the selection of shark tournaments for reporting. Comments received from the public and the HMS Advisory Panel have supported expanded tournament reporting. Under the No Action alternative, and consistent with current regulations, NMFS would select all shark tournaments for reporting, in addition to billfish and swordfish tournaments, in order to increase the number of tournaments for which the Agency receives reports on shortfin mako sharks caught, to support current management of shortfin mako sharks.

**Table 4.8** Number of registered tournaments selected for reporting and the potential additional number of tournaments if shark tournaments are selected for reporting, 2016-2017. Source: Atlantic Tournament Registration and Reporting

	2016	2017
Total number of tournaments registered (A)	268	287
Number of tournaments that were selected for reporting billfish and swordfish (B)	189	212
Percentage of tournaments selected for reporting (B/A = C)	70%	74%
Number of tournaments targeting shark species (D)	73	82
Number of shark tournaments that overlapped with billfish & swordfish tournaments and are already reporting (E)	35	41
Percentage of tournaments that are already reporting (E/D = F)	48%	50%
New tournaments to report (G)	38	41

A need exists to improve collection of fishing effort, landings, and other information from Atlantic HMS tournaments across the entire management area. Recreational fisheries surveys are conducted along the Atlantic, Gulf of Mexico, and U.S. Caribbean, but data collected from tournaments across some areas is sparse. LPS operates from Maine to Virginia and collects information from some tournaments, but not all. The MRIP operates south of Virginia including Puerto Rico but does not collect information from tournaments. Texas Parks and Wildlife Department operates the Texas Marine Harvest Monitoring Program that collects information from some tournaments, but not all and it is designed to target inshore fisheries. Because all HMS tournaments are required to register with NMFS, a census of all tournaments is feasible. Most of these tournaments (i.e., all of the billfish and swordfish tournaments) are already reporting.

Specifically, ICCAT's SCRS recommended that member nations strengthen their monitoring and data collection efforts to monitor the future status of this stock. To address SCRS' recommendation, NMFS plans to use the existing authority to select all shark tournaments for reporting because fishing effort and catch information on shortfin mako and other species of sharks will also help to improve recreational catch estimates and available biological information. Data collected through tournament reporting will include number of fish harvested, number released and disposition (live or dead), length, girth, and weight among other parameters. The tournament registration category of "pelagic shark" (which includes shortfin mako shark) makes up 95 percent of all shark tournaments, thus selection of all shark tournaments for reporting will only be an additional 5 percent of shark tournaments.

Indirect short- and long-term ecological impacts to incidentally caught species and EFH would likely be neutral. The primary gears associated with the capture of shortfin mako sharks are pelagic longline and rod and reel. These gear types do not typically interact with the sea floor and are actively managed, allowing for non-target species to be released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative C1 would be neutral, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. Since this alternative would improve data collection from the selected shark tournaments, NMFS prefers Alternative C1 at this time.

### **Alternative C2**

Under Alternative C2, NMFS would require vessels with a Directed or Incidental shark LAP to report, on a daily basis, the number of shortfin mako sharks retained and discarded dead as well as fishing effort (number of sets and number of hooks) via a vessel monitoring system (VMS). This alternative is intended to support the current inseason monitoring of shortfin mako shark catches currently done through required vessel logbooks, dealer reports, and observer reports. Currently, pelagic longline vessels and purse seine vessels are required to have NMFS-approved enhanced mobile transmitting unit (E-MTU) VMS installed and must report bluefin tuna interactions via VMS. Vessels with a Directed shark LAP and bottom longline or gillnet gear on board are also required to have an E-MTU VMS installed, although the VMS is not required to be operating all the time. This alternative could provide NMFS with more timely information on shortfin mako catches, including dead discards and fishing effort, as can be obtained through VMS reporting, and could improve real-time inseason monitoring. Specifically, this alternative would help address the current time lag between the time logbooks are submitted or the field information is reported by the observer during a fishing trip, the time the data are entered into a database, and the time the data are finalized (after a process of quality control) and available for use. VMS reporting could also provide a check against logbook or electronic monitoring data on shortfin mako shark interactions. In addition, if NMFS were to implement a quota for shortfin mako sharks (Alternative D4), real-time data through VMS reporting would further facilitate inseason management of that quota. As such, the enhanced reporting under this alternative would have direct short- and long-term minor beneficial impacts if it improves timely data

collection for inseason management and provides more timely, precise, and accurate estimates of fishing mortality by requiring vessels to report daily dead discards and fishing effort of shortfin mako sharks.

Indirect short- and long-term ecological impacts to incidentally caught species and EFH would likely be neutral. The primary gears associated with the capture of shortfin mako sharks are pelagic longline and rod and reel. These gear types do not typically interact with the sea floor and are actively managed, allowing for non-target species to be released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative C2 would be beneficial, the same as the direct ecological impacts discussed above. The analysis above takes into account past and present management measures while discussing ecological impacts. VMS reporting requirements under this alternative could potentially unnecessarily increase burden to HMS commercial vessels that already report in other ways (vessel logbooks, dealer reports of landings and electronic monitoring system) that are sufficient vehicles for improving data collection for shortfin mako sharks. In addition, given the current reporting requirements for all HMS commercial vessels that already enable inseason monitoring and management of shortfin mako sharks, NMFS does not prefer this alternative at this time.

### **Alternative C3**

Alternative C3 would implement mandatory reporting of all recreational interactions (landings and discards) of shortfin mako sharks in HMS fisheries. There are a number of reporting requirements under current regulations for recreational fishermen fishing for shortfin mako sharks. As described in Alternative C1, HMS recreational anglers fishing from Maine to Virginia currently are required to report shortfin mako landings and releases if intercepted by the LPS, and data is collected on shortfin mako shark catches by APAIS. The LPS currently accounts for the majority of total recreational landings, providing NMFS precise recreational landings estimates of shortfin mako sharks (Table 3.11). This current reporting system allows NMFS to effectively monitor the recreational harvest of the stock using traditional intercept surveys. Therefore, additional reporting by anglers may not be needed at this time. As mentioned in Alternative C1, NMFS is planning on improving tournament reporting in order to improve current estimates of recreational landings by U.S. fishermen.

This alternative would increase data collection on the harvest of the shortfin mako sharks to support management, and meet reporting requirements in the ICCAT recommendation. Mandatory reporting would also provide additional information to evaluate the effectiveness of the recreational measures being considered in Alternatives B1-B9, such as minimum sizes, fishing seasons, and expanded circle hook requirement. If NMFS were to implement a quota for shortfin mako sharks (Alternative D4) or establish seasonal retention and minimum size limits for shortfin mako sharks based on certain criteria and process (Alternative B6e), additional data through mandatory reporting would further facilitate inseason management. In addition, this alternative would provide an alternate source of shortfin mako harvest data from the LPS and MRIP. Therefore, this alternative would likely result in short- and long-term minor beneficial ecological impacts.

Indirect short- and long-term ecological impacts would be expected to be neutral. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat, thus, impact to EFH would likely be neutral. In addition, rod and reel is actively managed during fishing, allowing for non-target species to be released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral.

When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative C3 would be minor and beneficial, the same as the direct ecological impacts discussed above. Additional reporting requirements of shortfin mako shark interactions under this alternative could potentially provide undue burden to recreational anglers that already report on catches, landings, and discards through LPS, APAIS, and during tournaments. Currently, NMFS does not prefer this alternative due to the potential to unnecessarily increase the burden on recreational fishermen and monitoring of catches and compliance by NMFS because NMFS estimates of shortfin mako sharks in the recreational fishery currently have relatively high precision, as evidenced by the low percent standard error rates in the Large Pelagic Survey. In addition, there would be costs for initial setup and monitoring of a reporting system along with some enforcement concerns as recreational landings do not have matching dealer reports to verify compliance with the reporting requirement.

#### **4.1.4 Rebuilding Alternatives**

NMFS is considering several rebuilding plan alternatives that would assist with the rebuilding of the shortfin mako shark stock. The alternatives, which are listed below, range from maintaining the No Action alternative to developing a rebuilding plan or other management measures established by ICCAT.

Alternative D1: No action. Do not establish a rebuilding plan for shortfin mako sharks.

Alternative D2: Establish a domestic rebuilding plan for shortfin mako sharks unilaterally (i.e., without ICCAT).

*Alternative D3; Establish the foundation for developing an international rebuilding plan for shortfin mako sharks. – Preferred Alternative*

Alternative D4: Remove shortfin mako sharks from the pelagic shark management group, implement a U.S. shortfin mako shark quota if established by ICCAT, and adjust the pelagic shark quota accordingly.

Alternative D5: Implement area management for shortfin mako sharks if established by ICCAT.

##### **Alternative D1**

Under Alternative D1, NMFS would not establish a rebuilding plan or a foundation for rebuilding the shortfin mako shark stock. NMFS would still implement management measures in the HMS recreational and commercial fisheries to end overfishing consistent with the

Magnuson-Stevens Act and with ICCAT Recommendation 17-08 and our obligations under ATCA. ICCAT Recommendation 17-08 states that shortfin mako shark catches of 500 mt or less would stop overfishing and begin to rebuild the stock. Since the United States is responsible for approximately 11 percent of Atlantic-wide shortfin mako fishing mortality, overfishing cannot be stopped solely through domestic regulations. However, failure of the United States to reduce fishing mortality in domestic commercial and recreational fisheries consistent with a rebuilding plan would likely hamper rebuilding efforts. Therefore, maintaining the No Action alternative would have short- and long-term direct, minor adverse ecological impacts, as the shortfin mako shark stock would continue to be overfished and overfishing will continue occurring.

Short- and long-term indirect impacts on other species are expected to be neutral, because the recreational and commercial fisheries would not change. Cumulatively, this alternative and other actions could have minor adverse ecological impacts on the North Atlantic shortfin mako shark stock, because no rebuilding plan would be established to reduce fishing mortality and help rebuild the stock. For these reasons, NMFS does not prefer this alternative at this time.

### **Alternative D2**

This alternative would establish a domestic rebuilding plan independent of ICCAT. This alternative would allow the United States to develop a rebuilding plan to avoid overfishing shortfin mako sharks in U.S. Federal waters. However, the United States contributes only 11 percent of the mortality for North Atlantic shortfin mako sharks. Because of the relatively small U.S. contribution to North Atlantic shortfin mako shark mortality, domestic reductions of shortfin mako shark mortality alone, even a prohibition of all U.S. landings of shortfin mako sharks, would not end overfishing of the entire North Atlantic stock. In addition, a unilateral rebuilding plan would not meet the obligation of the United States under ATCA. This alternative would have short- and long-term direct, minor beneficial ecological impacts for the shortfin mako shark stock, since it would not address approximately 90 percent of shortfin mako shark mortality due to international fishing and would allow the stock to continue to be overfished.

Cumulative impacts, and short- and long-term, indirect impacts on other species, are anticipated to be neutral. The authorized gear types used in the recreational and commercial shortfin mako shark fishery (*e.g.*, hook and line, pelagic longline) have minimal interactions with protected species and inconsequential impacts on fishery habitats. 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. Because this alternative would not feature international cooperation, thus allowing the stock to continue to be overfished, with overfishing occurring, NMFS does not prefer this alternative at this time.

### **Alternative D3– Preferred Alternative**

Under Alternative D3, the preferred alternative, NMFS would take preliminary action toward rebuilding by adopting measures to end overfishing to establish a foundation for a rebuilding plan. NMFS would then take action at the international level through ICCAT to develop a rebuilding plan for shortfin mako sharks. As part of this, NMFS would promote Magnuson-Stevens Act's rebuilding provisions and approaches and other relevant provisions of the Act. *See* 16 U.S.C. § 1812(c). This rebuilding plan would encompass the objectives set forth by

ICCAT based on new scientific advice from the SCRS, which is currently scheduled for in 2019. Under this alternative, NMFS would continue to implement new management measures for North Atlantic shortfin mako sharks in U.S. fisheries based on ICCAT Recommendation 17-08. Any international management recommendations adopted by the United States to help protect shortfin mako sharks would be implemented domestically, which could include measures described in Alternatives D4 and D5. Because of the small U.S. contribution to North Atlantic shortfin mako shark mortality, and the lack of a rebuilding plan from the current 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 under this alternative 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 has 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. This alternative would not cause an unnecessary disadvantage to domestic recreational and commercial fishermen, but would have direct, minor adverse ecological impacts for shortfin mako sharks in the short-term, because there would be no rebuilding plan to further reduce fishing mortality in the commercial and recreational shortfin mako fisheries and contribute to ending overfishing, although there would be changes to current regulations as described under the commercial, recreational, and monitoring alternatives. In the long-term, any management recommendations adopted at the international level to end overfishing of shortfin mako sharks and rebuild the stock 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 and help rebuild the stock.

Cumulative impacts, and short- and long-term, indirect impacts on other species, are anticipated to be neutral. The authorized gear types used in the recreational and commercial shortfin mako shark fishery (*e.g.*, hook and line, pelagic longline) have minimal interactions with protected species and inconsequential impacts on fishery habitats. 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. Long-term, if management recommendations adopted at the international level to end overfishing of shortfin mako sharks in 2019 cause a significant change in overall effort in the U.S. commercial and recreational fisheries that catch shortfin mako shark, these measures could provide a minor, beneficial, long-term impact to protected resources. Because of the potential for long-term direct, beneficial ecological benefits on the North Atlantic shortfin mako shark stock, NMFS prefers Alternative D3 at this time.

#### **Alternative D4**

Under this alternative, NMFS would remove shortfin mako sharks from the commercial pelagic shark management group and implement a species-specific quota for shortfin mako sharks if established by ICCAT. A shortfin mako-specific quota would likely include both commercial and recreational catches, as do other ICCAT established quotas. In addition, NMFS would establish a new commercial pelagic shark species quota for common thresher and oceanic

whitetip sharks based on recent landings. The vast majority of shortfin mako sharks are caught incidentally using pelagic longline (commercial) or rod and reel (recreational). In the commercial fishery, shortfin mako sharks are rarely targeted, but caught incidentally on sets targeting tunas and swordfish. In recent years, on average, total catches between the recreational and commercial fisheries have been nearly evenly split, with the average commercial mortality (including dead discards) at 187 mt ww (95 mt dw) and recreational landings at 192 mt ww (98 mt dw), totaling 379 mt ww (195 mt dw) as reported to ICCAT (Table 3.3). Currently, the annual commercial quota for common thresher, oceanic whitetip, and shortfin mako is 488 mt dw. On average, only 24 percent (116.3 mt dw) of the pelagic shark quota is filled every year of which approximately 71 percent (82.1 mt dw) is comprised of shortfin mako sharks. There is currently no recreational quota for shortfin mako sharks.

The 2017 ICCAT stock assessment indicated that the North Atlantic population of shortfin mako sharks is overfished and experiencing overfishing. In November 2017, ICCAT adopted management measures (Recommendation 17-08) to address the overfishing determination, but did not recommend a TAC necessary to stop overfishing of shortfin mako sharks. 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 instead of a species-specific quota under this alternative. It is difficult at this time to determine if setting a species-specific quota for shortfin mako sharks would have positive ecological benefits for the stock, as this scenario was not explored in the stock assessment. A species-specific quota for shortfin mako sharks would require authorized fishermen to discard all shortfin mako sharks once the quota is reached, potentially leading to an increase in regulatory discards, which would not result in decreased mortality of shortfin mako sharks and thus, contribute to the health of the stock. However, this species-specific quota may provide long-term direct, minor beneficial ecological impacts if ICCAT established a TAC for the United States that is well below the total average harvest by the United States (i.e., 379 mt ww or 195 mt dw) or below the current annual commercial quota for common thresher, oceanic whitetip, and shortfin mako (488 mt dw) as it could potentially reduce the mortality of shortfin mako sharks by U.S. fishermen, assuming the quota last year round and does not cause any regulatory discards due to the quota being met early in the season. Short-term direct, ecological impacts would be neutral for Alternative D4 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 beneficial if domestic commercial and recreational fishing practices would change considerably under this alternative.

Current average annual commercial landings from 2013 to 2017 for common thresher and oceanic whitetip combined, was 34.3 mt dw (Table 4.9). If a reduced pelagic shark species quota leads to regulatory dead discards of common thresher and oceanic whitetip sharks once the quota is reached, then Alternative D4 could lead to minor adverse ecological impacts for these two species. However, 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 for these two species based on recent landings. It is not expected that the level of fishing effort or mortality would increase under this alternative, and therefore, Alternative D4 would have short- and long-term indirect neutral ecological impacts for common thresher and oceanic whitetip sharks.

**Table 4.9 Commercial Landings of Shortfin Mako, Oceanic Whitetip, and Thresher Sharks, 2013-2017.** Source: 2013-2016 data from 2017 HMS SAFE Report; 2017 data from HMS eDealer database (preliminary).

Year	Shortfin Mako Shark (lb dw)	Shortfin Mako shark (mt dw)	Oceanic Whitetip Shark (lb dw)	Oceanic Whitetip Shark (mt dw)	Thresher Shark (lb dw)	Thresher shark (mt dw)
2013	199,177	90.3	62	< 0.1	48,768	22.1
2014	218,295	99.0	22	< 0.1	116,012	52.6
2015	141,720	64.2	0	0	72,463	32.9
2016	160,829	73.0	0	0	78,219	35.5
2017	185,403	84.1	0	0	61,284	27.8
Average	181,085	82.1	17	< 0.1	75,349	34.2

Short- and long-term indirect impacts on other species are expected to be neutral because the quotas would remain at current levels and therefore fishing effort is not expected to change. Cumulatively, this alternative and other actions could have minor beneficial ecological impacts on the North Atlantic shortfin mako shark stock, because a quota could be implemented to reduce fishing mortality and help rebuild the shortfin mako shark stock. 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. Therefore, NMFS does not prefer this alternative at this time.

### Alternative D5

The current ICCAT recommendation calls on the SCRS to provide additional scientific advice in 2019 that takes into account a spatial/temporal analysis of North Atlantic shortfin mako shark catches in order to identify areas with high interactions. If the scientific advice recommends implementing area-based management measures for this stock, and if that area management is established by ICCAT in a future recommendation, under this alternative, NMFS would take steps to implement area-based management measures domestically. Without a specific area to analyze at this time, the precise impacts with regard to reductions in shortfin mako shark catches and effort redistribution cannot be determined. Implementing area management for shortfin mako sharks, if recommended by the scientific advice, would likely have long-term, direct, moderate, beneficial ecological impacts. Short-term direct, ecological impacts would be neutral for this alternative 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. As mentioned in the previous alternatives, 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.

This alternative could lead to a reduction in localized fishing effort, which could result in long-term, direct, minor beneficial ecological impacts on HMS stocks other than shortfin mako shark, but would need to be analyzed considering the specific area and redistribution of fishing effort. Ecological impacts of this alternative on prohibited species and protected resources would likely be long-term, indirect, minor, and beneficial due to localized reductions in fishing effort and corresponding reductions in bycatch. Impacts on habitat would likely be neutral, since the authorized gear types used in the recreational and commercial shortfin mako shark fishery (*e.g.*, hook and line, pelagic longline) typically do not come into contact with sensitive bottom habitats. Cumulatively, this alternative and other actions could have minor beneficial ecological impacts on the North Atlantic shortfin mako shark stock, because area-based management measures could be implemented to reduce fishing mortality and help rebuild the shortfin mako shark stock. Without scientific advice from the SCRS on area management for shortfin mako sharks, the placement and impacts of such measures cannot be evaluated more specifically. Therefore, NMFS does not prefer this alternative at this time.

#### **Alternative D6**

Under this alternative, NMFS would annually allocate a specific number of “allowable” dead discards of shortfin mako sharks as a bycatch cap or sub-annual catch limit (ACL) that would apply to all fisheries, not just HMS fisheries. When that cap is reached, then NMFS would close the associated directed fisheries for the remainder of the fishing year. Shortfin mako sharks are primarily caught commercially with pelagic longline gear when fishing for swordfish and tuna species, and recreationally with rod and reel gear when targeting sharks or other HMS. As shown in Tables 3.7 and 3.8, shortfin mako sharks are also rarely caught on other gear types including bottom longline, gillnet, and other gears managed by NMFS and the New England, Mid-Atlantic, South Atlantic, Gulf of Mexico, and Caribbean Fishery Management Councils. As shown in these tables, from Table 3.7 only 2 percent of shortfin mako sharks have been caught outside of the HMS pelagic longline or recreational fishery. Thus, establishing a bycatch cap for these other fisheries at this time would have little impact in reducing shortfin mako shark mortality. Additionally, as ICCAT has not established an overall TAC for shortfin mako sharks, it is difficult to determine at what level NMFS would establish for any such bycatch cap, especially as any such level would be unlikely to change fishing behavior since shortfin mako sharks are only rarely caught on these other gear types. However, if shortfin mako shark interactions increases in those fisheries, which would then indicate fishing behavior has changed in some form, then NMFS could consider establishing a bycatch cap in these fisheries.

This alternative would have direct short- and long-term minor ecological impacts on shortfin mako sharks since this could close certain fisheries before the end of the year if the bycatch cap is reached. Indirect ecological impacts in the short- and long-term are expected to be minor and beneficial as other non-target species may also be avoided if certain fisheries before the end of the year if the bycatch cap is reached. The cumulative impacts could be minor and beneficial if fishermen can learn how to avoid shortfin mako sharks even more than they already do. This

alternative is not preferred, because U.S. catches of shortfin mako are small and thus unilateral U.S. bycatch caps will not address overfishing and rebuilding. Given the wide range of the stock and the number of countries fishing on it, ending overfishing and preventing an overfished status can only be effectively accomplished through international efforts by securing conservation and management participation by countries that contribute more significantly to mortality on the stock. Therefore, it is difficult at this time to determine if setting a bycatch cap for shortfin mako sharks would have positive ecological benefits for the stock, as this scenario was not explored in the most recent stock assessment, and, if recommended by scientific advice, would have to be considered at the international level to be effective.

## **4.2 Impacts on Essential Fish Habitat**

Pursuant to 16 U.S.C. 1855(b)(1), and as implemented by 50 C.F.R. §800.815, the Magnuson-Stevens Act requires NMFS to identify and describe EFH for each life stage of managed species and to evaluate the potential adverse effects of fishing activities on EFH 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. NMFS discusses the ecological impacts to EFH due to each preferred action in this proposed amendment. The preferred commercial alternative, Alternative A2, would allow retention of shortfin mako shark by persons with a directed or incidental shark LAP only if the shark is dead at haulback and there is a functional electronic monitoring system on board. Allowing retention based on disposition and the presence of electronic monitoring equipment is not anticipated to change PLL fishing techniques in a way that would change the spatial distribution of effort, bring this gear into contact with bottom habitats that may be considered EFH, or to impact EFH designated in the pelagic environment. This alternative is not expected to change the amount of effort exerted by the pelagic longline fishery, or increase the amount of dead discards in the fishery (high concentrations of which could result in localized increases in BOD). Impacts on EFH as a result of implementing Alternative A2 are anticipated to be neutral.

The preferred recreational alternative, Alternative B3, would increase the minimum size of all shortfin mako sharks from 54 inches FL to 83 inches FL. A change in the minimum size of shortfin mako that may be retained is not anticipated to change recreational fishing techniques in a way that would change the spatial distribution of effort, increase gear contact with bottom habitats that may be considered EFH, or to impact EFH designated in the pelagic environment. This alternative is not expected to increase the effort exerted by the recreational fishery, or increase the amount of dead discards in the fishery (high concentrations of which could result in localized increases in biological oxygen demand). Impacts on EFH as a result of implementing Alternative B3 are anticipated to be neutral.

The other preferred recreational alternative, Alternative B9, would require the use of circle hooks for recreational shark fishing in all areas and would remove the current management line established for dusky sharks near Chatham, Massachusetts. Changing the type of hook is not anticipated to change recreational fishing techniques in a way that would change the spatial distribution of effort, increase gear contact with bottom habitats that may be considered EFH, or to impact EFH designated in the pelagic environment. This alternative is not expected to

increase the amount of effort exerted by the recreational fishery, or increase the amount of dead discards in the fishery (high concentrations of which could result in localized increases in biological oxygen demand). Circle hooks have been demonstrated to result in less gut-hooking of target species, which may result in fewer dead discards. Impacts on EFH as a result of implementing Alternative B9 are anticipated to be neutral.

The preferred monitoring alternative, Alternative C1, would not require additional reporting of shortfin mako sharks outside of current reporting systems. However, NMFS plans to begin selecting all registered HMS shark tournaments to collect more data on shortfin mako shark landings and discards. Currently, NMFS has the authority to select all HMS registered tournaments, but only billfish and swordfish tournaments are selecting for reporting. Selecting shark tournaments to report is not anticipated to change recreational fishing techniques in a way that would change the spatial distribution of effort, increase gear contact with bottom habitats that may be considered EFH, or to impact EFH designated in the pelagic environment. This alternative is not expected to increase the amount of effort exerted by the recreational fishery, or increase the amount of dead discards in the fishery (high concentrations of which could result in localized increases in BOD). Since reporting is administrative in nature, impacts on EFH as a result of implementing Alternative C1 are anticipated to be neutral.

The preferred alternative, Alternative D3, would establish the foundation for developing an international rebuilding plan for shortfin mako sharks. NMFS would take action at the international level through ICCAT to address overfishing of and rebuild shortfin mako. ICCAT is expected to establish a rebuilding plan at its 2019 meeting. Aspects of this rebuilding plan would most likely include effort controls for participating nations, such as those outlined in ICCAT Recommendation 17-08. These measures are similar to the preferred alternatives identified above, and as such are not anticipated to have different impacts on EFH. Once this rebuilding plan is finalized at the international level, NMFS will likely complete an additional rulemaking and amendment to update the rebuilding plan for shortfin mako. At that time, NMFS will reassess impacts of the proposed measures to EFH.

### **4.3 Impacts on Protected Resources**

Specific protected resources impacts that would result from each of the alternatives are as follows.

#### *Commercial Alternatives*

The commercial alternatives in this document generally consider restrictions on the disposition and size of retained shortfin mako sharks in commercial HMS fisheries. Alternative A1, the no action alternative, would maintain all commercial shark regulations in place prior to publication of the shortfin mako shark emergency rule (March 2018). Relative to the pre-March 2018 baseline, the no action alternative would not affect effort in commercial HMS fisheries and would thus have no new effects on protected resources. Protected resource interaction rates and levels would not change. Consequently, short and long-term direct impacts on protected resources resulting from Alternative A1 would be neutral.

Alternatives A2 through A5 would restrict the number of shortfin mako sharks that can be retained through a requirement to release all individuals that are alive at haulback, introduction of a larger minimum size, and/or restrict the retention of shortfin mako sharks to vessels using pelagic longline gear. Because Alternatives A2 through A5 would all result in a reduction in shortfin mako landings, it is possible that some HMS commercial fishing effort would decrease. However, shortfin mako sharks are rarely targeted in commercial fisheries and are generally only retained when caught incidentally. Thus, any reduction in effort would likely be small and the associated reductions in protected resources interactions would be similarly small. For this reason, Alternatives A2 through A5 would result in short and long-term direct minor beneficial impacts to protected resources.

Alternative A6 would prohibit commercial retention and landings of shortfin mako sharks and would likely lead to reductions to commercial fishing effort since some trips may become less profitable. However, shortfin mako sharks are rarely targeted in commercial fisheries and are generally only retained when caught incidentally. Thus, any reduction in effort would likely be small and the associated reductions in protected resource interactions would be similarly small. For this reason, Alternative A6 would result in short and long-term direct minor beneficial impacts to protected resources.

#### *Recreational Alternatives*

The recreational alternatives in this document generally consider minimum sizes and seasons for shortfin mako sharks as well as some options for tags and/or gear requirements. Recreational fishing typically uses rod and reel, which has a low incidence of protected resource interactions because the gear is constantly tended. For this reason, changes to recreational fishing effort are unlikely to have large impacts on protected resources. The following descriptions of protected resource interactions are only in the context of recreational fishing. Alternative B1, the no action alternative, would maintain all commercial shark regulations in place prior to publication of the shortfin mako shark emergency rule (March 2018). Relative to the pre-March 2018 baseline, the no action alternative would not affect effort in recreational HMS fisheries and would thus have no new effects on protected resources. Protected resource interaction rates and levels would not change. Consequently, short and long-term direct impacts on protected resources resulting from Alternative B1 would be neutral.

Alternatives B2 through B5 consider different minimum sizes for shortfin mako sharks all of which are above the current minimum size of 54 inches FL. Increasing the minimum size would lead to reduced retention of shortfin mako sharks, which may disincentivize fishing for the species. Private anglers and potential charter clients may refrain from shortfin mako shark fishing if there is a reduced likelihood of catching a legal size shark. The reduction in recreational fishing effort would result in a reduction in protected resource interactions. Thus, Alternatives B2 through B5 would result in short and long-term direct minor beneficial impacts to protected resources.

Alternatives B6, sub-alternatives B6a through B6e, and Alternative B7 consider different minimum sizes and seasons and slot limits for recreational shortfin mako shark fishing. Similar to Alternatives B2 through B5, this would result in reduced recreational fishing effort. Thus,

Alternatives B6, sub-alternatives B6a through B6e, and Alternative B7 would result in short and long-term direct minor beneficial impacts to protected resources.

Alternative B8 considers introducing a tagging system into the recreational shortfin mako shark fishery. Anglers wishing to retain shortfin mako sharks would be issued tags and would be required to attach a tag to each retained individual. Such a measure could cap the number of shortfin mako sharks retained by capping the number of tags issued to anglers. Such a cap would reduce the number of shortfin mako sharks harvested, thus, reduce the amount of fishing effort directed on the species. Fishermen that do not receive tags, or do not receive as many as desired, may reduce the number of trips and/or time spent fishing for shortfin mako sharks. The reduction in recreational fishing effort would result in a reduction in protected resource interactions. Thus, Alternative B7 would result in short and long-term direct minor beneficial impacts to protected resources.

Alternative B9 considers geographically expanding the current circle hook requirement in the recreational fishery. Currently, recreational fishermen targeting sharks must use circle hooks when fishing south of a line near Chatham, MA. Alternative B9 would expand the requirement to the waters north of that line. Circle hooks can be beneficial to some species because they reduce the chances of swallowing and gut hooking and more often hook individuals in the jaw. Circle hooks have a demonstrated benefit to a variety of protected resources including sea turtles and marine mammals. Circle hook use in the recreational shark fishery would benefit protected resources since incidentally hooked individuals are less likely to swallow the hook. However, the benefit is likely small since Alternative B9 only extends the requirement into a small geographic area. Thus, Alternative B9 would result in short and long-term direct minor beneficial impacts to protected resources.

Alternative B10 would prohibit the retention and landings of shortfin mako sharks in the recreational fishery and only allow catch and release of the species. Because fishermen are unable to retain shortfin mako sharks, it is likely that fewer trips would target the species, thus reducing recreational fishing effort. The reduction in recreational fishing effort would result in a reduction in protected resource interactions. Thus, Alternative B10 would result in short and long-term direct minor beneficial impacts to protected resources.

#### *Monitoring Alternatives*

Alternatives C1 through C3 consider commercial and recreational reporting requirements for shortfin mako sharks. Reporting requirements are unlikely to affect fishing effort, location, or technique, thus, no new protected resource impacts would be expected to result from adoption of any of these alternatives. For this reason, short and long-term direct impacts on protected resources resulting from Alternatives C1 through C3 would be neutral.

#### *Rebuilding Alternatives*

Alternatives D1 through D5 consider international and domestic rebuilding plans for shortfin mako sharks and consider adoption of future ICCAT quota and/or area-based management recommendations. These actions alone are unlikely to affect fishing effort, location, or technique, thus, no new protected resource impacts would be expected to result from adoption of

any of these alternatives. For this reason, short and long-term direct impacts on protected resources resulting from Alternatives D1 through D5 would be neutral.

Alternatives D6 considers bycatch caps for all fisheries that interact with shortfin mako sharks. However, shortfin mako sharks are rarely targeted in commercial fisheries and recreational fishing effort will decrease as a result of other alternatives. Thus, any reduction in effort would likely be small and the associated reductions in protected resource interactions would be similarly small. For this reason, Alternative B6 would result in short and long-term direct minor beneficial impacts to protected resources.

#### **4.4 Economic and Social Evaluation**

This section assesses the socioeconomic impacts of the alternatives presented in this document. The primary purpose of this section is to provide the baseline socioeconomic data and socioeconomic impact analysis for the Regulatory Impact Review (RIR) in Chapter 6.0 and the Initial regulatory Flexibility Analysis (IRFA) in Chapter 7.0. It also provides relevant data for Community Profiles described in Chapter 8.0. While this section provides a socioeconomic analysis, it is not a stand-alone analysis as it refers back to, provides background data for, and builds upon the specific data and analyses provided in Chapters 3.0 and 9.0.

In this rulemaking, NMFS considered a range of alternatives to address shortfin mako shark overfishing and meet the objectives of the proposed action. There are six alternatives that address a range of measures to reduce shortfin mako shark retention in the commercial fishery. There are nine alternatives and several sub-alternatives to reduce shortfin mako shark harvest in the commercial fisheries. There are three alternatives that address the ICCAT recommendation for more shortfin mako shark data collection. There are five alternatives that address the rebuilding and potential management measures from ICCAT of shortfin mako sharks. The expected socioeconomic impacts of the different alternatives considered and analyzed are discussed below.

##### **4.4.1 Commercial Alternatives**

###### **Alternative A1**

Under Alternative A1, NMFS would not implement any new management measures in commercial HMS fisheries. Once the emergency interim final rule for shortfin mako sharks expires, management measures would revert to those in effect prior to March 2, 2018 (e.g., no requirement to release shortfin mako sharks that are alive at haulback). Directed and incidental shark limited access permit (LAP) holders would continue to be allowed to land and sell shortfin mako sharks to an authorized dealer, subject to current limits, including the pelagic shark commercial quota.

Short-term direct socioeconomic impacts would likely be neutral since commercial fishermen could continue catch and retain shortfin mako sharks at a similar level and rate as the status quo. In recent years, about 180,000 lb dw of shortfin mako sharks have been landed and the

commercial revenues from shortfin mako sharks have averaged approximately \$375,000 per year, which equates to approximately 1 percent of overall HMS ex-vessel revenues (Table 3.22).

Long-term direct minor adverse socioeconomic impacts would be expected under Alternative A1. If the shortfin mako shark stock continues to decline, fewer sharks would be available to commercial fishermen. Average annual commercial revenues from shortfin mako sharks would likely be lower than the current average commercial revenue of \$375,000 (Table 3.22). Furthermore, continued decline in shortfin mako shark stock health would likely lead to more severe fishing mortality reductions which could impact target species catch in affected fisheries. For example, rod and reel commercial fisheries that incidentally catch shortfin mako sharks may need to reduce effort to reduce fishing mortality, affecting target catch of species such as tunas.

Short- and long-term indirect socioeconomic impacts would be neutral under Alternative A1. Shortfin mako sharks are rarely targeted in commercial fisheries and are usually caught incidentally while fishing for other species. Thus, shortfin mako shark measures are unlikely to affect total effort, and businesses that support commercial fishing such as dealers, processors, and bait and tackle suppliers are unlikely to be affected.

#### **Alternative A2 – Preferred Alternative**

Under Alternative A2, the preferred alternative, retention of shortfin mako sharks would only be allowed if the following three criteria are met: 1) the vessel has been issued a Directed or Incidental shark LAP, 2) the shark is dead at haulback, and 3) there is a functional electronic monitoring system on board the vessel. This alternative is designed to be consistent with one of the limited provisions allowing retention of shortfin mako sharks under ICCAT Recommendation 17-08. Under the current HMS regulations, all HMS permitted vessels that fish with pelagic longline gear are already required to have a functional electronic monitoring system (79 FR 71510; December 2, 2014) and either a Directed or an Incidental shark LAP. Vessels utilizing other gear types (i.e., gillnet or bottom longline) are not required to have an electronic monitoring system under current regulations but could choose to install one if the operator wishes to retain shortfin mako sharks that are dead at haulback and if the vessel holds a commercial shark LAP. Under this alternative, the electronic monitoring system would be used to verify the disposition of shortfin mako sharks at haulback to ensure that only sharks dead at haulback were retained.

Short- and long-term direct minor adverse socioeconomic impacts are expected under Alternative A2 because these measures would reduce the number of shortfin mako sharks landed and sold. However, shortfin mako sharks are rarely a targeted species and are worth less than other, more valuable target species, so the adverse effects would be minor. Compared to the No Action alternative, this alternative is expected to reduce ex-vessel revenues derived from shortfin mako sharks commensurate with the landings reduction of approximately 75 percent for the commercial fisheries, as described above. Thus, the commercial fisheries could cumulatively experience revenue losses of approximately \$281,000 per year (75 percent of \$375,000 overall average ex-vessel revenue), which would impact the pelagic longline fishery the most (Table 3.22). Under Alternative A2, some of these landings would be prohibited, but the total socioeconomic impact would be less than \$375,000. Additionally, vessels utilizing gear types other than pelagic longline are unlikely to have electronic monitoring systems currently installed.



Thus, these vessels would need to pay to install these systems if they wish to retain shortfin mako sharks, introducing an additional expense for non-pelagic longline vessels.

Short- and long-term indirect socioeconomic impacts would be neutral under Alternative A2. Shortfin mako sharks are rarely targeted in commercial fisheries and are usually caught incidentally while fishing for other species. Thus, shortfin mako shark measures are unlikely to affect total effort, and businesses that support commercial fishing such as dealers, processors, and bait and tackle suppliers are unlikely to be affected.

### **Alternative A3**

This alternative is similar to Alternative A2 except that the ability to retain dead shortfin mako sharks would be limited to permit holders that opt in to a program that would use the existing electronic monitoring systems, which are currently used in relation to the bluefin tuna IBQ program, also to verify the disposition of shortfin mako sharks at haulback. In other words, this alternative would allow for retention of shortfin mako sharks that are dead at haulback by persons with a Directed or Incidental shark LAP only if permit holders opt in to enhanced electronic monitoring coverage. If the permit holder does not opt in to the enhanced electronic monitoring coverage, they could not retain any shortfin mako sharks.

Socioeconomic impacts under this alternative are expected to be similar to those under Alternative A2; namely, short- and long-term direct minor adverse socioeconomic impacts. Compared to the preferred alternative, this alternative is expected to cumulatively experience revenue losses of approximately \$281,000 per year (75 percent of \$375,000 overall average ex-vessel revenue), which would impact the pelagic longline fishery the most (Table 3.22). Lost revenues would have greater social and socioeconomic impacts on fishing communities with higher reliance on shortfin mako shark landings, including Wanchese, NC, Fairhaven/New Bedford, MA, and Barnegat Light, NJ (Table 3.21). Under this alternative, a portion of the pelagic longline fleet could opt out of any retention of shortfin mako sharks, resulting in a greater reduction in overall shark ex-vessel revenue for those vessels. Overall, the socioeconomic impacts associated with these reductions in revenue are not expected to be substantial, as shortfin mako sharks comprise less than one percent of total HMS ex-vessel revenues on average (Table 3.22), and an even smaller fraction of total fisheries revenues in the affected fishing communities.

Commercial vessels with other gear types, such as bottom longline, gillnet, or handgear, could land shortfin mako sharks only if they opt into using an electronic monitoring system to verify sharks are dead at haulback. Vessels utilizing gear types other than pelagic longline are unlikely to have electronic monitoring systems currently installed. Thus, these vessels would need to pay to install these systems if they wish to retain shortfin mako sharks, introducing an additional expense for non-pelagic longline vessels. Due to the low commercial value of shortfin mako sharks and the high cost of electronic monitoring it is reasonable to expect that these fisheries will not install cameras and therefore will not retain shortfin mako sharks. However, the magnitude of shortfin mako landings by these gear types is very small, as described under ecological impacts above, so there would be little socioeconomic impact.

Short- and long-term indirect socioeconomic impacts would be neutral under Alternative A3. Shortfin mako sharks are rarely targeted in commercial fisheries and are usually caught

incidentally while fishing for other species. Thus, shortfin mako shark measures are unlikely to affect total effort, and businesses that support commercial fishing such as dealers, processors, and bait and tackle suppliers are unlikely to be affected.

#### **Alternative A4**

This alternative would establish a commercial minimum size of 83 inches FL (210 cm FL) for retention of shortfin mako sharks caught incidentally during fishing for other species, whether the shark is dead or alive at haulback and regardless of sex. Based on observer data, only six percent of shortfin mako sharks are caught with pelagic longline gear greater than 83 inches FL. Thus, restricting fishermen to retaining six percent of shortfin mako sharks would represent a considerable reduction in number of shortfin mako sharks landed and in the resulting ex-vessel revenue. However, the overall socioeconomic impacts associated with these reductions in revenue are not expected to be substantial, as shortfin mako sharks comprise less than one percent of total HMS ex-vessel revenues on average (Table 3.22). Additionally, the magnitude of shortfin mako landings by other gear types (e.g., bottom longline, gillnet, handgear) is very small, as described under ecological impacts above, so this alternative would have little socioeconomic impact. Therefore, short and long-term direct minor adverse economic impacts are expected under this alternative.

Short- and long-term indirect socioeconomic impacts would be neutral under Alternative A4. Shortfin mako sharks are rarely targeted in commercial fisheries and are usually caught incidentally while fishing for other species. Thus, shortfin mako shark measures are unlikely to affect total effort, and businesses that support commercial fishing such as dealers, processors, and bait and tackle suppliers are unlikely to be affected.

#### **Alternative A5**

This alternative would allow permit holders to retain shortfin mako sharks caught on any commercial gear (e.g., pelagic longline, bottom longline, gillnet, handgear) provided that an observer is on board that can verify that the shark was dead at haulback. Under this alternative, electronic monitoring would not be used to verify the disposition of shortfin mako sharks caught on pelagic longline gear, but instead pelagic longline vessels could only retain shortfin mako sharks when the sharks are dead at haulback and an observer is on board.

As described above, this alternative would result in a 95 percent reduction in number of shortfin mako sharks retained on pelagic longline gear. Since the majority of commercial shortfin mako landings are from the pelagic longline fishery, that fishery could experience revenue losses of approximately \$356,000 per year (95 percent of \$375,000 overall average ex-vessel revenue) (Table 3.22). However, the overall socioeconomic impacts associated with these reductions in revenue are not expected to be substantial, as shortfin mako sharks comprise less than one percent of total HMS ex-vessel revenues on average (Table 3.22). Additionally, the magnitude of shortfin mako landings by other gear types (e.g., bottom longline, gillnet, handgear) is very small, as described under ecological impacts above, so this alternative would have little socioeconomic impact. Therefore, short and long-term direct minor adverse socioeconomic impacts are expected under this alternative.

Short- and long-term indirect socioeconomic impacts would be neutral under Alternative A4. Shortfin mako sharks are rarely targeted in commercial fisheries and are usually caught incidentally while fishing for other species. Thus, shortfin mako shark measures are unlikely to affect total effort, and businesses that support commercial fishing such as dealers, processors, and bait and tackle suppliers are unlikely to be affected.

#### **Alternative A6**

This alternative would place shortfin mako sharks on the prohibited sharks list to prohibit any catch or retention of shortfin mako sharks in commercial HMS fisheries. As described above, in recent years, about 180,000 lb dw of shortfin mako sharks have been landed and the commercial revenues from shortfin mako sharks have averaged approximately \$375,000 per year (Table 3.22). A prohibition on shortfin mako shark landings would result in revenue losses of approximately \$375,000 per year. However, the overall socioeconomic impacts associated with these reductions in revenue are not expected to be substantial, as shortfin mako sharks comprise less than 1 percent of total HMS ex-vessel revenues on average (Table 3.22). Therefore, short- and long-term direct minor adverse socioeconomic impacts are expected under this alternative.

Short- and long-term indirect socioeconomic impacts would be neutral under Alternative A4. Shortfin mako sharks are rarely targeted in commercial fisheries and are usually caught incidentally while fishing for other species. Thus, shortfin mako shark measures are unlikely to affect total effort, and businesses that support commercial fishing such as dealers, processors, and bait and tackle suppliers are unlikely to be affected.

### **4.4.2 Recreational Alternatives**

#### **Alternative B1**

Under this alternative, NMFS would maintain the non-emergency rule recreational regulations that pertain to shortfin mako sharks established in the 2006 Consolidated HMS FMP and amendments. Recreational fishermen would continue to be limited to one authorized shark species greater than 54 inches FL (including shortfin mako sharks) or one hammerhead shark (great, scalloped, or smooth) greater than 78 inches FL per vessel per trip along with one Atlantic sharpnose and bonnethead shark per person and an unlimited number of smoothhound sharks per trip. This would result in short-term, direct neutral socioeconomic impacts. However, long-term moderate adverse socioeconomic impacts could be expected as overfishing would continue and likely result in declining recreational catches which may necessitate the need for more restrictive management measures under MSA.

Indirect socioeconomic impacts from this alternative would likely be neutral in the short- and long-term. Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns. Shortfin mako sharks are one of the most popular sharks to target among recreational anglers who averaged approximately 4,800 targeted trips for them a year in the Northeast (Maine to Virginia) region per year, and were a primary target species for registered HMS tournaments within the Northeast. A 2011 survey of HMS Angling permit holders in the Northeast found they spent an average of \$567 per directed shark trip or \$615 when adjusted for inflation to June 2017 dollars (Hutt et al. 2014). Extrapolated to the average number of directed trips targeted shortfin mako

sharks in the region, this comes out to approximately \$2.95 million in trip expenditures per year (Table 4.10). This is likely a conservative estimate as one in four trips targeting shortfin mako sharks are for-hire trips which generally have higher average costs. As such, cumulative impacts are expected to be moderate adverse if overfishing continues and NMFS has to implement more restrictive measures to end overfishing and rebuild shortfin mako sharks.

**Table 4.10** Estimated average annual expenditures for directed shortfin mako trips from Maine to Virginia with potential reductions in directed trips and annual expenditures due to the implementation of a shortfin mako shark fishing season, 2012-2016. Note: 72 percent of shortfin mako sharks harvested by recreational fishermen are landed in targeted trips. Sources: Large Pelagic Survey and Hutt et al. 2014.

Alternative or Sub-Alternative	Direct Trips for Shortfin Mako Sharks per Year	Total Expenditures <sup>1</sup>	Estimated Reduction in Directed Trips	Estimated Reduction in Total Expenditures
B1 – B5	4,803	\$2,955,094	--	--
B6a	4,803	\$2,955,094	0	\$0
B6b	4,328	\$2,662,845	-475	-\$292,249
B6c	3,539	\$2,177,405	-1,264	-\$777,689
B6d	2,368	\$1,456,936	-2,435	-\$1,498,158

<sup>1</sup> Extrapolated based on estimate of average cost per directed shark trip (\$566.95/trip) in the Northeast (Maine to Virginia) taken by HMS Angling permit holders in 2011 (Hutt et al. 2014) adjusted for inflation to June 2017 U.S. dollars (\$615.26/trip).

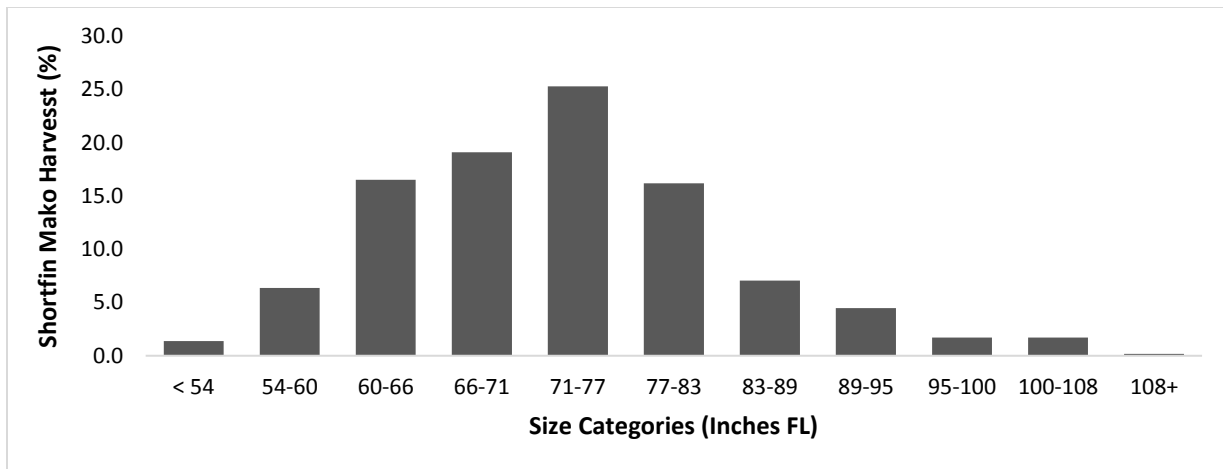
### Alternative B2

Under Alternative B2, recreational HMS permit holders (those who hold HMS Angling or Charter/Headboat permits, and Atlantic Tunas General category and Swordfish General Commercial permits when participating in a registered HMS tournament) would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL (180 cm FL) and female shortfin mako sharks that measure at least 83 inches FL (210 cm FL). This increase in the size limit is projected to reduce recreational landings by at least 64 percent in numbers of sharks landed, and 49 percent in the weight of sharks landed. While this alternative would not establish a shortfin mako fishing season, such a significant increase in the minimum size limit would likely result in some reduction in directed fishing effort for shortfin mako sharks.

Approximately 4,800 directed trips targeted shortfin mako sharks on average each year (Table 4.10), and about 36 percent ([2,432 average shortfin mako sharks harvested annually x 72 percent landed on directed trips] / 4,803 directed trips) of them harvested shortfin mako sharks when managed under the 54 inches FL minimum size limit. A 64 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 13 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to short- and long-term moderate adverse direct and indirect socioeconomic impacts on supporting businesses and industries. Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.

However, there are two factors that might minimize reductions in fishing effort. First, the frequency distribution of harvested shortfin mako sharks peaks between 71 and 77 inches FL (Figure 4.1). Under the 54 inches FL minimum size limit, two-thirds of shortfin mako sharks

caught by recreational fishermen were released. This suggests that a number of released sharks are likely greater in size than the 54 inches FL minimum size limit. If this is the case, requiring recreational anglers to release more shortfin mako sharks may have less impact on directed fishing effort than anticipated. Secondly, HMS anglers have a number of substitute species to which they can shift their fishing effort including common thresher sharks, blue sharks, various tuna species, and swordfish. If HMS anglers are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts are likely to be minor for this alternative.



**Figure 4.1** Length distribution of recreationally harvested shortfin mako sharks under the 54 inch FL size limit, 2012-2016. Source: Large Pelagic Survey.

### Alternative B3 – Preferred Alternative

Under Alternative B3, the preferred alternative, HMS recreational permit holders could only land shortfin mako sharks, male or female, that are at least 83 inches FL. This alternative matches the minimum size limit implemented in the emergency interim final rule (83 FR 8946; March 2, 2018). Assuming no reduction in directed fishing effort, this increase in the minimum size limit would result in an 83 percent reduction in the number of sharks landed, and a 68 percent reduction in the weight of sharks landed. Such a large increase in the minimum size limit and associated reduction in landings is unlikely to have no effect on directed fishing effort. In Table 4.10, approximately 4,800 directed trips targeted shortfin mako sharks on average each year, and about 36 percent ( $[2,432 \text{ average shortfin mako sharks harvested annually} \times 72 \text{ percent landed on directed trips}] / 4,803 \text{ directed trips}$ ) of them harvested shortfin mako sharks when managed under the 54 inches FL minimum size limit. An 83 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 6 percent. NMFS is aware of at least one tournament directed at shortfin mako sharks in the Northeast that has chosen to cancel its 2018 event due to the more stringent current 83 inches FL minimum size limit. Tournaments account for over half of directed recreational trips for shortfin mako sharks, and 77 percent of them in the month of June when effort is at its highest. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries. Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.

As stated under Alternative B2, there are two factors that might minimize reductions in fishing effort. They are the frequency distribution of harvested shortfin mako sharks peaks between 71 and 77 inches FL (Figure 4.1) and HMS anglers have a number of substitute species to which they can shift their fishing effort (common thresher sharks, blue sharks, various tuna species, and swordfish). Depending on how much HMS anglers and tournaments are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts are likely to be minor to moderate for this alternative.

#### **Alternative B4**

Under Alternative B4, recreational HMS permit holders would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL and female shortfin mako sharks that measure at least 108 inches FL. Assuming no reduction in directed fishing effort, this increase in the minimum size limit would result in a 76 percent reduction in the number of sharks landed, and a 72 percent reduction in the weight of sharks landed. Such a large increase in the size limit and associated reduction in landings is unlikely to have no effect on directed fishing effort. In Table 4.10, approximately 4,800 directed trips targeted shortfin mako sharks on average each year, and about 36 percent ( $[2,432 \text{ average shortfin mako sharks harvested annually} \times 72 \text{ percent landed on directed trips}] / 4,803 \text{ directed trips}$ ) of them harvested shortfin mako sharks when managed under the 54 inches FL minimum size limit. A 76 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to approximately 9 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, especially if it results in the cancellation of shark fishing tournaments, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries. Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.

Similar to Alternative B2, there are two factors that might minimize reductions in fishing effort (harvested shortfin mako sharks peaks between 71 and 77 inches FL and shifting focus to other HMS species). Depending on how much HMS anglers and tournaments are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts are likely to be minor to moderate for this alternative.

#### **Alternative B5**

Under Alternative B5, recreational HMS permit holders would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL and female shortfin mako sharks that measure at least 120 inches FL. Assuming no reduction in directed fishing effort, this increase in the size limit would result in a 76 percent reduction in the number of sharks landed, and a 73 percent reduction in the weight of sharks landed. Such a large increase in the minimum size limit and associated reduction in landings is unlikely to have no effect on directed fishing effort. In Table 4.10, approximately 4,800 directed trips targeted shortfin mako sharks on average each year, and about 36 percent ( $[2,432 \text{ average shortfin mako sharks harvested annually} \times 72 \text{ percent landed on directed trips}] / 4,803 \text{ directed trips}$ ) of them harvested shortfin mako sharks when managed under the 54 inches FL minimum size limit. A 76 percent reduction in shortfin mako

sharks harvested would thus reduce the percentage of directed trips harvesting them to 8.6 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, especially if it results in the cancellation of shark fishing tournaments, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries. Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.

Similar to Alternative B2, there are two factors that might minimize reductions in fishing effort (harvested shortfin mako sharks peaks between 71 and 77 inches FL and shifting focus to other HMS species). Depending on how much HMS anglers and tournaments are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts are likely to be minor to moderate for this alternative.

### **Alternative B6a**

Under Alternative B6a, the minimum size limit for the retention of shortfin mako sharks would be increased from 54 inches FL to 71 inches FL for male and 83 inches FL for female shortfin mako sharks, and a shortfin mako fishing season would be established from May through October. The fishing season established under this alternative would have little to no effect on shortfin mako fishing activity in the Northeast, but may reduce fishing effort in the South Atlantic and Gulf of Mexico regions; however, a lack of data on targeted trips for shortfin mako sharks in this region makes any assessment of potential socioeconomic impacts difficult. However, this combination of increase in the size limit and fishing season is projected to reduce recreational landings by at least 64 percent in numbers of sharks landed, and 49 percent in the weight of sharks landed in the Northeast. Such a significant increase in the minimum size limit would likely result in some reduction in directed fishing effort for shortfin mako sharks. In Table 4.10, approximately 4,800 directed trips targeted shortfin mako sharks on average each year, and about 36 percent ( $[2,432 \text{ average shortfin mako sharks harvested annually} \times 72 \text{ percent landed on directed trips}] / 4,803 \text{ directed trips}$ ) of these trips harvested shortfin mako sharks when managed under the 54 inches FL minimum size limit. A 64 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 13 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse direct and indirect socioeconomic impacts on supporting businesses and industries. Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.

Similar to Alternative B2, there are two factors that might minimize reductions in fishing effort (harvested shortfin mako sharks peaks between 71 and 77 inches FL and shifting focus to other HMS species). If HMS anglers are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts are likely to be minor for this alternative.

### **Alternative B6b**

Under Alternative B6b, NMFS would establish a three-month fishing season for shortfin mako sharks spanning the summer months of June through August. This season would be combined

with a 71 inches FL minimum size limit for males and 100 inches FL for females. Based on estimates from the LPS, on average 475 directed trips are taken for shortfin mako sharks each September and October, representing approximately 10 percent of all annual directed trips (Table 4.10). Unless these trips are redistributed within the shortened season or converted to trips targeting other HMS species, the loss of these trips would represent a reduction in HMS angler expenditures of approximately \$292,000 (Table 4.10). No registered HMS tournaments held in September and October target sharks exclusively, so it is highly unlikely this alternative would result in the rescheduling of any tournaments due to the proposed fishing season. It is much more likely that directed fishing effort would be affected by the proposed increases in the minimum size limits. Assuming this increase in the size limit has minimal effect on fishing effort directly towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 78 percent reduction in the number of sharks landed, and a 76 percent reduction in the weight of sharks landed. Such a large increase in the minimum size limit and associated reduction in landings is unlikely to have no effect on directed fishing effort. In Table 4.10, approximately 4,300 directed trips targeted shortfin mako sharks on average each year between June and August, and about 36 percent ( $[2,177 \text{ shortfin mako sharks harvested per year} \times 72 \text{ percent landed on directed trips}] / 4,328 \text{ directed trips}$ ) of them harvested shortfin mako sharks when managed under the 54 inches FL minimum size limit. A 78 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 8 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse direct and indirect socioeconomic impacts on supporting businesses and industries. Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.

Similar to Alternative B2, there are two factors that might minimize reductions in fishing effort (harvested shortfin mako sharks peaks between 71 and 77 inches FL and shifting focus to other HMS species). If HMS anglers are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts are likely to be minor for this alternative.

### **Alternative B6c**

Under Alternative B6c, NMFS would establish a two-month fishing season for shortfin mako sharks for the months of June and July. This season would be combined with a 71 inches FL minimum size limit for males and 90 inches FL for females. Based on estimates from the LPS, on average 1,264 directed trips are taken for shortfin mako sharks each August through October, representing approximately 26 percent of all annual directed trips (Table 4.10). Unless these trips are redistributed within the shortened season or converted to trips targeting other HMS species, the loss of these trips would represent a reduction in HMS angler expenditures of approximately \$777,000 (Table 4.10). However, only two registered HMS tournaments held in August through October target sharks exclusively, one out of New York, which primarily targets thresher sharks, and a Florida tournament where participants fish exclusively from shore, so it is highly unlikely this alternative would result in the rescheduling of any tournaments due to the potential fishing season. It is likely that directed fishing effort would also be affected by the potential increases in the minimum size limits. Assuming this increase in the size limit has minimal effect on fishing effort directly towards shortfin mako sharks within the season, this



combination of season and increase in the size limit should result in a 78 percent reduction in the number of sharks landed, and a 76 percent reduction in the weight of sharks landed. Such a large increase in the size limit and associated reduction in landings is unlikely to have no effect on directed fishing effort. In Table 4.10, approximately 3,500 directed trips targeted shortfin mako sharks on average each year between June and July, and about 38 percent ( $[1,876 \text{ shortfin mako sharks harvested per year} \times 72 \text{ percent landed on directed trips}] / 3,539 \text{ directed trips}$ ) of them harvested shortfin mako sharks when managed under the 54 inches FL minimum size limit. A 78 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 8 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse direct and indirect socioeconomic impacts on supporting businesses and industries. Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.

Similar to Alternative B2, there are two factors that might minimize reductions in fishing effort (harvested shortfin mako sharks peaks between 71 and 77 inches FL and shifting focus to other HMS species). If HMS anglers are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts may only be minor for this alternative.

### **Alternative B6d**

Under Alternative B6d, NMFS would establish a one-month fishing season for shortfin mako sharks for the month of June only. This season would be combined with a 71 inches FL minimum size limit for males and 83 inches FL for females. Based on estimates from the LPS, on average 2,435 directed trips are taken for shortfin mako sharks each July through October, representing approximately 51 percent of all annual directed trips (Table 4.10). Unless these trips are redistributed within the shortened season or converted to trips targeting other HMS species, the loss of these trips would represent a reduction in HMS angler expenditures of approximately \$1.5 million (Table 4.10). Additionally, there are seven registered HMS tournaments held in July through October that target sharks exclusively, including three of four tournaments held in the state of Rhode Island, and the only tournament in Massachusetts to target sharks exclusively. It is likely that directed fishing effort would also be affected by the proposed increases in the minimum size limits. Assuming this increase in the size limit has minimal effect on fishing effort directly towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 79 percent reduction in the number of sharks landed, and a 78 percent reduction in the weight of sharks landed. Such a large increase in the size limit and associated reduction in landings is unlikely to have no effect on directed fishing effort. In Table 4.10, approximately 2,400 directed trips targeted shortfin mako sharks on average each June, and about 40 percent ( $[1,306 \text{ shortfin mako sharks harvested per year} \times 72 \text{ percent landed on directed trips}] / 2,368 \text{ directed trips}$ ) of them harvested shortfin mako sharks when managed under the 54 inches FL minimum size limit. A 79 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 8 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse direct and indirect socioeconomic impacts on supporting businesses and industries. Indirect socioeconomic impacts include impacts on

supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.

However, there are three factors that might minimize reductions in directed fishing effort. The first and second factors are the same as in Alternative B2 (harvested shortfin mako sharks peaks between 71 and 77 inches FL and shifting focus to other HMS species). Finally, a one-month season is likely to result in some redistribution of tournaments and directed fishing effort from months outside the proposed season to the month of June. This redistribution of effort may be limited in part by the significant amount of directed effort and shark fishing tournaments that already occur in the month of June, thus limiting the available opportunities for scheduling more trips and tournaments. If HMS anglers are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts may only be minor for this alternative.

### **Alternative B6e**

Under Alternative B6e, NMFS would establish a process and criteria for determining season dates and minimum size limits for shortfin mako sharks on an annual basis through inseason actions. This process would be similar to how the agency sets season opens and retention limits for the shark commercial fisheries and the Atlantic Tunas General category fishery. NMFS would review data on recreational landings, catch rates, and effort levels for shortfin mako sharks in the previous years, and establish season dates and minimum size limits that would be expected to achieve the reduction targets established by ICCAT, and the objectives of the HMS fisheries management plan. This alternative would also allow NMFS to minimize adverse socioeconomic impacts to the HMS recreational fishery by allowing for adjustments to the season and size limits based on observed reductions and redistribution of fishing effort resulting from measures implemented in previous years. Direct and indirect socioeconomic impacts under this alternative may be moderately adverse in the short-term depending on how the fishery reacts to the initial measures implemented, but should result in minor impacts in the long-term as NMFS is able to adjust management measures in a way that balances conservation objectives with changes in angling behavior.

### **Alternative B7**

Under this alternative, NMFS would implement a “slot limit” for shortfin mako sharks in the recreational fishery. Under a slot limit, recreational fishermen would only be allowed to retain shortfin mako sharks within a narrow size range (e.g., between 71 and 83 inches FL) with no retention above or below that slot. Assuming no reduction in directed fishing effort, this alternative would be expected to result in similar reductions in landings as other alternatives analyzed here. For example, if NMFS established separate slot limits for male and female sharks with the lower limits set at 71 and inches FL, respectively, and an upper size limit as some greater size, then reductions in landings could be expected to be similar or slightly greater than those from Alternative B2. While this alternative would not establish a shortfin mako fishing season, such a significant increase in the size limit would likely result in some reduction in directed fishing effort for shortfin mako sharks, which may be further exacerbated by the complicated nature of slot limits regulations. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to short- and long-term moderate adverse direct and indirect socioeconomic impacts on supporting businesses and industries.

Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.

Similar to Alternative B2, there are two factors that might minimize reductions in fishing effort (harvested shortfin mako sharks peaks between 71 and 77 inches FL and shifting focus to other HMS species). Depending on how much HMS anglers and tournaments are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts are likely to be minor to moderate for this alternative.

### **Alternative B8**

Under alternative B8, NMFS would establish a landings tag requirement and a yearly limit on the number of landings tags assigned to a vessel, for shortfin mako sharks over the minimum size limit. This alternative would be expected to negatively affect fishing effort. As stated in above in Table 4.10, approximately 4,800 directed trips targeted shortfin mako sharks on average each year, and about 36 percent of them harvested shortfin mako sharks when managed under the 54 inches FL minimum size limit. An increase in the minimum size limit, and a yearly cap on landings for vessels would reduce effort drastically, while maintaining some opportunity for the recreational fleet. These factors would have direct negative adverse socioeconomic impacts on the recreational fleet, and would adversely affect the charter fleet the most, by limiting the number of trips that they could land shortfin mako sharks each year. This reduction may affect their ability to book trips. NMFS is aware of at least one tournament directed at shortfin mako sharks in the Northeast that chose to cancel its 2018 event due to the more stringent current 83 inches FL minimum size limit. By excluding tournaments from tagging requirements there may be a direct beneficial socioeconomic impact for tournaments, as this would be an additional opportunity, beyond their tags, to land shortfin mako sharks for permit holders.

However, there are two factors that might minimize reductions in fishing effort. Under the 54 inches FL minimum size limit, two-thirds of shortfin mako sharks caught by recreational fishermen were released. This release rate suggests that a significant number of released sharks are likely greater in size than the 54 inches FL minimum size limit. If this is the case, requiring recreational anglers to release more shortfin mako sharks may have less impact on directed fishing effort than anticipated. By allowing tournaments to land shortfin mako sharks without tags, under the minimum size limit, tournaments may be less affected than previously anticipated, as they would offer an additional opportunity to land shortfin mako sharks beyond permit holders tagging restrictions. Secondly, HMS anglers have a number of substitute species to which they can shift their fishing effort including common thresher sharks, blue sharks, various tuna species, and swordfish. Depending on how much HMS anglers are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, the adverse cumulative direct and indirect socioeconomic impacts are likely to be minor to moderate for this alternative to average recreational fishermen. The charter fleet will be the most adversely affected, with tournaments potentially seeing minor negative impacts, or potential beneficial impacts depending on the minimum size limit, and availability of tags within a given year.

### **Alternative B9 – Preferred Alternative**

Alternative B9 would require the use of non-offset, non-stainless steel circle hooks by HMS recreational permit holders with a shark endorsement when fishing for sharks recreationally, except when fishing with flies or artificial lures, in federal waters. The current regulatory requirement for such hooks applies to shark fishing in federal waters, as well as to Federal HMS permit holders fishing in state waters, south of 41° 43' N latitude (near Chatham, Massachusetts), as implemented in Amendment 5b to the 2006 Consolidated HMS FMP. This option would remove the boundary line, requiring HMS permit holders with a shark endorsement to use circle hooks in all areas.

Alternative B8 could result in short- and long-term minor direct adverse socioeconomic impacts. Although this alternative would simplify recreational shark management by removing the geographic component of the circle hook requirement, some uncertainty may occur since the circle hook requirement was just recently introduced. Recreational shark fishermen north of Chatham, Massachusetts would need to purchase circle hooks to comply with this requirement, although the cost is modest. Additionally, it is possible that once the circle hook requirement is expanded, fishermen in the newly impacted area could find reduced catch rates of sharks including shortfin mako sharks. If reduced catch rates are realized, effort in the recreational shark fishery, including the for-hire fleet, could be impacted by reduced number of trips or reduced demand for chartered trips.

Short- and long-term indirect socioeconomic impacts would likely be neutral. In the greater recreational fishery, changes to shark management in limited geographic area are unlikely to affect effort. Thus, businesses supporting recreational fishing such as bait and tackle suppliers are unlikely to be affected.

### **Alternative B10**

Alternative B10 would place shortfin mako sharks on the prohibited sharks list to prohibit the retention of shortfin mako sharks in recreational HMS fisheries. HMS permit holders would be prohibited from retaining or landing shortfin mako sharks recreationally. In recreational fisheries, recreational fishermen would only be authorized to catch and release shortfin mako sharks. This requirement would be similar to the white shark catch and release requirement. Currently, recreational fishermen may target white sharks, but many not retain the shark and must release in a manner that maximizes the chance of survival. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, especially as it would likely result in the cancellation of some shark fishing tournaments, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries. Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.

Similar to Alternative B2, there are two factors that might minimize reductions in fishing effort (harvested shortfin mako sharks peaks between 71 and 77 inches FL and shifting focus to other HMS species). Depending on how much HMS anglers and tournaments are satisfied to practice catch-and-release fishing for shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts are likely to be minor to moderate for this alternative.

### 4.4.3 Monitoring Alternatives

#### **Alternative C1 – Preferred Alternative**

Alternative C1, the preferred and no action alternative, would make no changes to the current reporting requirements applicable to shortfin mako sharks in HMS fisheries. Since there would be no changes to the reporting requirements under this alternative, NMFS would expect fishing practices to remain the same and direct socioeconomic impacts to be neutral in the short-term. Indirect impacts to businesses like bait and ice houses and seafood dealers are expected to be neutral in the short- and long-term as their businesses would not change. Cumulative impacts are also anticipated to be neutral given fishing effort would remain the same. Currently, NMFS requires Atlantic HMS tournament operators to register their tournaments with NMFS, and authorize NMFS to select HMS tournaments for reporting. NMFS plans to expand current swordfish and billfish reporting and implement mandatory reporting to include all HMS landings and discards in registered HMS tournaments. Given that current reporting requirements on HMS commercial and recreational fishermen and the observer program provide data on landings and discards, and enable inseason monitoring and management based on landings of shortfin mako sharks, NMFS prefers this alternative at this time.

#### **Alternative C2**

Under Alternative C2, NMFS would require vessels with a directed or incidental shark LAP to report daily the number of shortfin mako sharks retained and discarded dead as well as fishing effort (number of sets and number of hooks) on a VMS. A requirement to report shortfin mako shark catches on VMS for vessels with a shark LAP would be an additional reporting requirement for those vessels on their existing systems. For other commercial vessels that are currently only required to report in the HMS logbook, the requirement would mean installing VMS to report dead discards of shortfin mako and fishing effort.

If a vessel has already installed a type-approved E-MTU VMS unit, this alternative would have neutral direct and indirect socioeconomic impacts in the short- and long-term as the only expense would be monthly communication service fees, which they may already be paying if the vessel is participating in a Council-managed fishery. Existing regulations require all vessel operators with E-MTU VMS units to provide hail out/in declarations and provide location reports on an hourly basis at all times while they are away from port. In order to comply with these regulations, vessel owners must subscribe to a communication service plan that includes an allowance for sending similar declarations (hail out/in) describing target species, fishing gear possessed, and estimated time/location of landing using their E-MTU VMS. Given that most shortfin mako sharks are incidentally caught by pelagic longline vessels that are already required to have an E-MTU VMS system onboard, adverse socioeconomic impacts are not expected. If vessels with a shark LAP do not have an E-MTU VMS unit, direct, adverse, short-term socioeconomic impacts are expected as a result of having to pay for the E-MTU VMS unit (approximately \$4,000) and a qualified marine electrician to install the unit (\$400). In the long-term, direct socioeconomic impacts would become minor, because monthly communication service provider costs (\$44) would be the only expense. Socioeconomic impacts to shore-based businesses, including fish dealers, bait and gear suppliers, and other fishing related industries are not expected. VMS reporting requirements under this alternative could potentially provide

undue burden to HMS commercial vessels that already report on catches, landings, and discards through vessel logbooks, dealer reports, and observer reports.

### **Alternative C3**

Alternative C3 would implement mandatory reporting of all recreational interactions (landed and discarded) of shortfin mako sharks in HMS fisheries. Recreational HMS permit holders would have a variety of options for reporting shortfin mako shark landings including a phone-in system, internet website, and/or a smartphone app. HMS Angling and Charter/Headboat permit holders currently use this method for required reporting of each individual landing of bluefin tuna, billfish, and swordfish within 24 hours. NMFS has also maintained a shortfin mako shark reporting app as an educational tool to encourage the practice of catch-and-release. Additionally, the potential burden associated with mandatory landings reports for shortfin mako sharks would be significantly reduced under the increased minimum size limits being considered in this rulemaking, although would still represent an increased burden over current reporting requirements. This alternative would have neutral direct and indirect socioeconomic impacts in the short- and long-term as no additional expense would be incurred for reporting. Economic impacts to shore-based businesses, including fish dealers, bait and gear suppliers, and other fishing related industries are not expected.

## **4.4.4 Rebuilding Alternatives**

### **Alternative D1**

Under Alternative D1, NMFS would not establish a rebuilding plan or a foundation for rebuilding the shortfin mako shark stock. NMFS would still implement management measures in the HMS recreational and commercial fisheries to end overfishing consistent with the Magnuson-Stevens Act and with ICCAT Recommendation 17-08 and our obligations under ATCA. Therefore, direct, indirect, and cumulative socioeconomic impacts in the short- and long-term would be neutral, as there would be no change in fishing effort or landings of shortfin mako sharks that would impact revenues generated from the commercial and recreational fisheries.

### **Alternative D2**

This alternative would establish a domestic rebuilding plan independent of ICCAT. Cumulatively, these measures would reduce opportunity to land shortfin mako sharks in the U.S. recreational and commercial fisheries, which could cause long-term, direct, minor, adverse socioeconomic impacts. Neutral short- and long-term indirect socioeconomic impacts are anticipated because these management measures would specifically address North Atlantic shortfin mako sharks and would not interfere with current operations of other recreational and commercial fisheries.

### **Alternative D3 – Preferred Alternative**

Under Alternative D3, the preferred alternative, NMFS would take preliminary action toward rebuilding by adopting measures to end overfishing to establish a foundation for a rebuilding plan. NMFS would then take action at the international level through ICCAT to develop a rebuilding plan for shortfin mako sharks. ICCAT is planning to establish a rebuilding plan for shortfin mako sharks in 2019, and this rebuilding plan would encompass the objectives set forth

by ICCAT based on scientific advice from the SCRS. This alternative would not result in any changes to the current recreational and commercial domestic regulations for shortfin mako sharks in the short-term. Therefore, no changes would initially be made to the recreational and commercial fisheries and this alternative would likely result in direct, neutral socioeconomic impacts for recreational and commercial fishermen in the short-term. Management measures to address overfishing of shortfin mako sharks could be adopted in 2019. These measures could change the way that the U.S. recreational and commercial shortfin mako shark fishery operates, which could cause long-term direct, minor 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 North Atlantic shortfin mako sharks and would not interfere with current operations of other recreational and commercial fisheries.

#### **Alternative D4**

Under this alternative, NMFS would remove shortfin mako sharks from the commercial pelagic shark management group and implement a species-specific quota for shortfin mako sharks if established by ICCAT. A shortfin mako-specific quota would likely include both commercial and recreational catches, as do other ICCAT established quotas. In addition, NMFS would establish a new commercial pelagic shark species quota for common thresher and oceanic whitetip sharks based on recent landings. The 2017 ICCAT stock assessment indicated that the North Atlantic population of shortfin mako sharks is overfished and experiencing overfishing. In November 2017, ICCAT adopted management measures (Recommendation 17-08) to address the overfishing determination, but did not recommend a TAC necessary to stop overfishing of shortfin mako sharks. Therefore, it is difficult at this time to determine how setting a species-specific quota for shortfin mako sharks would affect commercial and recreational fishing operations. However, this species-specific quota may provide long-term direct, minor adverse socioeconomic impacts if ICCAT established a TAC for the U.S. that is well below the total average harvest by the U.S. (i.e., 410 mt ww) or below the current annual commercial quota for common thresher, oceanic whitetip, and shortfin mako (488 mt dw) as it could potentially limit the amount of harvest for fishermen. Short-term direct socioeconomic impacts would be neutral for Alternative D4 because initially there would be no reduction in fishing effort and practices. Cumulative impacts of this alternative and other actions are expected to be adverse if domestic commercial and recreational fishing practices would change considerably under this alternative. Short- and long-term indirect impacts are expected to be neutral, as implementation of the shortfin mako shark species-specific quota should not change current harvest practices of other species.

#### **Alternative D5**

The current ICCAT recommendation calls on the SCRS to provide additional scientific advice in 2019 that takes into account a spatial/temporal analysis of North Atlantic shortfin mako shark catches in order to identify areas with high interactions. If the scientific advice recommends implementing area-based management measures for this stock, and if that area management is established by ICCAT in a future recommendation, under this alternative, NMFS would take steps to implement area-based management measures domestically. Without a specific area to analyze at this time, the precise impacts with regard to impacts on commercial and recreational fishery operations cannot be determined. Implementing area management for shortfin mako

sharks, if recommended by the scientific advice, could lead to a reduction in localized fishing effort, which would likely have short- and long-term, direct, minor, adverse socioeconomic impacts for fisheries that land shortfin mako sharks. Cumulative impacts of this alternative and other actions are expected to be adverse if commercial and recreational fishing practices would change considerably. Short- and long-term indirect impacts could be minor and adverse, as this alternative could lead to a reduction in localized fishing effort for other HMS, although future analysis in a separate rulemaking would take into account redistribution of fishing effort.

### **Alternative D6**

Under this alternative, NMFS would annually allocate a specific number of “allowable” dead discards of shortfin mako sharks as a bycatch cap or sub-annual catch limit (ACL) that would apply to all fisheries, not just HMS fisheries. When that cap is reached, then NMFS would close the associated directed fisheries for the remainder of the fishing year. This alternative would impact the HMS pelagic longline and shark recreational fisheries similar to Alternative D4. However, this alternative could also impact non-HMS fisheries by closing those fisheries if the bycatch cap were reached. Thus, Alternative D6 would have direct short-term minor adverse socioeconomic impacts since the bycatch caps could close fisheries if they are reached until those fishermen could modify fishing behavior to avoid shortfin mako sharks (even in fisheries where shortfin mako sharks are rarely, if ever, seen) and reduce interactions. In the long-term, this alternative would have neutral direct socioeconomic impacts as the vessels would avoid shortfin mako sharks. The indirect impacts to businesses like bait and ice houses and seafood dealers are expected to be neutral in the short and long-term as their businesses would not change. Cumulative impacts are also anticipated to be neutral given fishing effort would remain the same.

## **4.5 References**

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## 5.0 Cumulative Impacts

### 5.1 Past, Present, and Reasonably Foreseeable Actions

As discussed in Chapter 3, NMFS has taken a number of actions in the past in order to, among other things, rebuild overfished fisheries 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 Chapter 3. 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 in directed shark fisheries and in fisheries that catch sharks. The need and objectives of this document are described in earlier sections, particularly Chapter 1.0, and are not repeated here.

Recent major actions within HMS fisheries that may affect commercial and recreational HMS fishermen both directly and indirectly are listed below (Table 5.1). These fisheries are expected to be most affected by the proposed measures in Draft Amendment 11. A comprehensive list of all actions annually can be found in Chapter 5 of Amendment 5b to the 2006 Consolidated HMS FMP and Chapter 1 of the 2017 SAFE Report.

**Table 5.1 Recent major actions within HMS fisheries that may affect pelagic longline and recreational HMS fishermen dealing with sharks.**

<b>Federal Register Cite</b>	<b>Date</b>	<b>Rule or Notice</b>
<i>2018</i>		
83 FR 8037	02/23/2018	Proposed Rule to Revise Atlantic Shark Fishery Closure Regulations
83 FR 8946	03/02/2018	Emergency Interim Final Rule to Address Overfishing of Atlantic Shortfin Mako Sharks
83 FR 8969	03/02/2018	Notice of Intent for Scoping of Atlantic Bluefin Tuna Pelagic Longline Area-Based and Weak Hook Measures
83 FR 9232	03/05/2018	Transfer of 10 metric tons of Atlantic Bluefin Tuna Quota from the Reserve category to the January 2018 subquota period and Closes the General category fishery for large medium and giant BFT until the General category reopens on June 1, 2018
83 FR 9255	03/05/2018	Notice of Intent to Prepare an Environmental Impact Statement for Shortfin Mako Shark Management Measures
83 FR 10802	03/13/2018	Blacktip shark, aggregated LCS, and hammerhead sharks western Gulf of Mexico sub-region closure
83 FR 12332	03/21/2018	Re-scheduled scoping meeting
83 FR 17110	04/18/2018	Annual Adjustment of Bluefin Tuna Purse Seine and Reserve Category Quotas; Inseason Quota Transfer from the Reserve Category to the Longline category for April 13 – December 31
83 FR 18230	04/26/2018	Atlantic Bluefin Tuna Angling Category Fishery Daily Retention Limit Adjustment April 26 – December 31
83 FR 21936	05/11/2018	Atlantic Bluefin Tuna General Category Fishery Daily Retention Limit Adjustment for June 1 – August 31
83 FR 22602	05/16/2018	Atlantic Bluefin Tuna Angling Category Gulf of Mexico Trophy Fishery Closure March 13 – December 31
<i>2017</i>		
82 FR 3209	01/11/2017	Final rule; Atlantic Highly Migratory Species; Technical Amendment to Regulations

<b>Federal Register Cite</b>	<b>Date</b>	<b>Rule or Notice</b>
82 FR 4856	1/17/2017	Notice of Receipt of an Application for Exempted Fishing Permit and Availability of Draft Environmental Assessment for Pelagic Longline Research in East Florida Coast Closed Area
82 FR 10746	2/15/2017	Extension of Comment Period and Announcement of Public Webinar for Exempted Fishing Permit Application for Pelagic Longline Research in East Florida Coast Closed Area
82 FR 12296	3/2/2017	Annual Adjustment of Atlantic Bluefin Tuna Purse Seine and Reserve Category Quotas; Inseason Quota Transfer of 45 mt from the Reserve Category to the Longline Category
82 FR 12747	3/7/2017	Inseason Transfer of 40 mt Atlantic Bluefin Tuna Quota from the Reserve Category to the General Category and Adjusted Daily Retention Limit for March 5 – March 31
82 FR 14162	3/17/2017	Atlantic Bluefin Tuna Angling Category Southern Area Trophy Fishery Closure March 20
82 FR 16136	4/3/2017	Atlantic Bluefin Tuna General Category Fishery Closure March 29 – May 31
82 FR 16478	4/4/2017	Final Rule to Implement Amendment 5b to the 2006 Consolidated Atlantic HMS Fishery Management Plan
82 FR 19615	4/28/2017	Atlantic Bluefin Tuna Angling Category Recreational Daily Retention Limit Adjustment April 30 – December 31
82 FR 22616	5/17/2017	Atlantic Bluefin Tuna General Category Fishery Daily Retention Limit Adjustment for June 1 - August 31
82 FR 26603	6/8/2017	Atlantic Bluefin Tuna Angling Category Gulf of Mexico Trophy Fishery Closure June 7
82 FR 36689	8/7/2017	Atlantic Bluefin Tuna General Category Fishery Daily Retention Limit Adjustment August 5 – December 31
82 FR 37566	8/11/2017	Issuance of Exempted Fishing Permit and Availability of Final Environmental Assessment for Pelagic Longline Research in East Florida Coast Closed Area
82 FR 37825	8/14/2017	Atlantic Bluefin Tuna Angling Category Northern Area Trophy Fishery Closure August 11
82 FR 39047	8/17/2017	Atlantic Bluefin Tuna General Category Fishery Closure August 16-31
82 FR 39735	8/22/2017	Proposed Rule to Establish Quotas, Opening Dates, and Retention Limits for the 2018 Atlantic Shark Commercial Fishing Season
82 FR 41356	8/31/2017	Atlantic Bluefin Tuna General Category Fishery Daily Retention Limit Adjustment September 1 – December 31
82 FR 43500	9/18/2017	Adjustments to 2017 Northern Albacore Quota, North and South Atlantic Swordfish Quotas, and Atlantic Bluefin Tuna Reserve Category Quota
82 FR 43711	9/19/2017	Atlantic Bluefin Tuna General Category Fishery Closure September 17-30
82 FR 43710	9/19/2017	Notification that the Northeast Distant Area (NED) quota is filled and Atlantic Tunas Longline Category Individual Bluefin Quota Accounting Rules Now Apply in the NED
82 FR 46000	10/3/2017	Inseason Transfer of 156.4 mt Atlantic Bluefin Tuna Quota from the Reserve Category to the General Category
82 FR 46934	10/10/2017	Atlantic Bluefin Tuna General Category Fishery Closure October 5 – November 30
82 FR 49303	10/25/2017	Proposed Rule to Modify Individual Bluefin Tuna Quota Program Regulations for Accounting for Bluefin Tuna
82 FR 49773	10/27/2017	Proposed Rule for an Atlantic Highly Migratory Species Charter/Headboat Permit Commercial Sales Provision
82 FR 55520	11/22/2017	Transfer of Unused Atlantic Bluefin Tuna Harpoon Category Quota to the General Category; General Category Fishery Opens December 1 with 12.7 mt Quota
82 FR 55512	11/22/2017	Final Rule to Establish Quotas, Opening Dates, and Retention Limits for the 2018 Atlantic Shark Commercial Fishing Season

<b>Federal Register Cite</b>	<b>Date</b>	<b>Rule or Notice</b>
82 FR 57543	12/6/2017	Final rule for an Atlantic Highly Migratory Species Charter/Headboat Permit Commercial Sales Provision
82 FR 57885	12/8/2017	Atlantic Bluefin Tuna General Category Fishery Closure December 6-31, 2017
82 FR 61489	12/28/2017	Final Rule to Modify Individual Bluefin Tuna Quota Program Regulations for Accounting for Bluefin Tuna

The preferred alternatives in this document implement commercial and recreational measures to address overfishing of shortfin mako sharks and help rebuild the stock. Commercial fishermen would be required to release live shortfin sharks, only retaining shortfin mako sharks that are dead at haulback if vessel has been issued a directed of incidental shark LAP and has a functional electronic monitoring system on board the vessel. In the recreational fishery, NMFS would establish a recreational minimum size limit of 83 inches FL (210 cm FL) for all shortfin mako sharks and expand the requirement to use circle hooks by all HMS permit holders with a shark endorsement when fishing for sharks recreationally, except when fishing with flies or artificial lures, throughout the HMS management area. In addition, NMFS would continue collecting and monitoring commercial and recreational landings of shortfin mako sharks through existing reporting mechanisms and establish a foundation for rebuilding the shortfin mako shark stock in conjunction with ICCAT. The preferred alternatives are designed to help decrease the fishing mortality of shortfin mako sharks and help rebuild the North Atlantic shortfin mako shark stock. In doing so, the preferred alternatives have fewer negative socioeconomic impacts than other measures (Alternative A6, B9 - prohibit all shortfin mako shark landings in commercial and recreational fisheries; Alternative C3 – mandatory reporting for all recreationally caught shortfin mako sharks; and Alternative D1 – do no take action to rebuild shortfin mako sharks) while still reducing fishing mortality for shortfin mako sharks. Thus, the overall cumulative impacts of the preferred alternatives could have minor beneficial cumulative ecological impacts and minor adverse cumulative socioeconomic impacts. The following past and ongoing actions had or would have varying degrees of synergistic impacts on the human environment when considered in conjunction with the action in the alternatives:

- Amendment 3 to the 2006 Consolidated HMS FMP (75 FR 30484; June 1, 2010) implemented ACLs, changed quotas, promote live release of shortfin mako sharks, and added new species to the management group for the HMS fisheries. Changes in Amendment 3 were determined to likely result in moderate beneficial, cumulative ecological impacts for shortfin mako sharks by decreasing fishing mortality. However, the final measures, including taking actions internationally and promoting the live release of shortfin mako sharks, likely led to minor adverse cumulative socioeconomic impacts for commercial shark fishermen. Minor adverse cumulative socioeconomic impacts are expected when considered in conjunction with this action as more management measures are needed to address overfishing of shortfin mako sharks. There may be minor adverse cumulative socioeconomic impacts to recreational shark fisheries since circle hooks would be required throughout the HMS management area and the minimum size would increase in conjunction to the changes in promoting live release under Amendment 3.
- In 2011, NMFS published a rule that requires pelagic longline vessels fishing in the Gulf of Mexico to use weak hooks (76 FR 18653; April 5, 2011) in order to reduce bluefin

tuna mortality in their spawning grounds. This requirement could have cumulative, beneficial impacts on shortfin mako sharks caught on pelagic longline in the Gulf of Mexico if the shortfin mako shark can straighten the hook and be released. Research on weak hook use in the pelagic longline fishery in the Atlantic showed that there was an observed reduction of 38.5 percent for the “sharks requiem” category; however, the sample size was extremely low for this group, and the comparison between the control and experimental treatments was not significant (D. Foster, NMFS, pers. comm.). However, the benefits could be mixed as the blue shark catch (n=144) on weak hooks in the Atlantic showed an increase of 40 percent that was bordering on significance ( $p$  value = 0.0545) (D. Foster, NMFS, pers. comm.). In the Gulf of Mexico, a similar experiment with weak hooks did not indicate any effect (increase or decrease) in shark catch rates (Foster and Bergmann, in prep.). The weak hook requirement likely resulted in neutral cumulative adverse socioeconomic impacts on fishermen in the Gulf of Mexico region because catch composition was not predicted to significantly change for target species, such as yellowfin tuna or swordfish. When this action is considered in conjunction with the weak hook requirement, it is anticipated this action may have neutral cumulative socioeconomic impacts on the pelagic longline fishery as the commercial landings of shortfin mako sharks in the Gulf of Mexico region account for approximately 1 percent of the total shortfin mako shark landings.

- In 2010 and 2011, NMFS implemented two rules in order to adopt ICCAT Recommendations 10-07, 10-08, and 11-08. These rules prohibited the possession and harvest of oceanic whitetip, smooth hammerhead, scalloped hammerhead, great hammerhead, and silky sharks in the pelagic longline and recreational fisheries. Additionally, in 2016, NMFS implemented a rule to require live release of porbeagle sharks pursuant to ICCAT Recommendation 15-06. This current rulemaking would require the live release of shortfin mako sharks and retention of only dead shortfin mako sharks if vessel has a functional electronic monitoring system onboard and a directed or incidental shark LAP, as well as a new increased minimum size limit and use of circle hooks throughout all HMS management areas for permit holders with a shark endorsement. Thus, this action and these ICCAT rules that either prohibit the possession of several shark species or require live release of other sharks could have minor beneficial cumulative ecological impacts as live sharks not retained would be released in a way that could maximize their post-release survival. However, minor adverse cumulative socioeconomic impacts are anticipated by the interaction of these ICCAT rules and this action as the number of shark species that pelagic longline fishermen can keep has been decreasing and, in total, the reduction of shortfin mako sharks could be about 70 percent of their current total shark catch. Thus, this action could be expected to have a minor negative socioeconomic impact on the pelagic longline fishery.
- On January 1, 2015, NMFS implemented Amendment 7 (79 FR 71510; December 2, 2014). The rule dramatically changed bluefin tuna management, particularly within the pelagic longline fishery, which also interacts with shortfin mako sharks. In particular, Amendment 7 allocated U.S. bluefin tuna quota among domestic fishing categories; implemented measures applicable to the pelagic longline fishery, including Individual Bluefin Quotas (IBQs), two new Gear Restricted Areas, closure of the pelagic longline

fishery when annual bluefin tuna quota is reached, elimination of target catch requirements associated with retention of incidental bluefin tuna in the pelagic longline fishery, mandatory retention of legal-sized bluefin tuna caught as bycatch, expanded monitoring requirements, including electronic monitoring via cameras and bluefin tuna catch reporting via VMS, and transiting provisions for pelagic longline and bottom longline vessels. The rule also had impacts on the recreational fishery by changing the allocation of the Angling category Trophy South subquota for bluefin tuna for the Gulf of Mexico. Amendment 7 could have minor to moderate beneficial ecological cumulative impacts on shortfin mako sharks in conjunction with this action since commercial retention of shortfin mako sharks are only allowed by fishermen with a Directed or Incidental shark LAP and an electronic monitoring system onboard the vessel. Amendment 7 is not expected to have any additional ecological impacts on shortfin mako sharks in the recreational shark fishery in combination with this action as re-allocation of recreational sub-quotas for bluefin tuna is not anticipated to affect interaction rates of recreational anglers with shortfin mako sharks. Because Amendment 7 required pelagic longline vessels to carry electronic monitoring systems, it has positive synergistic socioeconomic impacts on these vessels' ability to land dead shortfin mako sharks consistent with Recommendation 17-08 and the preferred alternatives in this action.

- Amendment 5b to the 2006 Consolidated HMS FMP (82 FR 16478; April 4, 2017) implemented new recreational shark endorsement permits, recreational and commercial circle hook requirements, shark release protocols, additional training requirements, and outreach and fleet communication protocols to reduce fishing mortality on dusky sharks to end overfishing and rebuild the dusky shark population. Changes in Amendment 5b were determined to likely result in minor beneficial, cumulative ecological impacts for shortfin mako sharks by decreasing fishing mortality as circle hooks would be required by commercial and recreational fishermen targeting sharks. Minor adverse cumulative socioeconomic impacts are expected when considered in conjunction with this action as commercial fishermen would continue to only be able to retain dead shortfin mako sharks and the increase in the recreational minimum size from 54 inches FL to 83 inches FL and use of circle hooks throughout the HMS management area would be required.
- The Emergency Interim Final Rule to address overfishing of North Atlantic shortfin mako sharks (83 FR 8946; March 2, 2018) implemented management measures pursuant to ICCAT Recommendation 17-08 to reduce fishing mortality on North Atlantic shortfin mako sharks and address the U.S. contribution to overfishing. This rulemaking required require the live release of shortfin mako sharks and retention of only dead shortfin mako sharks if vessel has a functional electronic monitoring system onboard as well as a new increased minimum size limit for recreational fishermen. Cumulative ecological impacts of the preferred alternatives in the emergency rule were determined to be minor and beneficial, while the socioeconomic impacts were expected to be minor and adverse. Given that most of the preferred alternatives in this actions are an extension of the preferred alternatives in the emergency rule, the cumulative impacts would be expected to be the same as commercial fishermen would continue to only be able to retain dead shortfin mako sharks and both the requirement to use circle hooks throughout the HMS

management area and the increase in the recreational minimum size from 54 inches FL to 83 inches FL in the recreational fisheries would be required.

In addition, reasonably foreseeable future actions that could result in additional incremental cumulative impacts include: changes in the shark fisheries as a result of implementing ICCAT Recommendation 17-08 and any other measures implemented by ICCAT for shortfin mako sharks; changes in pelagic longline fleet-wide management measures including closed area, gear restricted area, and weak hooks, and a 3-year review of the management measure implemented under Amendment 7 for Atlantic bluefin tuna; and the increased Atlantic bluefin tuna quota. These measures while not all directly related to shortfin mako sharks could be implemented in other rulemakings and affect participants in recreational shark and/or commercial fisheries in conjunction with the preferred alternatives in this action. Such actions would have varied effects on fishermen that interact with shortfin mako sharks in the commercial and recreational shark fisheries. Any later actions that reduce fishing opportunities could be expected to have cumulative, adverse, socioeconomic impacts on such fishermen in conjunction with this action, such as the reinitiation of Biological Opinions for several HMS fisheries (see section 3.7).

NMFS recently completed comprehensive status review under the ESA for the oceanic whitetip shark (*Carcharhinus longimanus*) in response to a petition from Defenders of Wildlife to list the species. Based on the best scientific and commercial information available, including the status review report (Young *et al.*, 2016), and after taking into account efforts being made to protect the species, NMFS determined that the oceanic whitetip shark warrants listing as a threatened species. NMFS concluded that that critical habitat is not determinable because data sufficient to perform the required analyses are lacking; however, we solicit information on habitat features and areas in U.S. waters that may meet the definition of critical habitat for the oceanic whitetip shark. Oceanic whitetip sharks are currently not allowed to be retained on Atlantic HMS pelagic longline vessels. Although recreational fishermen may catch oceanic whitetips, they too are not allowed to land oceanic whitetip if they retain any ICCAT-related species, such as swordfish and tunas. NMFS does not anticipate this determination will have any impacts on commercial or recreational fishermen that interact with shortfin mako sharks, however, it ultimately will depend on the final protective management measures.

As shortfin mako sharks are very rarely encountered in fisheries outside of HMS fisheries (Table 3.7), NMFS considers any direct, indirect, or cumulative impacts of these alternatives on non-HMS fisheries to be negligible.

## **5.2 Cumulative Ecological Impacts**

Each alternative is described in Chapter 2.0 and a detailed discussion of ecological impacts for each alternative can be found in Chapter 4.0. Under Preferred Alternative A2, only vessels with a functional electronic monitoring system onboard and a directed or incidental shark LAP would be able to retain shortfin mako dead at haulback, requiring commercial vessels to release all shortfin mako sharks alive at the time of capture. This preferred alternative would reduce the amount of commercial landings. Under Preferred Alternative B3 and B9, recreational vessels would only be allowed to retain shortfin mako sharks at least 83 inches FL (210 cm FL) and be required to use circle hooks throughout the HMS management area, potentially reducing the amount of recreational landings and thus, shortfin mako shark mortality. Additionally, under

Preferred Alternatives C1 and D3, shortfin mako shark commercial and recreational landings would continue to be monitored through existing reporting systems and the foundation of a rebuilding plan for shortfin mako sharks would be established in conjunction with ICCAT, respectively. These preferred alternatives would allow NMFS to continue monitoring recreational and commercial landings of shortfin mako sharks in a timely and efficient manner while also addressing overfishing and rebuilding of the shortfin mako shark stock.

Preferred Alternative A2 would allow the retention of shortfin mako sharks by fishermen with a directed or incidental shark LAP only if the shark is dead at haulback and there is a functional electronic monitoring system on board the vessel. Alternative A2 would likely result in short- and long-term direct, minor beneficial ecological impacts since shortfin mako sharks that are alive at capture would be released instead of being retained, helping to reduce fishing mortality of shortfin mako sharks. Indirect short- and long-term ecological impacts to other species caught in the relevant fisheries would likely be neutral. The primary gears associated with the capture of shortfin mako sharks are pelagic longline and rod and reel, and shortfin mako sharks are rarely targeted in the commercial fisheries. Thus, no change to overall effort is expected and indirect ecological impacts are likely neutral. When considered in the context of management measures in the past, present, and foreseeable future, and the fact that U.S. shortfin mako shark landings are a small percentage of total North Atlantic-wide landings, the cumulative impacts of Alternative A2 would be minor and beneficial. However, if all ICCAT member countries, particularly those countries that catch the most shortfin mako sharks, implement the measures in Recommendation 17-08, the measures would likely result in short- and long-term direct moderate beneficial ecological impacts. Based on the information above and consistency with the ICCAT's SCRS recommendation, NMFS prefers this alternative at this time.

Preferred Alternative B3 would establish a recreational minimum size limit of 83 inches FL (210 cm FL) for all shortfin mako sharks. This preferred recreational minimum size limit would reduce the number of landings of shortfin mako sharks, helping reduce shortfin mako shark mortality and potentially achieving the U.S. contribution to the mortality reduction goal set by ICCAT's SCRS. This alternative would also help maximize safety and compliance among fishermen by not requiring fishermen to identify the sex of shortfin mako sharks at boatside. Alternative B3 would likely result in direct short- and long-term minor beneficial ecological impacts. Alternative B3 would likely have indirect minor beneficial ecological impacts in the short- and long-term. Recreational fishermen typically use rod and reel gear, which rarely contacts the benthic habitat, the gear is actively managed, and non-target species are usually released quickly in a manner that maximizes the chance for survival. For these reasons, NMFS prefers this alternative at this time. When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B3 would be minor and beneficial in the short- and long-term, the same as the direct ecological impacts discussed above.

Preferred Alternative B9 would expand the requirement to use non-offset, non-stainless steel circle hooks by all HMS permit holders with a shark endorsement when fishing for sharks recreationally, except when fishing with flies or artificial lures. Currently, this requirement is in place for all federally managed waters south of 41° 43' N latitude (near Chatham,



Massachusetts), but this alternative would remove the boundary line, requiring fishermen in all areas to use circle hooks. Alternative B9 could result in direct minor beneficial ecological impacts in the short- and long-term due to the reduction in post release mortality attributable to circle hook use. Research shows that the use of circle hooks reduces gut-hooking and increases post-release survival of shortfin mako sharks (see Chapter 4 for more detail). Minor indirect short- and long-term beneficial ecological impacts would result from Alternative B9 as other sharks besides shortfin mako sharks would benefit from circle hook use. Target and incidental teleost catch would also benefit from this alternative since circle hooks are less likely to foul hook many species. Thus, for these reasons, NMFS prefers this alternative. When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative B8 would be minor and beneficial in the short- and long-term, the same as the direct ecological impacts discussed above.

Overall, the preferred recreational alternatives (Alternatives B3 and B9) would likely have direct, indirect, and cumulative minor, beneficial ecological impacts in the short- and long-term.

Preferred Alternative C1 would make no changes to the current reporting requirements applicable to shortfin mako sharks in HMS fisheries, likely resulting in direct, short- and long-term, neutral ecological impacts. To address SCRS' recommendation to increase data collections, NMFS would use the existing authority to select shark tournaments for reporting. Existing regulations at 50 CFR 635.5(d) require Atlantic HMS tournament operators to register their tournaments with NMFS, and authorize NMFS to select HMS tournaments for reporting. Currently, all billfish and swordfish tournaments are selected for reporting, but, under this alternative, NMFS would expand tournament selection to include all shark tournaments. While ICCAT Recommendation 17-08 is specific to shortfin mako sharks, under this alternative, NMFS plans to select all shark tournaments for reporting because fishing effort and catch information on shortfin mako and other species of sharks will also help to improve recreational catch estimates. Indirect short- and long-term ecological impacts to incidentally caught species and EFH would likely be neutral. The primary gears associated with the capture of shortfin mako sharks are pelagic longline and rod and reel. These gear types do not typically interact with the sea floor and are actively managed, allowing for non-target species to be released quickly in a manner that maximizes the chance for survival. Thus, indirect ecological impacts are likely neutral. When considered in the context of management measures in the past, present, and foreseeable future, the cumulative impacts of Alternative C1 would be neutral, the same as the direct ecological impacts discussed above. Since this alternative would improve data collection from the selected shark tournaments, NMFS prefers Alternative C1 at this time.

Preferred Alternative D3 would establish a foundation to develop a rebuilding plan for the shortfin mako shark stock at the international level through ICCAT. This rebuilding plan would encompass the objectives set forth by ICCAT based on new scientific advice from the SCRS, which is currently scheduled for in 2019. Because of the small U.S. contribution to North Atlantic shortfin mako shark mortality, and the lack of a rebuilding plan from the current 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. This alternative would not cause any unnecessary disadvantage to domestic recreational and commercial fishermen, but would

have direct, minor adverse ecological impacts for shortfin mako sharks in the short-term, because there would be no rebuilding plan to further reduce fishing mortality in the commercial and recreational shortfin mako fisheries and contribute to ending overfishing. In the long-term, any management recommendations adopted at the international level to end overfishing of shortfin mako sharks and rebuild the stock 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 and help rebuild the stock. Short- and long-term, cumulative and indirect impacts on other species, are anticipated to be neutral since current fishing practices and the current minimal impact of authorized gear types used in the recreational and commercial shortfin mako shark fishery with protected species and inconsequential impacts on fishery habitats would remain the same. Long-term, if management recommendations adopted at the international level to end overfishing of shortfin mako sharks in 2019 cause a significant change in overall effort in the U.S. commercial and recreational fisheries that catch shortfin mako shark, these measures could provide a minor, beneficial, long-term impact to protected resources. Because of the potential for long-term direct, beneficial ecological benefits on the North Atlantic shortfin mako shark stock, NMFS prefers Alternative D3 at this time.

### **5.3 Cumulative Social and Economic Impacts**

Each alternative is described in Chapter 2.0 and a detailed discussion of socioeconomic impacts for each alternative can be found in Chapter 4.0.

Under preferred Alternative A2, NMFS would allow the retention of shortfin mako sharks by fishermen with a directed or incidental shark LAP only if the shark is dead at haulback and there is a functional electronic monitoring system on board the vessel. Short and long-term direct minor adverse economic impacts are expected under Alternative A2 because these measures would reduce the number of shortfin mako sharks landed and sold, and thus reduce ex-vessel revenues derived from shortfin mako shark landings (see Chapter 4.0 for more detail). However, shortfin mako sharks are rarely a targeted species and are worth less than other, more valuable target species (such as swordfish or tuna), so the adverse effects would be minor. Additionally, vessels that are unlikely to have electronic monitoring systems (e.g. non-pelagic longline vessels) currently installed would need to pay to install these systems if they wish to retain shortfin mako sharks, introducing an additional expense. Short and long-term indirect economic impacts would be neutral under Alternative A2. Shortfin mako sharks are rarely targeted in commercial fisheries and are usually caught incidentally while fishing for other species. Thus, shortfin mako shark measures are unlikely to affect total effort, and businesses that support commercial fishing such as dealers, processors, and bait and tackle suppliers are unlikely to be affected. Since the socioeconomic impacts of Alternative A2 would be minor while reducing fishing mortality for shortfin mako sharks, NMFS prefers Alternative A2 at this time.

Under preferred Alternative B3, the minimum size limit for retention of shortfin mako sharks would be increased to 83 inches FL for both males and female sharks. This alternative could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries (see Chapter 4 for more details). Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns. Depending on how much HMS anglers and tournaments are satisfied to practice catch-and-

release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts are likely to be minor to moderate for this alternative.

Alternative B9 would expand the requirement to use non-offset, non-stainless steel circle hook by all HMS permit holders with a shark endorsement when fishing for sharks recreationally, except when fishing with flies or artificial lures, to all waters managed within HMS management division. Currently, this requirement is in place for all federally managed waters south of 41° 43' N latitude (near Chatham, Massachusetts), but this alternative would remove the boundary line, requiring fishermen in all areas to use circle hooks. Alternative B8 could result in short- and long-term minor direct adverse socioeconomic impacts. Recreational shark fishermen north of Chatham, Massachusetts would need to purchase circle hooks to comply with this requirement, although the cost is modest. Additionally, it is possible that once the circle hook requirement is expanded, fishermen in the newly impacted area could find reduced catch rates of sharks including shortfin mako sharks. If reduced catch rates are realized, effort in the recreational shark fishery, including the for-hire fleet, could be impacted by reduced number of trips or reduced demand for chartered trips. Short- and long-term indirect socioeconomic impacts would likely be neutral. In the greater recreational fishery, changes to shark management in limited geographic area are unlikely to affect effort. Thus, businesses supporting recreational fishing such as bait and tackle suppliers are unlikely to be affected. Thus, cumulative impacts are also expected to be neutral and adverse for this alternative.

Overall, the preferred recreational alternatives (Alternatives B3 and B9) would likely have minor to moderate direct short- and long-term adverse socioeconomic impacts. These alternatives would also likely have neutral, minor, and moderate indirect adverse socioeconomic impacts in the short- and long-term. The cumulative impacts of the preferred commercial alternatives would be neutral, minor, and adverse.

Preferred Alternative C1 would make no changes to the current reporting requirements applicable to shortfin mako sharks in HMS fisheries. Since there would be no changes to the reporting requirements under this alternative, NMFS would expect fishing practices to remain the same and direct socioeconomic impacts to be neutral in the short-term. Indirect impacts to businesses like bait and ice houses and seafood dealers are expected to be neutral in the short- and long-term as their businesses would not change. Cumulative impacts are also anticipated to be neutral given fishing effort would remain the same. Given that current reporting requirements on HMS commercial and recreational fishermen and the observer program provide data on landings and discards, and enable inseason monitoring and management based on landings of shortfin mako sharks, NMFS prefers this alternative at this time.

Under Alternative D3, the preferred alternative, NMFS would establish the foundation for developing an international rebuilding plan for shortfin mako sharks. ICCAT is planning to establish a rebuilding plan for the North Atlantic population of shortfin mako sharks in 2019. This alternative would not result in any changes to the current recreational and commercial domestic regulations for shortfin mako sharks in the short-term. Therefore, no changes would initially be made to the recreational and commercial fisheries and this alternative would likely result in direct, neutral socioeconomic impacts for recreational and commercial fishermen in the

short-term. Management measures to address overfishing of shortfin mako sharks could be adopted in 2019. These measures could change the way that the U.S. recreational and commercial shortfin mako shark fishery operates, which could cause long-term direct, minor adverse socioeconomic impacts. Neutral short- and long-term indirect socioeconomic impacts are anticipated because international management measures would specifically address North Atlantic shortfin mako sharks and would not interfere with current operations of other recreational and commercial fisheries.

Overall, the preferred actions in Amendment 11 are expected to have minor adverse or neutral cumulative socioeconomic impacts on participants in the recreational and commercial fisheries, based on the detailed discussions of the socioeconomic impacts of each of the preferred actions in Chapter 4.0. NMFS anticipates that the cumulative direct and indirect socioeconomic impacts of all alternatives considered in this rulemaking are likely neutral or minor adverse cumulative socioeconomic impacts.

#### **5.4 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 5.2).

**Table 5.2 Comparison of the impacts of analyzed alternatives.**

**Symbol Key:**

- Neutral Impacts
- ⊖ Minor Adverse Impacts
- ⊕ Minor Beneficial Impacts
- ⦶ Moderate Adverse Impacts
- ⦶+ Moderate Beneficial Impacts
- Major Adverse Impacts
- + Major Beneficial Impacts

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socio-economic
<b>Alternatives for Commercial Fishing</b>					
<b>A1</b> No Action. Keep the non-emergency rule regulations for shortfin mako sharks	Direct	Short-term	⊖-	○	○
		Long-term	⊖-	○	⊖-
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊖-	○	○
	<b>A2</b> Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and there is a functional electronic monitoring system on board the vessel. Preferred Alternative	Direct	Short-term	⊕+	⊕+
Long-term			⊕+	⊕+	⊖-
Indirect		Short-term	○	○	○
		Long-term	○	○	○
Cumulative		⊕+	⊕+	⊖-	
<b>A3</b> Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and only if the permit holder agrees to allow the Agency to use electronic monitoring to verify landings of shortfin mako sharks		Direct	Short-term	⊕+	⊕+
	Long-term		⊕+	⊕+	⊖-
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊕+	⊕+	⊖-

<p><b>A4</b> Allow retention of live or dead shortfin mako sharks by persons with a Directed or Incidental shark LAP only if the shark is over 83 inches FL and there is a functional electronic monitoring system or observer on board the vessel to verify the fork length of the shark before the shark is dressed</p>	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative			⊙ <sub>+</sub>	⊙ <sub>+</sub>
<p><b>A5</b> Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and there is an observer on board the vessel to verify the shark was dead at haulback</p>	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative			⊙ <sub>+</sub>	⊙ <sub>+</sub>
<p><b>A6</b> Prohibit the commercial landing of all shortfin mako sharks, live or dead</p>	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative			⊙ <sub>+</sub>	⊙ <sub>+</sub>

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socio-economic
Alternatives for Recreational Fishing					
<b>B1</b> No Action. Keep the non-emergency rule regulations for shortfin mako sharks.	Direct	Short-term	⊖ -	⊖	⊖
		Long-term	⊖ -	⊖	⊖ -
	Indirect	Short-term	⊖	⊖	⊖
		Long-term	⊖	⊖	⊖
	Cumulative		⊖ -	⊖	⊖
<b>B2</b> Increase the minimum size limit for the retention of shortfin mako sharks from 54 inches FL to 71 inches FL (180 cm FL) for male and 83 inches FL (210 cm FL) for female shortfin mako sharks.	Direct	Short-term	⊖	⊖ +	⊖ -
		Long-term	⊖ +	⊖ +	⊖ -
	Indirect	Short-term	⊖ +	⊖ +	⊖ -
		Long-term	⊖ +	⊖ +	⊖ -
	Cumulative		⊖ +	⊖ +	⊖ -
<b>B3</b> Increase the minimum size of all shortfin mako sharks from 54 inches FL to 83 inches FL. – Preferred Alternative	Direct	Short-term	⊖ +	⊖ +	⊖ -
		Long-term	⊖ +	⊖ +	⊖ -
	Indirect	Short-term	⊖ +	⊖ +	⊖ -
		Long-term	⊖ +	⊖ +	⊖ -
	Cumulative		⊖ +	⊖ +	⊖ -
<b>B4</b> Increase the minimum size limit for the retention of shortfin mako sharks from 54 inches FL to 71 inches FL for male and 108 inches FL for female shortfin mako sharks.	Direct	Short-term	⊖ +	⊖ +	⊖ -
		Long-term	⊖ +	⊖ +	⊖ -
	Indirect	Short-term	⊖ +	⊖ +	⊖ -
		Long-term	⊖ +	⊖ +	⊖ -
	Cumulative		⊖ +	⊖ +	⊖ -
<b>B5</b> Increase the minimum size limit for the retention of male shortfin mako sharks to 71 inches FL and greater than 120 inches FL for females.	Direct	Short-term	⊖ +	⊖ +	⊖ -
		Long-term	⊖ +	⊖ +	⊖ -
	Indirect	Short-term	⊖ +	⊖ +	⊖ -

		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
<b>B6a</b> Seasonal retention of shortfin mako sharks from May through October at 71 inches FL for males and 83 inches FL for females.	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
<b>B6b</b> Seasonal retention of shortfin mako sharks from June through August at 71 inches FL for males and 100 inches FL for females.	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
<b>B6c</b> Seasonal retention of shortfin mako sharks from June through July at 71 inches FL for males and 90 inches FL for females.	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
<b>B6d</b> Seasonal retention of shortfin mako sharks in June only at 71 inches FL for males and 83 inches FL for females.	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
<b>B6e</b> Establish a process for seasonal retention and minimum size limits for shortfin mako sharks based on certain criteria.	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>



		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
<b>B7</b> Establish a slot limit for recreational retention of male and female shortfin mako sharks.	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
<b>B8</b> Establish a tagging or lottery program to land shortfin mako sharks greater than the minimum sizes.	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Indirect	Short-term	○	○	∅ <sub>-</sub>
		Long-term	○	○	∅ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
<b>B9</b> Require the use of circle hooks for recreational shark fishing. – Preferred Alternative	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	○
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	○
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
<b>B10</b> Prohibit landing of shortfin mako sharks in the HMS recreational fishery (catch and release only).	Direct	Short-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	∅ <sub>-</sub>
<b>Alternatives for Monitoring Measures</b>					
<i>CI</i> No action. Do not require reporting of shortfin mako sharks	Direct	Short-term	○	○	○

<i>outside of current commercial and recreational reporting systems. – Preferred Alternative</i>		Long-term	O	O	O
	Indirect	Short-term	O	O	O
		Long-term	O	O	O
	Cumulative		O	O	O
<b>C2</b> Establish mandatory commercial reporting of shortfin mako shark catches (landings and discards) on VMS.	Direct	Short-term	⊕ <sub>+</sub>	O	O
		Long-term	⊕ <sub>+</sub>	O	⊖ <sub>-</sub>
	Indirect	Short-term	O	O	O
		Long-term	O	O	O
	Cumulative		⊕ <sub>+</sub>	O	O
<b>C3</b> Implement mandatory reporting of all recreationally landed and discarded shortfin mako sharks (e.g., app, website, Vessel Trip Reports).	Direct	Short-term	⊕ <sub>+</sub>	O	O
		Long-term	⊕ <sub>+</sub>	O	O
	Indirect	Short-term	O	O	O
		Long-term	O	O	O
	Cumulative		⊕ <sub>+</sub>	O	O
<b>Alternative</b>	<b>Quality</b>	<b>Timeframe</b>	<b>Ecological</b>	<b>Protected Resources</b>	<b>Socio-economic</b>
<b>Rebuilding Measures</b>					
<b>D1</b> No action. Do not establish a rebuilding plan for shortfin mako sharks.	Direct	Short-term	⊖ <sub>-</sub>	O	O
		Long-term	⊖ <sub>-</sub>	O	O
	Indirect	Short-term	O	O	O
		Long-term	O	O	O
	Cumulative		⊖ <sub>-</sub>	O	O
<b>D2</b> Establish a domestic rebuilding plan for shortfin mako sharks unilaterally (i.e., without ICCAT).	Direct	Short-term	⊕ <sub>+</sub>	O	O
		Long-term	⊕ <sub>+</sub>	O	⊖ <sub>-</sub>
	Indirect	Short-term	O	O	O
		Long-term	O	O	O

	Cumulative		0	0	0
<b>D3</b> Establish the foundation for developing an international rebuilding plan for shortfin mako sharks. - Preferred Alternative	Direct	Short-term	0 -	0	0
		Long-term	0 +	0	0 -
	Indirect	Short-term	0	0	0
		Long-term	0	0	0
	Cumulative		0	0	0
<b>D4</b> Remove shortfin mako sharks from the pelagic shark management group and that group's quota; implement a U.S. shortfin mako shark-specific quota if established by ICCAT, and adjust the pelagic shark quota accordingly.	Direct	Short-term	0	0	0
		Long-term	0 +	0	0 -
	Indirect	Short-term	0	0	0
		Long-term	0	0	0
	Cumulative		0 +	0	0
<b>D5</b> Implement area management for shortfin mako sharks if established by ICCAT.	Direct	Short-term	0 +	0	0 -
		Long-term	0 +	0	0 -
	Indirect	Short-term	0	0	0 -
		Long-term	0	0	0 -
	Cumulative		0 +	0	0 -
<b>D6</b> Establish bycatch caps in all HMS fisheries that interact with shortfin mako sharks.	Direct	Short-term	0 +	0 +	0 -
		Long-term	0 +	0 +	0
	Indirect	Short-term	0 +	0 +	0 -
		Long-term	0 +	0 +	0
	Cumulative		0 +	0 +	0

## **5.5 Mitigation and Unavoidable Impacts**

Mitigation is an important mechanism that Federal agencies can use to minimize, prevent, or eliminate damage to the human and natural environment associated with their actions. As described in the Center for Environmental Quality regulations, agencies can use mitigation to reduce environmental impact in several ways. Mitigation may include one or more of the following: avoiding the impact by not taking a certain action or parts of an action; minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and compensating for the impact by replacing or providing substitute resources or environments. The mitigation measures discussed in an EIS must cover the range of impacts of the proposal and must be considered even for impacts that by themselves would not be considered "significant." If a proposed action is considered as a whole to have significant effects, all of its specific effects on the environment must be considered, and mitigation measures must be developed where it is feasible to do so. NMFS may consider mitigation provided that the mitigation efforts do not circumvent the goals and objectives of the rulemaking or the mandate to rebuild fisheries under the Magnuson-Stevens Act.

## **5.6 Mitigation Measures**

### **5.6.1 Commercial Measures**

Preferred Alternative A2 would have beneficial ecological impacts because the measures would reduce shortfin mako shark fishing mortality in the commercial fisheries. Thus, no mitigation measures are necessary to address adverse ecological impacts. Preferred Alternatives A2, which would allow retention of shortfin mako sharks dead at haulback if the vessel has been issued a directed or incidental shark LAP and there is a functional electronic monitoring system on board the vessel would have short- and long-term direct minor adverse socioeconomic impacts. This is because these measures would reduce the number of shortfin mako sharks landed and sold. However, shortfin mako sharks are rarely a targeted species and are worth less than other, more valuable target species, so the adverse effects would be minor. In addition, shortfin mako shark measures are unlikely to affect total effort, and businesses that support commercial fishing such as dealers, processors, and bait and tackle suppliers are unlikely to be affected. Thus, no mitigation measures are necessary to address adverse socioeconomic impacts.

### **5.6.2 Recreational Measures**

When taken as a whole, Preferred Alternatives B3 and B9 would have beneficial ecological impacts because the measures would reduce shortfin mako shark fishing mortality in the recreational and commercial shark fisheries. Thus, no mitigation measures are necessary to address adverse ecological impacts. The preferred alternatives could, however, result in some minor to moderate adverse socioeconomic impacts from the reduction in landings and in catch due to the new minimum size limit and use of circle hooks. There are two factors that might minimize reductions in fishing effort. The data suggests (see Chapter 4.0 for more details) that a number of released sharks are likely greater in size than the 54 inches FL minimum size limit. If

this is the case, requiring recreational anglers to release more shortfin mako sharks may have less impact on directed fishing effort than anticipated. Secondly, HMS anglers have a number of substitute species to which they can shift their fishing effort including common thresher sharks, blue sharks, various tuna species, and swordfish. If HMS anglers are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks, or shift their fishing effort to other species, then adverse cumulative direct and indirect socioeconomic impacts are likely to be minor for this alternative. In addition, while the use of circle hooks could result in a reduction in target catch, the circle hook requirement is limited to fishermen that hold a shark endorsement and would not apply broadly to all HMS anglers, mitigating adverse impacts.

### **5.6.3 Monitoring and Rebuilding Measures**

When taken as a whole, Preferred Alternatives C1, and D3 would have beneficial ecological impacts because the measures would reduce shortfin mako shark fishing mortality in the recreational and commercial shark fisheries and improve data collection. Thus, no mitigation measures are necessary to address adverse ecological impacts. Preferred Alternative C1, which would make no changes to the current reporting requirements applicable to shortfin mako sharks in HMS fisheries, and thus fishing practices would remain the same and direct, indirect socioeconomic impacts would be neutral in the short- and long-term. Preferred Alternative D3, which would establish the foundation for developing an international rebuilding plan for shortfin mako sharks based on the recommendation by ICCAT's SCRS in 2019 could cause long-term direct, minor adverse socioeconomic impacts if the measures change the way the U.S. recreational and commercial shortfin mako shark fishery operate. However, any future action to implement international measures would be analyzed in a separate rulemaking, and would mitigate socioeconomic adverse impacts to the extent practicable.

## **5.7 Unavoidable Adverse Impacts**

In general, there are no unavoidable adverse ecological impacts expected as a result of the preferred alternatives and corresponding management measures in the recreational and commercial fisheries to reduce fishing mortality of shortfin mako sharks. NMFS would continue to monitor the impact of the management measures in the preferred alternatives and would propose additional management measures, as necessary, to avoid any unanticipated adverse impacts. However, there are unavoidable adverse socioeconomic impacts as a result of the preferred alternatives and corresponding measures to reduce shortfin mako shark mortality in the recreational and commercial fisheries. In the commercial fishery, Alternative A2, a preferred alternative, would allow retention of shortfin mako sharks dead at haulback if the vessel has been issued a directed or incidental shark LAP and there is a functional electronic monitoring system on board the vessel. This alternative would have short- and long-term direct adverse socioeconomic impacts because these measures would reduce the number of shortfin mako sharks landed and sold. However, shortfin mako sharks are rarely a targeted species and are worth less than other, more valuable target species, so the adverse effects would be minor. In addition, most vessels that incidentally catch shortfin mako sharks are pelagic longline vessels. Pelagic longline vessels are already required to have a directed or incidental shark LAP and a functional electronic monitoring system on board. Thus, no additional expenses would be incurred to the majority of vessels already interacting with shortfin mako sharks. Vessels utilizing gear types other than pelagic longline are unlikely to have electronic monitoring

systems currently installed. Thus, these vessels would need to pay to install these systems if they wish to retain shortfin mako sharks, introducing an additional expense for non-pelagic longline vessels. This cost, however, is necessary in order to reduce shortfin mako shark mortality in the commercial shark fishery.

In the recreational shark fishery, Alternatives B3 and B9, preferred alternatives, would increase the minimum size limit and required use of circle hooks may or may not reduce directed fishing trips resulting in lower catch of some target species (See Chapter 4.0 for more information). To the extent that the number of directed fishing trips is reduced, some recreational fishermen may choose not to fish for sharks or to enter tournaments that offer awards for sharks. These missed fishing opportunities could result in minor adverse socioeconomic impacts in the short- and long-term. This reduction in efficiency, however, is necessary to reduce shortfin mako shark mortality in the recreational fishery.

## **5.8 Irreversible and Irretrievable Commitment of Resources**

The management measures in the preferred alternatives would not result in any irreversible and irretrievable commitment of resources. There are expected to be positive ecological impacts because of the reduction in shortfin mako shark fishing mortality.

## **5.9 References**

Young, C.N., J. Carlson, M. Hutchinson, C. Hutt, D. Kobayashi, C.T. McCandless, and J. Wraith. 2016. Status review report: oceanic whitetip shark (*Carcharhinus longimanus*). Final Report to the National Marine Fisheries Service, Office of Protected Resources. November 2016. 162 pp

## 6.0 Regulatory Impact Review

NMFS requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest, and is conducted to comply with Executive Order 12866 (E.O. 12866). The RIR provides analyses of the economic benefits and costs of each alternative to the nation and the fishery as a whole. The information contained in Chapter 6, taken together with the data and analysis incorporated by reference, comprise the complete RIR.

The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following statement from the order:

*In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits should be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.*

E.O. 12866 further requires Office of Management and Budget review of proposed regulations that are considered to be “significant.” A significant regulatory action is one that is likely to:

- Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments of communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in this Executive Order.

### 6.1 Description of the Management Objectives

Please see Chapter 1 for a description of the objectives of this rulemaking.

To achieve the purpose and address the need for acting, NMFS would implement management measures to address overfishing and take steps toward rebuilding the stock. More specifically, NMFS has identified the following objectives with regard to this proposed action:

- Address overfishing of shortfin mako sharks;

- Develop and implement management measures consistent with the ICCAT Recommendation 17-08; and
- Take steps to establish a foundation for rebuilding the shortfin mako shark stock.

## **6.2 Description of the Fishery**

Please see Chapter 3.0 for a description of the fisheries that could be affected by these management actions.

## **6.3 Statement of the Problem**

Please see Chapter 1 for a description of the problem and need for this rulemaking.

The purpose of Amendment 11 is to develop and implement management measures that would address overfishing and will take steps towards rebuilding the North Atlantic shortfin mako shark stock. This action is consistent with Recommendation 17-08, and the United States responsibilities under ATCA and the Magnuson-Stevens Act.

The need of Amendment 11 is to implement management measures consistent with the requirements of ATCA, the Magnuson-Stevens Act, and other statutes. On December 13, 2017, NMFS determined that North Atlantic shortfin mako sharks are overfished with overfishing occurring. To address overfishing and to ensure that timely data is provided to ICCAT under a provision in Recommendation 17-08, an interim final rule was published to implement management measures for North Atlantic shortfin mako sharks based on the measures in the ICCAT Recommendation and using NMFS' authority to issue emergency regulations under the Magnuson-Stevens Act. Under this authority, temporary regulations may remain in effect for no more than 180 days but may be extended for an additional 186 days as described in section 305(c) of the Magnuson-Stevens Act. Since the emergency rule may only be effective for up to 366 days, NMFS needs to develop an amendment to the 2006 Consolidated HMS FMP that will consider and evaluate the measures in ICCAT Recommendation 17-08 and additional management options to address overfishing and to establish a foundation for rebuilding the North Atlantic shortfin mako shark stock. This amendment is expected to be implemented prior to the expiration of the emergency rule.

## **6.4 Description of Each Alternative**

Please see Chapter 2 for a summary of each alternative suite and Chapter 4 for a complete description of each alternative and its expected ecological, social, and economic impacts. Chapters 3 and 6 provide additional information related to the economic impacts of the alternatives.



## 6.5 Economic Analysis of the Expected Effects of Each Alternative Relative to the Baseline

Table 6.1 summarizes the net economic benefits and costs of each of the alternatives analyzed in this EA. Additional details and more complete analyses are provided in Chapter 4.

**Table 6.1 Net Economic Benefits and Costs of Each Alternative.**

Alternatives	Economic Benefits	Economic Costs
Alternative A1: Keep the non-emergency rule regulations for shortfin mako sharks	This alternative would have neutral economic benefits since fishermen could continue to catch and retain mako sharks at a similar level and rate as the status quo.	This alternative would have neutral economic costs in the short-term since fishermen could continue to catch and retain shortfin mako sharks at a similar level and rate as the status quo. Over the long-term, however, there could be direct minor adverse economic costs if shortfin mako shark stock, which are found to be overfished and experiencing overfishing, continues to decline since fewer sharks would be available to commercial and recreational fishermen. If stock health continues to decline, future stock assessments may advise no fishing mortality immediately, which could result in reduced access to the resource for U.S. fishermen and restrictions in fisheries that interact with the species. Furthermore, failure to implement ICCAT Recommendation 17-08 and address the U.S. contribution to the overfishing of shortfin mako sharks would be inconsistent with ATCA and may result in ICCAT penalties or restrictions specific to the United States.
<i>Alternative A2: Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead</i>	There would be unquantified benefits to the public associated with reducing mortality resulting from reduced retention of shortfin mako sharks by the commercial fleet since fishermen would be required to	This alternative would have minor economic costs because these measures would reduce the number of shortfin mako sharks landed and sold. However, shortfin mako sharks are rarely a targeted species and are worth less than other, more valuable target species,

<p><i>at haulback and there is a functional electronic monitoring system on board the vessel – Preferred Alternative</i></p>	<p>release all shortfin mako sharks that are brought to the vessel alive. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value). In addition, in the long-term, a rebuilt shortfin mako stock could provide better harvest opportunities for the commercial fishing sector.</p>	<p>so the economic costs would be minor. The total reduction in revenue would be approximately \$278,000 per year. Additionally, vessels utilizing gear types other than pelagic longline are unlikely to have electronic monitoring systems currently installed. Thus, these vessels would need to pay to install these systems if they wish to retain shortfin mako sharks, introducing an additional expense for non-pelagic longline vessels.</p>
<p>Alternative A3: Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and only if the permit holder agrees to allow the Agency to use electronic monitoring to verify landings of shortfin mako sharks</p>	<p>The benefits would be similar to those under Alternative A2. Commercial vessels with other gear types, such as bottom longline, gillnet, or handgear, could land shortfin mako sharks only if they opt into using an electronic monitoring system to verify sharks are dead at haulback.</p>	<p>This alternative is similar to Alternative A2 except that fishermen would be required to opt into a program that uses electronic monitoring to verify the disposition of shortfin mako sharks at haulback. Under this alternative, a portion of the pelagic longline fleet could opt out of any retention of shortfin mako sharks, resulting in a greater reduction in overall shark ex-vessel revenue for those vessels.</p> <p>Vessels utilizing gear types other than pelagic longline are unlikely to have electronic monitoring systems currently installed. Thus, these vessels would need to pay to install these systems if they wish to retain shortfin mako sharks. Due to the low commercial value of shortfin mako sharks and the high cost of electronic monitoring it is reasonable to expect that these fisheries will not install cameras and therefore will not retain shortfin mako sharks.</p>
<p>Alternative A4: Allow retention of live or dead</p>	<p>The benefits would be similar to if not great than those under Alternative A2.</p>	<p>This alternative would have minor economic costs because these measures would reduce the number of</p>

<p>shortfin mako sharks by persons with a Directed or Incidental shark LAP only if the shark is over 83 inches FL and there is a functional electronic monitoring system or observer on board the vessel to verify the fork length of the shark before the shark is dressed</p>		<p>shortfin mako sharks landed and sold. However, shortfin mako sharks are rarely a targeted species and are worth less than other, more valuable target species, so the economic costs would be minor. Based on observer data, only 6 percent of shortfin mako sharks are caught with pelagic longline gear are greater than 83 inches FL. This would potentially reduce revenue from shortfin mako shark landings by approximately \$353,000 annually.</p>
<p>Alternative A5: Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback and there is an observer on board the vessel to verify the shark was dead at haulback</p>	<p>The benefits would be similar to those under Alternative A2. Any commercial vessel could land shortfin mako sharks provided that an observer in on board that can verify that the shark was dead at haulback.</p>	<p>This alternative would have minor economic costs because these measures would reduce the number of shortfin mako sharks landed and sold. However, shortfin mako sharks are rarely a targeted species and are worth less than other, more valuable target species, so the economic costs would be minor. The total reduction in revenue would be approximately \$356,000 per year given that this alternative is estimated to reduce the number of shortfin mako sharks retained on pelagic longline gear by 95 percent. Additionally, the magnitude of shortfin mako landings by other gear types (e.g., bottom longline, gillnet, handgear) is very small, so this alternative would have little socioeconomic impact.</p>
<p>Alternative A6: Prohibit the commercial landing of all shortfin mako sharks, live or dead</p>	<p>There would be unquantified benefits to the public associated with reducing mortality resulting from prohibiting any catch or retention of shortfin mako sharks by the commercial fleet. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and</p>	<p>This alternative would have minor economic costs because these measures would prohibit the sale of shortfin mako sharks. However, shortfin mako sharks are rarely a targeted species and are worth less than other, more valuable target species, so the economic costs would be minor. The total reduction in revenue would be approximately \$375,000 per year. However, the overall socioeconomic impacts associated with these reductions in revenue are not expected to be</p>

	values placed on knowing shark species will continue to survive (existence value). In addition, in the long-term, a rebuilt shortfin mako stock could provide better harvest opportunities for the commercial fishing sector.	substantial, as shortfin mako sharks comprise less than 1 percent of total HMS ex-vessel revenues on average.
Alternative B1: No Action. Keep the non-emergency rule regulations for shortfin mako sharks	No change in economic benefits.	Long-term moderate adverse socio-economic impacts could be expected as overfishing would continue and likely result in declining recreational catches which may necessitate the need for more restrictive management measures under the Magnusson-Stevens Act.
Alternative B2: Increase the minimum size limit for the retention of shortfin mako sharks from 54 inches FL to 71 inches FL (180 cm FL) for male and 83 inches FL (210 cm FL) for female shortfin mako sharks	There would be unquantified benefits to the public associated with reducing mortality resulting from reduced retention of shortfin mako sharks by the recreational sector. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value). In addition, in the long-term, a rebuilt shortfin mako stock could provide better fishing opportunities for the recreational fishing sector.	This increase in the size limit is projected to reduce recreational landings by at least 64 percent in the numbers of sharks landed. A 64 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of direct trips harvesting them to 13 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.
<i>Alternative B3: Increase the minimum size of all shortfin mako sharks from 54 inches FL to 83 inches (210 cm) FL – Preferred Alternative</i>	The benefits are similar to those of B2 but larger due to the greater reductions in landings resulting for the larger minimum size for male shortfin mako sharks.	This increase in the size limit is projected to reduce recreational landings by at least 83 percent in the numbers of sharks landed. An 83 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of direct trips harvesting them to 6 percent.

		At least one tournament directed at shortfin mako sharks in the Northeast has chosen to cancel its 2018 event due to the more stringent current 83 inches FL minimum size limit. Tournaments account for over half of directed recreational trips for shortfin mako sharks, and 77 percent of them in the month of June when effort is at its highest. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.
Alternative B4: Increase the minimum size limit for the retention of shortfin mako sharks from 54 inches FL to 71 inches FL for male and 108 inches FL for female shortfin mako sharks	The benefits are similar to those of B2 but larger due to the greater reductions in landings resulting for the larger minimum size for female shortfin mako sharks.	This increase in the size limit is projected to reduce recreational landings by at least 76 percent in the numbers of sharks landed. A 76 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of direct trips harvesting them to 9 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, especially if it results in the cancellation of shark fishing tournaments, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.
Alternative B5: Increase the minimum size limit for the retention of male shortfin mako sharks to 71 inches FL and greater than 120 inches FL for females	The benefits are similar to those of B2 but larger due to the greater reductions in landings resulting for the larger minimum size for female shortfin mako sharks.	This increase in the size limit is projected to reduce recreational landings by at least 76 percent in the numbers of sharks landed. A 76 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of direct trips harvesting them to 8.6 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, especially if it results in the cancellation of shark

		fishing tournaments, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.
Alternative B6: Allow seasonal retention of shortfin mako sharks with different minimum size limits for males and females depending on the season length. Retention of any shortfin mako sharks outside of the season would be restricted to greater than 120 inches FL		
Alternative B6a: Seasonal retention of shortfin mako sharks from May through October at 71 inches FL for males and 83 inches FL for females.	The benefits are similar to those of B2.	This increase in the size limit is projected to reduce recreational landings by at least 64 percent in the numbers of sharks landed. A 64 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of direct trips harvesting them to 13 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, especially if it results in the cancellation of shark fishing tournaments, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.
Alternative B6b: Seasonal retention of shortfin mako sharks from June through August at 71 inches FL for males and 100 inches FL for females.	The benefits are similar to those of B2.	Based on estimates from the LPS, on average 475 directed trips are taken for shortfin mako sharks each September and October, representing approximately 10 percent of all annual directed trips. Unless these trips are redistributed within the shortened season or converted to trips targeting other HMS species, the loss of these trips would represent a reduction in HMS angler expenditures of approximately \$292,000. No registered HMS tournaments held in September and October target sharks exclusively, so it is highly unlikely this alternative would result in the rescheduling of any tournaments due to the fishing season considered in this alternative. It is much more likely that directed fishing effort would be affected by

		<p>the potential increases in the minimum size limits. Assuming this increase in the size limit has minimal effect on fishing effort directly towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 78 percent reduction in the number of sharks landed, and a 76 percent reduction in the weight of sharks landed. A 78 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of direct trips harvesting them to 8 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, especially if it results in the cancellation of shark fishing tournaments, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.</p>
<p>Alternative B6c: Seasonal retention of shortfin mako sharks from June through July at 71 inches FL for males and 90 inches FL for females.</p>	<p>The benefits are similar to those of B2.</p>	<p>Based on estimates from the LPS, on average 1,264 directed trips are taken for shortfin mako sharks each August through October, representing approximately 26 percent of all annual directed trips. Unless these trips are redistributed within the shortened season or converted to trips targeting other HMS species, the loss of these trips would represent a reduction in HMS angler expenditures of approximately \$777,000. However, only two registered HMS tournaments held in August through October target sharks exclusively, one out of New York which primarily targets thresher sharks and a Florida tournament where participants fish exclusively from shore, so it is highly unlikely this alternative would result in the rescheduling of any tournaments due to the fishing season considered in this alternative. It is much more likely that directed</p>

		<p>fishing effort would be affected by the potential increases in the minimum size limits. Assuming this increase in the size limit has minimal effect on fishing effort directly towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 78 percent reduction in the number of sharks landed, and a 76 percent reduction in the weight of sharks landed. A 78 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of direct trips harvesting them to 8 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, especially if it results in the cancellation of shark fishing tournaments, thus leading to moderate adverse socioeconomic impacts on supporting businesses and industries such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.</p>
<p>Alternative B6d: Seasonal retention of shortfin mako sharks in June only at 71 inches FL for males and 83 inches FL for females.</p>	<p>The benefits are similar to those of B2.</p>	<p>Based on estimates from the LPS, on average 2,435 directed trips are taken for shortfin mako sharks each July through October, representing approximately 51 percent of all annual directed trips. Unless these trips are redistributed within the shortened season or converted to trips targeting other HMS species, the loss of these trips would represent a reduction in HMS angler expenditures of approximately \$1.5 million. Additionally, there are seven registered HMS tournaments held in July through October that target sharks exclusively, including three of four tournaments held in the state of Rhode Island, and the only tournament in Massachusetts to target sharks exclusively. It is likely that directed fishing effort would also be affected by the potential increases in the minimum size limits. Assuming this increase in the</p>



		size limit has minimal effect on fishing effort directly towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 79 percent reduction in the number of sharks landed, and a 78 percent reduction in the weight of sharks landed. A 79 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 8 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse direct and indirect socioeconomic impacts on supporting businesses and industries. Indirect socioeconomic impacts include impacts on supporting businesses such as bait and tackle suppliers, marinas, and the hospitality industry in coastal towns.
Alternative B6e: Establish a process for seasonal retention and minimum size limits for shortfin mako sharks based on certain criteria.	This alternative would also allow NMFS to minimize adverse socioeconomic impacts to the HMS recreational fishery by allowing for adjustments to the season and size limits based on observed reductions and redistribution of fishing effort resulting from measures implemented in previous years.	Direct and indirect socioeconomic costs under this alternative may be moderately in the short-term depending on how the fishery reacts to the initial measures implemented.
Alternative B7: Establish a slot limit for the recreational retention of male and female shortfin mako sharks.	The benefits are similar to those of B2.	This could result in a substantial reduction in directed fishing trips for shortfin mako sharks, thus leading to short- and long-term moderate adverse direct and indirect socioeconomic impacts on supporting businesses and industries.
Alternative B8: Establish a tagging program to land shortfin mako sharks greater than the minimum sizes.	By excluding tournaments from tagging requirements, there may be a direct beneficial socioeconomic impact for tournaments and their participants, as this	An increase in the minimum size limit, and a yearly cap on landings for vessels would reduce effort drastically and have adverse socioeconomic impacts on the recreational fleet. This would adversely affect

	would be an additional opportunity, beyond their tags, to land shortfin mako sharks for permit holders.	the charter fleet the most, by limiting the number of trips that they could land shortfin mako sharks each year, and thus may affect their ability to book trips.
<i>Alternative B9: Require the use of circle hooks for recreational shark fishing – Preferred Alternative</i>	This alternative could result in minor beneficial economic benefits associated with positive ecological impacts due to the reduction in post release mortality attributable to circle hook use.	This alternative could result in short- and long-term minor direct adverse socioeconomic impacts. Although this alternative would simplify recreational shark management by removing the geographic component of the circle hook requirement, some uncertainty may occur since the circle hook requirement was just recently introduced. Recreational shark fishermen north of Chatham, Massachusetts would need to purchase circle hooks to comply with this requirement, although the cost is modest. Additionally, it is possible that once the circle hook requirement is expanded, fishermen in the newly impacted area could find reduced catch rates of sharks including shortfin mako sharks. If reduced catch rates are realized, effort in the recreational shark fishery, including the for-hire fleet, could be impacted by reduced number of trips or reduced demand for chartered trips.
Alternative B9: Prohibit landing of shortfin mako sharks in the HMS recreational fishery (catch and release only)	There would be unquantified benefits to the public associated with dramatically reducing mortality of shortfin mako sharks by the recreational sector. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).	Shortfin mako sharks are a frequently targeted species even though only around four percent of the catch is retained. A prohibition on the retention of shortfin mako sharks is likely to disincentive some portion of the recreational shark fishery, particularly those individuals that plan to target shortfin mako sharks. Businesses that rely on recreational shark fishing such as charter and headboats may experience a decline in for hire trips resulting in adverse socioeconomic impacts. A few tournaments might also be canceled that feature shortfin mako prize categories.

<p>Alternative C1: <i>No action. Do not require reporting of shortfin mako sharks outside of current reporting systems - Preferred Alternative</i></p>	<p>Since there would be no changes to reporting requirements under this alternative, no changes in economic benefits are expected under this alternative.</p>	<p>Since there would be no changes to reporting requirements under this alternative, NMFS would expect fishing practices to remain the same, and therefore no changes in economic costs are anticipated for this alternative.</p>
<p>Alternative C2: Establish mandatory reporting of shortfin mako shark catches (landings and discards) on VMS</p>	<p>There could be some minor benefits associated in a more real-time collection of shortfin mako data using VMS systems that could improve the management of shortfin mako stocks.</p>	<p>If a vessel already has a type-approved E-MTU VMS unit, this alternative would have negligible additional costs, since the only expense would be any associated monthly communication service fees, which they may already be paying if the vessel is participating a Council-managed fishery, and the time to complete the VMS daily report. If vessels with a shark LAP do not have an E-MTU VMS unit, there would likely be economic costs are expected as a result of having to pay for the E-MTU VMS unit (approximately \$4,000) and a qualified marine electrician to install the unit (\$400), and monthly communication service provider costs (\$44).</p>
<p>Alternative C3: Implement mandatory reporting of all recreationally landed and discarded shortfin mako sharks (e.g., app, website, Vessel Trip Reports)</p>	<p>There could be some minor benefits associated in a more comprehensive collection of shortfin mako data by recreational anglers that could improve the management of shortfin mako stocks.</p>	<p>Recreational HMS permit holders would have a variety of options for reporting shortfin mako shark landings, including a phone-in system, internet website, and/or a smartphone app. The potential reporting burden associated with mandatory landings reports for shortfin mako sharks would be significantly reduced under the increased minimum size limits being considered in this rulemaking, although would still represent an increased burden over current reporting requirements.</p>
<p>Alternative D1: No action. Do not establish a rebuilding plan for shortfin mako sharks.</p>	<p>No change in economic benefits.</p>	<p>No change in economic costs.</p>
<p>Alternative D2: Establish a domestic rebuilding plan for</p>	<p>There could be some minor unquantified socioeconomic benefits in the long-term</p>	<p>The economic costs would be the same as those described under preferred alternatives A2, B3, B8, and</p>

shortfin mako sharks unilaterally (i.e., without ICCAT)	associated with potential reductions in shortfin mako overfishing.	C1. Cumulatively, these measures would reduce opportunities to land shortfin mako sharks in the U.S. recreational and commercial fisheries.
<i>Alternative D3: Establish the foundation for developing an international rebuilding plan for shortfin mako sharks - Preferred Alternative</i>	No changes would initially be made to the recreational and commercial fisheries. Management measures to address overfishing of shortfin mako sharks could be adopted in 2019.	Measures adopted in 2019 by ICCAT could change the way that the U.S. recreational and commercial shortfin mako fishery operates, which may result in long-term costs to these sectors. However, any future actions would be analyzed in a separate rulemaking.
Alternative D4: Remove shortfin mako sharks from the pelagic shark management group and that group's quota; implement a U.S. shortfin mako shark-specific quota if established by ICCAT, and adjust the pelagic shark quota accordingly	In the short-term, there would likely be no change in benefits because initially there would be no reduction in fishing effort and practices.	Establishing a shortfin mako species-specific quota may provide long-term result in minor costs if ICCAT establishes a TAC for the U.S. that is well below the total average harvest by the U.S. or below the current annual commercial quota for common thresher, oceanic whitetip, and shortfin mako as it could potentially limit the amount of harvest for fishermen.
Alternative D5: Implement area management for shortfin mako sharks if established by ICCAT	In the short-term, there would likely be no change in benefits because initially there would be no reduction in fishing effort and practices.	Without a specific area to analyze at this time, the precise impacts with regard to impacts on commercial and recreational fishery operations cannot be determined. Implementing area management for shortfin mako sharks, if recommended by the scientific advice of the SCRS in 2019, could lead to a reduction in localized fishing effort, which would likely have short- and long-term minor economic costs for fisheries that land shortfin mako sharks.
Alternative D6: Establish bycatch caps in all HMS fisheries that interact with shortfin mako sharks	In the short-term, there would likely be no change in benefits because initially there would be no reduction in fishing effort and practices.	This alternative would have direct short-term minor adverse socioeconomic costs since the bycatch caps could close fisheries if they are reached until those fishermen could modify fishing behavior to avoid. Long-term impacts would be neutral as the vessels would avoid shortfin mako sharks.

## 6.6 Conclusions

As noted above, under E.O. 12866, a regulation is a “significant regulatory action” if it is likely to: (1) have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or (4) raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in this Executive Order. Pursuant to the procedures established to implement section 6 of E.O. 12866, the Office of Management and Budget has determined that this action is not significant. A summary of the expected net economic benefits and costs of each alternative, which are based on supporting text in Chapter 4, can be found in Table 6.1.

## **7.0 Initial Regulatory Flexibility Analysis**

The Initial Regulatory Flexibility Analysis (IRFA) is conducted to comply with the Regulatory Flexibility Act (5 U.S.C. §§ 601 et seq.) (RFA). The goal of the RFA is to minimize the economic burden of federal regulations on small entities. To that end, the RFA directs federal agencies to assess whether a proposed regulation is likely to result in significant economic impacts to a substantial number of small entities, and identify and analyze any significant alternatives to the proposed rule that accomplish the objectives of applicable statutes and minimize any significant effects on small entities. Certain data and analysis required in an IRFA are also included in other Chapters of this document. Therefore, this IRFA incorporates by reference the economic analyses and impacts in Chapter 4 of this document.

### **7.1 Description of the Reasons Why Action is Being Considered**

Please see Chapter 1 for a description of the reasons why action is being considered for the proposed action.

### **7.2 Statement of the Objectives of, and Legal Basis for, the Proposed Rule**

Section 603(b)(2) of the RFA requires Agencies to state the objective of, and legal basis for the proposed action. Please see Chapter 1 for a full description of the objectives of this action.

Consistent with the provisions of the Magnuson-Stevens Act and ATCA, NMFS proposes to modify the 2006 Atlantic HMS FMP in response to ICCAT Recommendation 17-8 and the stock status determination for shortfin mako sharks.

NMFS has identified the following objectives with regard to this proposed action:

- Address overfishing of shortfin mako sharks;
- Develop and implement management measures consistent with the ICCAT Recommendation 17-08; and
- Take steps to establish a foundation for rebuilding the shortfin mako shark stock.

### **7.3 Description and Estimate of the Number of Small Entities to Which the Proposed Rule Would Apply**

Section 603(b)(3) of the Regulatory Flexibility Act requires Agencies to provide an estimate of the number of small entities to which the rule would apply. The Small Business Administration (SBA) has established size criteria for all major industry sectors in the United States, including fish harvesters. Provision is made under SBA's regulations for an agency to develop its own industry-specific size standards after consultation with SBA Office of Advocacy and an opportunity for public comment (see 13 CFR 121.903(c)). Under this provision, NMFS may establish size standards that differ from those established by the SBA Office of Size Standards, but only for use by NMFS and only for the purpose of conducting an analysis of economic effects in fulfillment of the agency's obligations under the RFA. To utilize this provision, NMFS must publish such size standards in the Federal Register (FR), which NMFS did on December 29, 2015 (80 FR 81194, December 29, 2015). In this final rule effective on July 1,

2016, NMFS established a small business size standard of \$11 million in annual gross receipts for all businesses in the commercial fishing industry (NAICS 11411) for RFA compliance purposes. NMFS considers all HMS permit holders to be small entities because they had average annual receipts of less than \$11 million for commercial fishing. The Small Business Administration (SBA) has established size standards for all other major industry sectors in the U.S., including the scenic and sightseeing transportation (water) sector (NAICS code 487210, for-hire), which includes charter/party boat entities. The Small Business Administration (SBA) has defined a small charter/party boat entity as one with average annual receipts (revenue) of less than \$7.5 million.

Regarding those entities that would be directly affected by the recreational management measures, HMS Angling (Recreational) category permits are typically obtained by individuals who are not considered businesses or small entities for purposes of the RFA because they are not engaged in commercial business activity. Vessels with the HMS Charter/Headboat category permit can operate as for-hire vessels. These permit holders can be regarded as small entities for RFA purposes (i.e., they are engaged in the business of fish harvesting, are independently owned or operated, are not dominant in their field of operation, and have average annual revenues of less than \$7.5 million). Overall, the recreational alternatives would have impacts on the portion of the 3,618 HMS Charter/Headboat permit holders who fish for or retain sharks. There were also 282 registered HMS tournaments in 2017, which could be impacted by this rule. Of those registered HMS tournaments, 72 had awards or prizes for pelagic sharks.

Regarding those entities that would be directly affected by the preferred commercial management measures, the average annual revenue per active pelagic longline vessel is estimated to be \$187,000 based on the 170 active vessels between 2006 and 2012 that produced an estimated \$31.8 million in revenue annually. The maximum annual revenue for any pelagic longline vessel between 2006 and 2016 was less than \$1.9 million, well below the NMFS small business size standard for commercial fishing businesses of \$11 million. Other non-longline HMS commercial fishing vessels typically generally earn less revenue than pelagic longline vessels. Therefore, NMFS considers all Atlantic HMS commercial permit holders to be small entities (i.e., they are engaged in the business of fish harvesting, are independently owned or operated, are not dominant in their field of operation, and have combined annual receipts not in excess of \$11 million for all its affiliated operations worldwide). The preferred commercial alternatives would apply to the 280 Atlantic tunas Longline category permit holders, 221 directed shark permit holders, and 269 incidental shark permit holders. Of these 280 permit holders, 85 pelagic longline vessels were actively fishing in 2016 based on logbook records. Based on HMS logbook data, an average of 10 vessels that used gear other than pelagic longline gear interacted with shortfin mako sharks between 2012 and 2016, which is also equal to the 2016 number of vessels reporting shortfin mako sharks on non-pelagic longline gear.

NMFS has determined that the preferred alternatives would not likely directly affect any small organizations or small government jurisdictions defined under RFA, nor would there be disproportionate economic impacts between large and small entities. Furthermore, there would be no disproportionate economic impacts among the universe of vessels based on gear, home port, or vessel length.

More information regarding the description of the fisheries affected, and the categories and number of permit holders, can be found in Chapter 3.0.

#### **7.4 Description of the Projected Reporting, Record-Keeping, and Other Compliance Requirements of the Proposed Rule, Including an Estimate of the Classes of Small Entities Which Would Be Subject to the Requirements of the Report or Record**

Section 603(b)(4) of the RFA requires Agencies to describe any new reporting, record-keeping and other compliance requirements. The action does not contain any new collection of information, reporting, or record-keeping requirements.

#### **7.5 Identification of All Relevant Federal Rules Which May Duplicate, Overlap, or Conflict with the Proposed Rule**

Under section 603(b)(5) of the RFA, Agencies must identify, to the extent practicable, relevant Federal rules which duplicate, overlap, or conflict with the proposed action. Fishermen, dealers, and managers in these fisheries must comply with a number of international agreements, domestic laws, and other fishery management measures. These include, but are not limited to, the Magnuson-Stevens Act, the Atlantic Tunas Convention Act, the High Seas Fishing Compliance Act, the Marine Mammal Protection Act, the Endangered Species Act, the National Environmental Policy Act, the Paperwork Reduction Act, and the Coastal Zone Management Act. This proposed action has been determined not to duplicate, overlap, or conflict with any Federal rules.

#### **7.6 Description of Any Significant Alternatives to the Proposed Rule That Accomplish the Stated Objectives of the Applicable Statutes and That Minimize Any Significant Economic Impact of the Proposed Rule on Small Entities**

One of the requirements of an IRFA is to describe any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities. The analysis shall discuss significant alternatives such as:

1. Establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
2. Clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;
3. Use of performance rather than design standards; and
4. Exemptions from coverage of the rule, or any part thereof, for small entities.



These categories of alternatives are described at 5 U.S.C. § 603 (c)(1)-(4)). NMFS examined each of these categories of alternatives. Regarding the first, second, and fourth categories, NMFS cannot establish differing compliance or reporting requirements for small entities or exempt small entities from coverage of the rule or parts of it because all of the businesses impacted by this rule are considered small entities and thus the requirements are already designed for small entities. NMFS does not know of any performance or design standards that would satisfy the aforementioned objectives of this rulemaking while, concurrently, complying with the Magnuson-Stevens Act. As described below, NMFS analyzed several different alternatives in this proposed rulemaking, and provides rationales for identifying the preferred alternatives to achieve the desired objectives.

The alternatives considered and analyzed are described below. The IRFA assumes that each vessel will have similar catch and gross revenues to show the relative impact of the proposed action on vessels.

### **7.6.1 Commercial Alternatives**

Alternative A1, the No Action alternative, would keep the non-emergency rule regulations for shortfin mako sharks. Once the emergency rule for shortfin mako sharks expires, management measures would revert back to those effective before March 2018 (e.g. no requirement to release shortfin mako sharks that are alive at haulback). Directed and incidental shark LAP holders would continue to be allowed to land and sell shortfin mako sharks to an authorized dealer, subject to current limits, including the pelagic shark commercial quota. Short-term direct economic impacts on small entities would likely be neutral since commercial fishermen could continue to catch and retain shortfin mako sharks at a similar level and rate as the status quo.

In recent years, about 180,000 lb dw of shortfin mako sharks have been landed and the commercial revenues from shortfin mako sharks have averaged approximately \$375,000 per year, which equates to approximately 1 percent of overall HMS ex-vessel revenues. Approximately 97.26 percent of shortfin mako commercial landings, based on dealer reports, were made by pelagic longline vessels. There were 85 pelagic longline vessels that were active in 2016 based on logbook reports. Therefore, the average revenue from shortfin mako shark landings per pelagic longline vessel is \$4,291 per year ( $(\$375,000 \times 97.26\%) / 85$ ).

Even though pelagic longline gear is the primary commercial gear used to land shortfin mako sharks, other gear types also interact with this species. Based on HMS logbook data, an average of 10 vessels that used gear other than pelagic longline gear interacted with shortfin mako sharks between 2012 and 2016, which is also equal to the 2016 number of vessels reporting shortfin mako sharks on non-pelagic longline gear. Therefore, these vessels that used gear other than pelagic longline gear landed an average of only \$1,028 ( $(\$375,000 \times 2.74\%) / 10$ ) worth of shortfin mako sharks per year.

Under Alternative A2, the preferred alternative, retention of shortfin mako sharks would only be allowed if the following three criteria are met: 1) the vessel has been issued a Directed or Incidental shark LAP, 2) the shark is dead at haulback, and 3) there is a functional electronic monitoring system on board the vessel. This alternative is designed to be consistent with one of the limited provisions allowing retention of shortfin mako sharks under ICCAT

Recommendation 17-08. Under the current HMS regulations, all HMS permitted vessels that fish with pelagic longline gear are already required to have a functional electronic monitoring system (79 FR 71510; December 2, 2014) and either a Directed or an Incidental shark LAP. Vessels utilizing other gear types (i.e., gillnet or bottom longline) are not required to have an electronic monitoring system under current regulations but could choose to install one if the operator wishes to retain shortfin mako sharks that are dead at haulback and if the vessel holds a commercial shark LAP. Under this alternative, the electronic monitoring system would be used to verify the disposition of shortfin mako sharks at haulback to ensure that only sharks dead at haulback were retained.

This alternative would be consistent with ICCAT Recommendation 17-08 and would reduce the number of landings by pelagic longline vessels on average by 74 percent based on observer data from 2013-2016. A 74 percent reduction in shortfin mako landings would reduce revenues by an average of \$3,175 ( $\$4,291 \times 74\%$ ) per vessel for the 85 activate pelagic longline vessels and would eliminate all of the \$1,028 in landing per vessel by the 10 non-pelagic longline vessels that landing shortfin mako sharks since those vessels are unlikely to have electronic monitoring systems currently installed. Those non-pelagic longline vessels would need to pay to install electronic monitoring systems if they wish to retain shortfin mako sharks, introducing an additional expense for those vessels if it there were an economic incentive for those vessels to try to retain shortfin mako sharks under this alternative. Overall, this alternative would have minor economic costs on small entities because these measures would reduce the number of shortfin mako sharks landed and sold by these fishing vessels. However, shortfin mako sharks are rarely a target species and are worth less than other more valuable target species.

Alternative A3 is similar to Alternative A2 except that the ability to retain dead shortfin mako sharks would be limited to permit holders that opt in to a program that would use the existing electronic monitoring systems, which are currently used in relation to the bluefin tuna IBQ program, also to verify the disposition of shortfin mako sharks at haulback. In other words, this alternative would allow for retention of shortfin mako sharks that are dead at haulback by persons with a Directed or Incidental shark LAP only if permit holders opt in to enhanced electronic monitoring coverage. If the permit holder does not opt in to the enhanced electronic monitoring coverage, they could not retain any shortfin mako sharks.

The economic impacts to small entities under this alternative are expected to be similar to those under Alternative A2. Under this alternative, a portion of the pelagic longline fleet could opt out of any retention of shortfin mako sharks, resulting in a greater reduction in overall shark ex-vessel revenue for those vessels. Overall, the socioeconomic impacts associated with these reductions in revenue are not expected be substantial, as shortfin mako sharks comprise less than one percent of total HMS ex-vessel revenues on average. Non-pelagic longline vessels would need to pay to install electronic monitoring systems if they wish to retain shortfin mako sharks, introducing an additional expense for those vessels. Due to the low commercial value of shortfin mako sharks and the high cost of electronic monitoring it is reasonable to expect that these fisheries will not install cameras and therefore will not retain shortfin mako sharks. Overall, this alternative would have minor economic costs on small entities, because these measures would reduce the number of shortfin mako sharks landed and sold by these fishing vessels, however,

shortfin mako sharks are rarely a target species and are worth less than other more valuable target species.

Alternative A4 would establish a commercial minimum size of 83 inches FL (210 cm FL) for retention of shortfin mako sharks caught incidentally during fishing for other species, whether the shark is dead or alive at haulback. Based on observer data, only six percent of shortfin mako sharks are caught with pelagic longline gear greater than 83 inches FL. Thus, restricting fishermen to retaining six percent of shortfin mako sharks would represent a considerable reduction in number of shortfin mako sharks landed and in the resulting ex-vessel revenue. A 94 percent reduction in shortfin mako landings would reduce annual revenues by an average of \$4,034 ( $\$4,291 \times 94\%$ ) per vessel for the 85 activate pelagic longline vessels and would reduce annual revenues by an average of \$966 ( $\$1,028 \times 94\%$ ) per vessel for the 10 non-pelagic longline vessels that land shortfin mako sharks. However, the overall economic impacts associated with these reductions in revenue are not expected be substantial, as shortfin mako sharks comprise less than one percent of total HMS ex-vessel revenues on average. Additionally, the magnitude of shortfin mako landings by other gear types (e.g., bottom longline, gillnet, handgear) is very small. Overall, this alternative would have minor economic costs on small entities because these measures would reduce the number of shortfin mako sharks landed and sold by these fishing vessels, however, shortfin mako sharks are rarely a target species and are worth less than other more valuable target species.

Alternative A5 would allow fishermen to retain shortfin mako sharks caught on any commercial gear (e.g., pelagic longline, bottom longline, gillnet, handgear) provided that an observer is on board that can verify that the shark was dead at haulback. Under this alternative, electronic monitoring would not be used to verify the disposition of shortfin mako sharks caught on pelagic longline gear, but instead pelagic longline vessels could only retain shortfin mako sharks when the sharks are dead at haulback and an observer is on board.

Since only five percent of pelagic longline gear trips are observed, this alternative would result in a 95 percent reduction in the number of shortfin mako sharks retained on pelagic longline gear. A 95 percent reduction in shortfin mako landings would reduce annual revenues by an average of \$4,076 ( $\$4,291 \times 94\%$ ) per vessel for the 85 activate pelagic longline vessels and would reduce annual revenues by an average of \$977 ( $\$1,028 \times 95\%$ ) per vessel for the 10 non-pelagic longline vessels that land shortfin mako sharks.. However, the overall economic impacts associated with these reductions in revenue are not expected be substantial, as shortfin mako sharks comprise less than one percent of total HMS ex-vessel revenues on average. Additionally, the magnitude of shortfin mako landings by other gear types (e.g., bottom longline, gillnet, handgear) is very small. Overall, this alternative would have minor economic costs on small entities because these measures would reduce the number of shortfin mako sharks landed and sold by these fishing vessels, however, shortfin mako sharks are rarely a target species and are worth less than other more valuable target species.

Alternative A6 would place shortfin mako sharks on the prohibited sharks list to prohibit any catch or retention of shortfin mako sharks in commercial HMS fisheries. In recent years, about 180,000 lb dw of shortfin mako sharks have been landed and the commercial revenues from shortfin mako sharks have averaged approximately \$375,000 per year, which equates to

approximately one percent of overall HMS ex-vessel revenues. That revenue would be eliminated under this alternative. Approximately 97.26 percent of shortfin mako commercial landings, based on dealer reports, were made by pelagic longline vessels. There were 85 pelagic longline vessels that were active in 2016 based on logbook reports. Therefore, the average loss in annual revenue from shortfin mako shark landings per pelagic longline vessel would be \$4,291 per year  $((\$375,000 \times 97.26\%) / 85)$ . The average loss in annual revenue from shortfin mako shark landings for vessel using other gear types would be \$1,028 per year  $((\$375,000 \times 2.74\%) / 10)$ . However, the overall economic impacts associated with these reductions in revenue are not expected to be substantial, as shortfin mako sharks comprise less than one percent of total HMS ex-vessel revenues on average. Additionally, the magnitude of shortfin mako landings by other gear types (e.g., bottom longline, gillnet, handgear) is very small. Overall, this alternative would have minor economic costs on small entities because these measures would reduce the number of shortfin mako sharks landed and sold by these fishing vessels, however, shortfin mako sharks are rarely a target species and are worth less than other more valuable target species.

## **7.6.2 Recreational Alternatives**

While HMS Angling permit holders are not considered small entities by NMFS for purposes of the Regulatory Flexibility Act, Charter/Headboat permit holders and tournament operators are considered to be small entities and could be potentially impacted by the various recreational alternatives, as described below

Alternative B1, the no action alternative, would not implement any management measures in the recreational shark fishery to decrease mortality of shortfin mako sharks. This would result in no additional economic impacts on small entities associated with this fishery in the short-term.

Under Alternative B2, the minimum size limit for the retention of shortfin mako sharks would be increased from 54 inches FL to 71 inches FL for male and 83 inches FL for female shortfin mako sharks. This increase in the size limit is projected to reduce recreational landings by at least 64 percent in numbers of sharks landed, and 49 percent in the weight of sharks landed. While this alternative would not establish a shortfin mako fishing season, such a significant increase in the minimum size limit would likely result in some reduction in directed fishing effort for shortfin mako sharks.

Under Alternative B3, the preferred alternative, the minimum size limit for retention of shortfin mako sharks would be increased to 83 inches FL for both males and female sharks consistent with the measure implemented in the emergency rule. Assuming no reduction in directed fishing effort, this increase in the minimum size limit would result in an 83 percent reduction in the number of sharks landed, and a 68 percent reduction in the weight of sharks landed. Such a large increase in the minimum size limit and associated reduction in landings is unlikely to have no effect on directed fishing effort. An 83 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 6 percent. At least one tournament directed at shortfin mako sharks in the Northeast has chosen to cancel its 2018 event due to the more stringent current 83 inches FL minimum size limit. Tournaments account for over half of directed recreational trips for shortfin mako sharks, and 77 percent of them in the month of June when effort is at its highest. This could result in a significant reduction in

directed fishing trips for shortfin mako sharks, thus leading to moderate adverse economic impacts on some charter/headboats and tournament operators.

Under Alternative B4, recreational HMS permit holders would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL and female shortfin mako sharks that measure at least 108 inches FL. Assuming no reduction in directed fishing effort, this increase in the minimum size limit would result in a 76 percent reduction in the number of sharks landed, and a 72 percent reduction in the weight of sharks landed. A 76 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to approximately 9 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse economic impacts on some charter/headboats and tournament operators.

Under Alternative B5, recreational HMS permit holders would only be allowed to retain male shortfin mako sharks that measure at least 71 inches FL and female shortfin mako sharks that measure at least 120 inches FL. Assuming no reduction in directed fishing effort, this increase in the size limit would result in a 76 percent reduction in the number of sharks landed, and a 73 percent reduction in the weight of sharks landed. A 76 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 8.6 percent. This could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse economic impacts on some charter/headboats and tournament operators.

Under Alternative B6a, the minimum size limit for the retention of shortfin mako sharks would be increased from 54 inches FL to 71 inches FL for male and 83 inches FL for female shortfin mako sharks, and a shortfin mako fishing season would be established from May through October. The fishing season established under this alternative would have little to no effect on shortfin mako fishing activity in the Northeast, but may reduce fishing effort in the South Atlantic and Gulf of Mexico regions; however, a lack of data on targeted trips for shortfin mako sharks in this region makes any assessment of potential socioeconomic impacts difficult. However, this combination of increase in the size limit and fishing season is projected to reduce recreational landings by at least 64 percent in numbers of sharks landed, and 49 percent in the weight of sharks landed in the Northeast. A 64 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 13 percent. This reduction on directed trips could lead to moderate adverse economic impacts on some charter/headboats and tournament operators.

Under Alternative B6b, NMFS would establish a three-month fishing season for shortfin mako sharks spanning the summer months of June through August. This season would be combined with a 71 inches FL minimum size limit for males and 100 inches FL for females. Based on estimates from the LPS, on average 475 directed trips are taken for shortfin mako sharks each September and October, representing approximately 10 percent of all annual directed trips. No registered HMS tournaments held in September and October target sharks exclusively, so it is highly unlikely this alternative would result in the rescheduling of any tournaments due to the fishing season. It is much more likely that directed fishing effort would be affected by the increases in the minimum size limits. Assuming this increase in the size limit has minimal effect

on fishing effort directly towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 78 percent reduction in the number of sharks landed, and a 76 percent reduction in the weight of sharks landed. This reduction could result in a significant reduction in directed fishing trips for shortfin mako sharks, thus leading to moderate adverse economic impacts on some charter/headboat operators.

Under Alternative B6c, NMFS would establish a two-month fishing season for shortfin mako sharks for the months of June and July. This season would be combined with a 71 inches FL minimum size limit for males and 90 inches FL for females. Based on estimates from the LPS, on average 1,264 directed trips are taken for shortfin mako sharks each August through October, representing approximately 26 percent of all annual directed trips. Only two registered HMS tournaments held in August through October target sharks exclusively, one out of New York that primarily targets thresher sharks and one out of Florida where participants fish exclusively from shore. Thus, it is highly unlikely this alternative would result in the rescheduling of any tournaments due to the fishing season. It is likely that directed fishing effort would also be affected by the increases in the minimum size limits. Assuming this increase in the size limit has minimal effect on fishing effort directly towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 78 percent reduction in the number of sharks landed, and a 76 percent reduction in the weight of sharks landed. Such a large increase in the size limit and associated reduction in landings is unlikely to have no effect on directed fishing effort. A 78 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 8 percent. This reduction in directed trips could lead to moderate adverse economic impacts on some charter/headboats and tournament operators.

Under Alternative B6d, NMFS would establish a one-month fishing season for shortfin mako sharks for the month of June only. This season would be combined with a 71 inches FL minimum size limit for males and 83 inches FL for females. Based on estimates from the LPS, on average 2,435 directed trips are taken for shortfin mako sharks each July through October, representing approximately 51 percent of all annual directed trips. Additionally, there are seven registered HMS tournaments held in July through October that target sharks exclusively, including three of four tournaments held in the state of Rhode Island, and the only tournament in Massachusetts to target sharks exclusively. It is likely that directed fishing effort would also be affected by the increases in the minimum size limits. Assuming this increase in the size limit has minimal effect on fishing effort directly towards shortfin mako sharks within the season, this combination of season and increase in the size limit should result in a 79 percent reduction in the number of sharks landed, and a 78 percent reduction in the weight of sharks landed. Such a large increase in the size limit and associated reduction in landings is unlikely to have no effect on directed fishing effort. A 79 percent reduction in shortfin mako sharks harvested would thus reduce the percentage of directed trips harvesting them to 8 percent. This reduction in directed trips could lead to moderate adverse economic impacts on some charter/headboats and tournament operators.

Under Alternative B6e, NMFS would establish a process and criteria for determining season dates and minimum size limits for shortfin mako sharks on an annual basis through inseason actions. This process would be similar to how the agency sets season opens and retention limits

for the shark commercial fisheries and the Atlantic Tunas General category fishery. NMFS would review data on recreational landings, catch rates, and effort levels for shortfin mako sharks in the previous years, and establish season dates and minimum size limits that would be expected to achieve the reduction targets established by ICCAT, and the objectives of the HMS fisheries management plan. This alternative would also allow NMFS to minimize adverse economic impacts to the HMS recreational fishery by allowing for adjustments to the season and size limits based on observed reductions and redistribution of fishing effort resulting from measures implemented in previous years.

Under Alternative B7, NMFS would implement a “slot limit” for shortfin mako sharks in the recreational fishery. Under a slot limit, recreational fishermen would only be allowed to retain shortfin mako sharks within a narrow size range (e.g., between 71 and 83 inches FL) with no retention above or below that slot. Assuming no reduction in directed fishing effort, this alternative would be expected to result in similar reductions in landings as other alternatives analyzed here. While this alternative would not establish a shortfin mako fishing season, as described above in earlier alternatives, such a significant increase in the size limit would likely result in some reduction in directed fishing effort for shortfin mako sharks. This reduction in effort may be further exacerbated by the complicated nature of slot limits regulations. Similar to Alternative B2, there are two factors that might minimize reductions in fishing effort (harvested shortfin mako sharks peaks between 71 and 77 inches FL and shifting focus to other HMS species). The amount of effort reduction by recreational fishermen would depend on how much HMS anglers and tournaments are satisfied to practice catch-and-release fishing for sub-legal shortfin mako sharks or shift their fishing effort to other species.

Under alternative B8, NMFS would establish a landings tag requirement and a yearly limit on the number of landings tags assigned to a vessel, for shortfin mako sharks over the minimum size limit. This requirement would be expected to negatively affect fishing effort. An increase in the minimum size limit and a yearly cap on landings for vessels would reduce effort drastically, while maintaining some opportunity for the recreational fleet. This effort reduction would adversely affect the charter fleet the most by limiting the number of trips that they could land shortfin mako sharks each year. This effort reduction may also affect their ability to book trips. At least one tournament directed at shortfin mako sharks in the Northeast has chosen to cancel its 2018 event due to the more stringent current 83 inches FL minimum size limit. By excluding tournaments from a landings tag requirement there may be a direct beneficial economic impact for tournaments, as this would be an additional opportunity, beyond their tags, to land shortfin mako sharks for permit holders.

Alternative B9 would expand the requirement to use non-offset, non-stainless steel circle hook by all HMS permit holders with a shark endorsement when fishing for sharks recreationally, except when fishing with flies or artificial lures, to all waters managed within HMS management division. Currently, this requirement is in place for all federally managed waters south of 41° 43' N latitude (near Chatham, Massachusetts), but this alternative would remove the boundary line, requiring fishermen in all areas to use circle hooks. Recreational shark fishermen north of Chatham, Massachusetts would need to purchase circle hooks to comply with this requirement, although the cost is modest. Additionally, it is possible that once the circle hook requirement is expanded, fishermen in the newly impacted area could find reduced catch rates of sharks

including shortfin mako sharks. If reduced catch rates are realized, effort in the recreational shark fishery, including the for-hire fleet, could be impacted by reduced number of trips or reduced demand for chartered trips.

Alternative B10 would place shortfin mako sharks on the prohibited sharks list to prohibit the retention of shortfin mako sharks in recreational HMS fisheries. HMS permit holders would be prohibited from retaining or landing shortfin mako sharks recreationally. In recreational fisheries, recreational fishermen would only be authorized to catch and release shortfin mako sharks. A prohibition on the retention of shortfin mako sharks is likely to disincentive some portion of the recreational shark fishery, particularly those individuals that plan to target shortfin mako sharks. Businesses that rely on recreational shark fishing such as and tournament operators and charter/headboats may experience a decline in demand resulting in adverse economic impacts.

### **7.6.3 Monitoring Alternatives**

Alternative C1, the preferred alternative, would make no changes to the current reporting requirements applicable to shortfin mako sharks in HMS fisheries. Since there would be no changes to the reporting requirements under this alternative, NMFS would expect fishing practices to remain the same and direct economic impacts in small entities to be neutral in the short-term.

Under Alternative C2, NMFS would require vessels with a directed or incidental shark LAP to report daily the number of shortfin mako sharks retained and discarded dead, as well as fishing effort (number of sets and number of hooks) on a VMS. A requirement to report shortfin mako shark catches on VMS for vessels with a shark LAP would be an additional reporting requirement for those vessels on their existing systems. For other commercial vessels that are currently only required to report in the HMS logbook, the requirement would mean installing VMS to report dead discards of shortfin mako and fishing effort.

If a vessel has already installed a type-approved E-MTU VMS unit, the only expense would be monthly communication service fees, which they may already be paying if the vessel is participating in a Council-managed fishery. Existing regulations require all vessel operators with E-MTU VMS units to provide hail out/in declarations and provide location reports on an hourly basis at all times while they are away from port. In order to comply with these regulations, vessel owners must subscribe to a communication service plan that includes an allowance for sending similar declarations (hail out/in) describing target species, fishing gear possessed, and estimated time/location of landing using their E-MTU VMS. Given that most shortfin mako sharks are incidentally caught by pelagic longline vessels that are already required to have an E-MTU VMS system onboard, adverse economic impacts are not expected. If vessels with a shark LAP do not have an E-MTU VMS unit, direct, economic costs are expected as a result of having to pay for the E-MTU VMS unit (approximately \$4,000) and a qualified marine electrician to install the unit (\$400). VMS reporting requirements under this alternative could potentially provide undue burden to HMS commercial vessels that already report on catches, landings, and discards through vessel logbooks, dealer reports, and observer reports.



Alternative C3 would implement mandatory reporting of all recreational interactions (landed and discarded) of shortfin mako sharks in HMS fisheries. Recreational HMS permit holders would have a variety of options for reporting shortfin mako shark landings including a phone-in system, internet website, and/or a smartphone app. HMS Angling and Charter/Headboat permit holders currently use this method for required reporting of each individual landing of bluefin tuna, billfish, and swordfish within 24 hours. NMFS has also maintained a shortfin mako shark reporting app as an educational tool to encourage the practice of catch-and-release. Additionally, the potential burden associated with mandatory landings reports for shortfin mako sharks would be significantly reduced under the increased minimum size limits being considered in this rulemaking, although would still represent an increased burden over current reporting requirements. While HMS Angling permit holders are not considered small entities by NMFS for purposes of the Regulatory Flexibility Act, Charter/Headboat permit holders are considered to be small entities and would be potentially impacted by this alternative.

#### **7.6.4 Rebuilding Alternatives**

Under Alternative D1, NMFS would not establish a rebuilding plan for shortfin mako sharks and would maintain the current recreational and commercial shark fishing regulations that pertain to shortfin mako sharks in U.S. fisheries. There would likely be no direct short-term impact on small entities from this alternative as there would be no change in fishing effort or landings of shortfin mako sharks that would impact revenues generated from the commercial and recreational fisheries.

Under Alternative D2, NMFS would establish a domestic rebuilding plan for shortfin mako sharks unilaterally (i.e., without ICCAT). While such an alternative could avoid overfishing shortfin mako sharks in the United States by changing the way that the U.S. recreational and commercial fisheries operate, such a plan could not effectively rebuild the stock, since U.S. catches are only 11 percent of the reported catch Atlantic-wide. Such an alternative would be expected to cause short- and long-term direct economic impacts.

Under Alternative D3, the preferred alternative, NMFS would take preliminary action toward rebuilding by adopting measures to end overfishing to establish a foundation for a rebuilding plan. NMFS would then take action at the international level through ICCAT to develop a rebuilding plan for shortfin mako sharks. ICCAT is planning to establish a rebuilding plan for shortfin mako sharks in 2019, and this rebuilding plan would encompass the objectives set forth by ICCAT based on scientific advice from the SCRS. This alternative would not result in any changes to the current recreational and commercial domestic regulations for shortfin mako sharks in the short-term. There would likely be no direct short-term impact on small entities from this alternative as there would be no change in fishing effort or landings of shortfin mako sharks that would impact revenues generated from the commercial and recreational fisheries. Management measures to address overfishing of shortfin mako sharks could be adopted in 2019. These measures could change the way that the U.S. recreational and commercial shortfin mako shark fishery operates, which could cause long-term direct economic impacts. Any future action to implement international measures would be analyzed in a separate rulemaking.

Under Alternative D4, NMFS would remove shortfin mako sharks from the commercial pelagic shark management group and would implement a species-specific quota for shortfin mako sharks

as established by ICCAT, which would include both commercial and recreational catches as well as dead discards. In addition, NMFS would establish a new commercial pelagic shark species quota for common thresher and oceanic whitetip sharks based on recent landings. The 2017 ICCAT stock assessment indicated that the North Atlantic population of shortfin mako sharks is overfished and experiencing overfishing. In November 2017, ICCAT adopted management measures (Recommendation 17-08) to address the overfishing determination, but did not recommend a TAC necessary to stop overfishing of shortfin mako sharks. Therefore, it is difficult at this time to determine how setting a species-specific quota for shortfin mako sharks would affect commercial and recreational fishing operations. However, this species-specific quota may provide long-term direct, minor adverse economic impacts if ICCAT established a TAC for the United States that is well below the total average harvest by the United States (i.e., 379 mt ww or 195 mt dw) or below the current annual commercial quota for common thresher, oceanic whitetip, and shortfin mako (488 mt dw) as it could potentially limit the amount of harvest for fishermen. Short-term direct socioeconomic impacts would be neutral for Alternative D4 because initially there would be no reduction in fishing effort and practices.

Under Alternative D5, NMFS would take steps to implement area-based management measures domestically if such measures are established by ICCAT. Recommendation 17-08 calls on the SCRS to provide additional scientific advice in 2019 that takes into account a spatial/temporal analysis of North Atlantic shortfin mako shark catches in order to identify areas with high interactions. Without a specific area to analyze at this time, the precise impacts with regard to impacts on commercial and recreational fishery operations cannot be determined. Implementing area management for shortfin mako sharks, if recommended by the scientific advice, could lead to a reduction in localized fishing effort, which would likely have adverse economic impacts for small entities that land shortfin mako sharks.

Under Alternative D6, NMFS would establish bycatch caps for fisheries that interact with shortfin mako sharks. This alternative would impact the HMS pelagic longline and shark recreational fisheries similar to Alternative D4. However, this alternative could also impact non-HMS fisheries by closing those fisheries if the bycatch cap were reached. This alternative could lead to short-term adverse impacts since the bycatch caps could close fisheries if they are reached until those fishermen could modify fishing behavior to avoid shortfin mako sharks (even in fisheries where shortfin mako sharks are rarely, if ever, seen) and reduce interactions. In the long-term, this alternative would have neutral impacts as the vessels would avoid shortfin mako sharks. The impacts to small businesses are expected to be neutral in the short and long-term as their businesses would not change.

## 8.0 Community Profiles

### 8.1 Introduction

The Magnuson-Stevens Act requires, among other things, that all FMPs include a fishery impact statement intended to assess, specify, and describe the likely effects of the measures on fishermen and fishing communities (§303(a)(9)).

NEPA requires federal agencies to consider the interactions of natural and human environments by using a “systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences...in planning and decision-making” (§102(2)(A)). Moreover, agencies need to address the aesthetic, historic, cultural, economic, social, or health effects, which may be direct, indirect, or cumulative. Consideration of social impacts is a growing concern as fisheries experience increased participation and/or declines in stocks. The consequences of management actions need to be examined to better ascertain and, to the fullest extent possible, mitigate regulatory impacts on affected constituents.

Social impacts are generally the consequences to human populations resulting from some type of public or private action. Those consequences may include alterations to the ways in which people live, work or play, relate to one another, and organize to meet their needs. In addition, cultural impacts, which may involve changes in values and beliefs that affect people’s way of identifying themselves within their occupation, communities, and society in general are included under this interpretation. Social impact analyses help determine the consequences of policy action in advance by comparing the status quo with the projected impacts. Community profiles are an initial step in the social impact assessment process. Although public hearings and scoping meetings provide input from those concerned with a particular action, they do not constitute a full overview of the fishery.

The Magnuson-Stevens Act outlines a set of National Standards that apply to all fishery management plans and the implementation of regulations. Specifically, National Standard 8 notes that:

“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: (1) provide for the sustained participation of such communities; and (2) to the extent practicable, minimize adverse economic impacts on such communities” (§301(a)(8)). See also 50 CFR §600.345 for National Standard 8 Guidelines.

“Sustained participation” is defined to mean continued access to the fishery within the constraints of the condition of the resource (50 CFR §600.345(b)(4)). It should be clearly noted that National Standard 8 “does not constitute a basis for allocation of resources to a specific fishing community nor for providing preferential treatment based on residence in a fishing community” (50 CFR §600.345(b)(2)). The Magnuson-Stevens Act further defines a “fishing community” as:

“a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, crew, and fish processors that are based in such communities” (§301(16)).

Likewise, specific to development and amendment of HMS FMPs, the Magnuson-Stevens Act, paragraph 304(g)(1)(C), requires the Secretary to:

- Evaluate the likely effects, if any, of conservation and management measures on participants in the affected fisheries; and
- Minimize, to the extent practicable, any disadvantage to U.S. fishermen in relation to foreign competitors.

NMFS (2001) guidelines for social impact assessments specify that the following elements are utilized in the development of FMPs and FMP amendments:

1. The size and demographic characteristics of the fishery-related work force residing in the area; these determine demographic, income, and employment effects in relation to the work force as a whole, by community and region.
2. The cultural issues of attitudes, beliefs, and values of fishermen, fishery-related workers, other stakeholders, and their communities.
3. The effects of proposed actions on social structure and organization; that is, on the ability to provide necessary social support and services to families and communities.
4. The non-economic social aspects of the proposed action or policy; these include life-style issues, health and safety issues, and the non-consumptive and recreational use of living marine resources and their habitats.
5. The historical dependence on and participation in the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution and rights.

## **8.2 Methodology -- Previous community profiles and assessments**

Background information on the legal requirements and summary information on the community studies conducted to choose the communities profiled in this document is not repeated here and can be found in previous HMS Stock Assessment and Fishery Evaluation (SAFE) Reports, and was most recently updated in Chapter 6 of the 2011 HMS SAFE Report (NMFS 2011).

Additionally, the 2011 and 2012 HMS SAFE Reports contain modified demographic profile tables from previous documents to include the same baseline information for each community profiled, and use 1990, 2000, and 2010 Bureau of the Census data for comparative purposes. Chapter 6 of the 2011 SAFE Report is an update of the 2008 SAFE Report (NMFS 2008), and included available 2010 U.S. Census information. The 2008 SAFE Report consolidated all of the communities profiled in previous HMS FMPs or FMP amendments and updated the

community information where possible. Of the communities profiled, ten (Gloucester and New Bedford, Massachusetts; Barnegat Light and Brielle, New Jersey; Hatteras Village and Wanchese, North Carolina; Islamorada and Madeira Beach, Florida; and Dulac and Venice, Louisiana) were originally selected due to the proportion of HMS landings in the community, the relationship between the geographic communities and the fishing fleets, the existence of other community studies, and input from the HMS and Billfish Advisory Panels (since consolidated in 2006 into one HMS Advisory Panel). The remaining 14 communities (Wakefield, Rhode Island; Montauk, New York; Cape May, New Jersey; Ocean City, Maryland; Atlantic Beach, Beaufort, and Morehead City, North Carolina; Apalachicola, Destin, and Port Salerno, Florida; Orange Beach, Alabama; Grand Isle, Louisiana; and Freeport and Port Aransas, Texas), although not selected initially, have been identified as communities that could be impacted by changes to the current HMS regulations because of the number of HMS permits associated with these communities, and their community profile information has been incorporated into the document. The descriptive community profiles are organized by state and include information provided by Wilson, *et al.* (1998), Kirkley (2005), Impact Assessment, Inc. (2004), and recent information obtained from MRAG Americas, Inc. (2008).

This section presents social indicators of vulnerability and resilience developed by Jepson and Colburn (2013) for 18 communities selected for being among the top ten ports for shortfin mako shark commercial landings, or for hosting multiple shark-only fishing tournaments (Table 8.1). Jepson and Colburn (2013) developed a series of indices using social indicator variables that could assess a coastal community's vulnerability or resilience to potential economic disruptions such as those resulting from drastic changes in fisheries quotas and seasons, or natural and anthropogenic disasters. Indices and index scores were developed using factor analyses of data from the United States Census, permit sales, landings reports, and recreational fishing effort estimates from the MRIP survey (Jepson and Colburn, 2013). The nine social indices developed by Jepsen and Colburn (2013) can be divided into two categories: 1) fishing engagement and reliance, and 2) social vulnerability. For each index, the community is ranked as scoring high (one standard deviation or more above the mean score), medium high (0.5 to 0.99 standard deviations above the mean score), medium (0 to 0.49 standard deviations above the mean score), or low (below the mean score) on the index scale.

#### *Fishing Reliance and Engagement Indices*

Jepsen and Colburn (2013) developed two indices each to measure community reliance and engagement with commercial and recreational fishing, respectively. Commercial fishing engagement was assessed based on pounds of landings, value of landings, number of commercial fishing permits sold, and number of dealers with landings. Commercial fishing reliance was assessed based on value of landings per capita; number of commercial permits per capita; dealers with landings per capita; and data on percentage of people employed in agriculture, forestry, and fishing from the Bureau of Labor Statistics. The recreational fishing engagement index was measured using MRIP estimates of the number of charter, private boat, and shore recreational fishing trips originating in each community. The recreational fishing reliance index was generated using the same fishing trip estimates adjusted to a per capita basis. MRIP data is not available for the state of Texas, so the recreational indexes for Texas were instead calculated based on recreational permit data from NMFS, and boat ramp data from the state of Texas. As

such, recreational index scores for Texas communities are only comparable to other communities within the state.

In Table 8.1, fishing reliance and engagement index scores are presented for 18 HMS communities. Seven of the eighteen HMS communities scored either high or medium high on at least three indicators of fishing reliance and engagement, and only one community (Center Moriches, NY) failed to score at least medium high on one of the four indices. Three communities that scored high on all four indices included Montauk, NY; Barnegat Light, NJ; and Cape May, NJ, indicating that these communities have greater than normal dependence on the recreational and commercial fishing sectors for jobs and economic support. New Bedford, MA scored high or medium high on both fishing engagement indices, while scoring medium or low on both fishing reliance indices indicating that while New Bedford has a significant fishing community, it is not a massive component of the city's overall population. Conversely, Nantucket, MA scored high on both recreational fishing indices, while scoring medium on both commercial fishing indices suggesting this community has greater than normal dependence on the recreational fishing sector for jobs and economic support.

### *Social Vulnerability Indices*

Five indices of social vulnerability developed by Jepsen and Colburn (2013) are presented in this section (Table 8.1). The personal disruption index includes the following community variables representing disruptive forces in family lives: percent unemployment, crime index, percent with no diploma, percent in poverty, and percent separated females. The population composition index shows the presence of populations who are traditionally considered more vulnerable due to circumstances associated with low incomes and fewer resources. The poverty index includes several variables measuring poverty levels within different community social groups including: percent receiving government assistance, percent of families below the poverty line, percent over age of 65 in poverty, and percent under age of 18 in poverty. The labor force index characterizes the strength and stability of the labor force and employment opportunities that may exist. A higher ranking indicates fewer employment opportunities and a more vulnerable labor force. Finally, the housing characteristics index is a measure of infrastructure vulnerability and includes factors that indicate housing that made be vulnerable to coastal hazards such as severe storms or coastal flooding. Fort Pierce, FL was the only HMS community to score high or medium high on all five indices of social vulnerability. Five other HMS community scored high or medium high on two or three social vulnerability indices: New Bedford, MA; Ocean City, MD; Beaufort, NC; Wanchese, NC; and Wadmalaw Island, SC. These scores suggest these communities would likely experience greater difficulty recovering from economic hardships caused by job losses in the recreational and commercial fishing sectors.

**Table 8.1 Social Vulnerability Indices for 25 HMS Communities.** Source: Jepson and Colburn 2013; also found on the Social Indicators website <https://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index>.

Community	Population	Fishing Engagement and Reliance				Social Vulnerability				
		Commercial Engagement	Commercial Reliance	Recreational Engagement	Recreational Reliance	Personal Disruption	Population Composition	Poverty	Labor Force	Housing
Gloucester, MA	29,237	HIGH	MEDIUM	HIGH	LOW	LOW	LOW	LOW	LOW	LOW
Nantucket, MA	7,787	MEDIUM	MEDIUM	HIGH	HIGH	LOW	LOW	LOW	LOW	LOW
New Bedford, MA	94,873	HIGH	MEDIUM	MED HIGH	LOW	HIGH	MED HIGH	HIGH	MEDIUM	MEDIUM
Fairhaven, MA		HIGH	LOW	MED HIGH	LOW	LOW	LOW	LOW	LOW	MEDIUM
Narragansett, RI	15,786	HIGH	MEDIUM	HIGH	MEDIUM	LOW	LOW	LOW	MEDIUM	LOW
Center Moriches, NY		LOW	LOW	MEDIUM	LOW	MEDIUM	LOW	LOW	LOW	LOW
Freeport, NY		MED HIGH	LOW	HIGH	LOW	MEDIUM	HIGH	MEDIUM	LOW	LOW
Islip, NY		MEDIUM	MED HIGH	LOW	LOW	LOW	LOW	LOW	LOW	LOW
Montauk, NY	3,471	HIGH	HIGH	HIGH	HIGH	LOW	LOW	LOW	MEDIUM	LOW
Barneгат Light, NJ	592	HIGH	HIGH	HIGH	HIGH	LOW	LOW	LOW	HIGH	LOW
Brielle, NJ	4,772	MEDIUM	LOW	HIGH	MEDIUM	LOW	LOW	LOW	MED HIGH	LOW
Cape May, NJ	3,576	HIGH	HIGH	HIGH	HIGH	LOW	LOW	MEDIUM	HIGH	MEDIUM
Point Pleasant, NJ		HIGH	MEDIUM	HIGH	MEDIUM	LOW	LOW	LOW	LOW	LOW
Ocean City, MD	7,093	HIGH	MEDIUM	HIGH	HIGH	LOW	LOW	LOW	HIGH	MED HIGH
Beaufort, NC	4,119	HIGH	MEDIUM	HIGH	MED HIGH	MED HIGH	LOW	LOW	LOW	MED HIGH
Wanchese, NC	1,753	HIGH	MED HIGH	MED HIGH	HIGH	LOW	LOW	MED HIGH	LOW	MED HIGH
Wadmalaw Island, SC		LOW	LOW	LOW	HIGH	LOW	LOW	LOW	HIGH	MED HIGH
Fort Pierce, FL	42,744	MED HIGH	LOW	HIGH	MEDIUM	HIGH	HIGH	HIGH	MED HIGH	MED HIGH

### **8.3 Overview of the HMS Recreational Fishery**

To recreationally fish for sharks in federal waters, a vessel must either have an HMS Angling or HMS Charter/Headboat permit. Vessels may also participate in registered shark tournaments if they possess an Atlantic Tunas General or Swordfish General Commercial permit. According to the 2017 SAFE Report, 20,338 HMS Angling permits were issued as of October 2017, and the top four home ports by state for these permit holders were Florida (20 percent), New Jersey (14 percent), Massachusetts (12 percent), and New York (9 percent). According to the 2017 SAFE Report, as of October 2017, 3,618 HMS Charter/Headboat permits were issued in 2017, and the top four home ports by state for these permit holders were Massachusetts (19 percent), Florida (18 percent), New Jersey (12 percent), and North Carolina (9 percent). According to the 2017 SAFE Report, as of October 2017, 2,940 Atlantic Tunas General Category permits, and 613 Swordfish General Commercial permits were issued. Beginning in 2018, any vessel possessing one of the above permits that wishes to target or retain sharks must also acquire a shark endorsement on their HMS permit by watching a video on prohibited shark identification and safe handling in addition to taking a short, educational quiz. As of May 24, 2018, 8,352 HMS permits (5,920 Angling; 1,779 Charter/Headboat; 653 Atlantic Tunas General and Swordfish General Commercial) out of 15,584 combined permits (54 percent) had acquired the shark endorsement on their HMS permit.

A large part of the recreational shark fishery, especially for shortfin mako sharks, is organized around shark fishing tournaments. All tournaments targeting Atlantic HMS (tunas, sharks, billfish, or swordfish) are required to register with NMFS. In 2017, 70 registered HMS tournaments listed pelagic sharks as possible target species, and 27 of those tournaments targeted sharks exclusively. Of the 27 tournaments that targeted sharks exclusively, 10 were held in New Jersey and 10 were held in New York with the remaining 7 divided between Rhode Island (2), Maine (1), Massachusetts (1), Connecticut (1), Maryland (1), and South Carolina (1).

### **8.4 Overview of the Pelagic Longline Fishery**

The Atlantic HMS pelagic longline fishery of the Atlantic and Gulf of Mexico extends from Maine to Texas, and includes Puerto Rico and the U.S. Virgin Islands. In order to fish with pelagic longline gear, vessels must possess an Atlantic Tunas Longline limited access permit, along with Shark (Directed or Incidental) and Swordfish (Directed or Incidental) limited access permits. Therefore, the number of participants in the Atlantic HMS pelagic longline fishery is determined from the number of Atlantic tunas Longline permits that are issued. According to the 2017 SAFE Report, the geographic extent of 280 Atlantic tunas Longline permit holders is large, but is concentrated in the waters off five states as of October 2017; Florida (42 percent), New Jersey (15 percent), Louisiana (13 percent), New York (6 percent), and North Carolina (6 percent). The U.S. pelagic longline fishery for Atlantic HMS primarily targets swordfish, yellowfin tuna, and bigeye tuna in various areas and seasons, and is generally considered a multi-species fishery. For a more detailed description of the pelagic longline fishery, please see Chapter 3.0.

Dealers that purchase sharks, which are occasionally targeted by the pelagic longline fishery, are also found throughout the range of where the fishery operates. According to the 2017 SAFE



Report, as of October 2017, the top four states with dealers who had Atlantic shark dealer permits, which consisted of 113 dealers, were Florida (27 percent), North Carolina (18 percent), New York (12 percent), and New Jersey (9 percent).

## **8.5 Summary of Fisheries Impacts**

The following provides a summary of impacts to participants in the recreational and pelagic longline fisheries and fishing dependent communities, including measures taken to minimize adverse social and economic effects and to provide for the sustained participation in these fisheries. Based on the foregoing assessment and referenced sections of this EIS, NMFS has determined that the action as proposed would have the following impacts on participants in affected fisheries.

### *Summary of Impacts*

Cumulative social and economic impacts to participants in the recreational fisheries and the commercial fisheries are expected to be minor adverse or neutral, as described in Chapter 4.0.

### *Minimization of Adverse Impacts*

Mitigation of adverse impacts was considered when selecting the preferred alternatives. Please see Chapters 4.0 for additional information on how preferred alternatives were selected to minimize social and economic impacts.

### *Effects on Domestic Fishermen*

Shortfin mako sharks are the most frequently targeted shark species among pelagic longline fishermen, but due to international management under ICCAT all nations that target North Atlantic shortfin mako sharks will be expected to institute similar measures in their respective fisheries. Thus, proposed management measures under Amendment 11 are not expected to have any additional impact on domestic fishermen in relation to foreign competitors.

### *Social Impact Assessment*

This amendment conforms to the following guidelines for social impact assessments (as outlined above):

- NMFS describes the demographic characteristics of the fishery-related work force residing in communities affected by fishery management in Chapter 6 of the 2011 and 2012 SAFE Reports (NMFS 2011; NMFS 2012). In particular, the demographic, income, and employment effects in relation to the work force as a whole by community and region are discussed in Chapter 6 of the SAFE Reports.
- The preferred alternatives are expected to have minor adverse or neutral cumulative socioeconomic impacts and, therefore, should not change the cultural issues of attitudes, beliefs, and values of fishermen, fishery-related workers, other stakeholders, and their communities.
- The preferred alternatives should not affect the social structure and organization, such as the ability to provide necessary social support and services for families and communities.

- The preferred alternatives should not affect the non-economic social aspects of the affected communities, such as lifestyle issues, health and safety issues, and the non-consumptive and recreational use of living marine resources and their habitats.
- The preferred alternatives should not affect the historical dependence on and participation in the commercial and recreational and pelagic longline fisheries by fishermen and communities, reflected in the structure of fishing practices, income distribution, and rights.

## 8.6 References

- Impact Assessment, Inc. 2004. Identifying Communities Associated with the Fishing Industry in Louisiana. La Jolla, California. (NOAA-NMFS-Contract WC133F-02-SE-0297).
- Jepson, Michael and Lisa L. Colburn 2013. Development of Social Indicators of Fishing Community Vulnerability and Resilience in the U.S. Southeast and Northeast Regions. U.S. Dept. of Commerce., NOAA Technical Memorandum NMFS-F/SPO-129, 64 p.
- Kirkley, J.E. 2005. The communities of the Atlantic Highly Migratory Species (HMS) Fishery: An overview of change associated with the HMS Fishery Management Plan. Department of Coastal and Ocean Policy, School of Marine Science, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, Virginia (NOAA-NMFS-HMS contract report).
- MRAG, Americas, Inc., and M. Jepson. 2008. Updated Profiles for HMS Dependent Fishing Communities: Social Impact Assessment Services for HMS Fishing Communities. Solicitation Number: DG133F06RQ0381, 84 pp.
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Wilson, D., B.J. McCay, D. Estler, M. Perez-Lugo, J. LaMargue, S. Seminski, and A. Tomczuk. 1998. Social and Cultural Impact Assessment of the Highly Migratory Species Fishery Management Plan and the Amendment to the Atlantic Billfish Fisheries Management Plan. The Ecopolicy Center for Agriculture, Environmental, and Resource Issues, New Jersey Agricultural Experiment Station, Cook College, Rutgers, the State University of New Jersey (NOAA-NMFS-HMS contract report).

## 9.0 Applicable Law

### 9.1 Magnuson-Stevens Fishery Conservation and Management Act

An FMP or FMP amendment along with any implementing regulations must be consistent with ten national standards contained in the Magnuson-Stevens Act (sec. 301). This section describes how the preferred alternatives for Amendment 11 are consistent with the National Standards (NS) and guidelines set forth in 50 CFR part 600. More information can be found in earlier chapters.

#### 9.1.1 Consistency with the National Standards

NS 1 requires NMFS to prevent overfishing while achieving, on a continuing basis, optimum yield from each fishery.

This amendment meets the obligations of National Standard 1 by adopting and implementing conservation and management measures that should address overfishing, while achieving, on a continuing basis, the optimum yield for shortfin mako sharks and the U.S. fishing industry. The measures were designed to proportionately reduce the U.S. contribution to fishing mortality on the North Atlantic shortfin mako shark stock, while avoiding regulatory dead discards in the commercial fishery and allowing limited landings in the commercial and recreational fisheries.

As summarized in other chapters, over the past several years, NMFS has undertaken numerous management actions, including the 2006 Consolidated HMS FMP (NMFS 2006), Amendment 2 to the 2006 Consolidated HMS FMP (NMFS 2008), Amendment 3 to the 2006 Consolidated HMS FMP (NMFS 2010), Amendment 5 and 5b to the 2006 Consolidated HMS FMP and Amendment 6 to the 2006 Consolidated HMS FMP (NMFS 2015), to address overfishing and to rebuild shark stocks. The preferred alternatives in this document build upon ongoing management efforts to rebuild, manage, and conserve target species in accordance with Magnuson-Stevens Act requirements and the NS1 guidelines.

- The preferred commercial alternative, Alternative A2, would only allow the commercial retention of shortfin mako sharks that were dead on haulback by vessels with an electronic monitoring system. This measure would reduce fishing mortality of shortfin mako sharks through the release of all live shortfin mako sharks, but still provide the opportunity for fishermen to harvest dead individuals. Allowing for the retention of dead individuals reduces regulatory discards, more fully meets optimum yield requirements, but does not adversely harm the conservation of the species.
- The recreational preferred alternatives, Alternatives B3 and B9, would, respectively, increase the recreational shortfin mako shark minimum size to 83" FL and geographically expand the recreational sharks circle hook requirement. Increasing the minimum size would reduce recreational landings of shortfin mako sharks and the use of circle hooks would increase post release survival. Both of these measures would reduce fishing mortality of shortfin mako sharks while not overly restricting fishermen's ability to fish for shortfin mako sharks or other species.

- Alternative C1, the monitoring preferred alternative, would not implement new reporting requirements but would collect shark catch data from all registered HMS tournaments. This measure would increase the amount of data available for effective, sustainable shortfin mako shark management.
- The rebuilding preferred alternative, Alternative D3, would continue the process of international cooperation, through ICCAT, to develop a rebuilding plan for shortfin mako sharks. Coordinated international management would ensure that conservation measures applied throughout the species' range and would more fully address overfishing.

NS 2 requires that conservation and management measures be based on the best scientific information available. The preferred alternatives in this document are consistent with NS 2.

- The preferred commercial, recreational, monitoring, and rebuilding alternatives are based on the latest ICCAT's SCRS stock assessment for shortfin mako sharks. Furthermore, the analyses for the preferred alternatives drew heavily from several up-to-date data sources including logbooks, observer reports, fishery-independent surveys, LPS estimates, electronic dealer reports, and recent scientific research. Results from the stock assessment and the other data sources represent the best available science.

NS 3 requires that, to the extent practicable, an individual stock of fish be managed as a unit throughout its range and interrelated stocks of fish be managed as a unit or in close coordination. The preferred alternatives in this document are consistent with NS 3.

- The preferred alternatives for the recreational and commercial fisheries apply to shortfin mako sharks across their range within the U.S. EEZ and in state waters as a condition of Federal HMS fishing permits, unless the state has more restrictive measures. Many of the preferred alternatives are designed to comply with ICCAT Recommendation 17-08, which coordinates management measures for shortfin mako sharks across all contracting parties and the entire range of the North Atlantic shortfin mako shark stock.

NS 4 requires that conservation and management measures do not discriminate between residents of different states. Furthermore, if it becomes necessary to allocate or assign fishing privileges among various U.S. fishermen, such allocation should be fair and equitable to all fishermen; be reasonably calculated to promote conservation; and should be carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges. The preferred alternatives in this document are consistent with NS 4.

- The preferred alternatives apply across the entire Atlantic, Gulf of Mexico, and Caribbean U.S. EEZ. Preferred Alternative B8 would expand the circle hook requirement in the recreational shark fishery to include anglers in all states and areas. Thus, the conservation and management measures do not discriminate between residents of different states, consistent with NS 4.

- The preferred alternatives do not allocate or assign fishing privileges.

NS 5 requires that conservation and management measures should, where practicable, consider efficiency in the utilization of fishery resources with the exception that no such measure shall have economic allocation as its sole purpose. The preferred alternatives in this document are consistent with NS 5.

- The conservation and management measures in the preferred alternatives were analyzed for changes in the efficiency of utilization of the fishery resource. Because the goal is to reduce fishing mortality of shortfin mako sharks, there would be some loss in efficiency in both the recreational and commercial fisheries. In the near-term, the most efficient use of the shortfin mako shark resource would be to retain and land every individual caught. However, doing so could lead to continued overfishing and further stock decline. Thus, the preferred alternatives require some portion of shortfin mako shark catch to be released. The preferred alternatives have been designed, though, to minimize the loss in efficiency by allowing retention at a level that is not detrimental to stock status. Preferred Alternative A2 would only allow the commercial retention of shortfin mako sharks that were dead on haulback by vessels with an electronic monitoring system. This measure would reduce landings for some commercial fishermen that catch shortfin mako sharks incidental to other fishing, however, it minimizes the impact by allowing retention of sharks that are already dead. The recreational Preferred Alternatives B3 and B9 would, respectively, increase the shortfin mako shark minimum size to 83" FL and geographically expand the circle hook requirement in recreational shark fisheries. While the use of circle hooks may result in lower catch of target species, the effect is expected to be minimal and recent research indicates that in many cases the switch to circle hooks does not affect catchability of sharks compared to J hooks. (It does, however, improve the survival rate of sharks that are released by decreasing gut hooking and attendant mortality.) The preferred monitoring and rebuilding alternatives, Alternatives C1 and D3 would not reduce efficiency in the utilization of the resource since these measures focus on reporting and rebuilding plans and do not, by themselves, affect catch or retention of shortfin mako sharks.

NS 6 states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches. The preferred alternatives in this document are consistent with NS 6.

- Each of the preferred alternatives would implement measures that consider the variations among, and contingencies in, fisheries, fishery resources, and catches. The preferred commercial alternative, A2, considers variations in catch by allowing the retention of shortfin mako sharks in some instances. Shortfin mako sharks are usually only caught incidentally and are rarely targeted, so allowing the retention of some incidentally caught shortfin mako sharks provides the opportunity for fishermen to adjust to variations in catch. Preferred Alternative B9 would geographically expand the circle hook requirement in the recreational shark fishery and since circle hooks

provide some protection for other species in addition to shortfin mako sharks, a wider variety of catch will be afforded additional protection.

NS 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication. The preferred alternatives in this document are consistent with NS 7.

- The preferred alternatives were chosen, in part, to minimize costs while meeting required conservation goals. The economic impacts section of the EIS provides detailed analyses of the costs associated with each alternative. The preferred alternatives were also structured to avoid unnecessary duplication by taking into account the range of alternatives as well as existing requirements on the relevant fisheries and existing measures in place for shortfin mako sharks.

NS 8 states that conservation and management measures shall, consistent with the conservation requirements of the Magnuson-Stevens 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 provide for the sustained participation of such communities, and to the extent practicable, minimize adverse economic impacts on such communities. The preferred alternatives in this document are consistent with NS 8.

- The preferred alternatives are necessary to address overfishing of shortfin mako sharks and to implement Recommendation 17-08 in compliance with ATCA. There are some minor adverse social and economic impacts associated with the preferred measures in the recreational and commercial fisheries. However, these measures would reduce fishing mortality as prescribed by the ICCAT's SCRS stock assessment. NMFS considered a range of alternatives with varying environmental, economic, and social impacts. The preferred alternatives would minimize, to the extent practicable, negative social and economic impacts. Please see Chapter 4 for additional information.

NS 9 states that conservation and management measures shall, to the extent practicable, minimize bycatch, and to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. The preferred alternatives in this document are consistent with NS 9.

- The preferred alternatives largely focus on reducing shortfin mako shark fishing mortality. The shortfin mako shark conservation and management measures, particularly Preferred Alternative B9, will further minimize bycatch. Preferred Alternative B9 would geographically expand the circle hook requirement in the recreational shark fishery and since circle hooks provide some protection for other species in addition to shortfin mako sharks, bycatch mortality of other species would be reduced.

NS 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea. The preferred alternatives in the document are consistent with NS 10.

- No impact to safety of life at sea is anticipated to result from these preferred alternatives. The preferred alternatives would not require fishermen to travel greater distances, fish in bad weather, or otherwise fish in an unsafe manner. Regarding the alternatives for a recreational minimum size for shortfin mako sharks, NMFS prefers Alternative B3 at this time in part because this alternative would help maximize safety and compliance among fishermen by not requiring fishermen to identify the sex of shortfin mako sharks at boatside.

### **9.1.2 Consideration of Section 304(g) measures**

Section 304(g) of the Magnuson-Stevens Act sets forth requirements specific to the preparation and implementation of an FMP or FMP amendment for HMS. See 16 U.S.C. 1854(g) for full text. The summary of the requirements of Section 304(g) and an explanation of how NMFS is consistent with these requirements are below. The impacts of the preferred alternatives and how it meets these requirements are described in more detail in Chapters 2.0 and 4.0 of the document.

- 1. Consult with and consider the views of affected Councils, Commissioners, and advisory groups*

On March 5, 2018, NMFS published a notice of intent (NOI) to prepare this EIS and conducted scoping on relevant issues (83 FR 9255). The comment period for scoping closed on May 7, 2018. Following scoping, this Draft Amendment is the next step in the FMP amendment process.

Written comments received on the issues and options paper and presentation during the scoping meetings and at HMS Advisory Panel meetings were considered at all stages when preparing this DEIS. During the public comment period, NMFS conducted four public hearings and one public webinar, consulted with the New England Fishery Management Council, the Gulf of Mexico Management Council, the South Atlantic Fishery Management Council, the Mid-Atlantic Fishery Management Council, and both the Atlantic and Gulf States Marine Fisheries Commissions.

- 2. Establish an advisory panel for each FMP*

As part of the 2006 Consolidated HMS FMP, NMFS combined the Atlantic Billfish and HMS APs into one panel. The combined HMS AP provides representation from the commercial and recreational fishing industry, academia, non-governmental organizations, state representatives, representatives from the Regional Fishery Management Councils, and the Atlantic and Gulf States Marine Fisheries Commissions. This amendment will not change the HMS AP, and discussed the relevant subjects at the March 2018 meeting, including extensive discussion of the preferred recreational and commercial alternatives.

- 3. Evaluate the likely effects, if any, of conservation and management measures on participants in the affected fisheries and minimize, to the extent practicable, any disadvantage to U. S. fishermen in relation to foreign competitors*



Throughout this document, NMFS has described the effects of the management measures and any impacts on U.S. fishermen. The preferred alternatives in this document are necessary to address shortfin mako shark overfishing and to comply with ATCA's requirement to implement ICCAT recommendations, which in the long-term are not expected to disadvantage U.S. fishermen in relation to foreign competitors.

4. *With respect to HMS for which the United States is authorized to harvest an allocation, quota, or fishing mortality level under a relevant international fishery agreement, provide fishing vessels with a reasonable opportunity to harvest such allocation, quota, or at such fishing mortality level*

In August 2017, ICCAT's SCRS conducted a new benchmark stock assessment on the North Atlantic shortfin mako stock. At its November 2017 annual meeting, ICCAT accepted this stock assessment and determined the stock to be overfished, with overfishing occurring. On December 13, 2017, based on this assessment, NMFS issued a status determination finding the stock to be overfished and experiencing overfishing using domestic criteria. The 2017 assessment estimated that total North Atlantic shortfin mako catches across all ICCAT parties are currently between 3,600 and 4,750 mt per year, and that total catches would have to be at 1,000 mt or below (72-79 percent reductions) to prevent further population declines and that catches of 500 t or less currently are expected to stop overfishing and begin to rebuild the stock. Based on this information, ICCAT adopted new management measures for Atlantic shortfin mako (Recommendation 17-08), which the United States must implement as necessary and appropriate under the ATCA. These measures largely focus on maximizing live releases of Atlantic shortfin mako sharks, allowing retention only in certain limited circumstances, increasing minimum size limits, and improving data collection in ICCAT fisheries.

5. *Review on a continuing basis, and revise as appropriate, the conservation and management measures included in the FMP*

NMFS continues to review the need for any revisions to the existing regulations for Atlantic HMS fisheries. Amendment 11 to the 2006 Consolidated HMS FMP is the culmination of one of those reviews.

6. *Diligently pursue, through international entities, comparable international fishery management measures with respect to HMS*

As detailed in item 4 above, this action is in direct response to an international fishery management recommendation (Recommendation 17-08) to ensure that shortfin mako shark overfishing is addressed across its entire range. NMFS will continue to work with ICCAT and other international entities such as the CITES to implement comparable international fishery management measures. To the extent that some of the management measures in this amendment are exportable, NMFS works to provide foreign nations with the techniques and scientific knowledge to implement similar management measures.

7. *Ensure that conservation and management measures under this subsection:*
  - a. *Promote international conservation of the affected fishery;*

- b. Take into consideration traditional fishing patterns of fishing vessels of the United States and the operating requirements of the fisheries;*
- c. Are fair and equitable in allocating fishing privileges among United States fishermen and do not have economic allocation as the sole purpose; and*
- d. Promote, to the extent practicable, implementation of scientific research programs that include the tagging and release of Atlantic HMS*

All of the objectives of the document indicate how NMFS promotes the international conservation of the affected fisheries in order to obtain optimum yield while maintaining traditional fisheries and fishing gear and minimizing economic impacts on U.S. fishermen. The preferred alternatives in this document are expected to meet these goals. More specifically:

- a. As detailed in item 4 above, this action is in direct response to an international fishery management recommendation (Recommendation 17-08) to ensure that shortfin mako shark overfishing is addressed across its entire range.
- b. The preferred alternatives explicitly take traditional fishing patterns into account when establishing commercial, recreational, monitoring, and rebuilding measures. The preferred alternatives would reduce fishing mortality of shortfin mako sharks while minimizing changes to fishermen's access to target species.
- c. The preferred alternatives do not allocate or assign fishing privileges.
- d. NMFS has a number of Atlantic HMS scientific research programs in place including tagging and release projects. The preferred alternatives would not directly implement or establish any new scientific programs, however, these actions would not impact existing programs either.

## **9.2 Paperwork Reduction Act**

There are no new collection of information requirements in the action pursuant to the Paperwork Reduction Act.

## **9.3 Coastal Zone Management Act**

NMFS has determined that this action is consistent to the maximum extent practicable with the enforceable policies of the approved coastal management program of each state along the Atlantic coast, Gulf of Mexico, and the Caribbean Sea. This determination will be submitted for review by the responsible state agencies under section 307 of the CZMA.

## **9.4 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.

Community profile information are available in the 2006 Consolidated HMS FMP (Chapter 9), a recent report 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), and in the 2015 HMS SAFE Report. The MRAG report updated community profiles presented in the 2006 Consolidated HMS FMP, and provided new social impacts assessments for HMS fishing communities along the Atlantic and Gulf of Mexico coasts. The 2011 and 2012 SAFE Reports (NMFS 2011 and NMFS 2012) include updated census data for all coastal Atlantic states, and some selected communities that are known centers of HMS fishing, processing or dealer activity. 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 alternatives were selected to minimize ecological and economic impacts and provide for the sustained participation of fishing communities. The preferred alternatives would not have any effects on human health nor are they expected to have any disproportionate social or economic effects on minority and low-income communities.

## **9.5 References**

- MRAG, Americas, Inc., and M. Jepson. 2008. Updated Profiles for HMS Dependent Fishing Communities: Social Impact Assessment Services for HMS Fishing Communities. Solicitation Number: DG133F06RQ0381, 84 pp.
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## 10.0 List of Preparers

The development of this rulemaking involved input from many people within NMFS, NMFS contractors, and input from public, constituent groups, and the HMS Advisory Panel. Staff and contractors from the HMS Management Division, in alphabetical order, who worked on this document include:

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## 10.1 List of Agencies, Organizations, and Persons Consulted

Under 304(g)(1)(A) of the Magnuson-Stevens Act, NMFS is required to consult and consider the comments and views of affected Fishery Management Councils, ICCAT Commissioners and advisory groups, and advisory panels established under 302(g) regarding amendments to an Atlantic HMS FMP. NMFS provided documents and consulted with the Atlantic, Gulf, and Caribbean Fishery Management Councils, Gulf and Atlantic States Marine Fisheries Commissions, and the HMS Advisory Panel at various stages throughout the process. Hard copies were also provided to anyone who requested copies.

The development of this document also involved considerable input from other staff members and Offices throughout NOAA including, but not limited to:

- Other Divisions within the Office of Sustainable Fisheries (Alan Risenhoover, Jenni Wallace, Kelly Denit);
- The Southeast Fisheries Science Center (Dr. Enric Cortés and Dr. Guillermo Diaz);
- The Northeast Fisheries Science Center (Dr. Lisa Natanson);
- NOAA General Counsel (Caroline Park, Loren Remsberg, and Megan Walline); and,
- NMFS NEPA (Steve Leathery and Cristi Reid).

Comments on the proposed rule and the draft amendment/Environmental Impact Statement will be accepted for at least 60 days from the date of publication of the proposed rule in the Federal Register. An HMS Advisory Panel meeting and numerous public hearings will be held along the Atlantic Coast, including the Caribbean, and the Gulf of Mexico. Additionally, NMFS will request the opportunity to present the proposed rule and Draft Amendment 11 to the 2006 Consolidated HMS FMP to the five Atlantic and Gulf Regional Fishery Management Councils and two Interstate Marine Fisheries Commissions.

The Federal Register notice and the EIS, and any necessary addenda will also be made available to the public via the HMS webpage.

## Appendix 1. Comments Received During Scoping Phase

This section provides a summary of the comments received during scoping. The written comments received can all be found at <https://www.regulations.gov/docket?D=NOAA-NMFS-2018-0011>.

### Overall Comments on This Rulemaking

- Any action will take another species was being taken away from fishermen.
- The United States only accounts for 11 percent of the total shortfin mako shark mortality and so any domestic catch reductions would have little impact on the stock.
- ICCAT should have implemented different recommendations or regulations based on the overall shortfin mako shark catches.
- Numerous commenters stated that the stock assessment is not accurate. Some felt that sharks were more abundant now. Others stated that the SCRS assessment contains a lot of uncertainty especially in reported shortfin mako shark catch by other member countries. Another commenter states that since there is so much uncertainty in the assessment, and the U.S. catch is such a small portion of total catch, a more measured approach should be taken
- NMFS should consider a sunset clause in these regulations if the domestic reduction in commercial or recreational catch exceed the estimates reduction needed to rebuild the stock.
- NMFS should make the emergency measures permanent and create a rebuilding plan immediately since shortfin mako sharks are a valuable species commercially and recreationally and ending overfishing is important.
- U.S. shortfin mako shark fishermen should not be so heavily punished; any regulations should be implemented slowly.
- Most of the impact to the stock is coming from European Union countries; NMFS should proceed with caution and not implement dramatic measures that are not necessary at this time.
- NMFS should wait until ICCAT finalizes action before implementing measures.
- Pelagic longline target catch per unit effort has gone down since Amendment 7, but shortfin mako shark catch per unit effort has stayed the same even though vessels are now fishing in deeper waters and they are seeing more shortfin mako sharks.
- NMFS should do research to see if there is different genetic subpopulations since tracking data seems to suggest that there is a resident population in the Gulf that travel to the Caribbean for spawning and do not appear to go into other parts of the Atlantic Ocean.
- Some commenters questioned what conversion factor other countries using since that could affect reported catch weight.
- NMFS must prohibit the retention of all shortfin mako sharks to comply with NS1 to prevent overfishing immediately.

- To comply with NS2, NMFS must prohibit the retention of shortfin mako sharks. NS2 requires the use of the best scientific information available. The SCRS report is the best scientific information available and the report states that banning the retention of shortfin mako sharks would increase the odds of immediately ending overfishing and rebuilding the stock.
- A retention prohibition would have very minor economics impacts on commercial and recreational fishermen.
- The size and numbers of shortfin mako sharks caught have been decreasing over the past 40 years.
- One commenter requested clarification on the data used in the assessment and for management including: how NMFS determined the whole weight to dressed weight conversion for shortfin mako sharks; where international recreational landings data comes from; average weights in the commercial and recreational fisheries.
- NMFS needs to consider shortfin mako shark fishing mortality from all fisheries, including those fisheries outside the jurisdiction of the HMS Management Division. NMFS must then set a mortality limit across all fisheries, track it, and then stop the mortality when limits are reached.
- Amendment 11 should include a review of shortfin mako EFH. NMFS must designate EFH then minimize the effect of fishing of EFH.
- NEPA requires NMFS to examine a full range of possible management alternatives; Amendment 11 must comply with this requirement.
- The Magnuson-Stevens Act requires NMFS to implement ACLs and AMs shortfin mako sharks under NS1 and to minimize bycatch of the species under NS9.

### **Comments Regarding Commercial Options**

- NMFS should implement a separate shortfin mako shark commercial quota.
- NMFS should not implement a separate shortfin mako shark commercial quota. Because ICCAT rejected the option to implement an Atlantic-wide TAC and allocations, NMFS should not implement a domestic quota.
- NMFS should allow commercial fishermen to retain dead shortfin mako sharks since discarding would not support conservation of the species.
- NMFS should allow the retention of dead shortfin mako sharks when cameras or observers are on board to verify the disposition of the shark
- Allowing the retention of dead shortfin mako sharks provides incentive for poor handling practices (e.g. leaving shortfin mako sharks on the fishing line too long) to ensure they are dead at haulback. It would also remove any incentive to fish in areas of high shortfin mako shark abundance
- Why should commercial fisherman using gear other than pelagic longline gear release a mako shark even if it is dead?
- Electronic monitoring should not be used for shortfin mako sharks because fishermen were told electronic monitoring was only going to be used for only bluefin tuna during Amendment 7. Using it for shortfin mako sharks will open the door for other species and have negative impacts on the fleet.



- Commercial fishing for shortfin mako sharks should be stopped since there is little commercial value and the population is so tiny; allowing retention of dead fish only encourages longer soak times
- Shortfin mako sharks are more valuable in the summer at approximately \$3/lb. In fall and winter, fishermen get \$1.50/lb.
- Sharks larger than 150 lb should be released because they are not good to eat.
- NMFS should have a directed fishery in April where fishermen could retain 10-16 shortfin mako sharks.
- NMFS or ICCAT should establish a 10-year ban on the sale of shortfin mako sharks, and compensate commercial fishermen for any losses.
- NMFS should expand application of electronic monitoring for enforcing dead shortfin mako shark retention without reducing total catch;
- NMFS should consider a maximum gangion test strength that would break with larger sharks.
- NMFS should establish a maximum number of shortfin mako sharks annually, such as 20, for each commercial vessel.

### **Comments Regarding Recreational Options**

- NMFS should implement a recreational minimum size limit of greater than 83 inches FL due to the size of maturity of female sharks.
- NMFS should implement a 1 or 2 shark per season limit per vessel with a 54" FL size limit.
- The typical recreation fisherman do not see any mako sharks as large as 83" FL.
- NMFS should ban the tournaments instead of increasing the size limit for typical recreational fishermen.
- The 83" FL minimum size will be dangerous for sharks and anglers and may cause many shortfin mako sharks to be released dead. A more reasonable approach would be to establish a size limit of 72" FL or established a retention limit of 1 or 2 shortfin mako sharks per person per season.
- NMFS should require catch-and-release for shortfin mako sharks in the recreational fishery.
- The 83" FL minimum size for shortfin mako sharks will hurt fishermen and not rebuild the stock quickly. Larger shortfin mako sharks almost always live with the highest survival rate and the perfect market size mako is 60"-72" FL. For this reason, NMFS should implement a slot limit.
- Changes in bait pattern migration mainly with bluefish also effect migration and patterns of shortfin mako sharks. Water temperatures also affect distribution.
- NMFS should expand the geographical range of the circle hook requirement in the recreational shark fishery.
- NMFS should not require circle hooks north of Chatham, MA since the scientific data is lacking associated with the recreational use of circle hooks, and the subsequent impact on shortfin mako release mortality.

- A minimum size of 72" FL is more reasonable than an 83" FL since allowing the fish to grow to 72" FL provides enough time for the sharks to breed.
- Measuring a shark over 83" FL is harmful to the shark and to the crew.
- If NMFS implements such a large minimum size requirement, many fishermen are likely to stay inshore and target thresher sharks or completely change gears and go offshore tuna fishing which puts pressure on other recovering species.
- NMFS should implement a recreational landings tag program for shortfin mako sharks where HMS anglers are issued a certain number of tags that must be attached to retained shortfin mako sharks. The number of tags would cap total recreational landings. NMFS could start with 1 tag per day for sharks over 83" FL and 2 tags per season for sharks between 71-83" FL.
- Tournaments have already been cancelled due to the large increase.
- NMFS should require mandatory reporting of shortfin mako sharks caught in the recreational fishery or tournaments.
- NMFS should consider larger size limits for females based on size of 50 percent size at maturity.
- NMFS should and NMFS should not implement different male/female minimum sizes.
- NMFS should implement a slot size limit for a recreational male only fishery
- The large size limit for females will have a larger impact on the recreational fishery than Agency estimated.
- How will NMFS enforce the larger recreational size limit?
- NMFS should consider gear changes to reduce post-release mortality such as line strength.
- NMFS needs to do a study on circle hooks before requiring them for shortfin mako sharks.
- NMFS should consider implementing seasons in the recreational shortfin mako shark fishery. One example could be: a tournament season from May 15 to August 31 with a 71" FL minimum size and a non-tournament season from May 1 to October 31 with a 71" FL minimum size for male sharks and an 83" FL minimum size for female shortfin mako sharks.
- Larger shortfin mako sharks are undesirable because the meat does not taste as good.
- NMFS should consider a male-only recreational fishery with a 71" FL minimum size. This commenter felt that fishermen can be easily trained to differentiate males from females, and a male-only approach would protect the big mature females who have a large contribution to rebuilding. With the 83" minimum size, NMFS is forcing the fishery to target the big spawners.
- The economic impact to the recreational sector would be larger than NOAA Fisheries states.
- New circle hook requirement south of Chatham, MA has already protected a certain number of mako sharks that were accounted for in the analyses.

### **Comments Regarding Monitoring Options**

- NMFS should require more reporting of shortfin mako sharks.

- NMFS should not require more reporting for commercial fishermen since commercial fishermen already have electronic monitoring coverage, can carry an observer, report in logbooks, and land to authorized dealers.
- NMFS should require mandatory reporting in tournaments, but need to include other data to report like sex, length, weight, girth, and depth of landings.
- NMFS should increase reporting of all recreational landings and discards, either as a voluntary measure or as a mandatory measure.
- NMFS should require 100 percent shortfin mako shark catch reporting across all fisheries that interact with the species.

### **Comments Regarding Rebuilding Options**

- NMFS should work internationally on a rebuilding plan.
- NMFS should pursue a domestic rebuilding plan at the same time as working on an international rebuilding plan.
- NMFS should and should not take unilateral action to rebuild the stock
- Any long-term rebuilding plan should consider the species biology and life history.

### **Comments Outside the Scope of This Rulemaking**

- Fishermen should be able to fin small coastal sharks at sea, and discard the fins. The fins of those species are worthless and just cause more work for the fishermen.
- State fin bans are inconsistent with MSA and National Standards.
- The 25 percent rule for smoothhound sharks is ridiculous.

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