

Issues and Options for

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

March 2018

Highly Migratory Species Management Division
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1 Introduction

The National Marine Fisheries Service (NMFS) intends to amend the 2006 Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan (FMP) (Consolidated HMS FMP) to address overfishing of the North Atlantic shortfin mako shark. This document examines potential management options to address overfishing of and begin rebuilding the North Atlantic shortfin mako stock and also requests additional information and input from consulting parties and the public prior to development of a formal Draft Environmental Impact Statement (DEIS) and proposed rule. The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires NMFS to “consult with and consider the comments and views of affected Councils, commissions and advisory groups appointed under Acts implementing relevant international fishery agreements pertaining to highly migratory species, and the [HMS] advisory panel in preparing and implementing any fishery management plan or amendment.” Therefore, we are starting our scoping stage and requesting comments and views on this Issues and Options document for Amendment 11 to the 2006 Consolidated Atlantic HMS FMP by May 7, 2018. An electronic version of this document is available on the HMS Management Division website at: <https://www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species>.

In August 2017, the International Commission for the Conservation of Atlantic Tunas (ICCAT) 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, which indicated that the stock was overfished with overfishing occurring. On December 13, 2017, based on the results of this assessment, NMFS also determined the stock to be overfished with overfishing occurring. Based on the stock assessment, ICCAT adopted new management measures for shortfin mako (Recommendation 17-08), which the United States must implement as necessary and appropriate under the Atlantic Tunas Convention Act (ATCA). NMFS initially implemented these measures through an interim final rule using emergency Magnuson-Stevens Act authority to temporarily and immediately implement commercial and recreational measures. In 2018, ICCAT will review the catches from the first six months of 2018 and decide whether the measures contained in Recommendation 17-08 should be modified. Without implementing the interim final rule, the reported U.S. catch data for the first half of 2018 would reflect catches under the existing management practices, and thus not reflect the true potential of the new measures at addressing overfishing. Any resulting action by ICCAT based on such incomplete information could disadvantage U.S. fishermen. For more details on the stock assessment and recommendation, please refer to the ICCAT website at <http://www.iccat.int/>.

NMFS is developing Amendment 11 to the 2006 Consolidated Atlantic HMS FMP (Amendment 11) in response to the ICCAT Recommendation and the stock status determination. NMFS anticipates that the proposed rule and DEIS will be available in mid-2018 and the Final Amendment 11 and its related documents will be available in Spring 2019. NMFS requests receipt of any comments on this scoping document by May 7, 2018.

Any written comments on this document should be submitted to Guý DuBeck, HMS Management Division, F/SF1, Office of Sustainable Fisheries, 1315 East West Highway, Silver Spring, MD 20910 or via the Federal e-Rulemaking Portal

(www.regulations.gov/#!docketDetail;D=NOAA-NMFS-2018-0011) by May 7, 2018. For further information, contact Guý DuBeck or Karyl Brewster-Geisz at (301) 427-8503.

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

NMFS specifically solicits opinions and advice on the potential range of options and whether there are additional options that should be addressed and considered in the rulemaking process. Additionally, NMFS solicits opinions and advice on the impacts described for each option.

1.1 Management History

Atlantic HMS fisheries are managed under the dual authority of the Magnuson-Stevens Act and ATCA. HMS fisheries require management at the international, national, and state levels because of the highly migratory nature of the species. 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 HMS 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 laws prevail. Additionally, in 2005, the Atlantic States Marine Fisheries Commission (ASMFC) agreed to develop an interstate coastal shark FMP. This interstate FMP coordinates management measures among all states along the Atlantic coast (Florida to Maine). NMFS participated in the development of this interstate shark FMP, which went into effect in 2010.

On the international level, NMFS participates in the stock assessments conducted by the SCRS and in the annual ICCAT meetings. NMFS implements conservation and management measures adopted through ICCAT and through other relevant international agreements, consistent with specific domestic implementing legislation. ICCAT has assessed the Atlantic blue and the 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 manages sharks domestically through the 2006 Consolidated HMS FMP and its amendments, along with other Atlantic HMS. For more information on the complete HMS management history as it relates to sharks, please refer to the 2006 Consolidated HMS FMP and Amendments 2, 3, 5a, 5b, 6, 9, and 10, which address shark conservation and management. Relevant proposed rules, final rules, and other official notices, along with 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.

1.2 Shortfin Mako Shark Stock Assessment

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. The shortfin mako ICCAT SCRS report from 2017 can be found at 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, 40 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 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).

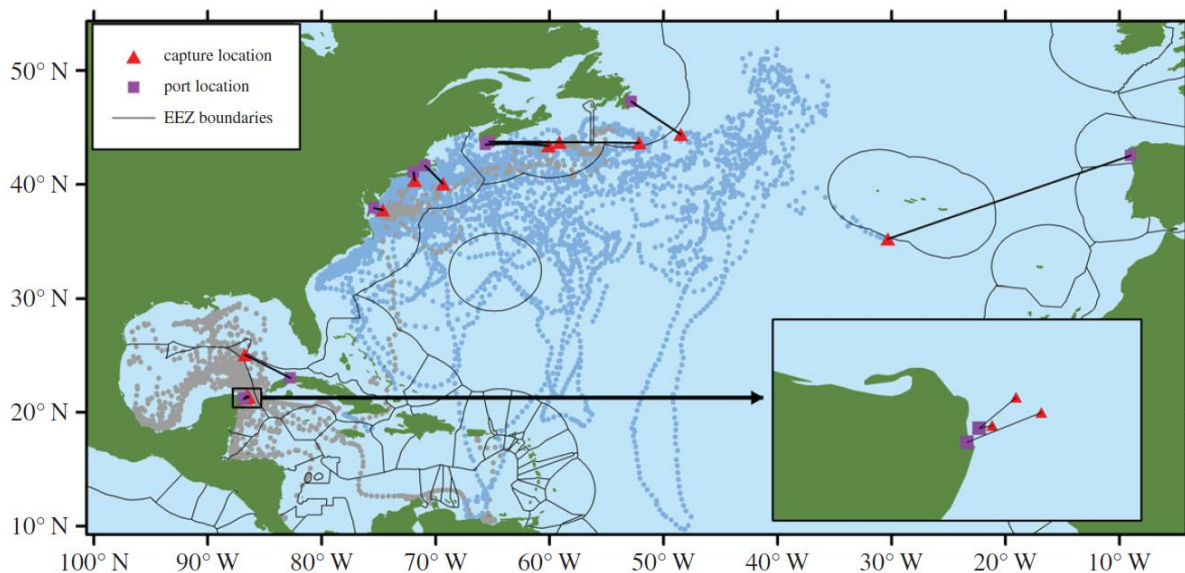


Figure 1. Tracks (dots) and capture locations (triangles) of 40 satellite tagged shortfin mako sharks from Byrne et al. (2017).

In November 2017 at its annual meeting, ICCAT accepted this stock assessment and its results, which determined that the stock was overfished with overfishing occurring applying

ICCAT criteria. 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 2).

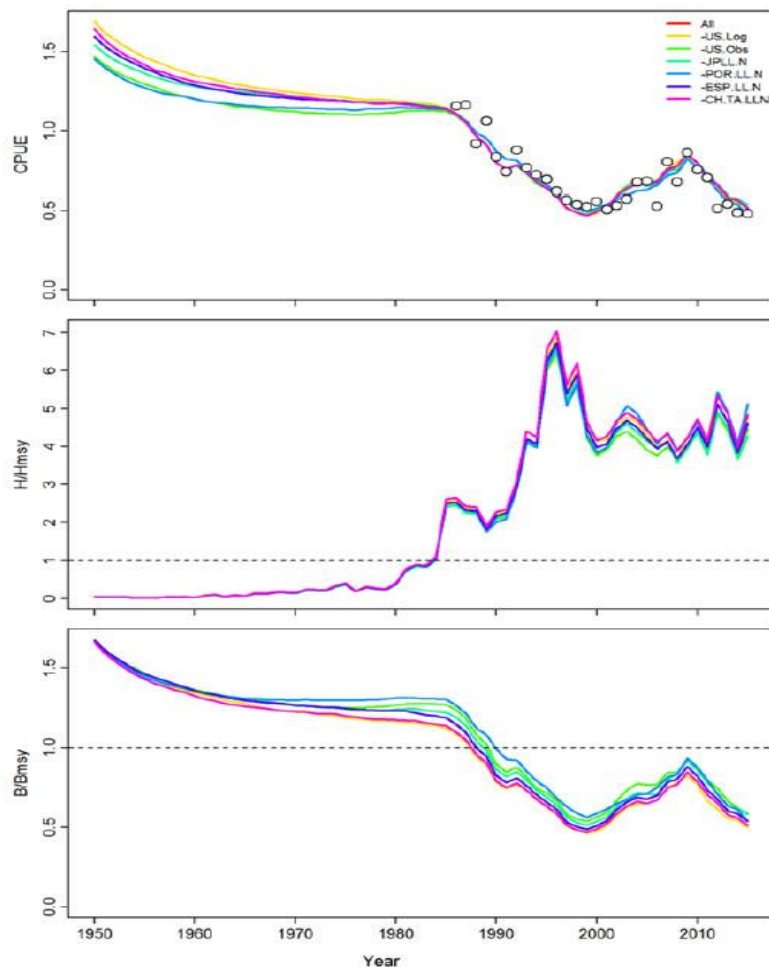


Figure 2. Trends in North Atlantic shortfin mako shark CPUE, F/F_{MSY} , and B/B_{MSY} using the C1 catch scenario used in the 2017 stock assessment. Circles denote US pelagic longline CPUE.

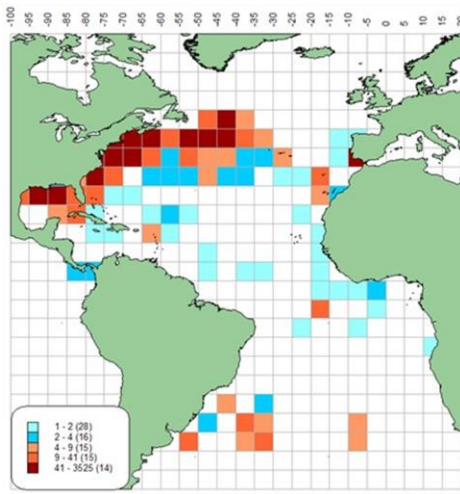
The 2017 assessment estimated that total North Atlantic shortfin mako shark catches across all nations are currently between 3,600 and 4,750 mt per year and that total catches would have to be reduced below 1,000 mt (72-79 percent reductions) to prevent further population declines. The projections indicate 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. Research indicates that post-release survival rates of shortfin

mako sharks are high (70 percent); however, the assessment could not determine if requiring live releases alone would reduce landings sufficiently to end overfishing and rebuild the stock.

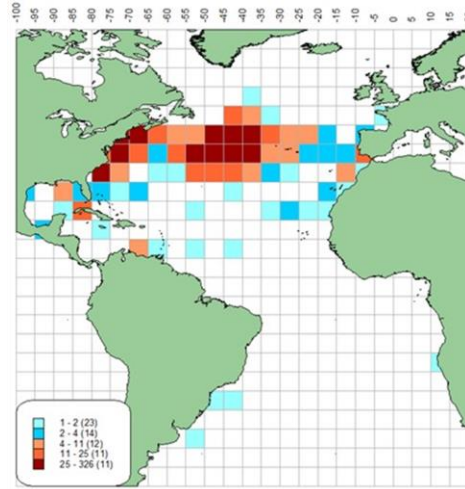
1.3 Biological Information

The shortfin mako shark is an oceanic species found in warm to warm-temperate waters throughout all oceans. Mark-recapture information from the NMFS Apex Predator Program is shown in Figure 3. Northwest Atlantic tagging data for immature sharks presented at the 2017 ICCAT shortfin mako stock assessment meeting indicated distinct core use areas in the Mid-Atlantic Bight and off the western edge of the Yucatan Channel (Mexico). Vaudo et al. (2017) also noted spatial segregation between 12 sharks tagged in the Gulf of Mexico/Caribbean and 14 sharks tagged in the northwest Atlantic. Sharks tagged off the Yucatan Peninsula traveled considerably less distance by several orders of magnitude, than sharks tagged in the Mid-Atlantic Bight. Seasonal distribution was observed in the latter, with several individuals observed making round-trips between the Sargasso Sea and northern habitats between the Mid-Atlantic Bight and the Grand Banks. Many of the sharks tagged off Mexico remained along the eastern edge of Campeche Bank, Mexico for several consecutive months (i.e., no seasonal patterns were observed in the data). Similar results are presented in Byrne et al. (2017), which analyzed data collected on 46 sharks over a three-year time span to evaluate fishery interactions and mortality. Vaudo et al. (2017) hypothesized that behavioral differences were linked to resource utilization; the unique oceanography off the Yucatan Peninsula may have created an environment that concentrated prey resources, whereas in the northwest Atlantic shortfin mako sharks may have moved in response to large-scale climactic and oceanographic forces that affected prey distribution. Shortfin mako sharks feed 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 diet switch from cephalopod to bluefish in the spring.

a)



b)



c)

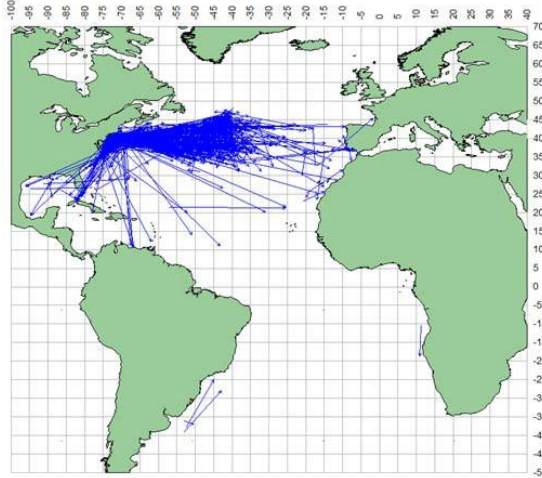


Figure 3. NMFS Apex Predator Program tag and release distributions for shortfin mako in the Atlantic Ocean (a = Density of releases, b = Density of recoveries, c = Straight displacement between release and recovery locations). Source: SCRS 2012.

Considerable variation exists in the descriptions of reproductive life history for shortfin mako sharks. For example, reported age and length at maturity varies by region (ICCAT 2006-2016), and it has been noted that males have double the growth rate of females in the North Atlantic. Cailliet and Mollet (1997) estimated that a female mako shark matures at four to six years, has a two-year reproductive cycle, and a gestation period of approximately 12 months. According to Pratt and Casey (1983), females mature at about 7 years of age; however, Campana et al. (2002) used radiocarbon assays and found that the estimate may have been incorrect. Bishop et al. (2006) considered Campana et al. (2002) when estimating median age at maturity in New Zealand waters to be 19 to 21 years for females and 7 to 9 years for males. In Maia et al.

(2007b), 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 was not estimated because female sharks from 210-290 cm FL were not sampled, although this appears to be the interval where maturation occurs. Cailliet et al. (1983) estimated the von Bertalanffy parameters ($n = 44$) for the shortfin mako shark as: $L = 3210$ mm, $K = .072$, and $t_0 = -3.75$.

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. Semba et al. (2011) estimated gestation period being between 9 and 13 months, with fecundity increasing as the female grows. North Atlantic shortfin mako shark populations have higher productivity than South Atlantic shortfin mako shark populations (SCRS 2017).

Based on cohort analysis of shortfin mako sharks 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., 2007b). 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 was in accordance with previous studies that reported male and female mako sharks grew at the same rate until they reached about 200 cm FL (Casey and Kohler, 1992; Campana et al. 2005). Bishop et al. (2006) described rapid initial growth rates to approx. 39 cm fork length in the first year. Thereafter, males and females grew at similar, but slower rates until about age 7 years, after which the relative growth of males declined. Life span estimates are varied; published maximum ages for females are 11.5 years (Pratt and Casey 1983), 25 years (Cailliet and Mollet 1997), and 29 years (Bishop et al. 2006), and 28 years for males (Bishop et al. 2006).

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, nor of any past genetic isolation among shortfin mako shark populations. Very weak evidence of population structure throughout the Atlantic and Pacific Oceans was found in microsatellite analysis by Schrey and Hiest (2003). The authors indicated that integrating the results from microsatellite- and mitochondrial-based studies may provide evidence for gender-biased dispersal for the shortfin mako. The significant genetic structure detected in mtDNA data indicated that female shortfin mako sharks may exhibit philopatry for parturition sites, and thus reproductive stocks of mako sharks may exist in the presence of considerable male-mediated gene flow. Pregnant shortfin mako sharks have only been captured between 20° and 30° N or S lat. (Gilmore 1993); however, there is no information about the area where mating occurs.

1.3.1 Shortfin Mako 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. Shortfin mako EFH was identified following the methods described in Amendment 10 to the 2006 Consolidated HMS FMP (NMFS 2017). Size breaks used to distinguish different life stages of pelagic sharks, including shortfin mako, are shown in Table 1.

Table 1. Size class information for Atlantic HMS pelagic sharks used in EFH analyses. Source: NMFS 2017.

Pelagic Sharks	Young-of-the-year FL (cm) ≤	Juveniles FL (cm) =	Adults F 50% mat or max range at 1st maturity FL (cm) ≥	Young-of-the- year size range FL (cm) =	Embryo size range or maximum embryo size in term females FL (cm) =	Length at 1st maturity or range at 50% maturity FL (cm) =	References
Bigeye Thresher <i>Alopias superciliosus</i>			216			209-216	Stillwell & Casey (1976), Moreno & Moron (1992)
Blue <i>Prionace glauca</i>	76	77-184	185	30-76	46.61	185	Stevens (1975), Silva (1996), Skomal & Natanson (2003), Pratt (1979)
Common Thresher <i>Alopias vulpinus</i>	111	112-212	213		94	213	Moreno <i>et al.</i> (1989), Gervelis (2005)
Longfin Mako <i>Isurus paucus</i>			225			225	Guitart-Manday (1966)
Oceanic Whitetip <i>Carcharhinus longimanus</i>	68	69-179	180	42-68	55	180	Leesa <i>et al.</i> (1999), Seki <i>et al.</i> (1998), ICCAT (2014)^
Porbeagle <i>Lamna nasus</i>	105	106-196	197	57-105	66	197	Jensen <i>et al.</i> (2002), Natanson <i>et al.</i> (2002)
Shortfin Mako <i>Isurus oxyrinchus</i>	128	129-274	275	64-128	70	275	Duffy & Francis (2001), Natanson <i>et al.</i> (2006), ICCAT (2014)^

^ICCAT manual, with notations on life history parameters.

https://www.iccat.int/Documents/SCRS/Manual/Appendices/Appendix%204%20III_SHK.pdf

A map depicting the boundaries of shortfin mako shark EFH is shown in Figure 4. At this time, available information is insufficient for the identification of EFH by life stage, therefore all life stages are combined in the EFH designation. EFH in the Atlantic Ocean includes pelagic habitats seaward of the continental shelf break between the seaward extent of the U.S. EEZ boundary and Georges Bank (off Massachusetts) to Cape Cod (seaward of the 200 m bathymetric line); coastal and offshore habitats between Cape Cod and Cape Lookout, North Carolina; and localized habitats off South Carolina and Georgia. 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. For more information, please refer to Final Amendment 10 at <http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/am10/index.html>.

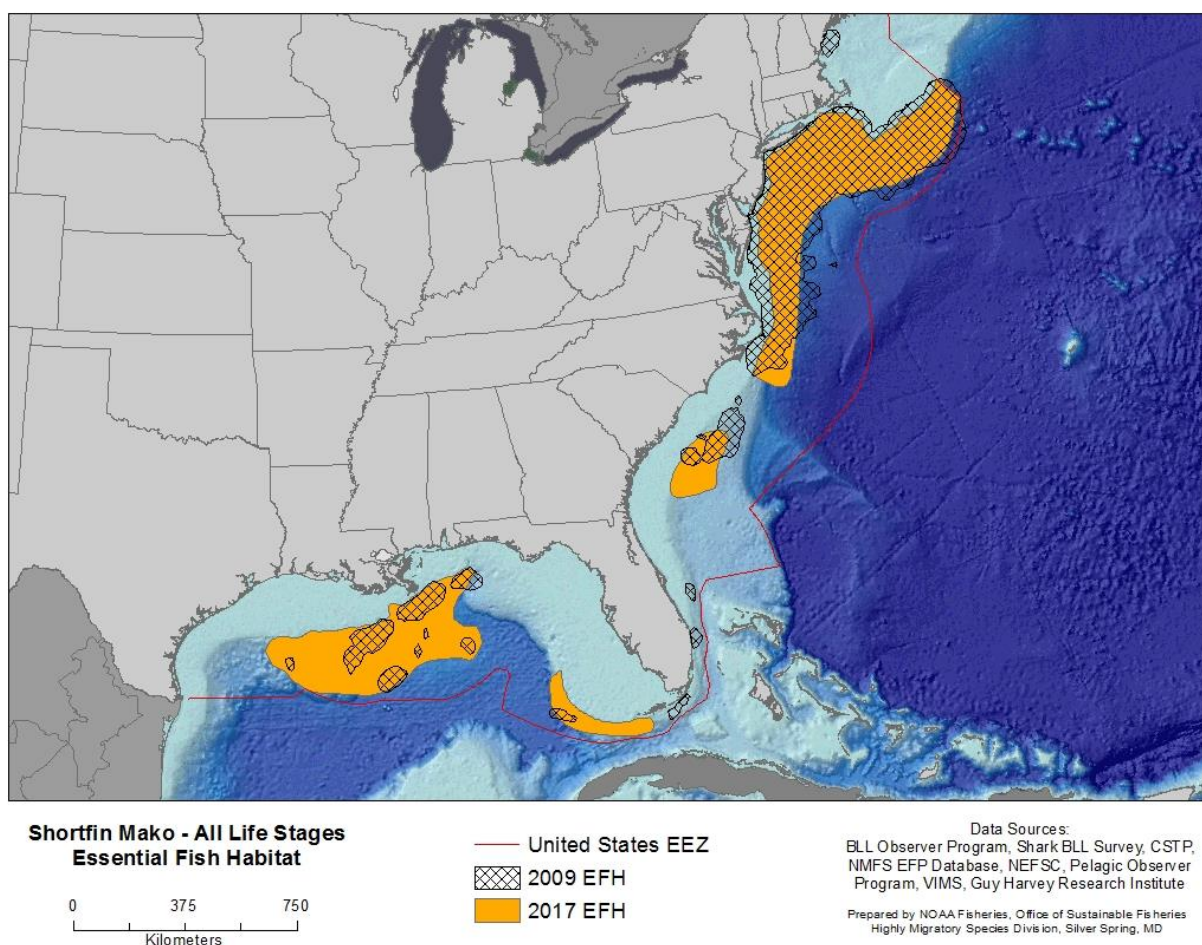


Figure 4. EFH of shortfin mako sharks (all life stages combined). Note: Neonate/YOY (≤ 128 cm FL), Juvenile (129 to 274 cm FL), and Adult (≥ 275 cm FL)

1.4 ICCAT Recommendation 17-08

In November 2017, as a result of the most recent stock assessment, ICCAT adopted Recommendation 17-08 requiring new commercial and recreational management measures for shortfin mako sharks, which the United States must implement under the Atlantic Tunas Convention Act. The recommendation requires the release of all shortfin mako sharks in a manner that causes the least harm, while giving due consideration to the safety of crew members. Under the commercial measures, fishermen using pelagic longline gear must release all live shortfin mako sharks and can retain a shortfin mako shark only if it is dead at haulback and either an observer or functioning electronic monitoring system are on board. Under the recreational measures, fishermen that hold an HMS Angling or HMS Charter/Headboat permit, and fishermen that hold Atlantic Tunas General category and/or Swordfish General Commercial permits when participating in a registered HMS tournament, and who choose to land a shortfin mako shark can only land – at a minimum – males at least 71 inches (180 cm) FL and females at least 83 inches (210 cm) FL. For more details on the recommendation, please refer to the ICCAT website at <http://www.iccat.int/>.

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 the North Atlantic shortfin mako shark stock. This action is consistent with ICCAT Recommendation 17-08, and U.S. 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. 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. 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 is developing an amendment to the 2006 Consolidated Atlantic HMS Fishery Management Plan 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. This Issues and Options paper is part of the scoping process for that FMP amendment and associated rulemaking.

The goal of this issues and options document is to examine potential management options to address overfishing of and take steps toward 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.

Objectives: 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 towards rebuilding the shortfin mako shark stock.

2 Range of Potential Options

In this chapter, NMFS examines an initial range of options to meet the objectives of the rule and NEPA requirements and invites comment these options and on whether additional options should be examined. This chapter is organized by the following sections: commercial, recreational, recreational monitoring, and rebuilding program.

2.1 Commercial Options

NMFS is considering a variety of commercial options, some of which are from ICCAT Recommendation 17-08 and the interim final rule, and some that end overfishing and/or rebuilding, but are not specifically included in the ICCAT Recommendation. These options include 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.

Option 1 – No Action. Keep current regulations for shortfin mako sharks.

Under Option 1, NMFS would not implement any new management measures in commercial HMS fisheries. 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. 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 2).

Table 2. Average shortfin mako shark ex-vessel prices, and overall percentage of total shark ex-vessel revenue, 2013-2016. 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		

Pros

- Would have no negative economic impacts in the short-term on U.S. commercial fishermen since no fishing restrictions would be implemented.
- HMS commercial fishermen would continue to be able to harvest shortfin mako sharks under the current regulations.

Cons

- Overfishing of shortfin mako sharks would continue and further reduce the stock size, complicating rebuilding efforts. 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.
- This option would not implement ICCAT 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 ICCAT 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.
- Would 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.

Option 2 – Require live release of shortfin mako sharks in the commercial pelagic longline fishery

Under Option 2, fishermen using pelagic longline gear would be required to release all live shortfin mako sharks with a minimum of harm, while giving due consideration to the safety of crew members. This option would be consistent with ICCAT Recommendation 17-08. This option would reduce the number of landings by pelagic longline vessels on average by 74 percent based on observer data from 2013-2016 (Table 3). However, this option 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 4). This option would require those fishermen to release all shortfin mako sharks that are brought to the vessel alive. There could be greater 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 5). However, 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 2).

Table 3. Disposition of shortfin mako shark interactions with pelagic longline gear, 2013-2016. Source: Atlantic Pelagic Observer Program

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	344	70.3%	43.4%
2015	128	27	212	59	444	76.6%	37.6%
2016	87	30	480	211	808	70.2%	15.3%
AVG	131	35	240	96	502	74.0%	35.3%

Table 4. 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 5. Top 10 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 Islnd	SC	20,979	2.3%

Pros

- Would have ecological benefits since it is expected to result in live release and reducing shortfin mako shark fishing mortality.
- Would assist with the rebuilding of the stock since the U.S. would be implementing part of the ICCAT Recommendation under this option.
- Would be consistent 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.

Cons

- Would have some negative socioeconomic impacts on fishermen since they would have to release all live shortfin mako sharks, reducing efficiency, landings, and potential economic benefits, although shortfin mako sharks are not significant source of revenue.

Option 3 – Allow retention of a shortfin mako shark by persons with a Directed or Incidental shark LAP only if the shark is dead at haulback, caught incidentally with pelagic longline gear during fishing for other species, and there is a functional electronic monitoring system on board the vessel

Option 3 would allow retention of a shortfin mako shark only if it is dead at haulback by a vessel with a Directed or Incidental shark LAP, if it is caught incidentally during fishing for other species using pelagic longline gear, and a functional electronic monitoring system onboard the vessel. In the commercial fishery, the vast majority of shortfin mako sharks are rarely targeted. Rather, these sharks are caught incidentally on pelagic longline sets that are targeting tunas and swordfish. Under the current HMS regulations, all HMS permitted pelagic longline vessels are already required to have an electronic monitoring system on board the vessel (79 FR 71510; December 2, 2014) and either a Directed or Incidental shark LAP. Commercial vessels

with other gear types, such as bottom longline or gillnet vessels, could not land dead shortfin mako sharks under this option.

Based on HMS logbook data, 85 percent of shortfin mako sharks caught are kept and landed by fishermen across all gear types, while 14 percent are discarded alive and 1 percent are discarded dead (Table 4). Based on Pelagic Observer Program data, over 70 percent of the shortfin mako sharks are alive upon capture on pelagic longline vessels (Table 6). Therefore, this option would require those individuals to release the majority of the shortfin mako sharks caught and only a small portion of shortfin mako sharks would be retained (those that are dead at haulback and of legal size). Survival rates are expected to be high for released sharks.

Table 6. Summary of all available observed shortfin mako shark interactions by data source, 2012-2016.

Year	Data Source	Number of Vessels Observed with Shortfin Mako	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

Currently, commercial pelagic longline vessels are required to report shortfin mako shark catches in logbooks. Landings information is reported by an authorized HMS dealer while observers record information on catches. Since an operating electronic monitoring system is already required on board the vessel, the footage would assist with improving monitoring of shortfin mako sharks.

Pros

- Improved health of the stock as there would be an increase on live releases of shortfin mako sharks that would otherwise have been retained and landed.
- No increases in fishing effort in the commercial pelagic longline fishery expected.
- Provides another potential check of data between all other sources: observers, logbooks, or dealers.
- Does not create additional reporting or permit requirements for pelagic longline vessels.
- Contribute to ending overfishing and rebuilding consistent with MSA requirements and contribute to ICCAT recommendation requirements consistent with ICCAT obligations and ATCA.

Cons

- Reduced opportunities to land shortfin mako sharks for vessels who do not meet the criteria and may want to retain shortfin mako (e.g., bottom longline, gillnet, handgear, etc.).
- Reduced opportunities and revenue losses by the pelagic longline fishery as a result of the landing reduction for the commercial fishery. Even though shortfin mako sharks are a minor source of economic revenue to the overall HMS commercial fisheries, this species could be a significant source of seasonal revenue to individual fishermen.
- Could have negative socioeconomic impacts on fishing communities with higher reliance on shortfin mako shark landings.

Option 4 – Prohibit the landing of all shortfin sharks caught on non-pelagic longline gear (e.g., bottom longline, gillnet, handgear, etc.)

Under Option 4, NMFS would prohibit the landing of all shortfin mako sharks caught by commercial fishermen using non-pelagic longline gear (e.g., bottom longline, gillnet, handgear, etc.). Commercial fishermen using non-pelagic longline gear would be required to release all shortfin mako sharks with a minimum of harm, while giving due consideration to the safety of crew members. Based on HMS logbook data, an annual average of ten commercial vessels that used non-pelagic longline gear interacted with shortfin mako sharks (Table 7). Those vessels only interacted with, on average, 18 shortfin mako sharks per year of these 14 shortfin mako sharks were kept. This represents less than 1 percent of the total shortfin mako shark interactions in the HMS logbook data.

Table 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

Pros

- Improved health of the stock as there would be an increase on live releases of shortfin mako sharks that would otherwise have been retained and landed.
- No increase in protected resources interactions or fishing effort in the commercial pelagic longline fishery expected.
- Would only affect a small number of fishermen since pelagic longline gear is the primary commercial gear used to land pelagic shark species, including shortfin mako sharks.
- Would have few socioeconomic impacts for individual fishermen, given so few shortfin mako sharks are caught on non-pelagic longline gears.

Cons

- Would cause fishermen who interact with shortfin mako sharks with non-pelagic longline gear to release the sharks regardless on their status (live or dead).
- Reduced opportunities and revenue losses by the pelagic longline fishery as a result of the landings reduction for the commercial fishery.
- Would have negative socioeconomic impacts on individual fishermen with higher reliance on shortfin mako shark landings.

Option 5 – Remove shortfin mako sharks from pelagic shark quota; use recent landings to both establish a shortfin mako shark quota and adjust the pelagic shark quota

Under Option 5, NMFS would remove shortfin mako sharks from the pelagic shark quota and would establish a species-specific quota for shortfin mako sharks and a new pelagic shark species quota for common thresher and oceanic whitetip sharks based on recent landings. The quotas for blue and porbeagle sharks would not change under this option and would be 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.

Shortfin mako sharks are caught as bycatch in the pelagic longline fishery, and there is no directed fishery in the United States for this species. Removing shortfin mako sharks from the quota group of pelagic sharks, which includes common thresher, oceanic whitetip, and shortfin mako sharks, would allow them to be managed separately and would give NMFS the ability to track this separate quota more efficiently. To be consistent with the current ICCAT Recommendation, NMFS would need to require live release of shortfin mako sharks in the pelagic longline fishery, so only shortfin mako sharks that are dead at haulback could be retained (as described in Commercial Options 2 and 3 above) and counted towards a shortfin mako shark quota. Currently, the annual 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 (Table 8). While establishing a quota could allow NMFS to track shortfin mako and pelagic shark landings more efficiently, establishing a shortfin mako shark quota goes beyond the current ICCAT Recommendation. Additionally, if a large number of dead shortfin mako sharks are caught and appropriately landed under the ICCAT Recommendation, any quota established could be exceeded which would cause the fishery to close and require fishermen to release dead shortfin mako sharks, contributing to regulatory discards and waste, which would not be consistent with the recommendation.

Table 8. 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

Pros

- Establishing a separate shortfin mako shark quota could allow fishermen to track monthly updates of how many shortfin mako sharks have been caught, via the shark landings updates released on the HMS Management Division listserv and website.
- Establishing a quota would cap commercial landings of shortfin mako sharks in the U.S. which would assist with a potential rebuilding plan in the future.

Cons

- A species-specific landings quota 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 contribute to the health of the stock.
- A reduced pelagic shark species quota may also lead to increased regulatory discards of common thresher and oceanic whitetip sharks if the quota is reached.
- Given there are no current stock assessments for oceanic whitetip or common thresher sharks, it would be difficult to determine the ecological impacts of setting a reduced quota for these two species when you remove shortfin mako sharks from the pelagic shark species management group.
- ICCAT has not established country-specific TACs for shortfin mako sharks. Because the United States does not have a TAC for shortfin mako sharks, it is difficult to determine at what level to set a species-specific quota to best benefit the stock, while also accounting for high catches from other countries.
- The data are not yet available from the ICCAT SCRS on areas of high shortfin mako shark interactions, there is no information fishermen can use to avoid interacting with shortfin mako sharks once the quota is met.
- A reduced pelagic shark species quota and species-specific shortfin mako shark quota could potentially result in revenue losses to fishermen and businesses that rely on this resource if the quotas are met before the season ends.
- A shortfin mako shark quota and a reduced pelagic shark species quota could disadvantage vessels that primarily fish later in the year, depending on when in the year the quotas are met.

Option 6 – Allow retention of shortfin mako sharks greater than 83 inches FL by persons with a Directed or Incidental shark LAP caught on non-pelagic longline gear (e.g., bottom longline, gillnet, handgear, etc.)

Option 6 would establish a commercial minimum size of 83 inches FL (210 cm FL) for non-pelagic longline gears to retain a shortfin mako shark. The majority of commercial shortfin mako shark interactions occur in the pelagic longline fishery (> 97 percent of catch), but observer reports from the NEFSC Northeast Fisheries Observer Program and SEFSC Bottom Longline Observer Program Targeting Sharks have observed small numbers of shortfin mako shark interactions (Table 6). Currently, there are no commercial minimum size restrictions for sharks because any such restriction would require the head remain attached for the size to be valid. Because sharks need to be dressed quickly to preserve the quality of the meat, fishermen are allowed to dress the shark by removing the head and the viscera as long as the fins remain naturally attached to the carcass. Under this option, fishermen would be required to leave the head of the shortfin mako shark attached to the carcass unless an appropriate alternative minimum size specific to shortfin mako sharks can be determined.

Pros

- Could have beneficial socioeconomic impact on non-pelagic longline gears since fishermen with this gear would have to discard all shortfin mako sharks under other options (i.e., Commercial Option 4 and 5).
- Could have beneficial ecological impacts to the stock since non-pelagic longline gear fishermen would only be able to retain shortfin mako sharks greater than 83 inches FL (210 cm FL).
- Would be consistent with ICCAT Recommendation 17-08.

Cons

- Vessels with non-pelagic longline gear on board are not required to have electronic monitoring or have a low to no observer coverage rate.
- Would allow additional landings of shortfin mako sharks (dead or alive), which could have ecological impacts to the stock.
- Would require the head remain attached to the shark carcass, which could reduce the quality of the meat and reduce the ex-vessel price. Additionally, keeping the head on a large shark could also complicate the packing/storage process and reduce efficiencies on the vessel.

Option 7 – Allow landing of shortfin mako sharks that are dead at haulback by persons with a Directed or Incidental shark LAP caught on non-pelagic longline gear (e.g., bottom longline, gillnet, handgear, etc.) only if an observer is on board

Option 7 would allow fishermen to retain shortfin mako sharks caught on gears other than pelagic longline (e.g., bottom longline, gillnet, handgear, etc.), provided that an observer is on board that can verify that the shark was dead at haulback. This option is similar to Commercial Option 3 except that the observer would be acting in a capacity similar to the electronic monitoring system and confirming whether the shark was dead before it was brought onboard the vessel. On average, only about one percent of the total shortfin mako shark landings occurred on non-pelagic longline gear (Table 9). Currently, observer coverage on 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.

Table 9. 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%

Pros

- Would allow other gears types to catch and land a small amount (less than one percent of total landings) of shortfin mako sharks when compared to pelagic longline.
- Could provide beneficial socioeconomic per-trip revenue for some fishermen.
- Would be consistent with ICCAT Recommendation 17-08.

Cons

- Would not lead to a large amount of landings due to the low landings reported and observations on non-pelagic longline gear. Imposing additional regulations may not justify the minimal impact.
- Observers would be required to determine the disposition of the shark and whether the fishermen can retain it. This could hinder normal observer data collection activities and exacerbate tensions on the vessel.
- Shortfin mako sharks that are caught when no observer is onboard the vessel, which is likely given the rarity of catching a shortfin mako shark on these gears and the current percent of observer coverage for these gear types, would still need to be discarded, live or dead.

Option 8 – Prohibit the commercial landing of all shortfin mako sharks, live or dead

Option 8 would place shortfin mako sharks on the prohibited species list to prohibit any catch or retention of shortfin mako sharks in commercial HMS fisheries, although some small level of bycatch would be expected to occur. HMS permit holders would be prohibited from landing shortfin mako sharks commercially. On average, 181,085 lb dw of shortfin mako sharks are landed annually, which accounts for on average 71 percent of the total pelagic shark landings (Table 10).

Table 10. 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%

Pros

- Could result ecological benefits and assist with the potential rebuilding of the stock since the total landings of shortfin mako sharks would be reduced from their current levels to zero.
- Interactions with shortfin mako sharks would still occur in commercial fisheries, but all individuals would be release or discarded. The only remaining sources of mortality would be from post-release mortality and those individuals that are dead at haulback.
- Would result a large numbers of live releases of shortfin mako sharks would be released that would otherwise have been retained and landed.
- Would comply with the obligations under MSA since we would prohibit landings and assist with ending overfishing of the stock.

Cons

- Would eliminate all commercial ex-vessel revenues derived from shortfin mako sharks (approximately \$375,000 per year).
- Lost revenues would have greater socioeconomic impacts on fishing communities with higher reliance on shortfin mako shark landings, including Wanchese, NC, Fairhaven/New Bedford, MA, and Barnegat Light, NJ.

2.2 Recreational Options

NMFS is also considering a variety of recreational options, some of which are from ICCAT Recommendation 17-08 and interim final rule, and some that otherwise promote ending overfishing and/or rebuilding, but are not specifically included in the ICCAT Recommendation. These range from no action, creating a catch and release fishery for shortfin mako sharks, increasing the minimum size to 83 inches FL or greater, restricting landings to tournaments or tagging program, revising the circle hook requirement, and establishing a variable inseason minimum size restriction.

Option 1 – No Action. Keep current regulations for shortfin mako sharks

Under Option 1, NMFS would maintain the current 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, which includes shortfin mako sharks, greater than 54 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. In addition, keeping the current regulations the same would allow overfishing of shortfin mako sharks to continue and further reduce the stock size.

Pros

- HMS recreational fishermen would continue to be able to harvest shortfin mako sharks under the current recreational vessel and size limit.
- No short-term negative economic effects on the fishery.

Cons

- Overfishing of shortfin mako sharks would continue and further reduce the stock size, complicating rebuilding efforts. 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.
- This option would not implement ICCAT 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 ICCAT 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.
- Would 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.

Option 2 – Prohibit landing of shortfin mako sharks in in the HMS recreational fishery (catch and release only)

Under Option 2, recreational HMS anglers (fishermen who hold HMS Angling or Charter/Headboat permits, or Atlantic Tunas General category and Swordfish General Commercial permits when participating in a registered HMS tournament) would only be authorized to catch and release shortfin mako sharks. This is similar to recreational measures for the catch and release of white sharks.

Pros

- Could reduce mortalities of shortfin mako sharks in the recreational fishery.
- Could help to rebuild the overfished stock.
- Would not prevent U.S. fishermen from recreational fishing for shortfin mako sharks.

Cons

- May have some negative socioeconomic impacts to HMS tournaments that have traditionally landed sharks, due to the decreased opportunity to land shortfin mako sharks. However, HMS tournaments could still target shortfin mako sharks under this option.
- Could have some negative socioeconomic impacts on charter/headboat operators whose passengers want to land shortfin mako sharks.

Option 3 – 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

Option 3 would implement management measures for the HMS recreational fishery consistent with ICCAT Recommendation 17-08. Recreational HMS 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 83 inches FL (210 cm FL), reducing the amount of recreational landings. According to length composition information from the Large Pelagics Survey (LPS), this option would reduce the recreational landings of male shortfin mako sharks by up to 44 percent and female shortfin mako sharks by up to 78 percent assuming 100 percent retention of legal-sized sharks (Table 11). 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 caught are expected to be large enough to retain under this option.

Table 11. 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

Pros

- Could result in beneficial ecological impacts since a large numbers of live releases of shortfin mako sharks would occur in the U.S. that would otherwise have been retained and landed.

Cons

- Would potentially result in negative socioeconomic impacts to recreational fishermen and tournament operators due to decreased opportunity to land shortfin mako sharks.
- Confirming the sex of a large and potentially active shortfin mako shark prior to its landing can be challenging for fishermen and may have safety implications.

Option 4 – Increase the minimum size of all shortfin mako sharks from 54 inches FL to 83 inches (210 cm) FL

Under Option 4, recreational fishermen (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) could only land shortfin mako sharks, male or female, that are at least 83 inches FL (210 cm FL). According to length composition information from the Large Pelagics Survey, this recreational minimum size limit could reduce landings by approximately 83 percent in the HMS recreational fishery (Table 12).

Table 12. Proportions and cumulative weights of shortfin mako sharks in various length categories in the recreational fishery, 2012-2016. Source: Large Pelagics Survey.

Fork Length Category	Count	Percent of Total (Count)	Weight in Category (kg)	Percent of Total (Weight)
<54 inches FL (137 cm FL)	89	1%	1,691	0%
54-71 inches FL (137-180 cm FL)	5,490	45%	256,655	29%
71-83 inches FL (180-210 cm FL)	4,676	38%	361,937	41%
>83 inches FL (210 cm FL)	1,911	16%	265,497	30%
Total	12,166		885,779	

Pros

- Could result in beneficial ecological impacts to the stock since a large numbers of live releases of shortfin mako sharks would occur in the U.S. that would otherwise have been retained and landed.
- Would comply with obligations under MSA and ACTA to implement ICCAT recommendations.

Cons

- Would potentially result in negative socioeconomic impacts to recreational fishermen and tournament operators due to the decreased opportunity to land shortfin mako sharks.

Option 5 – Increase the minimum size of all shortfin mako sharks to 83 inches FL and allow retention in registered HMS tournaments only

Under Option 5, shortfin mako sharks could not be retained outside of registered HMS tournaments. Within registered HMS tournaments, the minimum size for shortfin mako sharks would be increased to 83 inches FL (201 cm FL). 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 13). Overall, tournaments indicating pelagic sharks as a prize category were the highest in 2014 and 2015 with 84 tournaments in both years. However, 2016 showed a decrease in the number of these tournaments. Based on LPS data, tournaments account for approximately half of the shortfin mako interactions over the last five years; 63 percent of the sharks caught were retained (Table 14). Non-tournament shark interactions result in 53.6 percent being kept. This measure would require the release of all shortfin mako sharks outside tournaments, which could reduce shortfin mako shark mortality over 44 percent. Prohibiting the retention of shortfin mako sharks outside of tournaments and an increase in the minimum size would reduce recreational shortfin mako shark landings in the United States.

Table 13. HMS tournaments targeting shortfin mako and pelagic shark species, 2012-2016.

Year	Total Number of HMS Tournaments	Number of HMS Tournaments with Shortfin Mako Shark in the title or otherwise mentioned by name	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	11	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	13	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	8	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	8	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	10	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	10	73 (81)		

Table 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, 2010-2015.

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	123 (45.4%)	80 (65.0%)	43 (35.0%)
	Non-Tournament	146 (53.6%)	72 (49.7%)	73 (50.3%)
2011	Tournament	130 (48.7%)	90 (69.2%)	40 (30.8%)
	Non-Tournament	136 (50.9%)	79 (58.1%)	56 (41.2%)
2012	Tournament	149 (56.2%)	100 (67.1%)	49 (32.9%)
	Non-Tournament	116 (43.8%)	51 (44.0%)	65 (56.0%)
2013	Tournament	151 (54.3%)	103 (68.2%)	48 (31.8%)
	Non-Tournament	127 (45.7%)	75 (59.8%)	51 (40.2%)
2014	Tournament	134 (47.4%)	86 (64.2%)	48 (35.8%)
	Non-Tournament	149 (52.6%)	89 (59.7%)	60 (40.3%)
2015	Tournament	161 (53.1%)	78 (48.5%)	83 (51.5%)
	Non-Tournament	142 (46.9%)	74 (50.7%)	70 (49.3%)
Total	Tournament	848 (50.9%)	537 (63.3%)	311 (36.7%)
	Non-Tournament	817 (49.1%)	438 (53.6%)	375 (46.4%)

Pros

- Would have positive ecological impact to the stock since it would limit shortfin mako shark harvest to mature individuals and in tournaments only.
- Could have positive impact on HMS tournament participation since shortfin mako sharks can only be retained in tournaments.
- Would comply with obligations under MSA and ACTA to implement ICCAT recommendations.

Cons

- Negative economic impacts on charter/headboat operators whose passengers have been landing shortfin mako sharks outside of tournaments.
- Negative socioeconomic impacts on non-tournament HMS recreational fishermen since shortfin mako shark retention would be prohibited.

Option 6 – Establish a tagging or lottery program to land shortfin mako sharks greater than 83 inches FL recreationally

Under Option 6, NMFS would establish a tagging or lottery program to allow for the recreational landing of shortfin mako sharks. For this option, registered HMS tournaments would be excluded from this tagging or lottery program and participants would still be allowed to retain shortfin mako sharks greater than 83 inches FL. A possible way to implement this program would be to distribute non-transferable tags to interested HMS recreational permit holders based on a random lottery. HMS recreational permit holders would indicate that they wanted to be included in the lottery when applying for their HMS permit. NMFS would hold random lottery drawings throughout the year, where permit numbers of interested constituents would be selected. This would allow NMFS to potentially set a target catch limit for shortfin mako sharks with the number of tags offered. After tags were distributed, HMS recreational permit holders who received a tag would be able to land a shortfin mako shark greater than 83 inches FL (210 cm FL). Tags would be valid for one year from the date of issuance, with a current HMS permit. NMFS could implement a limit for the number of tags each HMS recreational permit holders would receive a fishing year. The tag would be required to be affixed to the shark at time of landing, and would be required to be reported online within 48 hours of landing. Unused tags, after the date of expiration, would need to be mailed back to NMFS. Failure to comply could jeopardize the ability for constituents to participate in the future.

Pros

- Could result in minor ecological benefits since the number of shortfin mako sharks landed would be limited to the selected recreational HMS permit holders.
- Could result in equal geographic distribution to all recreational participants to the extent that permits are equally distributed.
- Positive socioeconomic benefits if registered HMS tournaments are excluded from this potential tagging or lottery program and participants are still allowed to retain shortfin mako sharks at the new size limit.

- Increase in data availability and confidence in shortfin mako sharks landing estimates.

Cons

- Could cause negative socioeconomic impacts for HMS recreational or charter/headboat permit holders who were not selected to receive a tag in a given fishing year.
- More registered HMS tournaments might occur to get around this program and there is no current reporting requirements for tournaments.
- Administrative burden on HMS recreational permit holders and to the agency to procure and distribute tags, track landings, and ensure tag returns.

Option 7 – Require use of circle hooks for recreational shark fishing in all areas (remove the current management line established for dusky sharks near Chatham, MA)

Option 7 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. As of January 1, 2018, this regulation has been in place for all federally managed waters south of 41° 43' N latitude (near Chatham, Massachusetts), but this option would remove the boundary line, requiring fishermen in all areas to use circle hooks. The use of circle hooks may improve the survival rate of sharks that are released by decreasing deep hooking and attendant mortality associated with J-hooks.

Pros

- Would have ecological benefits to the stocks for all sharks including shortfin mako sharks since circle hooks would allow sharks to be more easily released in better condition, reducing dead discards and post-release mortality.
- Would simplify recreational management measures across entire region.

Cons

- Could cause some confusion with constituents since this would change the regulation just implemented at the start of 2018.
- Would cause minor socioeconomic impacts on recreational shark fishermen above the current Chatham, MA line since they would need to buy circle hooks.

Option 8 – Establish a minimum size limit for the retention of shortfin mako sharks that is greater than 83 inches FL

Raising the recreational minimum size for shortfin mako sharks from 54 to 83 inches FL (210 cm FL) would result in significant reductions in recreational landings, but there is some disagreement in the scientific literature about the median size at maturity for female shortfin mako sharks. ICCAT adopted 83 inches FL (210 cm FL) as the minimum size for female

shortfin mako sharks based on the results of Maia et al. (2007b) which estimated length at maturity for females to be between 83 to 114 inches FL (210 to 290 cm FL). Other papers have identified the median size at maturity for female mako sharks to be in the upper reaches of this range with Stevens (1983) and Kohler et al. (2002) estimating it to be as high at 102 or 108 inches FL. Thus, Option 8 considers establishing a minimum size limit that is greater than the ICCAT Recommendation of 83 inches FL (Table 15).

Table 15. Estimated number of shortfin mako sharks harvested from 2012-2016 under the existing 54 inches FL minimum size limit compared to the number that would have been harvested under four options of minimum length limits. Source: Large Pelagic Survey.

Minimum Size	2012	2013	2014	2015	2016	Average	Average (mt ww)
54 inches FL	2,735	2,762	2,650	2,126	1,893	2,433	177.2
83 inches FL	408	542	309	325	327	382	53.1
90 inches FL	46	181	172	103	235	147	25.1
102 inches FL	0	0	0	0	117	23	5.4
108 inches FL	0	0	0	0	30	6	1.7

Increasing the minimum size limit for mako sharks from 54 to 83 inches FL would reduce recreational harvest by 84 percent, or 124 mt whole weight (ww), based on average landings from 2012 to 2016 (Table 16). Raising the minimum size to 90 inches FL would reduce the average annual landings by 94 percent and a further 25 mt ww, while further raising the minimum size limit to 102 inches FL would reduce average landings by 99 percent. Any minimum size greater than 102 inches FL would result in estimates of zero harvest of shortfin mako sharks in most years. A breakdown of observed shortfin mako shark landings in the LPS by sex also shows that the sex to size ratio of shortfin mako shark landings below 83 inches FL is approximately 45 percent male and 55 percent female. Above 83 inches FL this ratio shifts to 26 percent male and 74 percent female with 100 percent of observed harvest being female at 102 inches FL or greater.

Table 16. Observed sex to size ratio of shortfin mako sharks harvested from 2012-2016 by size range. Source: Large Pelagic Survey.

Size Range	Percent of Male Shortfin Mako Sharks	Percent of Female Shortfin Mako Sharks
54 to 83 inches FL	45.4%	54.6%
83 to 90 inches FL	26.4%	73.6%
Greater than 102 inches FL	0.0%	100.0%

Increasing the minimum size beyond 83 inches FL may also have a slight negative socioeconomic effect on HMS tournaments. According to NMFS Northeast Fisheries Science Center tournament data, the 83 inches FL (210 cm FL) minimum size implemented by the emergency rule may not greatly impact tournament landings of shortfin mako sharks, where most of the largest sharks landed were above the 83 inches FL (210 cm FL) minimum size (Table 17). However, the larger minimum size limits being considered (102 inches and 108 inches FL) would exceed the sizes of many tournament winning sharks since 2012.

Table 17. Mean weights and lengths of the five largest shortfin mako sharks landed at Northeast shark tournaments, 2012-2016. Source: NEFSC Apex Predator Program

Year	Mean weight of 5 largest sharks (lb ww)	Fork Length (inches)	Fork Length (cm)	Largest male (lb ww)	Fork Length (inches)	Fork Length (cm)
2012	349	95	241.3	368	96	243.8
2013	329.2	93	236.2	311	91	231.1
2014	319.1	92	233.7	294.4	90	228.6
2015	415.8	100	254	349	95	241.3
2016	443.8	102	259.1	507	107	271.8

Pros

- Could result in beneficial ecological impacts.
- Increasing the minimum size limit beyond the ICCAT Recommendation could further reduce recreational harvest and could allow for some minor increased benefit in beginning to rebuild the North Atlantic shortfin mako shark stock.
- Could result in the release of more immature female sharks, which could increase the available breeding stock.

Cons

- Would potentially result in negative socioeconomic impacts to recreational fishermen and tournament operators due to the decreased opportunity to land shortfin mako sharks.
- Would largely turn the shortfin mako shark recreational fishery into a catch-and-release fishery since majority of the sharks (94-99 percent) would be below the considered minimum size limits.

Option 9 – Establish a variable inseason minimum size limit for shortfin mako sharks

Option 9 would establish criteria for making adjustments to the recreational minimum size limit for shortfin mako sharks on an inseason basis in response to landings estimates from LPS. Under this option, the minimum size for shortfin mako sharks would initially be set at 83 inches FL (210 cm FL). NMFS would monitor monthly landings estimates generated by LPS which covers Maine to Virginia from June through October each year. If shortfin mako shark landings estimates for the year exceed a set threshold, based on a rebuilding program, action could be taken to increase the minimum size within a fishing season. This would reduce landings while still allowing for harvest by HMS tournaments and recreational anglers. The minimum size limits under consideration would be within the range analyzed in Recreational option 8, and the size limit selected would be determined based on how much landings exceeded the rebuilding program. Option 9 is similar to current regulations at 50 CFR 635.20 (d)(5) where

minimum size limits for blue marlin, white marlin, and roundscale spearfish may be increased within a fishing season as total landings approach the 250 marlin annual landings limit. The purpose of this measure for shortfin mako sharks would give recreational fishermen extra incentive to practice catch-and-release of shortfin mako sharks, and ensure rebuilding targets are not exceeded.

However, without mandatory reporting of shortfin mako landings, such an action would likely not be taken any earlier than August as the first LPS harvest estimates are not available until late July. Analysis of shortfin mako shark catch in the LPS from 2012 to 2016 show that on average the majority (54 percent) of harvest occurs in the month of June with 23 percent of harvest occurring in July, and the remaining 23 percent being spread out from August to October (Table 18). As such, the first LPS monthly estimate for June should provide an accurate impression of the scale of harvest for the year.

Table 18. Mean shortfin mako catch, harvest, and release estimates by month from, 2012-2016. Source: Large Pelagic Survey.

Month	Monthly Catch (Number of sharks)	Percent of Total Catch	Monthly Harvest (Number of sharks)	Percent of Total Harvest	Monthly Releases (Number of sharks)	Percent of Total Releases
June	2,779	43.1%	1,306	53.7%	1,473	36.7%
July	2,165	33.6%	570	23.4%	1,596	39.7%
August	870	13.5%	302	12.4%	568	14.1%
September	428	6.6%	195	8.0%	233	5.8%
October	207	3.2%	60	2.5%	147	3.7%

Pros

- Would increase flexibility in the management of the recreational mako shark fishery.
- Would have fewer negative socioeconomic benefits than establishing a minimum size limit greater than 83 in FL.

Cons

- Could have minimal limited efficiency for management as the majority of shortfin mako shark harvest occurs within the first couple months of the recreational fishing season.
- Could cause confusion with HMS tournaments and permit holders if the minimum size for shortfin mako sharks changes inseason multiple times.
- Could cause socioeconomic impacts to Northeast HMS tournaments and permit holders if the minimum size limit increases to greater than 83 inches FL when the water warms in their fishing area and they are starting to target shortfin mako sharks.
- Increasing the minimum size limit at a size greater than 83 inches FL would impact HMS tournaments if participants cannot land this species.

- Could have negative economic impacts to late season tournaments if they have to reprint tournament brochures and regulations due to an inseason adjustment in the shortfin mako minimum size limit.

2.3 Monitoring Options

ICCAT Recommendation 17-08 suggests improving data collection for shortfin mako sharks. In the HMS commercial fisheries, data collection occurs through the electronic monitoring coverage on each pelagic longline vessel, logbook reporting, observers, and dealer reports of landings. However, NMFS could improve reporting by establishing mandatory reporting through the vessel monitoring system (VMS). In the HMS recreational fishery, data collection occurs through LPS or another recreational reporting database like Marine Recreational Information Program (MRIP) and state catch cards. Since the data collection in the recreational fishery is not as real-time, NMFS is considering some options to help improve the recreational estimates for shortfin mako sharks.

Option 1 – No action. Do not require reporting of shortfin mako sharks outside of current reporting systems.

Under Option 1, no additional reporting requirements would be placed on 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 released if intercepted by the 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 MRIP. HMS Angling and HMS Charter/ Headboat permit holders would not be required to report their landings of shortfin mako sharks on non-tournament trips, and tournament operators would not be required to report landings associated with shark tournaments unless selected.

Pros

- Would not increase reporting burden on HMS permit holders and HMS tournaments.

Cons

- Logbook reporting could be delayed up to 30 days.
- Reports of shortfin mako sharks in the LPS and APAIS would become less frequent if the minimum size limit is increased and cause less precise estimates of recreational landings, which could increase uncertainty in stock assessments.

Option 2 – Establish mandatory reporting of shortfin mako catches (landings and discards) on VMS

Option 2 would require vessels with an 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). This option is intended to support the inseason monitoring of shortfin mako shark catches. Currently, commercial vessels are required to report shortfin mako shark catch in the HMS logbook. In addition, landings information is reported by dealers and observers record information on catches. However, more timely information on shortfin mako catches, as can be obtained through VMS reporting, could improve real-time inseason monitoring. There is a 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.

Reporting to NMFS would be similar to bluefin tuna caught on pelagic longline gear as required by regulations at 50 C.F.R. § 635.69(e)(4)(i). For example, each set, as instructed by NMFS, the date and area of the set, the number of hooks and the length of all shortfin mako sharks retained (actual), and the length of all shortfin mako sharks discarded dead or alive (approximate), would need to be reported within 12 hours of completing each pelagic longline haulback via the VMS unit.

Under current HMS regulations, pelagic longline vessels and purse seine vessels are required to have NMFS-approved enhanced mobile transmitting unit (E-MTU) VMS installed, as are vessels with a Directed shark LAP and bottom longline or gillnet gear on board as described at §635.69(a). A requirement to report shortfin mako shark catches on VMS would be an additional reporting requirement for those vessels on their existing systems, while for other commercial vessels the requirement would mean installing VMS to report shortfin mako catches. Eligible commercial vessel owners could receive reimbursement for the cost of purchasing a VMS, contingent on the availability of funds.

Pros

- Supports timely inseason monitoring of catch, which would support implementation of certain other management options (e.g., a shortfin mako shark quota).
- Provides another source of data to verify data from other sources: electronic monitoring, observers, logbooks, or dealers.

Cons

- Creates an additional reporting requirement for vessels with Directed or Incidental shark LAPs.
- Creates a requirement for Directed or Incidental shark LAP vessels who fish commercially with handgear to install VMS.
- May not be necessary given existing reporting requirements (i.e., logbooks, eDealer, electronic monitoring), depending on what other management options VMS reporting would support.

Option 3 – Implement mandatory reporting of shortfin mako shark landings and discards in registered HMS tournaments (ATR)

Existing regulations at 50 CFR 635.5(d) authorize NMFS to select tournaments for reporting. Currently, only billfish and swordfish tournaments are selected for reporting. Under Option 3, NMFS would begin selecting shark tournaments for mandatory reporting of shortfin mako shark landings and discards in registered HMS tournaments; between 2012-2016 an average of 73 tournaments targeted sharks (Table 13). An Atlantic HMS tournament is any fishing competition involving Atlantic HMS in which participants must register or otherwise enter or in which a prize or award is offered for catching or landing such fish. Atlantic HMS tournaments are conducted from ports along the U.S. Atlantic coast, Gulf of Mexico, and U.S. Caribbean. Atlantic HMS tournaments vary in size. They may range from relatively small “members-only” club events with as few as ten participating boats (40 – 60 anglers) to larger, statewide tournaments with 250 or more participating vessels (1,000 – 1,500 anglers).

Under current HMS regulations, participants may target one or more HMS in a tournament. Most tournaments register to catch multiple HMS. Often, there is a primary species targeted in the tournament, and other species are caught for entry in separate categories. Figure 5 gives a breakdown of the number of tournaments in each state that registered for billfish, sharks, swordfish, or tuna species in 2016. Total numbers of tournaments divided by state for HMS species in 2016 were 182 billfish (top left), 76 shark (top right), 71 swordfish (bottom left), and 184 tuna (bottom right) in Figure 5.

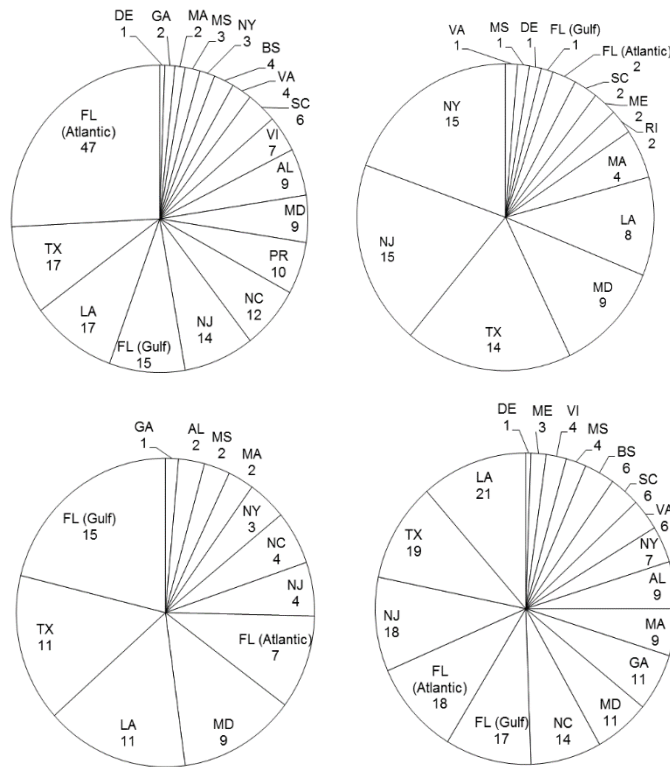


Figure 5. Number of Tournaments in each State that Registered for Billfish (Top Left), Shark (Top Right), Swordfish (Bottom Left), or Tuna (Bottom Right) Species in 2016.

Table 13 gives the breakdown of total number of HMS tournaments, the number of HMS tournaments with shortfin mako sharks in the title or otherwise mentioned by name, the number of HMS tournaments targeting ‘Pelagic Sharks/All Shark’ tournaments, and the number of HMS tournaments with pelagic sharks Category by Area. From 2012-2016, there were 250 HMS tournaments per year of which 10 specifically mentioned targeting shortfin mako sharks, and 73 reported targeting pelagic sharks which includes shortfin mako sharks.

Within this option, operators of tournaments targeting sharks (Table 13) could be selected by NMFS for reporting, in which case a record of tournament catch and effort would be submitted to NMFS within seven days of the conclusion of the tournament. In 2016, 76 shark tournaments (Table 13) occurred with greatest landing recorded for June, July, and August. Regional landings were greatest for Northeast Atlantic (88 percent), followed by Southeast Atlantic (67 percent), and Gulf of Mexico (70 percent) (Figure 6).

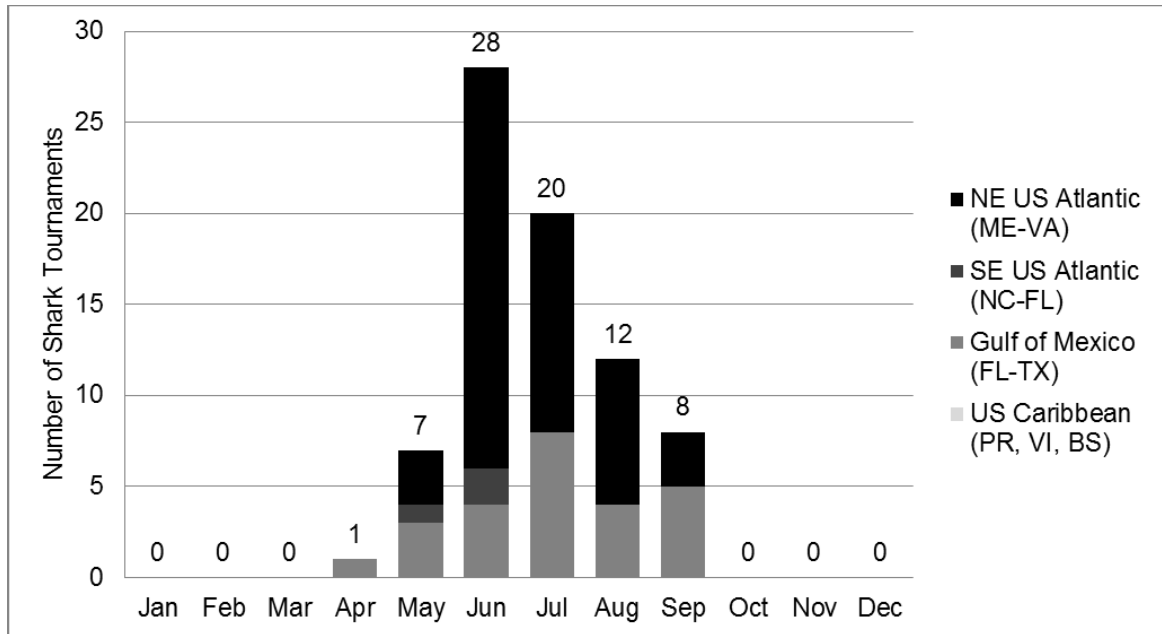


Figure 6. Regional distribution of tournaments that select sharks for 2016 time frame.

Table 19 provides the total numbers of HMS tournaments in 2016 that registered to award points or prizes for the catch or landing of each HMS. Marlin, sailfish, and yellowfin tuna continue to be the most sought after species.

Table 19. Number of Atlantic HMS Tournaments per Species in 2016.

Species		2016
Billfishes	Blue marlin	157
	White marlin	143
	Longbill spearfish	55
	Roundscale spearfish	45
	Sailfish	254
Swordfish		71
Tunas	Bluefin tuna	98
	Bigeye tuna	78
	Albacore tuna	41
	Yellowfin tuna	171
	Skipjack tuna	41
Sharks	Smoothhound	0
	Small coastal sharks	12
	Large Coastal Sharks	27
	Pelagic sharks	76

In Table 20, NMFS shows the number of billfish and swordfish tournaments (all of which are selected for reporting) and the additional number of tournaments that would be selected if shark tournaments are selected for reporting, an increase of 20 percent, based on data from 2016.

Table 20. Analysis of 2016 data showing number of tournaments reporting and the additional number of tournaments that would be required to report if tuna and or sharks are selected for reporting.

Source: Atlantic Tournament Registration and Reporting.

	Total Numbers	Percentages
Registered HMS Tournaments	268	-
Billfish and Swordfish Tournaments	189	70%
Tournaments Targeting Sharks	76	28%
Shark Tournaments that Overlap With Billfish and Swordfish Tournaments	38	20%
New Tournaments to Report	38	20%

Pros

- Provides a census of shark tournaments through which accurate records of landing may be obtained.
- The additional information will help improve data that the United States reports to ICCAT.

Cons

- There would be additional burden on tournament operator(s) to collect information on and report shortfin mako shark landings.
- Participants of the tournament would have the added of tracking all interactions of shortfin mako sharks.

Option 4 – Implement mandatory reporting of all recreationally landed and discarded shortfin mako sharks (e.g., app, website, Vessel Trip Reports)

Under Option 4, NMFS would implement mandatory reporting of all recreational interactions (landed and discarded) of shortfin mako sharks. Under the larger minimum size limit implemented in the emergency rule or being considered in this action, the number of shortfin mako shark landings would decrease significantly. This would also reduce the number of observations of shortfin mako sharks in LPS and other MRIP surveys, resulting in recreational landings estimates that are much more variable and uncertain with significantly higher percent standard errors (PSE). This increased variability in the data would reduce NMFS' ability to effectively monitor the recreational harvest of the stock using traditional intercept surveys alone.

Currently, HMS Angling and Charter/Headboat permit holders are required to report each individual landing of bluefin tuna, billfish, and swordfish within 24 hours to facilitate quota monitoring. Atlantic Tunas General and Harpoon permit holders are also required to make these reports for bluefin tuna. Shark landings have been excluded from this mandatory reporting requirement with the exception of the Maryland and North Carolina Catch Card programs. NMFS has 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 (Table 21). As such, NMFS is considering expanding mandatory landings reports to include shortfin mako sharks.

Table 21. Estimated reporting burden for shortfin mako shark landings reports under minimum size limits ranging from 54 to 108 inches FL based on average landings from 2012-2016 and a burden estimate of 5 minutes per report. Source: Large Pelagic Survey

Minimum Size Limit	Estimated Number of Responses	Estimated Burden Hours
54 inches FL	2,433	203
72 inches FL	1,317	110
83 inches FL	382	32
90 inches FL	147	13
102 inches FL	23	2
108 inches FL	6	1

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 are already required to be reported through the state reporting stations where anglers submit a state landings report (catch card) and obtain a fish tag. The state reports these landings to NMFS on a bi-weekly (during the bluefin tuna season, June-October) basis, and submits final, complete, annual summary reports at the end of the year. 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. If mandatory reporting is adopted, anglers in North Carolina could 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.

Pros

- Would increase data collection on the harvest of the species to support management, and meet reporting requirements for ICCAT.
- Mandatory reporting of shortfin mako landings would provide an alternative source of shortfin mako harvest data from the LPS and MRIP where PSE estimates could become less precise due to less frequent observations in the LPS and MRIP if the minimum size limit is increased to 83 inches FL or greater.

Cons

- Would result in additional reporting burden for HMS anglers.
- Would entail costs for initial setup and monitoring along with some enforcement concerns as recreational landings do not have matching dealer reports to verify compliance with the reporting requirement.
- Would require recreational fishermen to be able to accurately identify shortfin mako sharks from other shark species that would not be required to be reported.

2.4 Rebuilding Program

Since the North Atlantic shortfin mako sharks have been declared to be overfished and subject to overfishing, NMFS must take action to address overfishing in the fishery and to implement conservation and management measures to rebuild overfished stocks within 2 years of making this determination domestically. The United States accounts for about 11 percent of the recent total shortfin mako shark mortality. Thus, NMFS is considering options to address shortfin mako shark overfishing and potentially implement a rebuilding plan domestically or work with ICCAT to implement a rebuilding program.

Option 1 – No action. Do not establish a rebuilding plan for shortfin mako sharks.

Under Option 1, NMFS would not establish a rebuilding plan for shortfin mako sharks and the stock would continue to be overfished with overfishing occurring. However, NMFS could still implement management measure in the HMS recreational and commercial fisheries, consistent with the ICCAT Recommendation.

Pros

- Short-term management measures developed for shortfin mako sharks would assist in avoiding overfishing of the species within Federal waters of the United States.
- No additional management measures beyond the ICCAT Recommendation.

Cons

- Under this option, there is a higher probability that Atlantic shortfin mako sharks would continue to experiencing overfishing.
- If overfishing continues, future ICCAT recommendations could require more severe reductions and cause socioeconomic impacts to HMS permit holders.
- The United States would not meet its obligation under ATCA.

Option 2 – Establish a domestic rebuilding plan for shortfin mako sharks unilaterally (i.e., without ICCAT)

Under Option 2, NMFS would establish a domestic rebuilding plan independent of ICCAT. This option would allow the United States to develop a rebuilding plan domestically to avoid overfishing of shortfin mako sharks in U.S. Federal waters. This option would not feature international cooperation, thus allowing the stock to continue to be overfished, with overfishing occurring.

Pros

- Rebuilding plan would just focus on the overfishing of shortfin mako sharks domestically.
- No additional management measures beyond the ICCAT Recommendation.

Cons

- Would not address the overfishing and overfished status of North Atlantic shortfin mako shark stock at the international level where approximately 90 percent of mortality is occurring.
- The United States would not meet its obligation under ATCA.

Option 3 – Establish the foundation for developing an international rebuilding program for shortfin mako sharks

Under Option 3, NMFS would take action at the international level through ICCAT, the relevant regional fishery management organization, to address overfishing of and rebuild shortfin mako sharks. This rebuilding program would encompass the objectives set forth by ICCAT based on new scientific advice from the SCRS. ICCAT is planning to establish a rebuilding program for shortfin mako sharks in 2019. Under this option, NMFS would continue to implement new management measures for North Atlantic shortfin mako based on the recommendations from ICCAT. Any international management recommendations adopted by the United States to help protect shortfin mako sharks would be implemented domestically. This option would allow the United States and other international partners 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.

Pros

- Would work with ICCAT to establish an international rebuilding plan that would consider the impacts to HMS fishermen.
- Would address overfishing at the international level where approximately 90 percent of the mortality occurs and would have ecological benefits for the stock.

Cons

- Could cause socioeconomic impacts to HMS permit holders if the new scientific advice from the SCRS lead to more restrictive management measures.
- If the United States does not implement a rebuilding program, this could cause negative ecological impacts to the North Atlantic shortfin mako stock. International cooperation is needed by all parties to rebuild the stock, which is overfished and experiencing overfishing.

2.5 References

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