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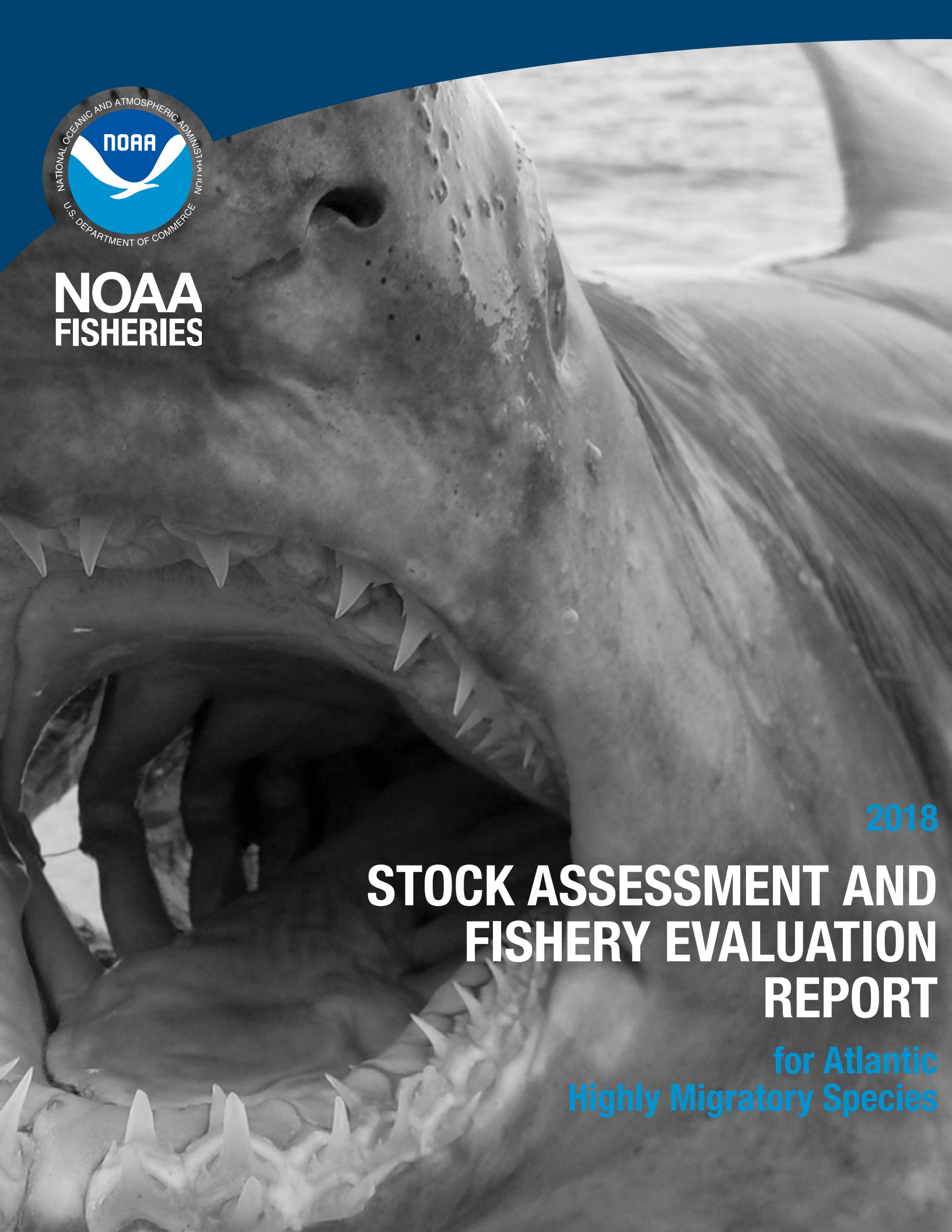

2018

STOCK ASSESSMENT AND FISHERY EVALUATION REPORT

for Atlantic Highly Migratory Species

2018
Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic Highly Migratory Species

Atlantic Highly Migratory Species Management Division
April 2019

For HMS permitting information and regulations:

HMS recreational fishers, commercial fishers, and dealer compliance guides:
https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-compliance-guides

Regulatory updates for tunas: https://hmspermits.noaa.gov/

For HMS permit purchase or renewals:

Vessel permits:

Open access permits: HMS Charter/Headboat, Atlantic tunas (General, Harpoon, Purse Seine, and Trap categories), North Atlantic swordfish (General Commercial), and HMS Angling (recreational)

Contact: NOAA Fisheries, (888) 872-8862
https://hmspermits.noaa.gov/

Open access permit: HMS Commercial Caribbean Small Boat and Smoothhound shark

Limited access permits: Atlantic sharks, Swordfish, and Tunas longline

Contact: NOAA Fisheries Southeast Regional Office, (727) 824-5326
http://sero.nmfs.noaa.gov/operations_management_information_services/constituency_services_branch/permits/

Dealer permits:

Tunas, Incidental HMS Squid Trawl:
NOAA Fisheries Greater Atlantic Regional Office, (978) 281-9370
http://www.greateratlantic.fisheries.noaa.gov/aps/permits/dealer/

Sharks, Swordfish:
NOAA Fisheries Southeast Regional Office, (727) 824-5326
http://sero.nmfs.noaa.gov/operations_management_information_services/constituency_services_branch/permits/

For copies of HMS SAFE Reports:

2014–present: https://www.fisheries.noaa.gov/content/atlantic-hms-stock-assessment-and-fisheries-evaluation-reports

2000–2013: Send email to: nmfs.sf.webmaster@noaa.gov

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Cover image: Photo taken by observers with the Northeast Fisheries Observer Program (NEFOP) at sea. "Porbeagle Jaw." March 2018.
https://www.nefsc.noaa.gov/fsb/photo_gallery/observer_photo_gallery.html

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LIST OF COMMONLY USED ACRONYMS

1999 FMP	1999 Atlantic Tunas, Swordfish, and Sharks FMP
ABC	Allowable biological catch
ACCSP	Atlantic Coastal Cooperative Statistics Program
ACL	Annual catch limit
ACT	Annual catch target
ALRS	Automated Landings Reporting System
ALS	Accumulated Landings System
ALWTRT/P	Atlantic Large Whale Take Reduction Team/Plan
AM	Accountability measure
AP	Advisory panel
APAIS	Access Point Angler Intercept Survey
ASMFC	Atlantic States Marine Fisheries Commission
ATCA	Atlantic Tunas Convention Act
ATR	Atlantic Tournament Registration and Reporting
B	Biomass
BAYS	Bigeye, northern albacore, yellowfin, and skipjack tunas
BFT	Bluefin tuna
BiOp	Biological opinion
BLL	Bottom longline
BLLOP	SEFSC Bottom Longline Observer Program
B_{MSST}	Biomass of the minimum stock size threshold
B_{MSY}	Stock biomass needed for maximum sustainable yield
B_{OY}	Stock biomass needed for optimum yield
CAR	Caribbean area
CBP	U.S. Bureau of Customs and Border Protection
CCSB	Commercial Caribbean small boat
CFMC	Caribbean Fishery Management Council
CFL	Curved fork length
CFR	Code of Federal Regulations
CITES	Convention on International Trade in Endangered Species of wild fauna, flora
COASTSPAN	Cooperative Atlantic States Shark Pupping And Nursery survey
CPCs	Contracting parties, non-contracting parties, entities, or fishing entities
CPUE	Catch per unit effort
CZMA	Coastal Zone Management Act
DEIS	Draft environmental impact statement
DPS	Distinct population segment
dw	Dressed weight
eBCD	Electronic international bluefin tuna catch documentation system
EBFM	Ecosystem-based fisheries management
eBFT	Electronic bluefin tuna landings database
EEZ	Exclusive economic zone
EFH	Essential fish habitat
EFP	Exempted fishing permit
EIS	Environmental impact statement
EM	Electronic monitoring (of PLL gear at haulback)
EO	Executive order
ESA	Endangered Species Act
F	Instantaneous fishing mortality
FAO	Food and Agriculture Organization
FEC	Florida East coast
FEIS	Final environmental impact statement
FES	Fishing effort survey
FL	Fork length
FMP	Fishery management plan
F	Fishing mortality
F_{MSY}	Instantaneous fishing mortality rate expected to yield max sustainable yield
F_{OY}	Fishing mortality rate expected to yield optimum yield
FR	Federal Register
FRFA	Final regulatory flexibility analysis
GARFO	Greater Atlantic Region Fisheries Office, Permit Office
GOM	Gulf of Mexico
GMFMC	Gulf of Mexico Fishery Management Council
GNOP	Southeast Gillnet Observer Program
GULFSPAN	Gulf of Mexico Shark Pupping And Nursery survey
GSMFC	Gulf States Marine Fisheries Comm
GRA(s)	Gear restricted area(s)
HAPC	Habitat area of particular concern
HMS	Highly migratory species: Atlantic sharks, tunas, swordfish, and billfish
HTS	Harmonized tariff schedule
IBQ	Individual bluefin [tuna] quota

ICCAT	International Commission for the Conservation of Atlantic Tunas
IPOA	International plan of action
IRFA	Initial regulatory flexibility analysis
ITDS	International Trade Data System
ITP	International trade program
ITS	Incidental Take Statement
IUU	Illegal, unreported, unregulated
LAP	Limited access permit
LCS	Large coastal sharks
LOA	Letter of acknowledgment
LOF	List of Fisheries
LPS	Large Pelagics Survey
MAB	Mid Atlantic Bight area
MAFMC	Mid-Atlantic Fishery Management Council
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MBTA	Migratory Bird Treaty Act
MFMT	Maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MRIP	Marine Recreational Information Program
MSST	Minimum stock size threshold
MSY	Maximum sustainable yield
mt	Metric tons
NCA	North central Atlantic area
NEC	Northeast coastal area
NED	Northeast distant area/waters
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fisheries Observer Program
NEFSC	Northeast Fisheries Science Center
NGO	Non-governmental organization
nmi	Nautical mile
NOA	Notice of availability
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NPOA	National plan of action (Seabirds)
NS	National Standards
OPR	Office of Protected Resources
OSF	Office of Sustainable Fisheries
OY	Optimum yield
PLTRT/P	Pelagic Longline Take Reduction Team/Plan
PLL	Pelagic longline
POP	Pelagic [Longline] Observer Program
PRA	Paperwork Reduction Act
RBS	Recreational Billfish Survey
RFMO	Regional fishery management organization
RIR	Regulatory impact review
RPAs	Reasonable and prudent alternatives
RPMs	Reasonable and prudent measures
SAB	South Atlantic bight area
SAFE	Stock assessment and fishery evaluation
SAFMC	South Atlantic Fishery Management Council
SAR	Sargasso Sea area
SBRM	Standardized bycatch reporting methodology
SCRS	Standing Committee for Research and Statistics
SCS	Small coastal sharks
SEDAR	Southeast Data and Assessment Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SFA	Sustainable Fisheries Act
SFL	Straight fork length
SRP	Scientific research permit
SSB	Spawning stock biomass
SSF	Spawning stock fecundity
SWO	Swordfish
TAC	Total allowable catch
TL	Total length
TRP	Take reduction plan
TUN	Tuna North area
TUS	Tuna South area
UDP	United Data Processing (SEFSC; replaced Fisheries Logbook System (FLS) 2015)
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	Vessel monitoring system
VTR	Vessel trip report
ww	Whole weight
YOY	Young of the year

EXECUTIVE SUMMARY

This 2018 Stock Assessment and Fisheries Evaluation (SAFE) Report is produced by the NOAA Fisheries Atlantic Highly Migratory Species (HMS) Management Division. It contains a review of the current status of Atlantic HMS stocks and describes the year's accomplishments in managing these tunas, swordfish, billfish, and sharks. Atlantic HMS SAFE Reports provide the public with information on the latest developments in Atlantic HMS management and fulfill Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requirements.

Since the 2017 HMS SAFE Report, the HMS Management Division accomplished the following:

- Held two HMS Advisory Panel meetings.
- Published several final rules regarding HMS fisheries that implemented editorial corrections to amend Atlantic HMS regulations, adjusted (as a temporary final rule) North and South Atlantic swordfish 2018 baseline quotas, modified the timing of Individual Bluefin Tuna Quota (IBQ) program accountability measures, and addressed (as an interim emergency final rule) overfishing of North Atlantic shortfin mako sharks.
- Published proposed and final rules revising current closure regulations for commercial shark fisheries, increased U.S. bluefin tuna quota, and established quotas, opening dates, and retention limits for the 2019 large coastal shark and hammerhead shark fisheries.
- Published a proposed rule for the long-term conservation and management of the shortfin mako shark stock.
- Enacted numerous inseason actions for the management of Atlantic HMS, particularly for bluefin tuna.

The 21st Special Meeting of the International Commission for the Conservation of Atlantic Tunas (ICCAT) was held in Dubrovnik, Croatia on November 12–19, 2018. The goals for the United States at this meeting were focused primarily on adoption of critical conservation measures for priority stocks while maintaining access to ICCAT-managed fisheries for U.S. recreational and commercial fishermen. The U.S. delegation developed recommendations aimed at promoting the conservation, management, and rebuilding of Atlantic HMS stocks (i.e., tunas, billfish, swordfish, and sharks), including those important to U.S. interests. ICCAT made progress on a number of issues, including the ongoing effort to amend the ICCAT Convention; management strategy evaluation for certain tuna stocks; monitoring, control, and surveillance measures; and compliance. At ICCAT, the United States advocated for needed conservation and management measures for bigeye tuna and other tropical tunas, marlins, sharks, and for measures promoting conservation of bycatch species (e.g., sea turtles and cetaceans), although such measures were not adopted this year.

Stock assessments for four HMS stocks were completed in 2018. The ICCAT Standing Committee on Research and Statistics (SCRS) completed stock assessments for Atlantic bigeye tuna and blue marlin. Two stock assessments were finalized through the Southeast Data and Assessment Review (SEDAR) process: sandbar sharks (SEDAR 54) and Gulf of Mexico blacktip shark (SEDAR 29-update). NOAA Fisheries continued shark nursery grounds research and essential fish habitat studies along the U.S. Atlantic, Gulf of Mexico, and Caribbean through the

Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) and Gulf of Mexico Shark Pupping and Nursery surveys (GULFSPAN).

Much of the information in this report is based on final reports of 2017 data that were completed and/or published in 2018. Domestic fishery landings and bycatch data are obtained from the U.S. Annual Report to ICCAT and directly from NOAA Fisheries program databases. These include commercial landings from the HMS and Coastal Fisheries Logbook programs, the Pelagic Longline and Southeast Gillnet and Bottom Longline Observer Programs, the Electronic Dealer Reporting Program (eDealer), and the online catch reporting system at https://hmspermits.noaa.gov/ through the Commercial Bluefin Tuna Landings Database (eBFT), and recreational landings from the Marine Recreational Information Program, the Large Pelagics Survey, the Recreational Billfish Survey, and the HMS Recreational Reporting Program. In 2017, the Recreational Billfish Survey was combined with the HMS tournament database registry, and was renamed the Atlantic Tournament Registration and Reporting System, or ATR.

International landings data are taken from the ICCAT SCRS' annual report. International trade data are acquired from the National Seafood Inspection Laboratory's Bluefin Tuna Catch Documentation and Swordfish Statistical Document programs, the U.S. Census Bureau, and U.S. Customs and Border Protection.

NOAA Fisheries permits information are collected from several databases: the Office of Science and Technology's International Fisheries Trade Permit database, the permit databases managed by the Northeast Regional Office and Southeast Regional Office, the HMS dealer permits database, the HMS-managed database containing permit information for exempted fishing, display, and scientific research, and the HMS Tournament Registry and Reporting System.

In early 2018, NOAA Fisheries webpages finalized a transition to a new content management system, https://www.fisheries.noaa.gov.

Feedback and comments on this SAFE Report are encouraged and should be sent to:

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1 INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) is the primary federal legislation governing the management of marine fisheries of the United States. The guidelines for National Standard 2 of the Magnuson-Stevens Act (50 CFR 600.315) require the NOAA Fisheries to prepare a Stock Assessment and Fishery Evaluation (SAFE) Report (as defined in 50 CFR 600.10, https://www.law.cornell.edu/cfr/text/50/600.10), or similar document and summarize, on a periodic basis, the best scientific information available concerning condition of the stocks, essential fish habitats (EFH, defined in 50 CFR 600.10, https://www.law.cornell.edu/cfr/text/50/600.10), marine ecosystems, and fisheries being managed under federal regulation. SAFE reports are updated or supplemented as necessary when new information is available to inform management decisions. This document constitutes the 2018 SAFE Report for Atlantic Highly Migratory Species (HMS) managed under the 2006 Consolidated Atlantic HMS Fishery Management Plan (FMP) and its amendments (Table 1.1).

Table 1.1 Species managed under 2006 Consolidated Atlantic HMS FMP and its amendments

Common name	*Scientific name*	Common name	*Scientific name*
Skipjack tuna	*Katsuwonus pelamis*	Night shark	*Carcharhinus signatus*
Albacore tuna	*Thunnus alalunga*	Sand tiger	*Carcharias taurus*
Yellowfin tuna	*Thunnus albacares*	White shark	*Carcharodon carcharias*
Bigeye tuna	*Thunnus obesus*	Basking shark	*Cetorhinus maximus*
Bluefin tuna	*Thunnus thynnus*	Tiger shark	*Galeocerdo cuvier*
Swordfish	*Xiphias gladius*	Nurse shark	*Ginglymostoma cirratum*
Sailfish	*Istiophorus platypterus*	Sevengill shark	*Heptranchias perlo*
White marlin	*Kajikia albida*	Sixgill shark	*Hexanchus griseus*
Blue marlin	*Makaira nigricans*	Bigeye sixgill shark	*Hexanchus nakamurai*
Roundscale spearfish	*Tetrapturus georgii*	Shortfin mako	*Isurus oxyrinchus*
Longbill spearfish	*Tetrapturus pfluegeri*	Longfin mako	*Isurus paucus*
Bigeye thresher shark	*Alopias superciliosus*	Porbeagle	*Lamna nasus*
Thresher shark	*Alopias vulpinus*	Smooth dogfish	*Mustelus canis*
Blacknose shark	*Carcharhinus acronotus*	Florida smoothhound	*Mustelus norrisi*
Bignose shark	*Carcharhinus altimus*	Gulf smoothhound	*Mustelus sinusmexicanus*
Narrowtooth shark	*Carcharhinus brachyurus*	Lemon shark	*Negaprion brevirostris*
Spinner shark	*Carcharhinus brevipinna*	Bigeye sand tiger	*Odontaspis noronhai*
Silky shark	*Carcharhinus falciformis*	Blue shark	*Prionace glauca*
Galapagos shark	*Carcharhinus galapagensis*	Whale shark	*Rhincodon typus*
Finetooth shark	*Carcharhinus isodon*	Caribbean sharpnose shark	*Rhizoprionodon porosus*
Bull shark	*Carcharhinus leucas*	Atlantic sharpnose shark	*Rhizoprionodon terraenovae*
Blacktip shark	*Carcharhinus limbatus*	Scalloped hammerhead	*Sphyrna lewini*
Oceanic whitetip shark	*Carcharhinus longimanus*	Great hammerhead	*Sphyrna mokarran*
Dusky shark	*Carcharhinus obscurus*	Bonnethead	*Sphyrna tiburo*
Caribbean reef shark	*Carcharhinus perezii*	Smooth hammerhead	*Sphyrna zygaena*
Sandbar shark	*Carcharhinus plumbeus*	Atlantic angel shark	*Squatina dumerili*
Smalltail shark	*Carcharhinus porosus*		

Consistent with the National Standard 2 guidelines, this SAFE Report provides a comprehensive summary of the most recent data on the condition of Atlantic HMS stocks, EFH, marine ecosystems, and fisheries managed under federal regulation from a variety of sources across a wide range of disciplines. This includes information from the latest stock assessment data, and a summary of recommendations and resolutions from the International Commission for the Conservation of Atlantic Tunas (ICCAT) and its Standing Committee on Research and Statistics (SCRS). It also provides updated information regarding the economic status of HMS fisheries, fishing communities, and industries, as well as the socio-economic and environmental impacts of recently implemented regulations.

1.1 Agency Activities and Regulatory Actions for HMS

Since the publication of the 2017 SAFE Report, NOAA Fisheries proposed or implemented a number of actions with regard to Atlantic HMS. These actions were published in the Federal Register (FR) and are listed in Table 1.2 and the major actions are discussed below. Most documents related to these and previous actions are available on the Atlantic HMS website at https://www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species or by calling the HMS Management Division at (301) 427-8503.

NOAA Fisheries held two Atlantic HMS Advisory Panel meetings in 2018 at Silver Spring, MD: March 7–9 and September 5–6. These meetings provided valuable opportunities for comments on a suite of management actions that NOAA Fisheries pursued or considered in 2018. Meeting presentations and transcripts are posted on the HMS website.

On January 30, 2018, NOAA Fisheries published a final rule to list oceanic whitetip shark as a threatened species throughout its range pursuant to the Endangered Species Act (ESA) (83 FR 4153). NOAA Fisheries considered the possibility of listing two distinct populations segments encompassing the Atlantic and Indo-Pacific but ultimately listed the species throughout its range due to a lack of genetic data to support the separate segments. Oceanic whitetip sharks occur within the management area of Atlantic HMS commercial and recreational fisheries, which are managed by the NOAA Fisheries Office of Sustainable Fisheries, HMS Management Division. Oceanic whitetip sharks are prohibited in all ICCAT fisheries and are therefore prohibited in the U.S. pelagic longline fishery, and the recreational fishery when the vessel has already retained a tuna, billfish, or swordfish.

On March 2, 2018, NOAA Fisheries published a Notice of Intent to draft an environmental impact statement and hold scoping meetings for a rule that would investigate whether area-based and weak hook management measures implemented to reduce dead discards of bluefin tuna in the pelagic longline fishery remain the best means of achieving the current management objectives. Measures would need to be consistent with the 2006 Consolidated HMS FMP, the Magnuson-Stevens Act, the Atlantic Tunas Convention Act (ATCA), and other relevant Federal laws and provide sufficient flexibility to adapt to future fishing needs (83 FR 8969). NOAA Fisheries held five scoping meetings and one webinar, and provided a scoping presentation at the Spring 2018 Atlantic HMS Advisory Panel meeting. NOAA Fisheries is currently developing a proposed rule, which is anticipated to be published in spring 2019.

Also on March 2, 2018, NOAA Fisheries published an interim final rule using emergency authority under the Magnuson-Stevens Act (16 U.S.C. § 1855(c)) to address overfishing of North

Atlantic shortfin mako sharks in HMS recreational and commercial fisheries (83 FR 8946). The management measures, which were immediately effective, were based on ICCAT's SCRS benchmark stock assessment for North Atlantic shortfin mako sharks. That assessment found the stock to be overfished with overfishing occurring. The measures largely focused on maximizing live releases of Atlantic shortfin mako sharks by allowing retention only in certain limited circumstances, increasing minimum size limits for retention, and improving data collection in ICCAT fisheries. These measures satisfy ICCAT Recommendation 17-08. The comment period for the interim final rule closed on May 7, 2018. An extension of the interim final rule was published on August 22, 2018 (83 FR 42452). The extension remains effective either through March 3, 2019 or when Amendment 11 to the 2006 Consolidated HMS FMP is finalized, which is expected in early 2019.

On June 14, 2018, NOAA Fisheries released draft Ecosystem-Based Fisheries Management (EBFM) Road Map Implementation Plans for Atlantic HMS, as well as plans for each NOAA Fisheries region and headquarters to guide implementation of the road map over the next five years. Building on existing efforts, the implementation plans will help address the growing demand for information and tools to manage with an ecosystem approach. The implementation plans coordinate the science and management functions of NOAA Fisheries and guide efforts to provide ecosystem information to managers to increase resilience of fish stocks, fishing-dependent communities, and protected species. The public comment period closed on September 30, 2018. Final implementation plans are anticipated in early 2019.

On July 2, 2018, NOAA Fisheries published a notice that adjusted the Swordfish General Commercial permit retention limits for the northwest Atlantic, Gulf of Mexico, and U.S. Caribbean regions for July through December of the 2018 fishing year (83 FR 30884). The Swordfish General Commercial permit retention limit in each of these regions was increased from the regulatory default limits of either two or three fish to six swordfish per vessel per trip. The adjustments applied to Swordfish General Commercial-permitted vessels and HMS Charter/Headboat-permitted vessels when on a non-for-hire trip.

On July 9, 2018, NOAA Fisheries published a final rule revising the current closure regulations for commercial shark fisheries (83 FR 31677). Revisions included changes to the landings threshold that prompts a closure and the minimum time between filing the closure with the Office of Federal Register and the closure becoming effective. The landings threshold was conditionally redefined allowing a shark fishery to remain open after the landings have reached, or are projected to reach, 80 percent of the available quota if the fishery's landings are not projected to reach 100 percent of the applicable quota before the end of the season. If the fishery's landings are projected to reach 100 percent of the applicable quota before the end of the season, the fishery would continue to be closed when landings have reached or are projected to reach 100 percent of the applicable quota before the end of the season. The minimum notice time between filing of the closure notice and the closure going into effect was modified, based on public comment, from five days to four days. This reduction allows more flexibility when closing shark fisheries and increased use of available quota while still preventing overharvests. These changes affect commercial shark fisheries in the Atlantic Ocean, including the Gulf of Mexico and Caribbean. The proposed rule for this action published on February 23, 2018 (83 FR 8037), and the public comment period ended on March 26, 2018.

On July 17, 2018, NOAA Fisheries published a final rule making editorial corrections to the regulations for Atlantic HMS (83 FR 33148). The purpose of this final action was to make the regulations easier to understand by updating cross-references, correcting grammatical and punctuation issues, and reformatting where needed to be consistent with FR guidelines. The action also simplified regulatory text by removing unnecessary language in several instances. Given these corrections are considered insignificant or non-substantive changes, the agency was not required to provide prior notice or seek public comment for this rule under the Administrative Procedure Act or any other law, and a proposed rule was not published. This final rule became effective on July 17, 2018.

On August 1, 2018, NOAA Fisheries published a temporary final rule that adjusted the North and South Atlantic swordfish baseline quotas for the 2018 fishing season (83 FR 37446). The resulting final adjusted North Atlantic baseline quota was increased from 2,937.6 metric tons (mt) dressed weight (dw) to 3,378.2 mt dw, while the final adjusted South Atlantic baseline quota decreased from 75.2 mt dw to 75.1 mt dw. Adjustments were based upon available underharvest from the 2017 U.S. commercial quota and international quota transfers. This action is consistent with ICCAT recommendations 17-02 and 17-03, and required to achieve domestic management objectives under the Magnuson-Stevens Act.

On October 11, 2018, NOAA Fisheries published a final rule that increased the baseline annual U.S. bluefin tuna quota from 1,058.79 mt whole weight (ww) to 1,247.86 mt ww and increased the baseline annual U.S. North Atlantic northern albacore quota from 527 mt ww to 632.4 mt ww to reflect quotas adopted by ICCAT (83 FR 51391). Accordingly, the bluefin tuna subquotas were increased by applying the process codified in the quota regulations to the ICCAT-recommended U.S. bluefin tuna quota. In the final rule, NOAA Fisheries updated regulatory language on school bluefin tuna to reflect current ICCAT requirements. NOAA Fisheries also made a minor change to the Atlantic tunas size limit regulations to address retention, possession, and landing of bigeye and yellowfin tuna damaged through predation by sharks and other marine species. NOAA Fisheries also provided notice of adjustment to the 2018 bluefin tuna Reserve category quota and the 2018 northern albacore baseline quota to account for the available underharvest from 2017, consistent with the Atlantic tunas quota regulations. The bluefin tuna purse seine and reserve category quotas that were announced earlier in 2018 were also further recalculated. The proposed rule for this action published on July 6, 2018 (83 FR 31517), and the public comment period ended on August 6, 2018.

On November 27, 2018, NOAA Fisheries published a final rule (83 FR 60777) that established quotas, opening dates, and retention limits for the 2019 Atlantic large coastal shark (LCS) and hammerhead commercial shark fisheries. Quota adjustments were based on over- and/or underharvests experienced during the 2018 fishing year. The LCS retention limit for Shark Directed limited access permit holders are set to begin at 45 LCS other than sandbar sharks, per trip, in the Gulf of Mexico region and at 25 LCS other than sandbar sharks, per trip in the Atlantic region. These retention limits for Shark Directed limited access permit holders have the flexibility to decrease or increase during the year to provide, to the extent practicable, prolonged fishing opportunities for commercial shark fishermen in all regions and areas. The proposed rule for this action published on September 11, 2018 (83 FR 45866), and the public comment period ended on October 11, 2018. All shark management groups open on January 1, 2019.

On December 12, 2018, a final environmental impact statement for Amendment 11 to the 2006 Atlantic Consolidated HMS FMP (Amendment 11) (83 FR 65670) was published in the Federal Register. Amendment 11, which is based on SCRS's stock assessment and ICCAT Recommendation 17-08, would implement management measures to address overfishing and establish a foundation for rebuilding the overfished shortfin mako shark stock. Until the final rule of this amendment is released, shortfin mako management measures have been modified by the March 2, 2018 interim emergency rule, described above. NOAA Fisheries announced its intent to prepare an Environmental Impact Statement for Amendment 11 to the 2006 Atlantic Consolidated HMS FMP and released an Issues and Options document presenting options for long-term conservation and management of the shortfin mako shark stock on March 5, 2018 (83 FR 9255). A proposed rule for Draft Amendment 11 was published on July 27, 2018 (83 FR 35590) and the notice of availability of a Draft Environmental Impact Statement also published on July 27, 2018 (83 FR 35637). NOAA Fisheries accepted public comments through October 8, 2018 and is working to finalize Amendment 11 before the interim final rule extension ends on March 3, 2019.

On December 21, 2018, NOAA Fisheries published a notice that adjusted the Swordfish General Commercial permit retention limits for the northwest Atlantic, Gulf of Mexico, and U.S. Caribbean regions for January through June of the 2019 fishing year (83 FR 65571). The Swordfish General Commercial permit retention limit in each of these regions was increased from the regulatory default limits of either two or three fish to six swordfish per vessel per trip. The Swordfish General Commercial permit retention limit in the Florida Swordfish Management Area remained unchanged at the default limit of zero swordfish per vessel per trip. These adjustments apply to Swordfish General Commercial-permitted vessels and to HMS Charter/Headboat-permitted vessels with a commercial endorsement when on a non-for-hire trip.

Based on public comments regarding Caribbean HMS regulations, the Atlantic HMS Management Division is considering undertaking a rulemaking that could potentially modify the swordfish limits for HMS Commercial Caribbean Small Boat and Swordfish General Commercial permit holders. NOAA Fisheries continues to gather input on local tuna, swordfish and shark fishing practices from the Caribbean Fishery Management Council (CFMC), the HMS Advisory Panel, local agencies, and fishermen in the Caribbean. To date, the Atlantic HMS Management Division has presented potential issues and options associated with such a rulemaking to the Caribbean council, the HMS Advisory Panel, and local commercial fishermen in Fajardo, Puerto Rico. The division continues to engage in outreach and consultation with interested parties while considering development of a proposed rule.

Table 1.2 Atlantic HMS federal management actions for Dec 22, 2017 to Dec 31, 2018

Citation	Date	Rule or notice
		HMS fisheries – general
83 FR 6841	2/15/2018	Notice of Public Meeting of the Atlantic HMS Advisory Panel
83 FR 9481	3/6/2018	Notice of Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops
83 FR 26432	6/7/2018	Notice of Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops
83 FR 33148	7/17/2018	Technical Amendment on Editorial Corrections Amending the Regulations for Atlantic HMS
83 FR 37795	8/2/2018	Notice of Public Meeting of the Atlantic HMS Advisory Panel
83 FR 42876	8/24/2018	Notice of Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops
83 FR 50642	10/9/2018	Request for Nominations for the Atlantic HMS Advisory Panel
83 FR 54724	10/31/2018	Notice of Intent to Issue Exempted Fishing Permits, Scientific Research Permits, Display Permits, Letters of Acknowledgment, and Shark Research Fishery Permits for Atlantic HMS in 2019
83 FR 63831	12/12/2018	Notice of Selection of All Atlantic HMS Tournaments for Reporting
83 FR 63837	12/12/2018	Notice of Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops
		Bluefin and BAYS (bigeye, albacore, yellowfin, skipjack) tunas
82 FR 60680	12/22/2017	Atlantic Bluefin Tuna General Category Fishery Inseason Transfer of 14.3 mt Atlantic Bluefin Tuna Quota from December 2018 Subquota to January 2018 Subquota and Daily Retention Limit for January 2018 Subquota Period
82 FR 61489	12/28/2017	Final Rule to Modify Individual Bluefin Tuna Quota Program Regulations for Accounting for Bluefin Tuna
83 FR 8969	3/2/2018	Notice of Availability of a Scoping Document on Pelagic Longline Bluefin Tuna Area-Based and Weak Hook Management
83 FR 9232	3/5/2018	Inseason Transfer of 10 mt Atlantic Bluefin Tuna Quota from the Reserve Category to the General Category and Closure of the General Category Fishery for Large Medium and Giant Bluefin Tuna
83 FR 12141	3/20/2018	Atlantic Bluefin Tuna Angling Category Southern Area Trophy Fishery Closure March 17
83 FR 17110	4/18/2018	Annual Adjustment of Atlantic Bluefin Tuna Purse Seine and Reserve Category Quotas; Inseason Quota Transfer of 44.5 mt from the Reserve Category to the Longline Category
83 FR 18230	4/26/2018	Atlantic Bluefin Tuna Angling Category Recreational Daily Retention Limit Adjustment April 26–December 31
83 FR 21936	5/11/2018	Atlantic Bluefin Tuna General Category Fishery Daily Retention Limit Adjustment for June 1–August 31
83 FR 22602	5/16/2018	Atlantic Bluefin Tuna Angling Category Gulf of Mexico Trophy Fishery Closure May 13
83 FR 31517	7/6/2018	Proposed Rule for Atlantic Bluefin Tuna and Northern Albacore Quotas; Minor Regulatory Change to Address Shark-damaged Tunas
83 FR 35566	7/27/2018	Atlantic Bluefin Tuna Angling Category Northern Area Trophy Fishery Closure July 26
83 FR 38664	8/7/2018	Inseason Transfer of 30 mt Atlantic Bluefin Tuna Quota from the Reserve Category to the Harpoon Category
83 FR 42607	8/23/2018	Atlantic Bluefin Tuna General Category Fishery Daily Retention Limit Adjustment August 23–31
83 FR 47843	9/21/2018	Inseason Transfer of 30 mt Atlantic Bluefin Tuna Quota from the Reserve Category to the General Category and Closure of the General Category Fishery September 23–30

Citation	Date	Rule or notice
83 FR 50857	10/10/2018	Inseason Transfer of 55 mt Atlantic Bluefin Tuna Quota from the Reserve Category and Harpoon Category to the General Category and Closure of the General Category Fishery October 5–December 1
83 FR 51391	10/11/2018	Final Rule for Atlantic Bluefin Tuna and Northern Albacore Quotas; Minor Regulatory Change to Address Predator-damaged Tunas
83 FR 52169	10/16/2018	Atlantic Bluefin Tuna General Category Fishery Reopen October 15–16
83 FR 55108	11/2/2018	Atlantic Bluefin Tuna General Category Fishery Reopen October 31–November 2
83 FR 57340	11/15/2018	Atlantic Bluefin Tuna General Category Fishery Reopen November 12–16
83 FR 62512	12/4/2018	Inseason Transfer of 139.1 mt Atlantic Bluefin Tuna Quota from the Reserve Category and Harpoon Category to the General Category; Adjustment of General Category December Subquota to 50 mt
83 FR 67140	12/28/2018	Atlantic Bluefin Tuna General Category Fishery Inseason Transfer of 19.5 mt Atlantic Bluefin Tuna Quota from December 2019 Subquota to January 2019 Subquota and Daily Retention Limit for January 2019 Subquota Period
		Sharks
83 FR 5061	2/5/2018	Notice of Public Meeting for Selected Participants of the 2018 Shark Research Fishery
83 FR 8037	2/23/2018	Proposed Rule to Revise Atlantic HMS Shark Fishery Closure Regulations
83 FR 8946	3/2/2018	Emergency Measures to Address Overfishing of Atlantic Shortfin Mako Shark
83 FR 9255	3/5/2018	Notice of Availability of a Scoping Document on Options to Address Overfishing of North Atlantic Shortfin Mako Sharks
83 FR 10802	3/13/2018	Closure of Commercial Blacktip Shark, Aggregated Large Coastal Sharks, and Hammerhead Shark Management Groups in the Western Gulf of Mexico Sub-Region March 13
83 FR 21744	5/10/2018	Atlantic Region Commercial Aggregated Large Coastal Shark and Hammerhead Shark Management Groups Retention Limit Adjustment May 12–December 31
83 FR 31677	7/9/2018	Final Rule to Revise Atlantic HMS Shark Fishery Closure Regulations
83 FR 33870	7/18/2018	Atlantic Region Commercial Aggregated Large Coastal Shark and Hammerhead Shark Management Groups Retention Limit Adjustment July 18–December 31
83 FR 35590	7/27/2018	Proposed Rule for Amendment 11 to the 2006 Consolidated HMS Fishery Management Plan on Shortfin Mako Shark Management
83 FR 42452	8/22/2018	Extension of Emergency Measures to Address Overfishing of Atlantic Shortfin Mako Shark
83 FR 45866	9/11/2018	Proposed Rule to Establish Quotas, Opening Dates, and Retention Limits for the 2019 Atlantic Shark Commercial Fishing Season
83 FR 47598	9/20/2018	Comment Period Extension for the Proposed Rule for Amendment 11 to the 2006 Consolidated HMS Fishery Management Plan on Shortfin Mako Shark Management
83 FR 48598	9/26/2018	Request for Nominations for the Atlantic HMS Southeast Data, Assessment, and Review Workshops Advisory Panel
83 FR 54917	11/1/2018	Request for Applications for Participation in the Atlantic HMS 2019 Shark Research Fishery
83 FR 55638	11/7/2018	Atlantic Region Commercial Aggregated Large Coastal Shark and Hammerhead Shark Management Groups Retention Limit Adjustment November 6–December 31
83 FR 60776	11/27/2018	Closure of Commercial Blacktip Shark in the Eastern Gulf of Mexico Sub-Region November 25
83 FR 60777	11/27/2018	Final Rule to Establish Quotas, Opening Dates, and Retention Limits for the 2019 Atlantic Shark Commercial Fishing Season
		Swordfish and billfishes
83 FR 30884	7/2/2018	Swordfish General Commercial Permit Retention Limit Adjustment July 1–December 31, 2018

Citation	Date	Rule or notice
83 FR 37446	8/1/2018	Adjustments to 2018 North and South Atlantic Swordfish Quotas
83 FR 65571	12/21/2018	Swordfish General Commercial Permit Retention Limit Adjustment January 1–June 30, 2019

1.2 2018 Accomplishments of the International Commission for the Conservation of Atlantic Tunas

ICCAT is a regional fishery management organization with 52 members, including the United States. The 21st Special Meeting of ICCAT was held in Dubrovnik, Croatia, on November 12–19, 2018. The goals for the United States at this meeting were focused primarily on adoption of critical conservation measures for priority stocks while maintaining access to ICCAT-managed fisheries for U.S. recreational and commercial fishermen. The U.S. delegation developed recommendations aimed at promoting the conservation, management, and rebuilding of Atlantic HMS stocks (i.e., tunas, billfish, swordfish, sharks), including those important to U.S. interests. ICCAT made progress on a number of issues, including the ongoing effort to amend the ICCAT Convention; a management strategy evaluation for certain tuna stocks; monitoring, control, and surveillance measures; and compliance. At ICCAT, the United States advocated for needed conservation and management measures for bigeye tuna and other tropical tunas, marlins, and sharks, and for measures promoting conservation of bycatch species (e.g., sea turtles and cetaceans), although such measures were not adopted this year.

Bluefin Tuna

ICCAT adopted Resolution 18-03 on the Development of Initial Management Objectives for Eastern and Western Atlantic bluefin tuna. This resolution details the anticipated work over the next year by ICCAT and its scientific body to develop bluefin tuna management objectives for potential adoption by ICCAT in 2019. Development of these objectives is an important element to transitioning to the management procedure for bluefin tuna stocks, which ICCAT has recommended for bluefin tuna and other priority stocks to manage fisheries in the face of identified uncertainties. For eastern Atlantic and Mediterranean bluefin tuna, Recommendation 18-02 modifies numerous management measures such as minimum size, fishing and farming capacity limits, and open seasons, and implements minor quota distribution modifications for 2019 and 2020 specifically to the total allowable catch adopted in 2017.

Tropical Tunas (Atlantic bigeye, yellowfin, and skipjack tunas)

A new stock assessment for bigeye tuna conducted in 2018 determined the stock was overfished and that overfishing was occurring. Despite strenuous efforts, ICCAT was not able to reach an agreement on a conservation and management measure to end overfishing and begin implementation of a rebuilding plan for bigeye tuna. The U.S. strongly advocated for a total allowable catch to end overfishing within two years and rebuild the stock within ten years. Ultimately, ICCAT adopted Recommendation 18-01 through 2018 for bigeye tuna, which extended existing management measures, including the quota table, in Recommendation 16-01. However, ICCAT did suspend paragraph 2(a) of Recommendation 16-01, which deals with payback of total allowable catch overages, and the Ghanaian payback provisions adopted in

2011. Bigeye tuna management measures will be revisited in 2019. A stock assessment for yellowfin tuna is scheduled for 2019.

Marlins

A new stock assessment for blue marlin conducted in 2018 found the stock was overfished and that overfishing was occurring. ICCAT adopted Recommendation 18-04, which extended the existing management measures on blue marlin and white marlin, originally established in Recommendation 15-05, for one year. ICCAT is expected to revisit the measures in 2019. A stock assessment for white marlin/spearfish is scheduled for 2019.

Monitoring, Control and Surveillance Measures

ICCAT adopted Recommendation 18-11, a framework for the bilateral exchange of at-sea inspectors that will help to familiarize inspectors with the boarding and inspection procedures of other ICCAT members. This voluntary program will help build capacity by providing direct experience in at-sea boarding and inspections and in post-inspection follow-up. Recommendation 18-09 strengthens the mechanism for combating illegal, unreported, and unregulated fishing (IUU) by requiring ICCAT members to restrict port entry and access to port services in defined circumstances, consistent with the 2009 Port State Measures Agreement.

Recommendation 18-10 strengthens ICCAT's minimum standards for maintaining a vessel monitoring system (VMS) on longline and purse seine vessels, increasing the frequency of data transmission and expanding the measure's application to smaller commercial vessels that are authorized to fish in waters beyond their country's jurisdiction. This measure will result in more precise information on fishing and fishing-related activities such as transshipment, which will support ICCAT members' enforcement and scientific initiatives. Finally, Recommendation 18-08 clarifies and streamlines the process to list and delist vessels as participating in IUU activities.

Convention Amendment

Following a 10-year negotiation process, ICCAT took the significant step of endorsing the text of proposed amendments to the 1969 ICCAT Convention to reflect a precautionary and ecosystem-based approach to fisheries management; clarify the scope of the Commission's management authority, particularly for sharks; and allow greater participation from Taiwan in ICCAT's deliberations. After undergoing a legal review, the amendments are expected to be adopted and opened for ratification in late 2019.

Compliance

In 2018, the Compliance Committee included two full-day sessions in advance of the ICCAT commission meeting to allow for in-depth CPC-by-CPC compliance review. CPCs are contracting parties, non-contracting parties, entities, or fishing entities. ICCAT implemented improvements to its compliance review process in 2018 and adopted three recommendations related to compliance: implementation of reporting check sheets for billfish measures, a continuation of reporting check sheets for shark measures, and an amendment of certain ICCAT reporting deadlines in order to improve the Compliance Committee's ability to carry out its work.

1.3 State Regulations

Table 1.3 outlines the state regulations regarding Atlantic HMS as of November 1, 2018. While the HMS Management Division updates this table annually, individuals interested in the current regulations for any state should contact that state directly.

The Atlantic tunas—bluefin, bigeye, albacore, yellowfin, and skipjack—are under federal jurisdiction from the outer boundary of the exclusive economic zone to the shoreline. Federal regulations for Atlantic tunas apply in state waters of the U.S. Atlantic, Gulf of Mexico, and Caribbean, with the exception of the state waters of Maine, Connecticut, and Mississippi (50 CFR 635.1(b)). NOAA Fisheries periodically reviews state tuna regulations for federal consistency as required under the Atlantic Tunas Conservation Act. Table 1.3 describes the state regulations as stated in available source material and makes no statement about the consistency of the individual fishery regulations with federal regulations.

Coastal states coordinate fishery management measures through commissions to create consistent regulations and ensure stocks are protected across state boundaries. The Atlantic States Marine Fisheries Commission (ASMFC) is composed of 15 member states along the U.S. Atlantic coast. The Gulf States Marine Fisheries Commission (GSMFC) is composed of five member states along the U.S. Gulf of Mexico coast. In August 2008, the Atlantic Commission approved the Interstate FMP for Atlantic Coastal Sharks, effective as of January 1, 2010. This FMP was modified via Addendum I in September 2009 to allow for limited at-sea processing of smoothhound sharks and to remove recreational smoothhound shark possession limits. The FMP was also modified via Addendum II in May 2013 to establish state shares of any future federal smoothhound shark quota and to allow smoothhound sharks to be fully processed at sea provided the fin to carcass ratio does not exceed 12 percent. In October 2013, the interstate FMP was further modified through Addendum III to reorganize some shark complexes to be consistent with federal regulations. In August 2016, Addendum IV was finalized which amended the smooth dogfish at-sea processing requirements to be consistent with federal regulations and states were required to implement this addendum by January 1, 2017. Under Addendum IV, smooth dogfish fins may be removed at sea provided that at least 25 percent of the retained catch is smooth dogfish. All other requirements, such as the 12 percent fin-to-carcass ratio are still applicable. Addendum V, implemented in October 2018, allows the ASMFC Coastal Shark Board to respond to changes in the stock status of coastal shark populations and adjust regulations through board action rather than an addendum, ensuring greater consistency between state and federal shark regulations. All management measures for coastal sharks in the interstate FMP and its addendums have been implemented by ASMFC members unless they have been granted *de minimus* status (as in Maine, Massachusetts, and New Hampshire) or they have equivalent conservation measures already in place. Member states can implement more restrictive management measures. A state can request permission to implement an alternative to any mandatory compliance measure only if that state can show to the ASMFC board's satisfaction that its alternative proposal will have the same conservation value as the measure contained in this management plan or any addenda prepared under adaptive management.

Delaware, Maryland, Massachusetts, New York, and Texas have also adopted legislative bans on the possession and trade of shark fins, although some of these allow limited exemptions for

species such as smoothhound sharks. Some states on the west coast of the United States, several U.S. territories, and Illinois have similar restrictions.

State rules and regulations pertaining to Atlantic HMS are listed in Table 1.3. As regulations are subject to change, contact the appropriate state personnel to ensure the regulations provided below are current.

Table 1.3 State rules and regulations pertaining to Atlantic HMS

State regulations are subject to change. Please contact the appropriate state personnel to ensure that the regulations listed below are current. Please note that states are listed below in geographic order, descending from the north. * = Regulations, references, and contact information not confirmed by state before publication of this year's report. Please see state resources for more information; X = Regulations in Effect; FL = Fork Length; CL = Carcass Length; TL = Total Length; LJFL = Lower Jaw Fork Length; CFL = Curved Fork Length; PFCFL = Pectoral fin curved fork length; dw = Dressed Weight; SCS = Small Coastal Sharks; LCS = Large Coastal Sharks.

State	Species				Cite reference	Regulatory details	Contact information
	Tunas	Swordfish	Billfishes	Sharks			
Maine*	X			X	Tuna: ME Rev. Stat. Ann. tit. 12, " 6001, 6502, and 6551 Sharks: 13-188 CMR Ch. 50, § 50.02	Tuna: Recreational retention limit is 1 tuna/year and requires a non-resident special tuna permit; unlawful to fish for tuna with gear other than harpoon or hook and line or possess tuna taken in unlawful manner. Sharks: Commercial harvest of coastal sharks (except spiny dogfish) in state waters is prohibited; finning is prohibited; sharks harvested elsewhere but landed in Maine, or sharks landed recreationally, must be landed with head, fins, and tail naturally attached to the carcass; porbeagle sharks shall only be taken by recreational fishing from state waters. Dealers who purchase sharks must obtain a federal dealer permit. Recreational anglers must possess a federal HMS Angling permit.	ME Department of Marine Resources Hanna Dean Regulations Officer Phone: (207) 624-6550 Fax: (207) 624-6024
New Hampshire			X	X	Billfish: N.H. Code Admin. R. Fis 603.13 Sharks: N.H. Code Admin. R. Fis 603.20 Bluefin tuna: N.H. Code Admin. R Fis 603.25	Billfish: Possession limit is 1 billfish/trip with a minimum size (LJFL) of 99" for blue marlin, 66" for white marlin, and 57" for sailfish; may be taken by rod and reel only; unlawful to sell billfish (blue or white marlin, sailfish, and longbill spearfish), personal use only. Sharks: See Fis 603.20 list for prohibited sharks at http://gencourt.state.nh.us/rules/state_agencies/fis600.html; no take, landings, or possession of prohibited shark species allowed; NH Wholesale Marine Species License and a federal dealer permit is required for all dealers purchasing listed sharks; porbeagle sharks can only be taken by recreational fishing from state waters; head, fins and tail must remain attached to all shark species through landing. Bluefin Tuna: Recreational size limit is 27" CFL (20" PFCFL); commercial size limit 73" CFL (54" PFCFL); possession and seasonal limits are listed in 50 CFR §635.	NH Fish and Game Department Douglas Grout Phone: (603) 868-1095 Fax: (603) 868-3305

State	Species				Cite reference	Regulatory details	Contact information
	Tunas	Swordfish	Billfishes	Sharks			
Massachusetts*	X			X	Bluefin Tuna: 322 CMR 6.04 Sharks: 322 CMR 6.37	Bluefin Tuna: references ATCA and federal regulations; bluefin tuna may be retained if caught in a trap as incidental catch; fishing for bluefin tuna by means of any net is prohibited prior to September 1 of the year; fishing for tuna by means of purse seine is allowed in state waters if the vessel is compliant with the registration requirements set forth in 322 CMR 6.04(4); purse seining for bluefin tuna is prohibited in Cape Cod Bay. Sharks: ASMFC Coastal Shark Plan (no shark species, except smooth dogfish in some instances, may be landed with tails or fins removed 322 CMR 6.37(3)(d)); permitted species that are allowed to be harvested, and prohibited species that are protected may not be harvested unless specifically authorized by the Director of NOAA Fisheries. All Massachusetts commercial and recreational fishing regulations are at http://www.mass.gov/eea/agencies/dfg/dmf/laws-and-regulations/	MA Division of Marine Fisheries Jared Silva Phone: (617) 626-1534 Fax: (617) 626-1509
Rhode Island				X	Sharks: RI Code of Regulations 250-RICR-90-00-3.19	Sharks: ASMFC Coastal Shark Plan, with additional measures to complement HMS regulations; commercial fishing license or landing permit required to harvest or land sharks; no person fishing commercially shall possess shortfin mako or species listed in the prohibited or research commercial species groups; no person fishing recreationally shall possess a shark listed in the prohibited or research species groups; minimum FL sizes of 54", with exception of 78" for scalloped, smooth, and great hammerhead sharks, 83" for shortfin mako, and no minimum size limits for Atlantic sharpnose, bonnethead, and smoothhound; any person fishing recreationally for sharks with rod and reel must use corrodible circle hooks and when releasing sharks maximize gear removal as safely as possible. All Rhode Island commercial and recreational marine fisheries regulations are at: http://www.dem.ri.gov/pubs/regs/regs/fishwild/rimftoc.htm	RI Department of Environment Management, Division of Marine Fisheries Conor Mcmanus, Ph.D. Phone: (401) 423-1941 Fax: (401)423-1925 Conor.McManus@dem.ri.gov
Connecticut				X	Sharks: Regulations of Connecticut State Agencies § 26-159a-1; Connecticut General Statutes §26-102, Declaration 18-02	Sharks: Prohibited species same as federal regulations; possession of sandbar sharks prohibited except by permit for research and display purposes. No commercial fishing for large coastal sharks; no commercial small coastal shark fishing until further notice.	CT Department of Energy and Environmental Protection Justin Davis Phone: (860) 447-4322 Fax: (860) 434-6150

State	Species				Cite reference	Regulatory details	Contact information
	Tunas	Swordfish	Billfishes	Sharks			
New York*			X	X	Billfish: NY Environmental Conservation ' 13-0339 (5) Sharks: NY Environmental Conservation ' 13-0338; State of NY Codes, Rules and Regulations (Section 40.7)	Billfish: Blue marlin, white marlin, sailfish, and longbill spearfish shall not be bought, sold or offered for sale; striped marlin, black marlin, shortbill spearfish shall not be bought, sold or offered for sale unless tagged and identified prior to entry into the state. Sharks: ASMFC Coastal Shark Plan. Separate requirement that no person shall possess, sell, offer for sale, trade, or distribute a shark fin; provided, however, that this prohibition shall not apply to any shark fin that was taken from a spiny dogfish (*Squalus acanthias*) or a smooth dogfish (*Mustelus canis*) lawfully caught by a licensed commercial fisherman; a shark fin may be possessed by any person if the shark was lawfully caught and the person has a recreational marine fishing registration or a license or permit from the department for bona fide scientific research or educational purposes. Non-stainless, non-offset circle hooks must be used when taking sharks. Commercial shark fishermen must attend NOAA Fisheries' Safe Handling, Release, and Identification Workshops.	NY Department of Environmental Conservation Stephen W. Heins Phone: (631) 444-0435 Fax: (631) 444-0449
New Jersey*				X	Sharks: NJ Admin Code, Title 7. Dept of Environmental Protection, NJAC 7:25-18.1 and 7:25-18.12(d)	Sharks: ASMFC Coastal Shark Plan.	NJ Division of Fish and Wildlife Russ Babb Phone: (609)748-2020 Fax: (609) 748-2032
Delaware			X	X	Billfish : DE Code Ann. titl. 7, ' 1310 Sharks: DE Code Regulations 3541	Billfish: Prohibition on sale of Atlantic sailfish and blue/white/striped marlin. Sharks: ASMFC Coastal Shark Plan.	DE Division of Fish and Wildlife John Clark Phone: (302) 739-9914

State	Species				Cite reference	Regulatory details	Contact information
	Tunas	Swordfish	Billfishes	Sharks			
Maryland*	X	X	X	X	Bluefin tuna: Code of Maryland Regulations 08.02.05.23 Swordfish: Md. Code. Regs. 08.02.05.27 Billfish: Md. Code Regs. 08.02.05.26 Sharks: Md. Code Regs. 08.02.22. 01-04	Bluefin tuna: Federal regulations used to control size and seasons, and recreational catch required to be reported using catch cards and to be tagged. Swordfish: Federal regulations used to control size and seasons, and recreational catch required to be reported using catch cards and to be tagged. Billfish (blue/white marlin and sailfish): Federal regulations control size and seasons, and recreational catch required to be reported using catch cards and to be tagged. Sharks: ASMFC Coastal Shark Plan. Recreational: Catch must be reported using catch cards and be tagged; all recreationally harvested sharks must have heads, tails, and fins attached naturally to the carcass through landing. Commercial: All commercially harvested sharks other than smoothhound must have tails and fins attached naturally to carcass through landing; smoothhound sharks harvested commercially may have dorsal, pectoral and caudal fins removed if smoothhound sharks make up at least 25%, by weight, of the total catch on board at the time of landing; if smoothhound fins are removed the total wet weight of the caudal fins may not exceed 4% of the total dressed weight of smoothhound carcasses landed or found on board a vessel; and the dorsal and pectoral fins may not exceed 8% of the total dw of smoothhound carcasses landed or found on board a vessel; closure for certain species from May 15–July 15 unless the shark was legally harvested from federal waters and gear is stowed; closed to harvest when federal waters are closed.	MD Department of Natural Resources Sarah Widman Phone: (410) 260-8266
Virginia			X	X	Billfish: 4 VA Admin Code 20-350-10 Sharks: 4 VA Admin Code 20-490-10	Billfish: Prohibition on sale of billfish. Sharks: ASMFC Coastal Shark Plan.	VA Marine Resources Commission Robert O'Reilly Phone: (757) 247-2247 Fax: (757) 247-2002

State	Species				Cite reference	Regulatory details	Contact information
	Tunas	Swordfish	Billfishes	Sharks			
North Carolina*	X		X	X	Tunas: 15A N.C. Admin. Code 3M.0520 Billfish: 15A N.C. Admin. Code 3M.050 Sharks: 15A N.C. Admin. Code 3M.0505	Tuna: Commercial and recreational minimum size of 27" CFL for yellowfin tuna, 27" CFL for bigeye tuna, 73" CFL for bluefin tuna; recreational bag limit of 3 yellowfin tuna/day. Billfish: Recreational possession limit of 1 blue or white marlin/vessel/trip; 1 sailfish/person/day; minimum size of 99" for blue marlin, 66" for white marlin, 63" for sailfish; unlawful to sell or offer for sale blue or white marlin and sailfish. Sharks: Director may impose restrictions for size, seasons, areas, quantity, etc. via proclamation; ASMFC Coastal Shark Plan; plus longline in the shark fishery shall not exceed 500 yd or have more than 50 hooks.	NC Division of Marine Fisheries Randy Gregory Phone: (252) 726-7021 Fax: (252) 726-0254
South Carolina*	X	X	X	X	Tuna/Swordfish: SC Code Ann 50-5-2725 and 2730 Billfish: SC Code Ann 50-5-1700, 1705, 2725 and 2730; 50-1-30 (7) Sharks: SC 50-5-2725, 2730	Tuna: 27" CFL for bigeye, 27" CFL for yellowfin, 27–73" CFL for bluefin. Billfish: min sizes of 99" for blue marlin, 66" for white marlin, 63" for sailfish, 47" for swordfish, spearfish possession prohibited; unlawful to sell billfish; hook and line gear only; unlawful to possess while transporting gillnets, seines, or other commercial gear. Sharks: See list for prohibited sharks; gillnets may not be used in the shark fishery in state waters; state permit required for shark fishing in state waters.	SC Department of Natural Resources Wallace Jenkins Phone: (843) 953-9835 Fax: (843) 953-9386
Georgia*			X	X	Gear Restrictions/Prohib: GA Code Ann 27-4-7; Billfish: GA Comp. R. & Regs. 391-2-4-.04 Sharks: GA Comp. R. & Regs. 391-2-4-.04	Gear Restrictions: Use of gillnets and longlines prohibited in state waters. Billfish: Possession prohibited in state waters except for catch and release. Sharks—commercial/recreational: Prohibited species same as federal, plus silky sharks; from the Small Shark Composite (bonnethead, Atlantic sharpnose, spiny dogfish) 1/person, min size 30" FL; hammerheads (great, scalloped and smooth) 1/person or boat (whichever less), min size 78" FL; other sharks 1 shark/person or boat (whichever is less), min size 54" FL; all species must be landed head and fins intact; sharks may not be landed if harvested with gillnets; ASMFC Coastal Shark Plan. It is unlawful to transfer at sea in State waters from a fishing vessel to any other vessel or person any fish caught which are subject to the restrictions specified in this Rule. GA. Comp. R. & Regs. 391-2-4-.04(5)(b).	GA Department of Natural Resources Carolyn Belcher Phone: (912) 264-7218 Fax: (912) 262-3143

Florida*		X	X	X	Sharks: FL Administrative Code 68B-44, 68B-4400 Billfish and Spearfish: FL Administrative Code 68B-33 Swordfish: FL Administrative Code 68B-58	Billfish: Longbill and Mediterranean spearfish—harvest, possession, landing, purchase, sale, exchange prohibited. Blue/white marlin, roundscale spearfish, and sailfish—sale prohibited, aggregate possession of 1 fish/person/day; gear restriction (hook and line only); min size limit (LJFL) of 99" blue marlin, 66" white marlin, 66" roundscale spearfish, 63" sailfish; all recreational landings must be reported to NOAA within 24 hours unless harvested as participant in fishing competition in which participants must register or award offered for catching or landing a billfish; must land in whole condition (gutting allowed). Swordfish: min size of 47" LJFL/25" CK; authorized fishing gear hook and line in state waters; recreational possession limit for private boats of 1 fish/person/day or 4 fish/vessel/day (with 4 or more persons onboard), for hire-boats of 1 fish/paying customer/day up to 15 fish/vessel/day, and captain/crew on for-hire vessels of zero bag limit; commercial harvest and sale allowed only with Fla saltwater products license, restricted species endorsement, and federal commercial swordfish permit, so federal regulations apply in state waters unless state regulations are more restrictive; wholesale dealers must possess federal swordfish dealer permit; all recreational landings must be reported to NOAA Fisheries within 24 hours unless harvested as a participant in a fishing competition in which participants must register or an award is offered for catching or landing a swordfish. Sharks—commercial/recreational: prohibited species same as federal regulations plus prohibition on harvest of spiny dogfish, lemon, sandbar, silky, tiger, great hammerhead, smooth hammerhead, and scalloped hammerhead sharks; hook and line only; unlawful to harvest any shark with the use of any multiple hook in conjunction with live or dead natural bait and unlawful to harvest shark by snagging (snatch hooking); min size of 54" except no min size on blacknose, blacktip, bonnethead, smooth dogfish, finetooth, Atlantic sharpnose; possession limit of 1 shark/person/day, max 2 sharks/vessel on any vessel with 2 or more persons on board; finning, removing heads and tails, and filleting prohibited (gutting allowed); state waters close to commercial harvest when adjacent federal waters close; federal permit required for commercial harvest, so federal regulations apply in state waters unless state regulations are more restrictive; direct and continuous transit through state waters to place of landing for spiny dogfish, lemon, sandbar, silky, tiger, great hammerhead, smooth hammerhead, and scalloped hammerhead sharks legally caught in federal waters is allowed.	FL Fish and Wildlife Conservation Commission Martha Guyas Phone: (850) 487-0554 Fax: (850) 487-4847

State	Species				Cite reference	Regulatory details	Contact information
	Tunas	Swordfish	Billfishes	Sharks			
Alabama	X	X	X	X	Tunas/Swordfish/Billfish: AL Administrative Code r.220-3-.30 Sharks: AL Administrative Code r.220-3-.30, r.220-3-.37, and r.220-3-.77	All HMS: Reference to federal landing form regulations; any vessel or individual required to possess a federal permit to harvest or retain marine aquatic species must possess such permit to possess or land such marine aquatic species in Alabama. Tuna: Recreational and commercial fishermen must have a federal permit to fish for tunas; CFL min size of 27" for yellowfin and bigeye. Sharks: prohibited species of Atlantic angel, basking, bigeye sand tiger, bigeye sixgill, bigeye thresher, bignose, Caribbean reef, Caribbean sharpnose, dusky, Galapagos, largetooth sawfish, longfin mako, narrowtooth, night, sand tiger, smalltooth sawfish, smalltail, sevengill, sixgill, spotted eagle ray, whale, white, sandbar (unless fisherman possess a federal shark research fishery permit), silky (unless fisherman possess a Federal Atlantic Shark permit). Recreational—bag limit of 1 sharpnose/pers/day and 1 bonnethead/pers/day with no min size; great, smooth, scalloped hammerheads 1/pers/day with 78" FL; all other sharks 1/person/day, min size of 54" FL or 30" dressed. Commercial—no min size and no possession limit on any non-prohibited species; restrictions of chumming and shore-based angling if creating unsafe conditions for beach goers, sun bathers, swimmers, or any other person; commercial-state waters close when federal season closes; no commercial shark fishing on weekends, Memorial Day, Independence Day, or Labor Day; regardless of open or closed season, gillnet fishermen targeting other fish may retain sharks with dw not exceeding 10 percent of total catch.	AL Department of Conservation and Natural Resources, Marine Resources Division Director Scott Bannon Phone: (251) 861-2882 www.outdooralabama.com
Mississippi	X		X	X	Tunas: MS ADC 43 000 040 Billfish: MS Code Title-22 part 7 Sharks: MS Code Title-22 part 7	Tunas: No directed bluefin tuna fishing; recreational anglers can retain incidentally-caught bluefin tuna up to 1/boat/week; recreational and commercial min size 27" CFL for yellowfin and bigeye; recreational retention (possession) limit for yellowfin is 3/person. Billfish: Unlawful to sell blue and white marlin and sailfish without proper federal documentation; recreational min size (LJFL) 99" for blue marlin, 66" for white marlin, 63" for sailfish; no possession for longbill spearfish; no limit for recreational take. Sharks: recreational min size 37" TL for LCS, 25" TL for SCS; possession limit for LCS and pelagics 1/pers up to 3/vessel and SCS 4/person; unlawful for commercial and/or recreational fishermen to possess sandbar, silky or dusky sharks; prohibition on finning.	MS Department of Marine Resources Matt Hill Phone: (228) 374-5000

State	Species				Cite reference	Regulatory details	Contact information
	Tunas	Swordfish	Billfishes	Sharks			
Louisiana	X	X	X	X	Tunas: LA Administrative Code Title 76, Pt. VII, Ch. 3, § 361 Swordfish/Billfish: LA Administrative Code Title76, Pt. VII, Ch. 3, § 355 Sharks: LA Administrative Code Title 76, Pt. VII, Ch. 3, § 357	Tunas: Recreational and commercial minimum size is 27" CFL for yellowfin and bigeye; recreational bag limits are 3 yellowfin/person; recreational minimum size is 73" CFL for bluefin tuna and bag limit is 1/vessel/year; recreational and commercial tuna fishing requires a federal permit; LA Admin Code States: "No person who, pursuant to state or federal law, is subject to the jurisdiction of this state shall violate any federal law, rule or regulation particularly those rules and regulations enacted pursuant to the Magnuson-Stevens Act and published in the Code of Federal Regulations (FR) as amended Title 50 and 15, for tunas while fishing in the EEZ, or possess, purchase, sell, barter, trade, or exchange tunas within or without the territorial boundaries of Louisiana in violation of any state or federal law, rule or regulation particularly those rules and regulations enacted pursuant to the Magnuson-Stevens Act and published in the Code of FR as amended Title 50 and 15 law." Billfish/Swordfish: Minimum size is 99" LJFL for blue marlin, 66" LJFL for white marlin 63" LJFL for sailfish, 29" carcass length or 33 lb dw for swordfish (47" LJFL if not dressed); recreational creel limit for swordfish is 5/vessel/trip; federal Swordfish permit required for commercial swordfish fishing; dealers must have federal permit to buy swordfish; state swordfish fishery closes with federal fishery; reference to federal billfish regulations; sale or purchase of sailfish, blue marlin, black marlin, striped marlin, hatchet marlin, and white marlin are prohibited. Sharks: Recreational minimum size is 54" FL, except Atlantic sharpnose and bonnethead, which have no size limit; bag limit is 1 sharpnose or bonnethead per person/day, all other sharks, except sandbar, silky and all prohibited sharks is 1 shark/ vessel/ trip in aggregate. Commercial has no minimum size; limit of 45/permit holder/day; requires annual state shark permit; owners/operators of vessels other than those taking sharks in compliance with state or federal commercial permits are restricted to no more than one shark from either the large coastal, small coastal, or pelagic group per vessel per trip within or outside Louisiana waters, except Atlantic sharpnose and bonnethead which are allowed at one/person/day. Commercial and recreational fishing prohibited between Apr 1–Jun 30; prohibited species are same as federal regulations; fins must remain naturally attached to carcass though off-loading.	LA Department of Wildlife and Fisheries Jason Adriance Phone: (504) 284-2032 or 225 765-2889 Fax: (504) 284-5263 or (225) 765-2489

State	Species				Cite reference	Regulatory details	Contact information
	Tunas	Swordfish	Billfishes	Sharks			
Texas		X	X	X	Billfish/Swordfish/Sharks: TX Administrative Code Title 31, Part 2, Parks and Wildlife Code Title 5, Parks and Wildlife Proclamations 57.971, 57.973 and 57.981	Blue marlin, white marlin, sailfish, sharks, longbill spearfish, and broadbill swordfish are gamefish and may only be taken with pole and line (including rod and reel); blue marlin, white marlin, sailfish, and longbill spearfish may not be sold for any purpose. Billfish: No bag limit; minimum size (TL) is 131" for blue marlin, 86" for white marlin, 84" for sailfish. Sharks: Commercial/recreational: bag limit is 1 shark/person/day; possession limit is twice the daily bag limit (i.e., 2 sharks/person/day); minimum size is 24" TL for Atlantic sharpnose, blacktip, and bonnethead sharks and 64" TL for all other lawful sharks, except hammerhead sharks; minimum size for great, smooth, and scalloped hammerhead sharks is 99" TL; prohibited species include all federally prohibited species and sandbar sharks; buying, selling, offering to buy or sell, or possessing a shark fin for the purpose of sale, transport, or shipment is prohibited.	TX Parks & Wildlife Department Perry Trial Phone: (361) 729-2328 Fax: (361) 729-1437 (fax)
Puerto Rico*	X	X	X	X	Regulation #7949 Article 13—Commercial Fishing Limits Article 18—Recreational Fishing Limits	Billfish/Marlin: It is illegal to sell, offer for sale, or traffic, whole or processed, those captured in jurisdictional waters of Puerto Rico. Swordfish, billfish, tuna, and shark: covered under the federal Atlantic HMS regulations (50 CFR, Part 635), which also apply in territorial waters; fishers who capture these species required to comply with said regulation; billfish captured incidentally with long line must be released by cutting the line close to the fishhook, avoiding the removal of the fish from the water; tuna and swordfish fishers shall obtain a permit according to requirements of federal government; nurse shark have year-round closed season.	Puerto Rico Department of Natural and Environmental Resources Craig Lilyestrom Phone: (787) 772-2022
U.S. Virgin Islands*	X	X	X	X	V.I.C., Title 12, Chapter 9A.	Federal regulations and federal permit requirements apply in territorial waters.	6291 Estate Nazareth St. Thomas, VI 00802 Phone: (340) 775-6762 45 Mars Hill Complex Frederiksted, St. Croix, VI 00840 Phone: (340) 773-1082

2 STATUS OF THE STOCKS

The term “stock of fish” means a species, subspecies, geographical grouping or other category of fish capable of management as a unit. “Stock” may also refer to a multispecies complex managed as a single unit due to the occurrence of two or more species being harvested together. Stock assessments measure the impact of fishing and on stocks and project harvest levels that maximize the number of fish that can be caught while preventing overfishing, and where necessary, rebuilding depleted stocks. The thresholds that NOAA Fisheries uses to determine the status of Atlantic highly migratory species (HMS) are presented in Figure 2.1. These thresholds are fully described in Chapter 3 of the 1999 Fishery Management Plan (FMP) for Atlantic Tunas, Swordfish, and Sharks FMP and in Amendment 1 to the Billfish FMP. The thresholds were also carried over in full to the 2006 Consolidated HMS FMP. These thresholds are based on those described in a paper providing the initial technical guidance for implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (Restrepo et al. 1998).

Images like Figure 2.1 are often used by stock assessment scientists to summarize the results of various stock assessment models. Generally, if the model results are in the white portion of the figure, a stock may have a status of “not overfished” and “overfishing is not occurring.” Similarly, if the model results are in the gray portions of the figure, a stock may have a status of “overfished,” “overfishing is occurring,” or both.

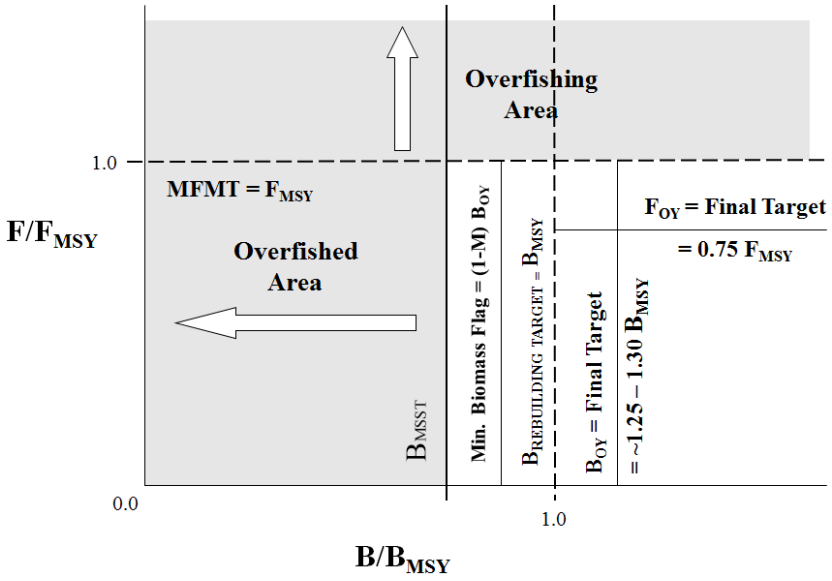

Figure 2.1 Illustration of the status determination criteria and rebuilding terms

In summary, a stock is considered “overfished” when the current biomass (B) is less than the biomass for the minimum stock size threshold ($B < B_{MSST}$). The minimum stock size threshold (MSST) is determined based on the natural mortality of the stock and the biomass at maximum sustainable yield (B_{MSY}). Maximum sustainable yield (MSY) is the maximum long-term average yield that can be produced by a stock on a continuing basis. The biomass can fall below the B_{MSY} without causing the stock to be declared “overfished” as long as the biomass is above B_{MSST}.

If a stock is declared overfished, action to rebuild the stock is required by law. A stock is considered rebuilt when B is greater than B_{MSY}. It is important to note that the International Commission for the Conservation of Atlantic Tunas (ICCAT) uses different thresholds for the overfished stock status determination. ICCAT defines an overfished status as B_{year} relative to B_{MSY}, while the domestic definition of an overfished status is B_{year} relative to B_{MSST}.

A stock may be determined as "overfishing may be occurring" if the current fishing mortality (F) is greater than the fishing mortality at MSY (F_{MSY}) ($F > F_{MSY}$). In the case of F, the maximum fishing mortality threshold is F_{MSY}. Thus, if F exceeds F_{MSY}, overfishing is occurring and action to end overfishing is required by law. The same status determination criteria for overfishing are applied by ICCAT and NOAA Fisheries for HMS.

A stock is considered healthy when B is greater than or equal to the biomass at optimum yield (B_{OY}) and F is less than or equal to the fishing mortality at optimum yield (F_{OY}).

The domestic thresholds used to calculate the status of Atlantic HMS as described in the 1999 FMP and Amendment 1 to the Atlantic Billfish FMP are:

- Maximum Fishing Mortality Threshold (MFMT) = $F_{limit} = F_{MSY}$.
- Overfishing is occurring when $F_{year} > F_{MSY}$.
- Minimum Stock Size Threshold (MSST) = $B_{limit} = (1\text{-}M)B_{MSY}$ when $M < 0.5$ or MSST = $0.5B_{MSY}$ when $M \geq 0.5$, M = natural mortality. Formula exceptions include blue marlin ($0.9B_{MSY}$), white marlin ($0.85B_{MSY}$), and west Atlantic sailfish ($0.75B_{MSY}$). In many cases an average M across age classes or sensitivity runs from a stock assessment model is used to calculate MSST. Domestically, an overfished status is defined as B_{year} relative to B_{MSST}.
- Biomass target during rebuilding = B_{MSY}.
- Fishing mortality during rebuilding < F_{MSY}.
- Fishing mortality for healthy stocks = $0.75F_{MSY}$ (Final target = F_{OY}).
- Biomass for healthy stocks = $B_{OY} \approx 1.25$ to $1.30B_{MSY}$.
- Minimum biomass flag = $(1\text{-}M)B_{OY}$.
- Level of certainty of *at least* 50 percent but depends on species and circumstances.
- For some stocks (e.g., bluefin tuna, albacore), spawning stock biomass (SSB) is used as a proxy for biomass.
- For sharks, in some cases, spawning stock fecundity (SSF) or number of fish (N) can be used as a proxy for biomass since biomass does not influence pup production in sharks. SSF is the sum of the number of mature sharks at age multiplied by pup-production at age.

Table 2.1 and Table 2.2 present the stock assessment information and the current stock statuses of Atlantic HMS as of November 2018 under the domestic and, when applicable, international thresholds. In some cases, these statuses are preliminary as NOAA Fisheries is still reviewing the most recent stock assessment results and has not yet issued formal stock status determinations. NOAA Fisheries updates all U.S. fisheries' stock statuses each quarter and provides an annual Status of U.S. Fisheries Report to Congress (https://www.fisheries.noaa.gov/national/2017-report-congress-status-us-fisheries).

Table 2.1 Domestic and international stock statuses for overfished and not overfished Atlantic HMS

Species	Current relative biomass level	B_{MSY}	International threshold	Domestic minimum stock size threshold	International stock status	Domestic stock status	Years to rebuild	Rebuilding start date (end date)
West Atlantic bluefin tuna	Unspecified*	*Unspecified**,†	B_{MSY}	0.86 SSB_{MSY}	Unspecified*	Unknown*		
Atlantic bigeye tuna	B_{2017}/B_{MSY} = 0.59 (0.42 - .80)	*Unspecified*†	B_{MSY}	0.6 B_{MSY}	Overfished	^	Not available††	1/1/1999
Atlantic yellowfin tuna	B_{2014}/B_{MSY} = 0.95 (0.71 - 1.36)	*Unspecified*†	B_{MSY}	0.5 B_{MSY} (age 2+)	Overfished	Not overfished		
North Atlantic albacore tuna	B_{2015}/B_{MSY} = 1.36 (1.05 - 1.78)	B_{MSY} = 407,567 mt (366,309 - 463,685)	B_{MSY}	0.7 B_{MSY} (285,297 mt)	Not overfished	Not overfished (Rebuilt)		
West Atlantic skipjack tuna	B_{2013}/B_{MSY}: Probably close to 1.3	30,755 mt	B_{MSY}	*Unknown*	Not overfished	Not overfished		
North Atlantic swordfish	B_{2015}/B_{MSY} = 1.04 (0.82 - 1.39)	82,640 mt (51,580 - 132,010)	B_{MSY}	0.8 B_{MSY}; (52,048 mt)	Not overfished	Not overfished		
South Atlantic swordfish	B_{2015}/B_{MSY} = 0.72 (0.53 - 1.01)	52,465 mt	B_{MSY}	0.8 B_{MSY} *(41,972)*	Overfished	**		
Blue marlin	SSB_{2016}/SSB_{MSY} = 0.69 (0.52 - 0.91)	*Unspecified*†	B_{MSY}	0.9 B_{MSY}	Overfished	^	Not available††	6/1/2001
White marlin (and roundscale spearfish)	B_{2010}/B_{MSY} = 0.5 (0.42 - 0.60)	29,240 mt (27,260 - 30,720 mt)	B_{MSY}	0.85 B_{MSY} (23,171 - 26,112 mt)	Overfished	Overfished	Not available ††	6/1/2001
West Atlantic sailfish	SSB_{2014}/SSB_{MSY} = 1.81 (0.51-2.57) ‡ SSB_{2014}/SSB_{MSY} = 1.16 (0.18-1.69)‡‡	1,438-1,636 mt ‡,‡‡	B_{MSY}	0.75 B_{MSY}	Not Likely	Not overfished - rebuilding		
Longbill spearfish	*Unknown*	*Unknown*	B_{MSY}	*Unknown*	*Unknown*	*Unknown*		
Northwest Atlantic porbeagle sharks	B_{2008}/B_{MSY} = 0.43 - 0.65	29,382 - 40,676 mt	B_{MSY}	(1-M) B_{MSY}‡‡*	Overfished	Overfished	100	7/24/2008 (2108)

Species	Current relative biomass level	B_{MSY}	International threshold	Domestic minimum stock size threshold	International stock status	Domestic stock status	Years to rebuild	Rebuilding start date (end date)
North Atlantic blue sharks	B_{2013}/B_{MSY} = 1.35–3.45	*Unspecified* †	B_{MSY}	(1-M)B_{MSY}	Not likely overfished	Not Overfished		
North Atlantic shortfin mako sharks	B_{2015}/B_{MSY} = 0.57–0.95	62,555 mt–123,475 mt †††	B_{MSY}	(1-M) B_{MSY}‡‡*	Overfished	Overfished	‡‡**	‡‡**
Sandbar sharks	SSF_{2015}/SSF_{MSY} = 0.77	SSF_{MSY} = 681,000 (numbers of sharks)	*NA*	595,000 (1-M)SSF_{MSY}	*NA*	Overfished	66	1/1/2005 (2070)
Gulf of Mexico blacktip sharks	SSF_{2016}/SSF_{MSY} = 2.73	SSF_{MSY} = 14,400,000 (numbers of sharks)	*NA*	12,200,000 (1-M)SSF_{MSY}	*NA*	Not overfished		
Atlantic blacktip sharks	*Unknown*	*Unknown*	*NA*	(1-M)B_{MSY}	*NA*	*Unknown*		
Dusky sharks	SSF_{2015}/SSF_{MSY} = 0.41–0.64	*Unknown*†	*NA*	(1-M)SSB_{MSY}	*NA*	Overfished	~100	7/24/2008 (2107)
Scalloped hammerhead sharks	N_{2005}/N_{MSY} = 0.45	N_{MSY} = 62,000 (numbers of sharks)	*NA*	(1-M)N_{MSY}	*NA*	Overfished	10	7/3/2013 (2023)
Atlantic Bonnethead sharks	*Unknown*	*Unknown*	*NA*	*Unknown*	*NA*	*Unknown*		
Gulf of Mexico Bonnethead sharks	*Unknown*	*Unknown*	*NA*	*Unknown*	*NA*	*Unknown*		
Atlantic sharpnose sharks – Atlantic stock	SSF_{2011}/SSF_{MSY} = 2.07	SSF_{MSY} = 4,860,000 (numbers of sharks)	*NA*	(1-M)SSF_{MSY}	*NA*	Not overfished		
Atlantic sharpnose sharks - Gulf of Mexico stock	SSF_{2011}/SSF_{MSY} = 1.01	SSF_{MSY} = 17,900,000	*NA*	(1-M)SSF_{MSY}	*NA*	Not overfished		
Atlantic blacknose sharks – Atlantic stock	SSF_{2009}/SSF_{MSY} = 0.43–0.64	SSF_{MSY} = 77,577–288,360 (numbers of sharks)	*NA*	62,294–231,553 (1-M)SSF_{MSY}	*NA*	Overfished	30	7/3/2013 (2043)
Atlantic blacknose sharks – Gulf of Mexico stock	*Unknown*	*Unknown*	*NA*	(1-M)B_{MSY}	*NA*	*Unknown*		

Species	Current relative biomass level	B_{MSY}	International threshold	Domestic minimum stock size threshold	International stock status	Domestic stock status	Years to rebuild	Rebuilding start date (end date)
Finetooth sharks	N_{2005}/N_{MSY} = 1.80	N_{MSY} = 3,200,000 (numbers of sharks)	*NA*	2,400,000 (1-M)N_{MSY}	*NA*	Not overfished		
Atlantic smooth dogfish	SSF_{2012}/SSF_{MSY} = 1.96–2.81	SSF_{MSY} = 4,746,000	*NA*	3,701,000 (1-M)SSF_{MSY}	*NA*	Not overfished		
Gulf of Mexico smoothhound shark complex	N_{2012}/N_{MSY} = 1.68–1.83	N_{MSY} = 7,190,000	*NA*	5.53E+06 (1-M)N_{MSY}	*NA*	Not overfished		

* In the 2017 stock assessment, the Standing Committee on Research and Statistics (SCRS) indicated that it is not possible to calculate biomass-based reference points (e.g., BMSY) absent additional knowledge or a basis for assumptions regarding how future recruitment potential relates to spawning stock biomass.
** South Atlantic swordfish are managed by ICCAT, and domestic stock status is not determined or reported in the U.S. stock status report.
† A value for BMSY (or its proxy) was not provided in the stock assessment.
†† There is insufficient information to estimate how many years it will take this stock to rebuild.
††† Only the BSP2-JAGS and JABBA models provided BMSY values in biomass. The BMSY range encompasses the eight scenarios run of the BSP2-JAGS and JABBA models. The SS3 model provided BMSY values in numbers.
‡ Stock synthesis estimate based on increasing catch-per-unit-effort (CPUE) trends, with approximate 95% confidence intervals.
‡‡ Stock synthesis estimate based on decreasing CPUE trends, with approximate 95% confidence intervals.
‡‡* M is unknown.
‡‡** Dates will be established by ICCAT in 2019.
NA = Not assessed internationally
^ A new assessment has been completed and domestic status has yet to be determined at the time of publication.

Sources: SCRS 2007, 2008, 2009a, 2009b, 2010, 2011, 2012a, 2012b, 2013, 2014, 2015, 2016, 2017; Gibson and Campana 2005; NMFS 2006, 2007; Hayes et al. 2009; SEDAR 2011a, 2011b, 2011c, 2011d, 2013a, 2013b, 2015a, 2015b, 2016, 2018a, 2018b.

Table 2.2 Domestic and international stock statuses for Atlantic HMS declared as "overfishing is occurring" and "overfishing is not occurring"

Species	Current relative fishing mortality rate	Maximum fishing mortality threshold	International stock status	Domestic stock status
West Atlantic bluefin tuna	$F_{current(2012-2014)}$ = 0.05 (0.04–0.10) $F_{0.1}$ = 0.09 (0.08–0.12) $F_{current}$ /$F_{0.1}$ = 0.59 (0.44–0.79)	F_{MSY} = *,†	Overfishing is not occurring*	Overfishing is not occurring*
Atlantic bigeye tuna	F_{2014}/F_{MSY} = 1.63 (1.14–2.12)	F_{MSY} = †	Overfishing is occurring	Overfishing is occurring
Atlantic yellowfin tuna	F_{2014}/F_{MSY}= 0.77 (0.53–1.05)	F_{MSY} = †	Overfishing is not occurring	Overfishing is not occurring
North Atlantic albacore tuna	F_{2014}/F_{MSY} = 0.54 (0.35–0.72)	F_{MSY} = 0.097 (0.079–0.109)	Overfishing is not occurring	Overfishing is not occurring
West Atlantic skipjack tuna	F_{2013}/F_{MSY}: probably close to 0.7	F_{MSY} = 1.02 (0.78–1.25)	Overfishing is not occurring	Overfishing is not occurring
North Atlantic swordfish	F_{2011}/F_{MSY} = 0.78 (0.62–1.01)	F_{MSY} = 0.17 (0.10 - 0.27)	Overfishing is not occurring	Overfishing is not occurring
South Atlantic swordfish	F_{2015}/F_{MSY} = 0.98 (0.70–1.36)	F_{MSY} = 0.28 (0.17–0.44)	Overfishing is not occurring	**
Blue marlin	F_{2009}/F_{MSY} = 1.03 (0.74–1.50)	F_{MSY} = †	Overfishing is occurring	Overfishing is occurring
White marlin (and roundscale spearfish)	F_{2010}/F_{MSY} = 0.99 (0.75–1.27; low productivity) F_{2010}/F_{MSY} = 0.72 (0.51–0.93; high productivity)	F_{MSY} = 0.03 (0.027–0.035)	Overfishing is not likely occurring	Overfishing is occurring
West Atlantic sailfish	F_{2014}/F_{MSY} =0.33 (0.25–0.57) ‡ F_{2014}/F_{MSY} =0.63 (0.42–2.02) ‡‡	F_{MSY}	Overfishing is not likely occurring	Overfishing is not occurring
Longbill spearfish	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Northwest Atlantic porbeagle shark	F_{2008}/F_{MSY} = 0.03–0.36	F_{MSY} = 0.025–0.075	Overfishing is not occurring	Overfishing is not occurring
North Atlantic blue shark	F_{2013}/F_{MSY} = 0.04–0.75	F_{MSY} = 0.19–0.20	Overfishing is not likely occurring	Overfishing is not occurring
North Atlantic shortfin mako shark	F_{2015}/F_{MSY} = 1.93–4.38	F_{MSY} = 0.015–0.056††	Overfishing is occurring	Overfishing is occurring
Sandbar	F_{2015}/F_{MSY} = 0.58	F_{MSY} = 0.07	*NA*	Overfishing is not occurring

Species	Current relative fishing mortality rate	Maximum fishing mortality threshold	International stock status	Domestic stock status
Gulf of Mexico blacktip	F_{2016}/F_{MSY} = 0.023	F_{MSY} = 0.087	*NA*	Overfishing is not occurring
Atlantic blacktip	*Unknown*	*Unknown*	*NA*	*Unknown*
Dusky shark	F_{2015}/F_{MSY} = 1.08–2.92	F_{MSY} = 0.015–0.046	*NA*	Overfishing is occurring
Scalloped hammerhead shark	F_{2005}/F_{MSY} =1.29	F_{MSY} = 0.11	*NA*	Overfishing is occurring
Bonnethead shark—Atlantic stock	*Unknown*	*Unknown*	*NA*	*Unknown*
Bonnethead shark—Gulf of Mexico stock	*Unknown*	*Unknown*	*NA*	*Unknown*
Atlantic sharpnose shark—Atlantic stock	F_{2011}/F_{MSY} = 0.23	F_{MSY} = 0.184	*NA*	Overfishing is not occurring
Atlantic sharpnose shark—Gulf of Mexico stock	F_{2011}/F_{MSY} = 0.57	F_{MSY} = 0.331	*NA*	Overfishing is not occurring
Atlantic blacknose shark—Atlantic stock	F_{2009}/F_{MSY} = 3.26–22.53	F_{MSY} = 0.01–0.15	*NA*	Overfishing is occurring
Atlantic blacknose shark—Gulf of Mexico stock	*Unknown*	*Unknown*	*NA*	*Unknown*
Finetooth shark	F_{2005}/F_{MSY} = 0.17	F_{MSY} = 0.03	*NA*	Overfishing is not occurring
Atlantic smooth dogfish	F_{2012}/F_{MSY} = 0.61–0.99	F_{MSY} = 0.129	*NA*	Overfishing is not occurring
Gulf of Mexico smoothhound shark complex	F_{2012}/F_{MSY} = 0.07–0.35	F_{MSY} = 0.106	*NA*	Overfishing is not occurring

* F_{year} refers to the geometric mean of the estimates for 2012–2014 (a proxy for recent F levels). In the 2017 stock assessment, SCRS indicated that it is not possible to calculate biomass-based reference points (e.g., FMSY). In the absence of such knowledge, SCRS considers F0.1 to be a reasonable proxy for the western stock. F0.1 is the fishing mortality rate where the slope of the yield per recruit curve is 10% of the slope of the curve at its origin. It is derived from the yield per recruit curve and does not assume a stock-recruitment relationship.

† A value for FMSY was not provided in the stock assessment.

** South Atlantic swordfish are managed by ICCAT, and domestic stock status is not determined or reported in the U.S. stock status report.

†† Range is derived from eight Bayesian production and one SS3 model runs. The value from SS3 is SSFMSY. The low value is the lowest value from four production model (JABBA and BSP2JAGS) runs and the high value is from the SS3 base run.

‡ Stock synthesis estimates are based on increasing CPUE trends, with approximate 95% confidence intervals.

‡‡ Stock synthesis estimates are based on decreasing CPUE trends, with approximate 95% confidence intervals.

NA = Not assessed internationally

Sources: SCRS 2007, 2008, 2009a, 2009b, 2010, 2011, 2012a, 2012b, 2013, 2014, 2015, 2016, 2017; Gibson and Campana 2005; NMFS 2006, 2007; Hayes et al., 2009; SEDAR 2011a, 2011b, 2011c, 2011d, 2013a, 2013b, 2015a, 2015b, 2016, 2018a , 2018b.

With the exception of many Atlantic shark stocks, stock assessments for Atlantic HMS are conducted by ICCAT's SCRS (see http://www.iccat.int/en/assess.html). In 2018, the SCRS completed assessments for Atlantic bigeye tuna and Atlantic blue marlin. A history of Atlantic HMS stock assessments conducted by SCRS is shown in Table 2.3.

Table 2.3 International HMS stock assessments conducted by ICCAT's SCRS.

Stock	Last assessment year	Upcoming assessment	Notes
Western Atlantic bluefin tuna	2017	2020	
Atlantic bigeye tuna	2018	2023	
Atlantic yellowfin tuna	2016	2019	
North Atlantic albacore tuna	2016	2020	
Western Atlantic skipjack tuna	2014	2019	
North Atlantic swordfish	2017	TBD	
South Atlantic swordfish	2017	TBD	
Blue marlin	2018	TBD	
White marlin (and roundscale spearfish)	2012	2019	
West Atlantic sailfish	2016	TBD	
Longbill spearfish	1997	TBD	
Porbeagle	2009	TBD	Next assessment a combination ICES and ICCAT assessment
Shortfin mako	2017	TBD	Projections scheduled to be produced by SCRS in 2019
Blue shark	2015	2021	

TBD = to be determined.

Atlantic shark stock assessments for large coastal, small coastal, and smoothhound sharks are generally completed through the Southeast Data and Assessment Review (SEDAR) process. SEDAR uses several different approaches in assessing stocks. The benchmark approach has been used to develop first-time assessments for stocks and to incorporate new datasets or new analytical methods into existing assessments. It is the most time-consuming and intensive approach for developing assessments. SEDAR is now moving away from benchmark assessments to research track assessments. Although still time-consuming, research track assessments allow scientists to select the best approach to assess the stocks or species groupings under review. Within the research track assessment, SEDAR may use a standard approach to incorporate recent information into existing assessments. For this approach, existing input datasets are updated, and new information and changes in model configuration may be considered for incorporation as well. Alternatively, the most rapid of the three approaches, referred to as the update approach, can be used; however, this is strictly to incorporate the most recent information into existing assessment analyses. With regard to stocks/species group management, the results from research track assessments cannot be directly used for management as these assessments require significant time and may not use the most recent data. Instead, management recommendations would result from the stock being assessed secondarily

via an update using the methods determined appropriate during the research track assessment. The first HMS stocks to be assessed using this approach will be the hammerhead shark complex in 2020. More information on how SEDAR assessments are conducted can be found at http://sedarweb.org/sedar-process.

In 2018, an assessment for sandbar sharks (SEDAR 54) was completed, as well as an update to the Gulf of Mexico blacktip sharks assessment (update to SEDAR 29). In some cases, NOAA Fisheries looks to other available resources, such as peer reviewed literature, for external assessments that, if deemed appropriate, could be used to determine stock status. NOAA Fisheries followed this process in determining the stock status of scalloped hammerhead sharks based on an assessment for this species completed by Hayes et al. (2009). A history of domestic HMS stock assessments is shown in Table 2.4.

Table 2.4 Domestic shark stock assessments

Shark stock	Last assessment year	Last assessment type	Upcoming assessment	Upcoming assessment type	Notes
Small coastal sharks (SCS)					
Combined	2007	Benchmark	N/A	N/A	Future assessments will focus on each individual stocks within the complex due to life history differences.
Finetooth	2007	Benchmark	TBD	Research	Next assessment is expected to split this species into two stocks.
Blacknose—Atlantic	2011	Benchmark	TBD	Research	
Blacknose—Gulf of Mexico	2011	Benchmark	TBD	Research	Most recent assessment rejected by NOAA Fisheries.
Bonnethead—Atlantic	2013	Standard	TBD	Research	Last assessment assessed at the species level and not the stock level. Plan to assess each stock individually.
Bonnethead—Gulf of Mexico	2013	Standard	TBD	Research	
Atlantic Sharpnose—Atlantic	2013	Standard	TBD	Research	Last assessment focused on the species. Plan to assess next at stock levels.
Atlantic Sharpnose—Gulf of Mexico	2013	Standard	TBD	Research	
Large coastal sharks (LCS)					
Combined	2006	Benchmark	N/A	N/A	Future assessments will focus on each individual stock within the complex due to life history differences.
Blacktip—Atlantic	2006	Benchmark	2019-2020	Benchmark	Previous assessment not accepted. Upcoming assessment will start late in 2019 and expected to be finalized end of 2020.
Scalloped hammerhead	2009	Outside SEDAR	2020	Research	
Sandbar	2018	Standard	TBD	Update	

Shark stock	Last assessment year	Last assessment type	Upcoming assessment	Upcoming assessment type	Notes
Blacktip—Gulf of Mexico	2018	Update	TBD	Update	
Great hammerhead	N/A	N/A	2020	Research	Individual species have not been assessed, although these species were included in the original LCS complex assessment.
Smooth hammerhead	N/A	N/A	2020	Research	
Bull	N/A	N/A	TBD	Benchmark	
Lemon	N/A	N/A	TBD	Benchmark	
Nurse	N/A	N/A	TBD	Benchmark	
Silky	N/A	N/A	TBD	Benchmark	
Spinner	N/A	N/A	TBD	Benchmark	
Tiger	N/A	N/A	TBD	Benchmark	
Smoothhound sharks					
Smoothhounds—Atlantic	2015	Benchmark	TBD	Update	
Smoothhounds—Gulf of Mexico	2015	Benchmark	TBD	Update	
Pelagic sharks					
Thresher	N/A	N/A	N/A	N/A	Individual species have not been assessed.
Oceanic whitetip	N/A	N/A	N/A	N/A	
Prohibited species					
Dusky	2016	Benchmark	TBD	Benchmark	Next assessment expected to be a benchmark or research track to consider issues raised after the last update assessment.
Atlantic angel	N/A	N/A	N/A	N/A	Individual species have not been assessed; some species may have been included in some of the early LCS complex assessments.
Basking	N/A	N/A	N/A	N/A	
Bigeye sand tiger	N/A	N/A	N/A	N/A	
Bigeye sixgill	N/A	N/A	N/A	N/A	
Bigeye thresher	N/A	N/A	N/A	N/A	
Bignose	N/A	N/A	N/A	N/A	
Caribbean reef	N/A	N/A	N/A	N/A	
Caribbean sharpnose	N/A	N/A	N/A	N/A	
Galapagos	N/A	N/A	N/A	N/A	
Longfin mako	N/A	N/A	N/A	N/A	
Narrowtooth	N/A	N/A	N/A	N/A	
Night	N/A	N/A	N/A	N/A	
Sand tiger	N/A	N/A	N/A	N/A	
Sevengill	N/A	N/A	N/A	N/A	
Sixgill	N/A	N/A	N/A	N/A	
Smalltail	N/A	N/A	N/A	N/A	
Whale	N/A	N/A	N/A	N/A	
White	N/A	N/A	N/A	N/A	

TBD = to be determined. N/A = None available.

2.1 Stock Assessment Details

SCRS reports are available online at http://www.iccat.int/en/meetings.asp. All SEDAR reports are available online at http://sedarweb.org/. Detailed stock assessments for the species in Table 2.1 and Table 2.2 are available at these links listed below.

- Western Atlantic bluefin tuna—http://www.iccat.int/Documents/Meetings/Docs/2017_BFT_ASS_REP_ENG.pdf
- Atlantic bigeye tuna—https://www.iccat.int/Documents/SCRS/DetRep/BET_ASS_ENG.pdf
- Atlantic yellowfin tuna—https://www.iccat.int/Documents/Meetings/Docs/2016_YFT_ASSESSMENT_ENG.pdf
- North Atlantic albacore tuna—http://www.iccat.int/Documents/Meetings/Docs/2016_ALB_REPORT_ENG.pdf
- West Atlantic skipjack tuna—http://iccat.int/Documents/Meetings/Docs/2014_SKJ_ASSESS_ENG.pdf
- Swordfish, North Atlantic and South Atlantic—http://www.iccat.int/Documents/Meetings/Docs/2017_ATL_SWO_ASS_REP_ENG.pdf
- Blue marlin—https://www.iccat.int/Documents/Meetings/Docs/2018/REPORTS/2018_BUM_SA_ENG.pdf
- White marlin and roundscale spearfish—http://www.iccat.int/Documents/Meetings/Docs/2012_WHM_ASSESS_ENG.pdf
- West Atlantic sailfish—http://www.iccat.org/Documents/Meetings/Docs/2016_SAI_REPORT_ENG.pdf
- Longbill spearfish—https://www.iccat.int/Documents/SCRS/DetRep/DET-SAI.pdf
- Sandbar sharks—http://sedarweb.org/sedar-54
- Gulf of Mexico blacktip sharks—http://sedarweb.org/sedar-29u
- Atlantic blacktip sharks—http://sedarweb.org/sedar-11
- Dusky sharks—http://sedarweb.org/sedar-21u
- Bonnethead sharks (Atlantic and Gulf of Mexico) —http://sedarweb.org/sedar-34
- Atlantic sharpnose sharks (Atlantic and Gulf of Mexico)—http://sedarweb.org/sedar-34
- Blacknose sharks (Atlantic and Gulf of Mexico)—http://sedarweb.org/sedar-21
- Finetooth sharks—http://sedarweb.org/sedar-13
- Northwest Atlantic porbeagle sharks—http://www.iccat.int/Documents/Meetings/Docs/2009_POR_ASSESS_ENG.pdf
- North Atlantic blue sharks—http://www.iccat.int/Documents/Meetings/Docs/2015_BSH%20ASSESS_REPORT_ENG.pdf
- North Atlantic shortfin mako sharks—http://iccat.int/Documents/Meetings/Docs/2017_SCRS_REP_ENG.pdf
- Scalloped hammerhead sharks—Assessed in Hayes et al. (2009).
- Smoothhound sharks (Atlantic and Gulf of Mexico)—http://sedarweb.org/sedar-39

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SEDAR. 2011c. SEDAR 21 Stock Assessment Report: HMS Gulf of Mexico blacknose shark. North Charleston (SC): SEDAR.

SEDAR. 2011d. SEDAR 21 Stock Assessment Report: HMS sandbar shark. North Charleston (SC): SEDAR.

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SEDAR. 2016. Update assessment to SEDAR 21: HMS dusky shark. North Charleston (SC): SEDAR.

SEDAR. 2018a. SEDAR 54 Stock Assessment Report: HMS Sandbar Shark. North Charleston (SC): SEDAR.

SEDAR. 2018b. Update assessment to SEDAR 29: HMS Gulf of Mexico Blacktip Shark Addendum and Post-Review Updates. North Charleston (SC): SEDAR.

3 ESSENTIAL FISH HABITAT

3.1 Designations in the 2006 Consolidated Atlantic HMS Fishery Management Plan and its Amendments

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires NOAA Fisheries to identify and describe essential fish habitat (EFH), minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of those habitats. EFH is defined in NOAA Fisheries implementing regulations as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (50 CFR 600.10). A review of information available on EFH for federally managed species must be completed at least once every five years, and habitat provisions must be revised or amended, as warranted (§ 600.815(a)(10)). A summary of the management history of HMS EFH described below is also provided in Table 3.1.

On July 1, 2015, NOAA Fisheries published its most recent EFH 5-Year Review and announced its intent to initiate an amendment to the 2006 Consolidated Atlantic HMS Fishery Management Plan (FMP) to evaluate and revise the 10 components of EFH listed at 50 CFR 600.815(a) as applicable to Atlantic HMS EFH text descriptions and boundary designations (80 FR 37598). Revisions would be made using new observer, survey, and tag/recapture data collected by the agency and the public, new literature, and public comments filed since 2009 in response to requests for information to revise EFH geographic boundaries. Several areas met the initial criteria of a Habitat Area of Particular Concern (HAPC) for lemon sharks, sand tiger sharks, larval billfish, and white sharks and warranted further consideration.

On September 1, 2016, NOAA Fisheries published Draft Amendment 10 (81 FR 62100), to update Atlantic HMS EFH based on the recommendations of the five-year review, using delineation methodologies established in Amendment 1 to the 2006 Consolidated HMS FMP (i.e., using 95 percent volume contours to develop EFH boundaries). The preferred alternatives in Draft Amendment 10 included: 1) proposals to modify existing HAPCs for bluefin tuna and sandbar, and designate new HAPCs for lemon and sand tiger sharks; 2) analyses of fishing and non-fishing impacts on EFH through a consideration of environmental and management changes and new information available since 2009; 3) ways to minimize, to the extent practicable, the adverse effects of fishing activities on EFH; and 4) actions to encourage the conservation and enhancement of EFH.

NOAA Fisheries sought public comment on Draft Amendment 10, conducted two public hearing conference calls/webinars, and presented to the Caribbean, Gulf of Mexico, South Atlantic, Mid-Atlantic, and New England Fishery Management Councils. NOAA Fisheries received 26 unique written comments, and a number of additional comments and/or clarifying questions at the Atlantic HMS Advisory Panel meeting and at council meetings. NOAA Fisheries also identified several new datasets and completed a comprehensive analysis of agency datasets.

On September 7, 2017, NOAA Fisheries published Final Amendment 10 (82 FR 42329), modifying the HAPC for bluefin tuna (Preferred Alternative 3b) and sandbar shark (Preferred Alternative 4b) established in Amendment 1. New literature published by Muhling et al. (2010) suggested moderate (20 to 40 percent) probabilities of bluefin tuna larvae in areas of the eastern Gulf of Mexico that are not completely covered by the existing HAPC. In response, NOAA

Fisheries extended the boundary of the bluefin tuna area for spawning, eggs, and larval life stages from 86° W, eastward to 82° W. The HAPC ranges from the 100-meter isobath to the exclusive economic zone.

Consistent with updates to EFH, Final Amendment 10 adjusted the sandbar shark HAPC originally established in the 1999 Atlantic Tunas, Swordfish, and Sharks FMP for neonate/young of the year (YOY) in coastal North Carolina, Chesapeake Bay, and Delaware Bay (Preferred Alternative 2b). Changes included the incorporation of additional area in Delaware Bay and Chesapeake Bay, and adjustment of the HAPC around the Outer Banks of North Carolina to remove areas in Pamlico Sound. The 1999 designated HAPC for sandbar shark was outside the geographic boundaries of the most recent EFH designation (Amendment 1) and boundaries were adjusted to include the HAPC within the sandbar shark EFH.

Final Amendment 10 also created new HAPCs for juvenile and adult lemon sharks (Preferred Alternative 5b) off southeastern Florida between Cape Canaveral and Jupiter Inlet, as well as sand tiger sharks of all life stages (Preferred Alternative 6b) in Delaware Bay and neonate/YOY and juveniles in the Plymouth, Kingston, Duxbury Bay system in coastal Massachusetts. The new HAPC for juvenile and adult lemon sharks is based on tagging studies and public comments regarding protection of habitat in locations where aggregations of lemon sharks occur. The two new sand tiger shark HAPCs are based on data collected by the Northeast Fisheries Science Center (Haulsee et al. 2014 and 2016) and Kilfoil et al. (2014) indicating that Delaware Bay constitutes important habitat for sand tiger sharks. The final rule for Amendment 10 and the supporting documents are available at https://www.fisheries.noaa.gov/action/amendment-10-2006-consolidated-hms-fishery-management-plan-essential-fish-habitat.

Table 3.1 Management history for HMS essential fish habitat

FMP or amendment	EFH and species
1999 FMP for Atlantic Tunas, Swordfish, and Sharks	EFH first identified and described for Atlantic tunas, swordfish and sharks; HAPCs designated for sandbar sharks.
1999 Amendment 1 to the 1988 FMP for Billfish	EFH first identified and described for Atlantic billfishes.
2003 Amendment 1 to the FMP for Atlantic Tunas, Swordfish and Sharks	EFH updated for blacktip, sandbar, finetooth, dusky, and nurse sharks.
2006 Consolidated Atlantic HMS FMP	Comprehensive review of EFH for all HMS. EFH for all Atlantic HMS consolidated into one FMP; no changes to EFH descriptions or boundaries.
2009 Amendment 1 to the 2006 Consolidated Atlantic HMS FMP	EFH updated for all federally managed Atlantic HMS. HAPC for bluefin tuna spawning area designated in the Gulf of Mexico.
2010 Amendment 3 to the 2006 Consolidated Atlantic HMS FMP	EFH first defined for smoothhound sharks (smooth dogfish, Florida smoothhound, and Gulf smoothhound).
2010 White Marlin/ Roundscale Spearfish Interpretive Rule and Final Action	EFH first defined for roundscale spearfish (same as white marlin EFH designation in Amendment 1 to the 2006 Consolidated Atlantic HMS FMP).
2015 Atlantic HMS EFH 5-Year Review	Comprehensive Review of EFH for all HMS. Determined that changes to some EFH descriptions and boundaries were warranted.
2017 Amendment 10 to the 2006 Consolidated Atlantic HMS FMP	EFH updated for all federally managed Atlantic HMS. Existing HAPCs for sandbar shark and bluefin tuna adjusted, and new HAPCS for sand tiger shark and lemon shark created to reflect recommendations in the 2015 five-year review.

3.2 Current Essential Fish Habitat Boundary Data Sources

NOAA Fisheries compiles EFH maps and provides the most recently designated EFH data to the public. The designated boundaries can be viewed on-line through the NOAA Fisheries' EFH Mapper at https://www.habitat.noaa.gov/protection/efh/efhmapper/. Downloadable EFH boundary spatial files (shapefiles) for all federally managed species, including Atlantic HMS, are available at https://www.habitat.noaa.gov/protection/efh/newInv/index.html.

3.3 Shark Nursery Grounds and Essential Fish Habitat Studies

NOAA Fisheries continues to study EFH for HMS to refine understanding of their important habitat areas. NOAA Fisheries has funded two cooperative survey programs designed to further delineate shark nursery habitats in the Atlantic and Gulf of Mexico. The Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey, and the Cooperative Gulf of Mexico States Shark Pupping and Nursery (GULFSPAN) Survey are designed to assess the geographical and seasonal extent of shark nursery habitat, determine which shark species use these areas, and gauge the relative importance of these coastal habitats in order to provide information that can then be used in EFH determinations. Shark nurseries are (1) areas where juvenile sharks are more commonly encountered; (2) areas where juvenile sharks remain or return to over an extended period of time; and (3) areas that are repeatedly utilized across years compared to other areas (Heupel et al. 2007).

3.3.1 Cooperative Atlantic States Shark Pupping and Nursery Survey Results

The COASTSPAN program, administered by the NOAA Fisheries Northeast Fisheries Science Center (NEFSC) Narragansett, RI laboratory, has been collecting information on shark nursery areas along the U.S. Atlantic coast since 1998. It involves NOAA Fisheries scientists along with state and university researchers in New Jersey, Delaware, Virginia, South Carolina, Georgia, and Florida. Areas sampled during the 2017 COASTSPAN survey are shown in Figure 3.1. Results by region from the 2017 COASTSPAN survey (McCandless, pers comm) are described below and Level 1 EFH point data are summarized in Table 3.2.

Figure 3.1 Regions sampled during the 2017 COASTSPAN Survey

New Jersey and Delaware (Delaware Bay)

COASTSPAN sampling encompassed the entire bay from the mouth of the Delaware River to the mouth of Delaware Bay using a random stratified design based on depth and geographic location. Additional sampling was also conducted at historical fixed stations throughout the bay. At 85 percent of the total catch, sandbar shark was the most abundant shark species caught in 2017, followed by sand tigers and smooth dogfish. Additionally, 10 adult male Atlantic sharpnose sharks were caught in Delaware Bay near Brandywine Shoal, the shipping channel south of Fourteen Foot Bank, and the mouth of the Bay, and one YOY spinner shark was caught within Inner Harbor. As in previous years, the majority (97 percent) of caught sandbar sharks were immature, with 10 percent of the juveniles as YOY; the remaining sandbar sharks were considered mature females based on length and girth measurements. Only juvenile smooth dogfish were caught in 2017, with YOY dominating the catch. The majority (54 percent) of sand tigers caught in 2017 were immature sharks, with the remaining considered mature based on clasper calcification for males and length and girth measurements for females. Delaware Bay continues to provide important nursery habitat for sandbar sharks, smooth dogfish and sand tigers. The extensive use of the bay by all life stages of sand tigers continues to highlight the seasonal importance of this essential shark habitat.

Virginia

COASTSPAN sampling conducted by the Virginia Institute of Marine Science encompassed the main stem of the lower Chesapeake Bay, as well as coastal inlet and lagoon habitats along the

Eastern Shore of Virginia. Sampling was conducted using a stratified random design, with stratification based on depth and geographic location. Juvenile sandbar sharks dominated the catch in the bay, lagoon, and inlet habitats, and the majority of sandbar sharks caught were YOY. In addition to sandbar sharks, there was one mature male blacktip shark caught along the Eastern Shore of Virginia in 2017. Within the Chesapeake Bay, three juvenile spinner sharks, two juvenile blacktip sharks, four mature smooth dogfish, three adult male Atlantic sharpnose sharks, and one juvenile male Atlantic sharpnose shark were also caught. Virginia's estuarine waters continue to provide important nursery habitat for sandbar sharks.

South Carolina

COASTSPAN sampling conducted by the South Carolina Department of Natural Resources in 2017 took place in both nearshore and estuarine waters along the South Carolina coast including: Bulls Bay, Charleston Harbor, North Edisto, Port Royal Sound, St. Helena Sound, and Winyah Bay. Thirteen species of sharks were captured, the most abundant of which was Atlantic sharpnose. Other sharks captured, in order of abundance, were finetooth, sandbar, blacktip, bonnethead, scalloped hammerhead, blacknose, bull, spinner, lemon, tiger, nurse, and one great hammerhead. The majority of sharks captured were immature, but the following species primarily consisted of mature individuals: Atlantic sharpnose, bonnethead, blacknose, bull, lemon, tiger, nurse, and great hammerhead sharks. An ultrasound was used to determine that two bull sharks and five blacktip sharks were pregnant when captured in May and June. Additionally, three blacktip sharks were determined to be post-partum by an ultrasound when captured in June. These findings continue to highlight the importance of South Carolina estuarine and nearshore waters as nursery habitat for many small and large coastal shark species and indicate the extensive use of these waters as habitat for several adult small coastal shark species.

Georgia

COASTSPAN sampling conducted by the University of North Florida took place in the estuarine waters of the St. Simon and St. Andrew sound systems. Of the seven species of shark captured, bonnethead was the most abundant. Other sharks in order of abundance were Atlantic sharpnose, sandbar, blacktip, scalloped hammerhead, and one of each finetooth and bull sharks. Three captured shark species were also present as YOY in estuarine waters: Atlantic sharpnose, blacktip, and bull sharks. The majority of sharks captured were immature, highlighting the importance of these areas as nursery habitat for both small and large coastal shark species. As in previous years, many of the bonnetheads captured were mature. Mature male Atlantic sharpnose sharks were also abundant in Georgia's estuarine waters, indicating these areas continue to provide important adult habitat for these small coastal shark species.

Atlantic Coast of Florida

COASTSPAN sampling conducted by the University of North Florida occurred within 2 km of Florida's northern Atlantic coast in and around Cumberland Sound, Nassau Sound, Tolomato River, and St. Johns River. Species represented in the 2017 catch included, in order of abundance, Atlantic sharpnose, blacknose, sandbar, blacktip, finetooth, scalloped hammerhead, bonnethead, spinner, lemon, bull, nurse, and great hammerhead shark. The great hammerhead was a mature female with mating scars and no evidence of pregnancy when examined with an ultrasound. Nassau and Cumberland Sounds continue to provide nursery habitat for juvenile Atlantic sharpnose, sandbar, and blacktip sharks. Cumberland Sound also provided nursery

habitat for finetooth, spinner, scalloped hammerhead, and bull sharks in 2017. Nassau Sound provided habitat for three large immature nurse sharks and two YOY bull sharks in 2017. Tolomato River continues to provide nursery habitat for neonate scalloped hammerheads. Mature male and YOY Atlantic sharpnose sharks were abundant in the estuarine waters sampled throughout northern Florida. Northern Florida's nearshore waters also continue to provide habitat for adult female bonnetheads and mature blacknose sharks.

Florida Atlantic University surveyed the Indian River Lagoon from Sebastian Inlet to Saint Lucie Inlet and the nearshore waters along the Atlantic coast in this region to look at elasmobranch distribution. Of the nine shark species caught in this region, bull and bonnetheads were the most commonly encountered at 65 and 13 percent of the catch, respectively. Captured bull sharks were all juveniles, including YOY, and bonnetheads were all mature-sized fish; both species were only caught within the Indian River Lagoon. Other species represented, in order of abundance were blacknose, Atlantic sharpnose, finetooth, blacktip, nurse, tiger, and great hammerhead. All of these species only contained mature sized individuals with the exception of the Atlantic sharpnose and blacktip shark. Atlantic sharpnose juveniles were only caught within the lagoon and adult males were caught within the lagoon and in nearshore ocean waters. One young-of-the-year blacktip shark was caught within the lagoon and two mature males were caught in the nearshore coastal waters. The remaining species consisted of mature individuals that were caught in nearshore ocean waters outside of the lagoon, except for the nurse shark. Two of the three nurse sharks were caught within the lagoon. Continued monitoring of this region will help to refine the essential fish habitat for species encountered there.

Table 3.2 Location and species for Level 1 EFH point data in the 2017 COASTSPAN Survey.

Sampling region	Species – new EFH point data	Sampling locations
Delaware / New Jersey	Sandbar, sand tiger, smooth dogfish, Atlantic sharpnose, and spinner sharks	Mouth of the Delaware River and Delaware Bay
Virginia	Sandbar, blacktip, spinner, and Atlantic sharpnose sharks	Nearshore and estuarine waters including lower Chesapeake Bay, and the coastal inlets and lagoons of the Eastern Shore
South Carolina	Atlantic sharpnose, finetooth, sandbar, blacktip, bonnethead, scalloped hammerhead, blacknose, bull, spinner, lemon, tiger, nurse, and great hammerhead sharks	Nearshore and estuarine waters including Bulls Bay, Charleston Harbor, North Edisto, Port Royal Sound, St. Helena Sound, and Winyah Bay
Georgia	Bonnethead, Atlantic sharpnose, sandbar, blacktip, scalloped hammerhead, finetooth, and bull sharks	St. Simon and St. Andrew sound systems
Florida (Atlantic Coast)	Atlantic sharpnose, bull, blacknose, sandbar, finetooth, bonnethead, blacktip, scalloped hammerhead, spinner, nurse, lemon, great hammerhead, and tiger sharks	Nearshore and estuarine waters including Cumberland Sound, Nassau Sound, Tolomato River, St. Johns River, and the Indian River Lagoon from Sebastian Inlet to Saint Lucie Inlet

Source: NEFSC (C. McCandless, pers comm)

3.3.2 Gulf of Mexico States Shark Pupping and Nursery Survey Results

NOAA Fisheries initiated the GULFSPAN program in 2003 to expand upon the COASTSPAN Survey. The GULFSPAN Survey examines the distribution and abundance of juvenile sharks in coastal areas of the Gulf of Mexico in order to continue to describe and further refine shark EFH. This cooperative program, which is administered by the NOAA Southeast Fisheries Science Center (SEFSC) Panama City, Florida laboratory, includes NOAA Fisheries scientists, the University of Southern Mississippi Gulf Coast Research Laboratory, the Florida State University Coastal and Marine Laboratory, and New College of Florida. GULFSPAN sampling in 2017 covered four areas: Mississippi Sound; St. Andrew Bay to St. Vincent Island, Florida; St. George Sound to Anclote Keys, Florida, which is known as the Big Bend of Florida; and southern Tampa Bay and Sarasota Bay, Florida (Figure 3.2). The following is a summary of the 2017 GULFSPAN catch and noted habitat associations (Deacy et al. 2017). Location and species for which Level 1 EFH point data were collected in the 2017 GULFSPAN survey are illustrated in Figure 3.2.

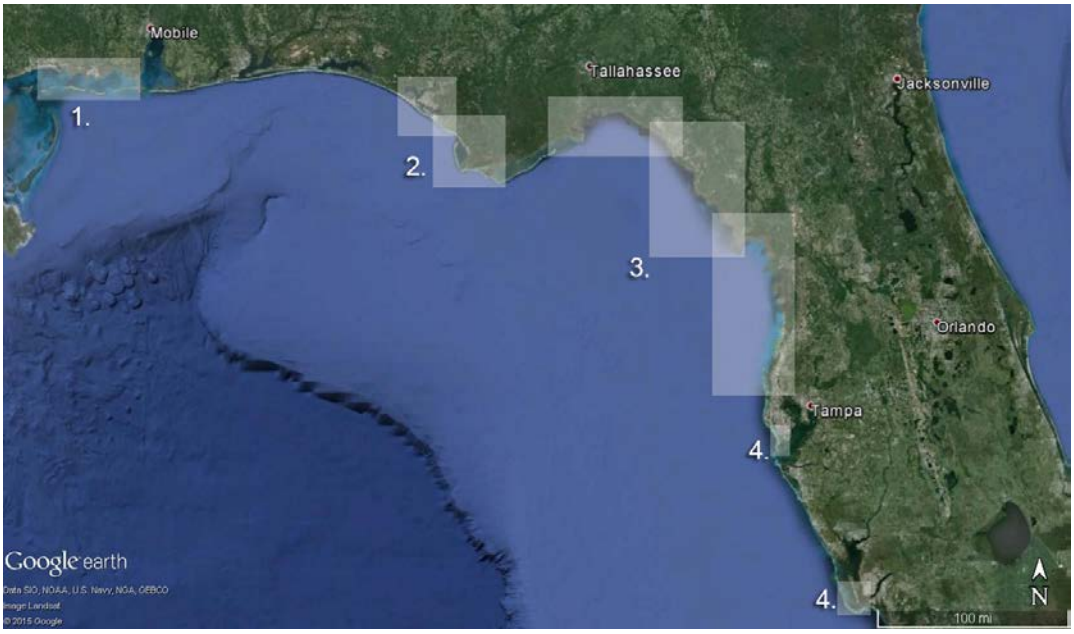

Figure 3.2 Regions sampled during the 2017 GULFSPAN survey

Mississippi Sound

In 2017, GULFSPAN sampling by the University of Southern Mississippi Gulf Coast Research Laboratory divided the coastal waters into east, central, and west regions that were allotted seven randomly generated stations inshore (depths of 2.0–2.9 meters) or offshore (depths of 3.0–10.0 meters). Three stations from at least two regions were sampled monthly between April and October.

A total of 21 gillnet sets were made, capturing 139 sharks of five species: Atlantic sharpnose, finetooth, blacktip (the most abundant), spinner, bull. Bluntnose stingrays, cownose rays, and Atlantic cownose rays were also captured. Approximately 74 percent of the elasmobranchs encountered were juvenile or YOY.

The blacktip shark was the most abundant elasmobranch and caught individuals were comprised entirely of juvenile and YOY, with the majority of the YOY catch occurring offshore. Juveniles were collected across a range of temperatures, depths, and dissolved oxygen concentrations that overlapped with sites where YOY individuals were caught. However, YOY individuals were generally caught in areas of lower salinity.

Atlantic sharpnose sharks were primarily caught offshore and no individuals were caught in the western region of the sampling area. Mature individuals made up 82 percent of the catch and were found at depths that ranged from 2.7–6.0 meters. The remaining catch was comprised of juvenile and YOY individuals that were caught in the same set.

Finetooth sharks were found across the sound and in inshore and offshore waters, however, the highest catch rate was inshore. Though adult finetooth are at times caught in the Mississippi Sound, adults were not caught in the 2017 survey. The finetooth shark catch was instead equally divided between juvenile and YOY. Environmental conditions where finetooth were caught overlapped with blacktip sharks, and it was not uncommon to catch immature blacktip and immature finetooth sharks in the same set.

Catches of bull sharks were confined to the western region with this species occurring both inshore and offshore. YOY dominated the inshore catch while the catch-per-unit-effort for juveniles and YOY were similar offshore. The bull sharks were typically caught in lower salinity areas, and when they were present, no other elasmobranch species were caught.

The only other shark species encountered was the spinner shark. Three were caught offshore of the central regions and three were caught inshore of the eastern region. Salinity and temperature range at both sites were typical of areas where blacktip and finetooth sharks are caught. However, the average water clarity was higher in areas where spinner sharks were caught.

Overall, the dominance of juvenile and YOY elasmobranchs of the four species at 76 percent of elasmobranch catch suggests the Mississippi Sound may act as a nursery area for several species. When YOY elasmobranchs were encountered for a species, it was often in numbers greater than one, which could point to a recent pupping event or a maintained affiliation by a recently pupped cohort. Specifically the offshore site sampled south of Horn Island in August caught 60 YOY blacktip sharks.

Due to the sampling regime put in place in 2012, the same sites are unable to be sampled monthly. It is therefore important to note that these results are only representative of the conditions at the time of sampling and likely do not reflect the species assemblage throughout the year. As the Mississippi Sound is a very dynamic environment, seasonal and monthly shifts in abundances and size classes are likely.

St. Andrew Bay to St. Vincent Island, Florida

Sampling by NOAA Fisheries SEFSC Panama City Laboratory covered four major areas along the panhandle of Florida: St. Andrew Bay, Crooked Island Sound, St. Joseph Bay, and the Gulf of Mexico side of St. Vincent Island. Due to inclement weather, not all sites were sampled in the months of April, May, June, and September.

A total of 118 gillnet sets were made, capturing Atlantic sharpnose (the most abundant), scalloped hammerhead, blacktip, bonnethead, finetooth, spinner, blacknose, bull, and sandbar. Three species of batoid were also caught: cownose ray, southern ray, and smooth butterfly ray. The elasmobranch catch consisted of 30 percent adult and 70 percent immature animals. Of the immature animals, 17 percent were one year old or older, and 53 percent were YOY. Two neonates, both Atlantic sharpnose sharks, were collected at St. Vincent Island on the side of Gulf of Mexico.

Important habitats included seagrass (*Thallassia testudinum* and *Halodule wrightii)*, sand, mud, and a mix of the three. Atlantic sharpnose were associated with the widest range of abiotic factors and depths and were captured over all bottom types across all areas. Bonnethead sharks were also associated with a wide range of each abiotic factor in all areas with adults found more often over sandy, muddy habitat. The majority of immature blacktip sharks were collected in Crooked Island Sound and St. Vincent Island over muddy, sandy habitat. Immature scalloped hammerhead were generally caught in deeper waters with higher temperature and salinity; however, water clarity varied greatly. Finetooth shark were caught in waters with high salinity and low water clarity. Only immature blacknose sharks were collected in Crooked Island Sound at similar temperature and salinity conditions. YOY spinner sharks were generally caught in deeper water at Crooked Island Sound and St. Vincent Island. Lastly, one bull shark at an undetermined life stage and one YOY sandbar shark were encountered in October at St. Vincent Island on the side of Gulf of Mexico.

Big Bend of Florida

Sampling by Florida State University Coastal and Marine Laboratory covered more than 300 km of Florida's coastline from St. George Sound to Anclote Keys. A total of 913 elasmobranchs were caught comprising 16 species. Of the 907 sharks, 399 individuals were tagged and released. Three species of sharks (Atlantic sharpnose, bonnethead, and blacktip) accounted for 91.3 percent of the total catch. Gillnets captured 402 sharks of eight species, while longlines captured 505 sharks of ten species. The remaining six elasmobranchs were comprised of batoids. Gillnets captured one Atlantic stingray, one southern stingray, and two cownose rays, and longlines captured two southern stingrays. As in previous years, sampling in 2017 indicates that this region serves as a primary nursery for Atlantic sharpnose, blacknose, and blacktip sharks.

Sampling continues to indicate that this region provides important primary and secondary nursery habitat for several species of large and small coastal sharks. Habitats sampled included seagrass (*T. testudinum, Syringodium filiforme, H. wrightii*), drift algae dominated bottom, mud bottom, sandy ridges, and hardbottom reefs (dominated by soft corals and sponges). Seagrass habitats in this region were in waters shallower than 4 meters; therefore, most effort occurred in this habitat type. All lifestages of Atlantic sharpnose, except adult females were found in all habitats sampled, although very few were captured over hardbottom reefs. Juvenile and adult bonnethead shark were most common in seagrass habitats. All life stages of blacktip sharks were typically captured on the edges of muddy channels and sandy ledges adjacent to seagrass habitats. YOY and juvenile blacknose were usually captured in sandy seagrass habitat, while adults were captured on the edges of muddy channels adjacent to seagrass habitats.

Sampling in St. George Sound occurred from April 25 to October 24, 2017. Water temperatures ranged from 23.8 to 30.3°C and salinity ranged from 30.8 to 34.3 parts per thousand which was

higher than other stations in the sampling area which were above 20.0 parts per thousand. Sampling from Apalachee Bay to Anclote Key occurred over July and August when water temperatures were high. Salinity ranged from 22.7 to 34.9 parts per thousand. No environmental associations were noted for the dominant caught species; however, blacknose sharks were most frequently captured in salinities above 30.0 parts per thousand. Atlantic sharpnose sharks, bonnethead sharks, and blacktip sharks were captured across nearly the full range of temperatures and salinities sampled.

Southern Tampa Bay, Florida

The New College of Florida completed 2017 GULFSPAN sampling in Terra Ceia Bay and Sarasota Bay. Sampling in Sarasota Bay was conducted May through October, while Terra Ceia Bay sampling occurred April through October, except for the month of August. This was the first year of GULFSPAN sampling in Terra Ceia Bay and the process was mostly exploratory, although attempts were made to spatially balance the sampling efforts.

A total of 164 elasmobranchs from nine species were caught three species of sharks (Atlantic sharpnose, bonnethead, blacktip) and seven species of batoids (cownose ray, Atlantic stingray, bluntnose stingray, southern stingray, smooth butterfly ray, spotted eagle ray), 36 percent of which were immature animals. Of the immature animals, 64 percent were one year or older and 32 percent were YOY. Two blacktip neonates—one male measuring 47 cm fork length and one female measuring 49 cm fork length—were caught in Terra Ceia Bay in June. Nine percent of the catch was not assigned a life stage.

Abundance and size trends differed slightly by area. The bonnethead was the most abundant species encountered, comprising 50 percent of the total catch. Catch of this species was composed of adults of both sexes and primarily female juveniles. Blacktip sharks, which comprised 6.1 percent of the catch, were the fourth most caught. Blacktip sharks consisted of YOY and juveniles of both sexes, as well as one adult animal, which was unsexed and unmeasured, but estimated to be 180 cm total length. One Atlantic sharpnose shark was caught.

The two systems differed in abiotic profiles. Temperature and salinity were consistently higher in Sarasota Bay than Terra Ceia Bay. Salinity in both systems was dramatically lower in August through early September, primarily due to an unnamed severe weather system in August that resulted in record-breaking rainfall (13.7” over 48 hours at Sarasota-Bradenton Airport) and flash flooding in Manatee and Sarasota counties. Hurricane Irma, which passed directly through the region on September 10–11, resulted in a further rainfall (5.8” at Sarasota-Bradenton Airport) and a rapid drop in water temperature (-5.5°C) along with a massive reverse storm surge (-6 feet) that emptied much of Terra Ceia Bay and Sarasota Bay. Temperature and salinity rates had returned to more typical seasonal levels by late September in Sarasota Bay, but salinity remained low in Terra Ceia Bay until October. These lower salinity levels correlated with lower catch rates in Sarasota Bay in August and Terra Ceia Bay in both early and late September, compared with other months.

The essential habitat profiles suggest that these systems serve as primary and secondary nursery areas for several species of sharks and rays. Habitats sampled included seagrass, sand, and mud dominated bottom types, as well as a mix of all three. Blacktip sharks were associated with mud/sand-dominated habitat, while other species were associated with seagrass-dominated

habitat. During the sampling season, temperatures ranged from 20.5 to 33.2°C and salinity ranged from 18.4 to 34.7 parts per thousand. Bonnetheads were encountered across almost this entire range of temperatures and salinities. Blacktip sharks were encountered across a much more narrow range of temperatures and salinities.

3.4 Conclusion

The COASTSPAN and GULFSPAN surveys provide comprehensive information that is incorporated into the HMS EFH five-year review and associated amendments (e.g., Amendment 1 and Amendment 10). These surveys continue to provide data needed to identify new EFH areas and to further refine areas already designated as EFH by determining specific habitat characteristics associated with these habitats for shark nurseries and pupping. Time series for both surveys maintain their usefulness in the stock assessments for large and small coastal shark species, are essential for monitoring these populations and their habitat use, and provide information for habitat consultations completed by the NOAA Fisheries Office of Habitat Conservation.

Table 3.3 Location and species for Level 1 EFH point data collected in the 2017 GULFSPAN survey

Sampling region	Species – new EFH point data	Sampling locations
Mississippi	Bull, blacktip, Atlantic sharpnose, finetooth, bonnethead, spinner	Mississippi Sound
NW Florida – St. Andrew Bay to St. Vincent Island	Atlantic sharpnose, blacktip, bonnethead, scalloped hammerhead, finetooth, spinner, blacknose, bull, sandbar	St. Andrew Bay, Crooked Island Sound, St. Joseph Bay, St. Vincent Island (Gulf of Mexico side)
NW Florida – Big Bend Region	Atlantic sharpnose, bonnethead, blacktip, Florida smoothhound, blacknose, great hammerhead, lemon, tiger, great hammerhead, nurse	St. George Sound, Apalachee Bay, Suwanee Sound, Waccasassa Bay, Anclote Keys
West Central Florida	Bonnethead, Atlantic sharpnose, blacktip	Sarasota Bay and Terra Ceia Bay

Source: Deacy et al. 2018

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4 HMS PERMITS AND TOURNAMENTS

Section 4.1 provides updates to the number of permits for Atlantic HMS fisheries and the number of dealer permits for sharks, swordfish, and tunas in Table 4.1–Table 4.11. Section 4.2 reports the historical number, locations, and target species of HMS tournament registrations.

4.1 HMS Permits

Limited Access Permits

The limited access permit program includes six vessel permits: Swordfish Directed, Swordfish Incidental, Swordfish Handgear, Shark Directed, Shark Incidental, and Atlantic Tunas Longline. The Swordfish Directed and Incidental permits are valid only if the permit holder also holds an Atlantic Tunas Longline and an Atlantic Shark permit. Similarly, the Atlantic Tunas Longline permit is valid only if the permit holder also holds specifically a Swordfish Directed or Incidental permit (not handgear) and an Atlantic Shark permit. No additional limited access permits are required to make a Swordfish Handgear or the Shark permits valid. The number of limited access permits issued are tabulated by state in Table 4.1.

Table 4.1 Number of limited access Shark, Swordfish, and Atlantic Tunas Longline vessel permits and permit holders by state

Permits by state in 2018							
State	Swordfish permits			Shark permits		Atlantic Tunas Longline permit	Permit holders (permits)
	Directed	Incidental	Handgear	Directed	Incidental		
Maine	3	1	2	1	6	4	9 (17)
Mass.	7	3	7	4	11	12	24 (44)
R.I.	-	-	12	-	3	1	11 (16)
Conn.	1	1	1	-	2	2	3 (7)
N.Y.	12	3	4	7	12	16	23 (54)
Pa.	2	-	-	1	2	2	3 (7)
N.J.	28	10	3	24	27	41	52 (133)
Del.	3	-	1	3	2	3	6 (12)
Md.	4	-	-	2	2	4	2 (12)
Va.	1	1	-	1	3	4	6 (10)
N.C.	9	5	-	19	8	14	26 (55)
S.C.	5	2	-	7	10	7	15 (31)
Ga.	-	1	-	3	3	1	6 (8)
Fla.	78	34	52	119	128	118	271 (529)
Ala.	-	-	-	3	1	-	3 (4)
Miss.	-	-	-	-	1	-	1 (1)
La.	28	4	1	21	32	36	57 (122)
Texas	1	7	-	3	12	10	13 (33)
Hawaii	1	-	-	-	-	1	1 (2)
Ore.	-	-	-	-	1	-	1 (1)
Calif.	-	-	-	-	-	1	1 (1)
Trinidad/ Tobago	2	-	-	2	-	2	2 (6)
Annual Totals for 2013–2018*							
2018*	185	72	83	220	268	280	537 (1,108)
2017	185	72	83	221	269	280	588 (1,110)
2016	186	72	83	223	271	280	540 (1,115)
2015	188	72	83	224	275	280	540 (1,122)
2014	183	66	77	206	258	246	536 (1,036)
2013	185	71	81	220	265	252	556 (1,074)

* As of October 2018. Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire.

Incidental HMS Squid Trawl Permit

The Incidental HMS Squid Trawl permit is available to all valid *Illex* squid moratorium permit holders (August 10, 2011; 76 FR 49368). The permit authorizes the retention of up to 15 north Atlantic swordfish per trip, as long as squid constitutes at least 75 percent of the total weight of catch on board. The distribution of Incidental HMS Squid Trawl permits among the Atlantic states is presented in Table 4.2.

Table 4.2 Number of Incidental HMS Squid Trawl permits by state as of October 2018

State	Number of Incidental HMS Squid Trawl permits
Maine	4
Mass.	6
R.I.	11
Conn.	3
N.Y.	4
N.J.	27
Va.	5
N.C.	6
2018 total	66
2017 total	65

Commercial Caribbean Small Boat Permit

The Commercial Caribbean Small Boat permit is open access and valid in the U.S. Caribbean region on vessels that are less than 45 feet long (October 1, 2012; 77 FR 59842). This permit allows the commercial retention of tunas, swordfish, and sharks. The current retention limit for bigeye, northern albacore, yellowfin, and skipjack tunas (collectively referred to as BAYS tuna) is 10 fish and the retention limit for North Atlantic swordfish is two fish. The shark retention limit is zero; however, if the retention limit were increased, permit holders would be allowed to retain and sell non-prohibited species of sharks. The distribution of these permits among the states and territories is presented in Table 4.3.

Table 4.3 Number of Commercial Caribbean Small Boat permits by state as of October 2018

State	Commercial Caribbean Small Boat permits
S.C.	2
Fla.	30
La.	1
Texas	1
Puerto Rico	4
US Virgin Is	2
2018 total	40
2017 total	39

Swordfish General Commercial Permit

The Swordfish General Commercial permit (August 21, 2013; 78 FR 52012) is open access and can be held in conjunction with the Atlantic Tunas Harpoon and General category permits. The swordfish retention limit under this permit may be set between zero and six fish per vessel per trip. The default retention limits for North Atlantic swordfish are three in the northwest Atlantic and Gulf of Mexico, two in the U.S. Caribbean), and zero in the Florida Swordfish Management Area. The swordfish retention limits were maintained at six fish throughout 2018 by two inseason actions, published in December 2017 (82 FR 58761) and July 2018 (83 FR 30884). The distribution of Swordfish General Commercial permits is presented in Table 4.4.

Table 4.4 Number of Swordfish General Commercial permits by state as of October 2018

State	Swordfish General Commercial permits	State	Swordfish General Commercial permits
Ala.	10	N.C.	80
Conn.	12	N.H.	36
Del.	5	N.J.	29
Fla.	78	N.Y.	45
Ga	1	Penn.	2
La.	11	Puerto Rico	9
Mass.	165	R.I.	43
Md.	5	S.C.	12
Maine	152	Texas	9
Miss.	1	Va.	16
Mont.	1	USVI	1
2018 total			723
2017 total			613

Smoothhound Shark Permits

Commercial smoothhound shark vessel permits have been required since March 15, 2016 (November 24, 2015, 80 FR 73128). These permits are open-access permits, and are required to land and sell smoothhound sharks including smooth dogfish, Florida smoothhound, and gulf smoothhound. Table 4.5 provides the number of permit holders by state.

Table 4.5 Number of smoothhound shark permits by state as of October 2018

State	**Commercial smoothhound shark permit**	**State**	**Commercial smoothhound shark permit**
Del.	3	N.C.	56
Fla.	13	N.J.	39
Ga.	1	N.Y.	13
La.	2	R.I.	6
Mass.	1	S.C.	6
Md.	4	Va.	17
Miss.	1	W.Va.	1
2018 total			163
2017 total			154

Atlantic Tunas Permits

Commercial Atlantic tunas permits are categorized by gear type (Longline, Harpoon, Trap, Purse Seine, and General category) (Table 4.6). The Atlantic Tunas General category permit is open access and authorizes the use of rod and reel, handline, harpoon, green-stick, and bandit gear. The distribution of the General category permit by state can be found in Table 4.7. HMS Charter/Headboat permit holders (Table 4.8) may also sell tunas to permitted tuna dealers.

Table 4.6 Number of commercial Atlantic tunas permits by category in 2012–2018

Category	2012	2013	2014	2015	2016	2017	2018*
Longline	253	252	246	280	280	280	280
Harpoon	13	14	14	23	9	11	21
Trap	8	7	3	4	-	1	-
General	4,084	3,783	3,396	3,230	2,910	2,940	2,942
Purse seine	3	3	5	5	5	5	5
Total	4,361	4,059	3,664	3,542	3,204	3,237	3,248

The General and Harpoon categories listed include those held in conjunction with a Swordfish General Commercial permit. All purse seine permits were eligible to receive Atlantic Bluefin Tuna Purse Seine category quota. * = As of October 2018. The actual number of 2018 permit holders in each category is subject to change as individuals renew their permits or allow them to expire.

The homeport states for the 21 Atlantic Tunas Harpoon category permits issued in 2018 were Maine with 11 vessels, Massachusetts with nine vessels, and Florida with one vessel.

Table 4.7 Number of Atlantic Tunas General category permits by state/territory as of October 2018

State	Atlantic Tunas General category permits	State	Atlantic Tunas General category permits
Ala.	24	N.H.	194
Conn.	49	N.J.	104
Del.	18	N.Y.	120
Fla.	144	Pa.	5
Ga.	3	P.R.	51
La.	26	R.I.	133
Mass.	972	S.C.	25
Md.	15	Texas	16
Maine	658	Va.	54
Miss.	15	USVI	3
Mont.	1	Vt.	3
N.C.	308	W.Va.	1
2018 total			2,942
2017 total			2,940

HMS Charter/Headboat Permit

The Atlantic HMS Charter/Headboat permit is open access and authorizes recreational fishing for all Atlantic HMS, commercial fishing for Atlantic tunas under certain conditions, and commercial fishing for North Atlantic swordfish only on non for-hire trips. Starting in 2018, vessel owners issued an HMS Charter/Headboat permit who intend to fish for sharks are required to obtain a shark endorsement (82 FR 16478). Similarly, starting in 2018, vessel owners issued an HMS Charter/Headboat permit who intend to sell their catch are required to obtain a commercial sale endorsement (82 FR 57543). Those vessels also are required to abide by the U.S. Coast Guard commercial fishing vessel safety regulations. The distribution of 2018 Atlantic HMS Charter/Headboat permits is presented in Table 4.8.

Table 4.8 Number of Atlantic HMS Charter/Headboat permits by state as of October 2018

State/territory	HMS CHB permits	State/territory	HMS CHB permits
Ala. *†	58	New Brunswick*†	1
Conn. *†	65	N.C. *†	343
Del. *†	98	N.H. *†	92
Fla. *†	679	N.J. *†	440
Ga. *†	52	N.Y. †	292
Hawaii †	1	Pa. *†	12
Idaho *†	2	Puerto Rico *	16
Ill. *	1	R.I. *†	121
Ky. *	1	S.C. *†	128
La. *†	96	Texas *†	102
Mass. *†	669	Va. *†	91
Md. *†	114	Virgin Islands *†	18
Maine *†	108	Wis. *	2
Mich. *	2	W.Va. *	2
Miss. *†	29	-	-
2018 total			3,635
2017 total			3,618

* State with shark endorsements. There are a total of 2,645 shark endorsements on HMS Charter/Headboat Permits.
† State with commercial endorsements. There are a total of 1,396 commercial endorsements on HMS Charter/Headboat permits.

HMS Angling Permit

The HMS Angling permit is open access and required to recreationally fish for, retain, or possess any federally-regulated HMS, including sharks, swordfish, white and blue marlin, sailfish, spearfish, bluefin tuna, and BAYS tunas. This requirement extends to catch-and-release fishing. The permit does not authorize the sale or transfer of HMS to any person for a commercial purpose. Starting in 2018, vessel owners issued an HMS Angling permit intending to fish for sharks are required to obtain a shark endorsement. Atlantic HMS Angling permit distribution is reported in Table 4.9.

Table 4.9 Number of Atlantic HMS Angling permits by state or country as of October 2018

State/country	Permits by home port*	Permits by residence**	State/country	Permits by home port*	Permits by residence**
Alaska †	3	1	Neb. †	-	1
Ala. †	421	384	N.H. †	245	282
Ark. †	7	10	N.J. †	2,941	2,524
Ariz. †	-	5	N.M. †	2	3
Calif. †	3	15	Nev. †	3	3
Colo.	1	6	N.Y. †	1,877	1,966
Conn. †	623	720	Ohio †	14	29
DC	-	4	Okla. †	10	13
Dela. †	836	551	Ore.	1	-
Fla. †	4,106	3,764	Pa. †	169	1047
Ga. †	114	202	Puerto Rico †	314	321
Hawaii	1	1	R.I. †	532	351
Iowa †	-	1	S.C. †	487	472
Idaho	-	1	S.D. †	-	3
Ill. †	10	26	Tenn. †	17	39
Ind. †	6	16	Texas †	619	670
Kan. †	2	4	Utah †	3	3
Ky. †	4	13	Va. †	772	857
La. †	599	602	USVI †	29	14
Mass. †	2,244	2,226	Vt. †	20	33
Md. †	1,095	1,019	Wash.	4	10
Maine†	393	330	Wis. †	7	12
Mich. †	21	27	W.V. †	6	8
Minn. †	3	9	Wyo.	-	3
Mo. †	8	17	Bahamas	1	-
Miss. †	195	223	Canada†	8	7
Mont. †	1	4	British VI	-	1
N.C.†	1,308	1,221	Guam	-	1
N.D.†	1	1	Not reported†	-	10
2018 total				20,086	20,086
2017 total				20,338	20,338

* The vessel port or other storage location.

** The permit holder's billing address.

† State with shark endorsements; a total of 10,769 shark endorsements on HMS Angling permits.

Atlantic Tunas, Swordfish, and Shark Dealer Permits

HMS dealer permits are open access and required for the "first receiver" of Atlantic tunas, swordfish, and sharks. A first receiver is any entity, person, or company that takes, for commercial purposes other than solely transport, immediate possession of the fish or any part of

the fish, as the fish are offloaded from a fishing vessel. Atlantic tunas, swordfish and sharks dealer permits are reported by state in Table 4.10.

Table 4.10 Number of domestic Atlantic tunas, swordfish, and sharks dealer permits

Permits by state – 2018*						
State/territory	Bluefin only	BAYS only	Bluefin and BAYS	Atlantic swordfish	Atlantic sharks	Total
Ala.	-	2	2	8	2	14
Calif.	2	-	-	1	-	3
Conn.	-	1	3	1	-	5
Dela.	-	2	5	1	2	10
Fla.	1	5	15	86	30	137
Ill.	-	-	1	1	-	2
Ga.	-	-	1	-	1	2
Hawaii	-	-	2	-	-	2
La.	-	-	6	9	6	21
Mass.	6	10	77	18	6	117
Md.	-	-	6	3	2	11
Maine	11	-	20	1	1	36
Mo.	-	-	-	1	-	1
N.C.	4	2	25	19	17	67
N.H.	1	-	5	1	-	7
N.J.	1	11	35	10	9	66
N.Y.	4	20	39	10	15	88
Pa.	-	-	2	1	-	3
Puerto Rico	-	1	1	1	-	3
R.I.	-	4	23	7	4	38
S.C.	-	1	5	10	9	25
Texas	-	4	2	3	2	11
Va.	-	5	10	1	2	18
USVI	-	2	1	-	-	3
Vt.	-	-	1	-	-	1
Annual totals 2013–2018*						
2018*	30	70	287	193	108	698
2017	32	70	291	189	113	695
2016	29	74	291	182	111	687
2015	33	79	289	184	102	687
2014	32	79	308	195	96	710
2013	35	72	318	183	97	705

* As of October 2018. The actual number of permits per state may change as permit holders move or sell their businesses.

Exempted Fishing Permits, Display Permits, Letters of Acknowledgement, Scientific Research Permits, and the Shark Research Fishery

Exempted fishing permits (EFPs), scientific research permits (SRPs), and display permits authorize collections of tunas, swordfish, billfishes, and sharks from Federal waters in the Atlantic Ocean and Gulf of Mexico for the purposes of scientific data collection and public display. EFPs are issued to individuals for the purpose of conducting research or other fishing activities aboard private (non-NOAA) vessels, whereas SRPs are issued to agency scientists who are conducting research aboard NOAA vessels. Letters of Acknowledgement (LOAs) are issued to acknowledge activity as "scientific research" but do not authorize any particular activity. LOAs are issued to individuals conducting research from "bona fide" research vessels on species that are only regulated by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and not the Atlantic Tunas Convention Act, since these laws differ on the treatment of scientific research activity. Display permits are issued to individuals who are fishing for, catching, and then transporting HMS to certified aquariums for public display. The number of EFPs, display permits, and SRPs issued from 2013 to 2018 by category and species are listed in Table 4.11. In 2018, NOAA Fisheries received six applications for the shark research fishery permit. Based on the qualification criteria and random selection process, six permits were issued. One shark research fishery permit was revoked mid-year.

Table 4.11 Number of Atlantic HMS exempted fishing permits, display permits, letters of acknowledgement, and scientific research permits in 2013–2018

Permit type		2013	2014	2015	2016	2017	2018*
Exempted fishing permit	Sharks for display	4	3	3	3	5	6
	HMS** for display	2	3	1	0	2	2
	Tunas for display	0	0	0	0	0	0
	Shark research on a non-scientific vessel	10	10	11	12	4	4
	Tuna research on a non-scientific vessel	4	2	2	4	2	2
	HMS** research on a non-scientific	3	3	4	4	4	2
	Billfish research on a non-scientific	1	0	0	0	0	0
	Shark fishing	0	0	0	0	0	0
	Tuna fishing	0	1	1	0	0	0
	Total	24	22	22	23	17	16
Scientific research permit	Shark research	3	2	4	5	1	1
	Tuna research	2	2	1	1	0	1
	Billfish research	0	0	0	0	0	0
	HMS** research	3	3	1	1	3	6
	Total	8	7	6	7	4	8
Letters of acknowledgement	Shark research	6	8	8	9	12	15
	Total	6	8	8	9	12	15

*As of October 31, 2018. **Multiple species.

Detailed information about HMS permits and regulations associated with those permits are available in the most recent HMS Recreational, Commercial, and Dealer Compliance Guides at https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-compliance-guides.

4.2 Atlantic HMS Tournaments

An Atlantic HMS tournament is defined as any fishing competition involving Atlantic HMS wherein participants must register or otherwise enter or in which a prize or award is offered for catching or landing such fish. Atlantic HMS tournaments vary by size and are conducted from ports along the U.S. Atlantic coast, Gulf of Mexico, and U.S. Caribbean. They may range from relatively small "members-only" club events with as few as 10 participating boats (40–60 anglers) to larger, statewide tournaments with 250 or more participating vessels (1,000–1,500 anglers). Larger tournaments often involve corporate sponsorship from tackle manufacturers, marinas, boat dealers, marine suppliers, beverage distributors, resorts, radio stations, publications, chambers of commerce, restaurants, and other local businesses.

Since 1999, federal regulations have required that tournaments register with NOAA Fisheries at least four weeks prior to the start of tournament fishing activities. Some foreign tournaments (e.g., those held in the Bahamas, Bermuda, and the Turks and Caicos) include voluntary registration because many of their participants are U.S. citizens. Tournament operators may be selected by NOAA Fisheries for reporting, in which case a record of tournament catch and effort must be submitted to NOAA Fisheries within seven days of the conclusion of the tournament. Tournament registration and reporting forms are available at https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-highly-migratory-species-tournaments.

Tournament operators may request HMS regulation booklets and other outreach materials (e.g., shark identification guides and "Careful Catch and Release" brochures) to distribute to tournament participants. In 2018, more than 157 tournaments requested and received over 10,300 copies of these materials from the HMS Management Division.

The number of HMS tournaments registered from 2008 to 2018 is reported in Figure 4.1, and the average distribution of HMS fishing tournaments across the U.S. Caribbean and along the Atlantic and Gulf of Mexico coastal states is represented in Figure 4.2. Since 2008, an average of 262 HMS tournaments have registered each year. The number of HMS 2018 tournaments registered as of October 31, 2018 is below this average at 246 tournaments. The largest number of HMS tournament registrations for a given year was received in 2017 (n=287). This was possibly due to an increase in outreach and compliance monitoring, and may have been influenced by an improving U.S. economy and lower fuel prices.

Summary data from the HMS Atlantic Tournament Registration and Reporting (ATR) database are presented in Figure 4.1–Figure 4.5 and in Table 4.12. Tournament landings of billfishes and swordfish are presented in Section 5.4.2.

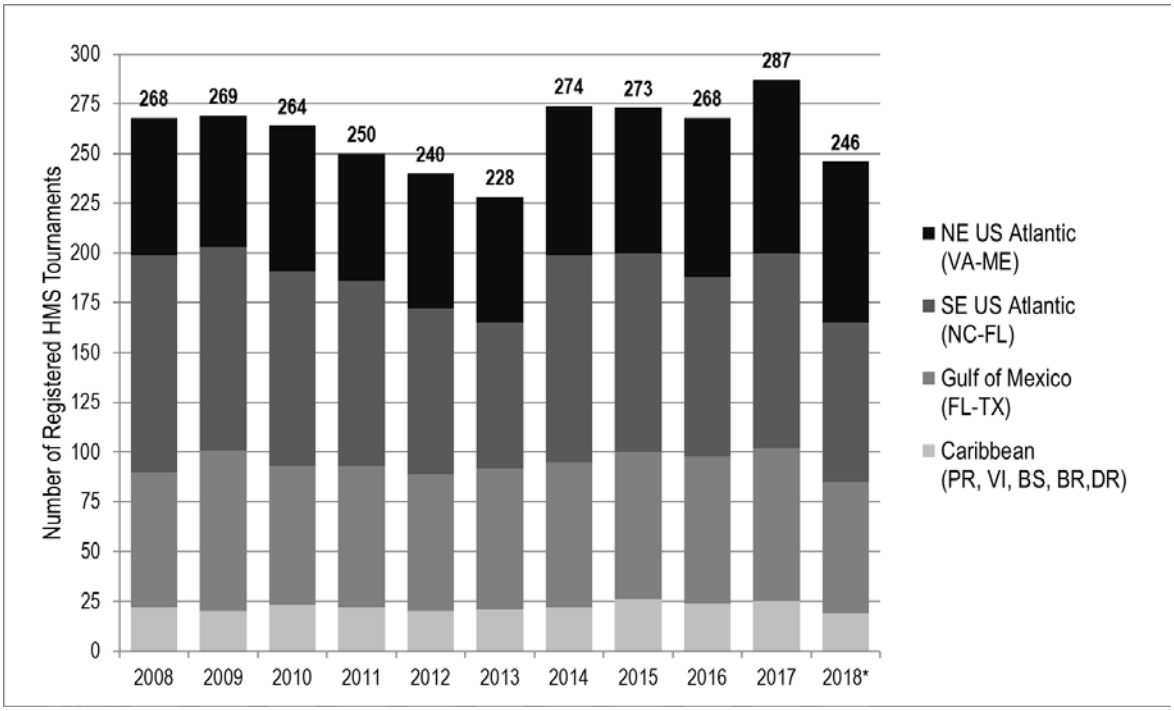

Figure 4.1 Annual number of registered Atlantic HMS tournaments by region in 2008–2018*

*2018 data are considered preliminary and do not represent a complete year (totals as of October 2018). Source: ATR database.

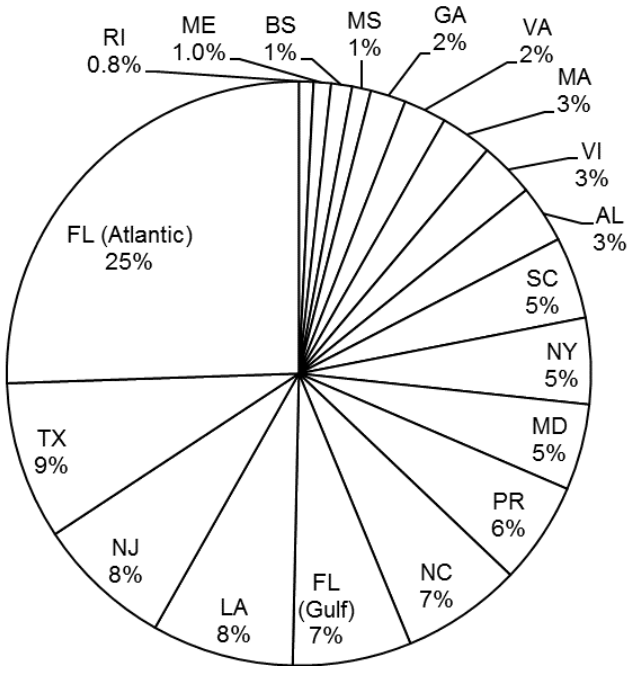

Figure 4.2 Percent of Atlantic HMS tournaments held in each state in 2008–2017

Number of tournaments is 2,504; areas excluded (< 1%) are Bermuda (0%), Connecticut (0.08%), and Delaware (0.28%). Source: ATR database.

Participants may target one or more HMS in a tournament. Most tournaments register to catch multiple HMS. In 2017, 68 percent of the Atlantic HMS tournament registrations indicated multiple HMS. Tuna and billfish, followed by sharks and swordfish, were listed most frequently as the target species in the 32 percent of tournaments that registered for only one species group. Often, a tournament targets a primary species, and other species are caught for entry in separate categories. The secondary species vary by region as these species are those present during the local fishing season at the time of the tournament. Figure 4.3 gives a breakdown of the percent of tournaments in each state registered for billfish, sharks, swordfish, or tuna species in 2017.

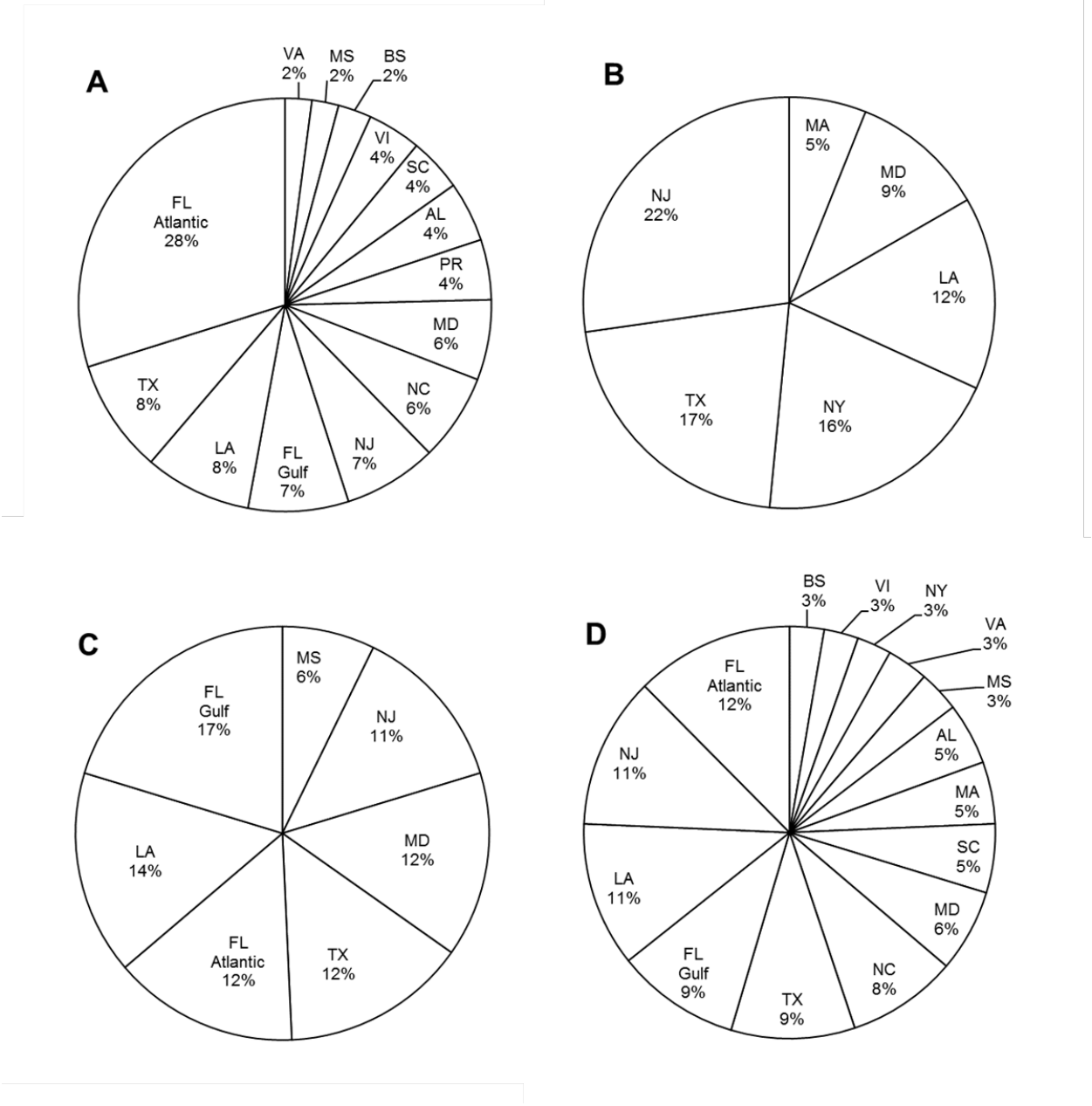

Figure 4.3 Percent of Atlantic HMS tournaments in each state that registered for (a) billfish, (b) shark, (c) swordfish, or (d) tuna species in 2017

The total numbers of tournaments by state in 2017 for each species group were 201 for billfish (A), 82 for shark (B), 81 for swordfish (C), and 196 for tuna species (D). Some areas with few tournaments were excluded due to confidentiality of the fisheries data. These include, by species, (A) 8 areas representing < 3.5% of total: Conn, Maine, Dominican Republic, Dela, R.I., N.Y., Ga, and Mass ; (B) 16 areas representing < 16% of total: Dominican Republic, Ga, Bahamas, Va, Puerto Rico, Virgin Islands, Conn, Del, Miss, Ala, Fla (Atlantic-side), Maine, R.I., S.C., Fla (Gulf-side), and N.C.; (C) 15 areas representing < 11% of total: Conn, Dominican Republic, Del, Maine, Bahamas, Puerto Rico, Virgin Islands, Ga, R.I., Ala, N.Y., S.C., Va, Mass, and N.C.; and (D) 5 areas representing < 6% of total: R.I., Del, Maine, Puerto Rico, and Ga. Source: ATR database.

Table 4.12 provides the total numbers of HMS tournaments from 2015 to 2018 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, which is further illustrated in Figure 4.4.

Table 4.12 Number of Atlantic HMS tournaments by targeted species in 2015–2018†

Species	2015	2016	2017	2018†
Blue marlin	161	158	174	148
White marlin	146	144	165	135
Longbill spearfish	67	55	65	37
Roundscale spearfish	61	45	102	72
Sailfish	161	155	175	141
Swordfish	89	89	71	81
Bluefin tuna	96	98	87	103
Bigeye tuna	75	78	96	95
Albacore tuna	48	41	57	50
Yellowfin tuna	166	172	183	159
Skipjack tuna	38	41	56	54
Smoothhounds*	--	0	0	3
Small coastal sharks	16	12	17	9
Large Coastal Sharks	32	27	23	18
Pelagic sharks	79	72	75	57

Tournaments may be represented more than once if registration included more than one highly migratory species.
* Smoothhounds includes smooth dogfish, Florida smoothhound, and Gulf smoothhound.
† Through October 2018.
Source: ATR database.

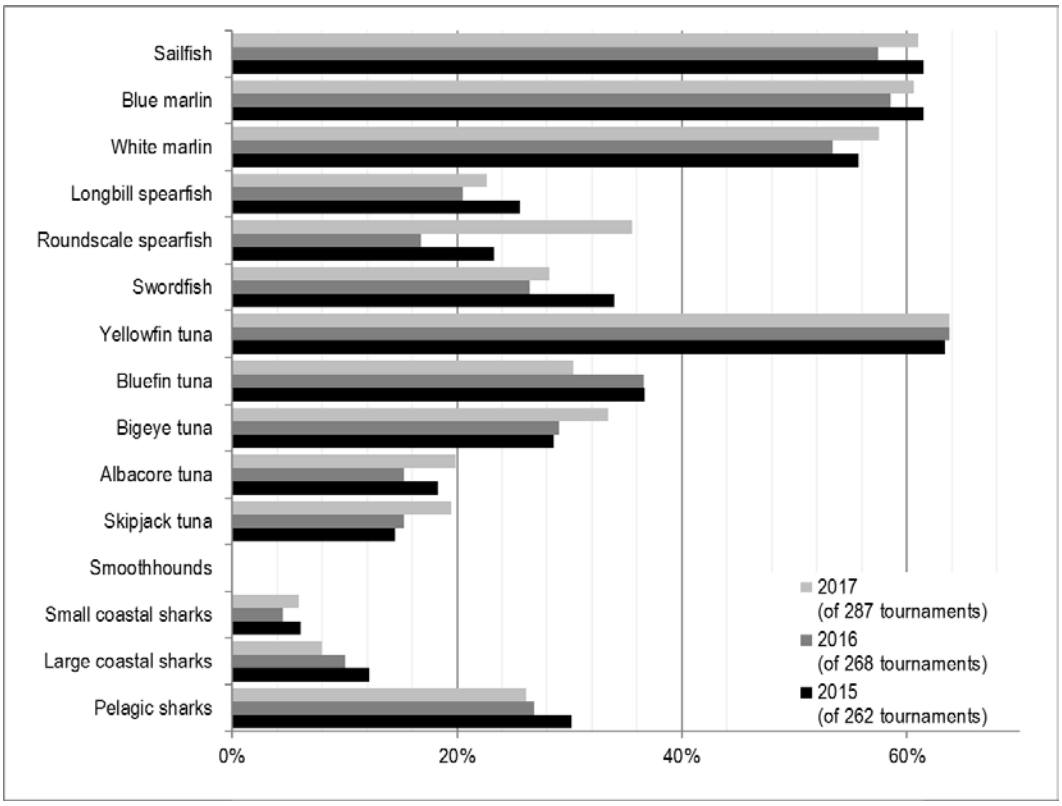

Figure 4.4 Percent of HMS tournaments registered for each species or group in 2015–2017

Source: ATR database.

Billfish Tournaments

A significant number of blue marlin, white marlin, and sailfish tournaments are "release-only," utilizing observers, angler affidavits, polygraph tests, photographs, or digital video camcorders to document the live release of billfish. All billfish tournaments must report all caught fish to the ATR System, including numbers of released fish. This reporting was previously reported to the Recreational Billfish Survey, or RBS.

Anglers fishing from an HMS-permitted vessel in any tournament awarding points or prizes for Atlantic billfish are required to deploy only non-offset circle hooks when using natural bait or natural bait/artificial lure combinations. The use of non-offset circle hooks increases the likelihood of post-release survival for billfish. For more information on studies of post-release survival on other HMS with this gear, as well as brochures and videos provided by NOAA Fisheries describing benefits and safe-handling-and-release procedures, consult Section 5.4.2 of this report.

Figure 4.5 depicts the time of year that billfish tournaments are most prevalent in regions of the U.S. Atlantic, Gulf of Mexico, and Caribbean. In 2017, all of the billfish tournaments occurring from January through February targeted sailfish along the Atlantic coast of Florida.

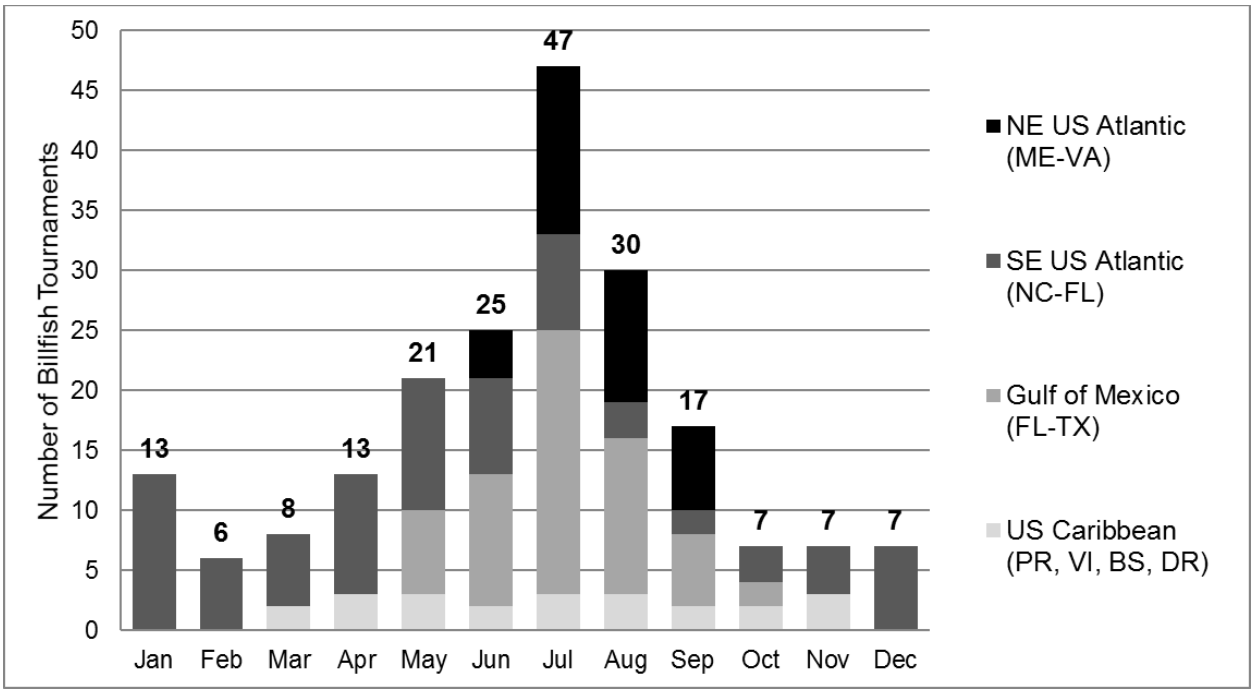

Figure 4.5 Number of billfish tournaments by region and month in 2017

5 FISHERY DATA

While HMS fishermen generally target specific species, the non-selective nature of many fishing gears warrants analysis and management by gear type, including for issues such as bycatch and safety. Further discussion of bycatch, incidental catch, and protected resource interactions is in Chapter 8.

Participation in a fishery requires the use of an authorized gear type and an approved fishery. If an individual fisherman intends on using a gear to participate in a fishery not already on the approved list of fisheries (LOF), he may notify the appropriate Council, or in the case of Atlantic HMS, the Director of NOAA of this intent. If no regulatory action is taken to prohibit this action, the individual may use the gear or participate in that fishery after 90 days. The approved list of fisheries (LOF section IX) and authorized gear types are provided in 50 CFR 600.725(v). A list of HMS fisheries and the authorized gear types are presented in Table 5.1.

Table 5.1 List of HMS fisheries and authorized gear types (50 CFR 600.725(v))

HMS fishery	Authorized gear types
Swordfish handgear	Rod and reel, harpoon, handline, bandit gear, buoy gear, green-stick gear
Swordfish recreational	Rod and reel, handline
Pelagic longline	Longline
Shark gillnet	Gillnet
Shark bottom longline	Longline
Shark handgear	Rod and reel, handline, bandit gear
Shark recreational	Rod and reel, handline
Tuna purse seine	Purse seine
Tuna recreational	Rod and reel, handline, speargun (allowed for BAYS tunas only), green-stick (only with Atlantic HMS Charter/Headboat permit)
Tuna handgear	Rod and reel, harpoon, handline, bandit gear
Tuna harpoon	Harpoon
Tuna green-stick	Green-stick
Atlantic billfish recreational	Rod and reel only
Commercial Caribbean small boat	Rod and reel, handline, harpoon, bandit gear, green-stick, and buoy gear

The U.S. percentage of regional and total catch of HMS, including landings and dead discards, is presented in Table 5.2 to provide a basis for comparison of the U.S. catch relative to other nations/entities. In that table, catch is broken down to landings and dead discards where possible. International catch levels and U.S. reported catches for HMS, other than sharks, are taken from the 2018 International Commission for the Conservation of Atlantic Tunas (ICCAT) Report of the Standing Committee on Research and Statistics (SCRS 2018). The data from the Standing Committee on Research and Statistics (SCRS) are reported by species; therefore, Table 5.2 provides a summary of U.S. and international HMS catches by species rather than gear type. U.S. billfish catch includes recreational landings and commercial dead discards; catch of bluefin tuna and swordfish includes recreational landings, commercial landings, and dead discards. International catch and landings data reported specifically from the pelagic longline and purse

seine fisheries are in sections 5.1.3 and 5.2.3, respectively. Data necessary to compare the U.S. regional and total percentage of international catch for most Atlantic shark species are limited; therefore, Table 5.2 provides information only on the species that have been assessed by the SCRS.

Table 5.2 U.S. vs. total international catch (mt, ww) of HMS reported to ICCAT in 2017

Species	Region		Catch			U.S. percentage of total catch
			Landed	Discarded dead	Total	
Atlantic swordfish	N Atlantic	*U.S.*	*1,270*	*107*	*1,377*	
			9,900	146	10,046	13.7
	S Atlantic		10,401	111	10,512	0.0
	Total		20,301	257	20,559	6.7
Atlantic bluefin tuna	W Atlantic	*U.S.*	*986*	*11*	*997*	
			1,839	12	1,851	53.9
	E Atlantic and Med		23,606	10	23,616	0.0
	Total		25,445	22	25,467	3.9
Atlantic bigeye tuna	Atlantic and Med	*U.S.*	*788*	-	*788*	
			78,444	38	78,482	1.0
	Total		78,444	38	78,482	1.0
Atlantic yellowfin tuna	W Atlantic	*U.S.*	*3,326*	-	*3,326*	
			33,085	3	33,088	10.1
	E Atlantic		106,165	63	106,228	0.0
	Total		139,250	66	139,316	2.4
Atlantic albacore tuna	N Atlantic	*U.S.*	*237*	-	*237*	
			28,008	302	28,310	0.8
	S Atlantic and Med		16,586	-	16,586	0.0
	Total		44,594	302	44,896	0.5
Atlantic skipjack tuna	W Atlantic	*U.S.*	-	-	-	
			23,276	-	23,276	0.0
	E Atlantic and Med		242,194	94	242,289	0.0
	Total		265,470	94	265,565	0.0
Atlantic blue marlin	Atlantic and Med	*U.S.*	*13*	*46*	*59*	
			1,888	99	1,987	3.0
	Total		1,888	99	1,987	3.0
Atlantic white marlin	Atlantic and Med	*U.S.*	*2*	*5*	*7*	
			395	7	401	1.7
	Total		395	7	401	1.7
Atlantic sailfish	W Atlantic	*U.S.*	*3*	*6*	*9*	
			1,069	6	1,076	0.8
	E Atlantic		1,584	7	1,591	0.0
	Total		2,653	14	2,666	0.3

Species	Region		Catch			U.S. percentage of total catch
			Landed	Discarded dead	Total	
Blue shark	N Atlantic	*U.S.*	*24*	*38*	*62*	
			39,542	133	39,675	0.2
	S Atlantic and Med		28,114	223	28,337	0.0
	Total		67,655	356	68,011	0.1
Porbeagle shark	N Atlantic	*U.S.*	*8*	*6*	*14*	
			17	9	26	53.8
	S Atlantic and Med		1	-	1	0.0
	Total		18	9	27	51.9
Shortfin mako shark	N Atlantic	*U.S.*	*296*	*4*	*300*	
			3,107	5	3,112	9.6
	S Atlantic and Med		2,737	4	2,742	0.0
	Total		5,844	9	5,854	5.1

Catch amounts are as reported by ICCAT member nations. Totals subject to rounding error. Med = Mediterranean Sea. U.S. catch reported in italics is included in the region's catch reported below it. "–" = Unreported data. Source: SCRS 2018.

5.1 Pelagic Longline

5.1.1 Current Management

The pelagic longline fishery for Atlantic HMS primarily targets swordfish, yellowfin tuna, and bigeye tuna in various areas and seasons. Secondary target species include dolphin, albacore tuna, and, to a lesser degree, sharks. Although gear can be modified (e.g., depth of set, hook type, hook size, bait) to target swordfish or tunas, the pelagic longline fishery is generally a multi-species fishery. Pelagic longline vessel operators are opportunistic, switching gear style and making subtle changes to target the best available economic opportunity on each individual trip. Pelagic longline gear sometimes attracts and hooks non-target finfish with little or no commercial value as well as species that cannot be retained by commercial fishermen due to regulations, such as billfish. Pelagic longline gear may also interact with protected species such as marine mammals, sea turtles, and seabirds. Thus, this gear has been classified as a Category I fishery with respect to the Marine Mammal Protection Act. Any species that cannot be landed due to fishery regulations is required to be released, regardless of whether the catch is dead or alive.

Pelagic longline gear is composed of several parts (Figure 5.1). The primary fishing line, or mainline of the longline system, can vary from 5 to 40 miles in length, with approximately 20–30 hooks per mile. The depth of the mainline is determined by ocean currents and the length of the floatline. The floatline connects the mainline to several buoys and periodic markers which can have radar reflectors or radio beacons attached. Each individual hook is connected by a leader, or gangion, to the mainline. Lightsticks, which contain light emitting chemicals, are used, particularly when targeting swordfish. When attached to the hook and suspended at a certain depth, lightsticks attract baitfish, which may, in turn, attract pelagic predators (NMFS 1999).

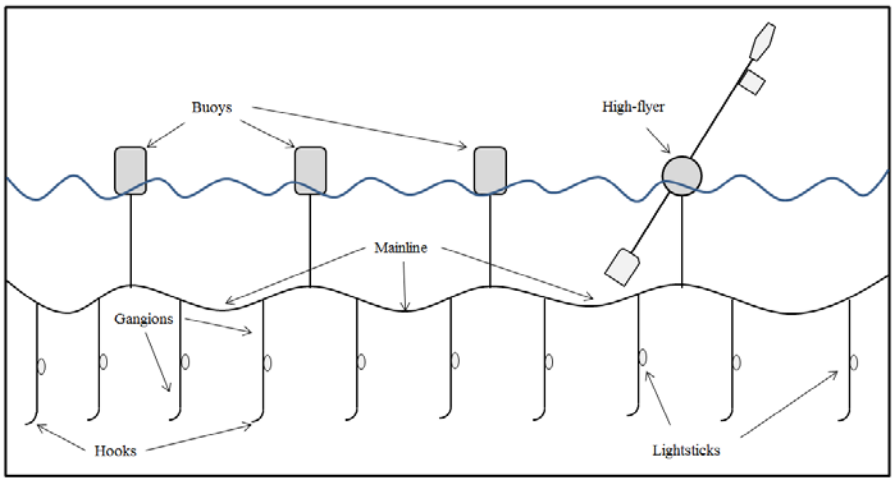

Figure 5.1 Typical U.S. pelagic longline gear

Source: Redesign from original in Arocha (1997)

When targeting swordfish, pelagic longline gear is generally deployed at sunset and hauled at sunrise to take advantage of swordfish's nocturnal, near-surface feeding habits (NMFS 1999). In general, longlines targeting tunas are set in the morning, fished deeper in the water column, and hauled back in the evening. Except for vessels of the distant water fleet, which undertake extended trips, fishing vessels preferentially target swordfish during periods when the moon is full to take advantage of increased densities of pelagic species near the surface. The number of hooks per set varies with line configuration and target species (Table 5.3).

Table 5.3 Average number of hooks per pelagic longline set in 2013–2017

Target species	2013	2014	2015	2016	2017
Swordfish	735	780	729	757	775
Bigeye tuna	620	811	641	619	708
Yellowfin tuna	638	608	571	641	542
Mix of tuna species	694	670	653	702	732
Shark	NA	293	298	274	295
Dolphin	933	1,093	1,140	943	918
Other species	NA	NA	150	NA	644
Mix of species	717	722	737	783	759

Source: Unified Data Processing (UDP)

Figure 5.2 illustrates basic differences between shallow swordfish and deep tuna longline sets. Swordfish sets are buoyed to the surface, have fewer hooks between floats, and are relatively shallow. This same type of gear arrangement is used for mixed target species sets. Tuna sets use a different type of float placed much further apart. Compared with swordfish sets, tuna sets have more hooks between the floats and the hooks are set much deeper in the water column. It is believed that tuna sets hook fewer turtles than the swordfish sets because of the difference in fishing depth. In addition, tuna sets use bait only, while swordfish sets use a combination of bait and lightsticks. Compared with vessels targeting swordfish or mixed species, vessels specifically targeting tuna are typically smaller and fish different grounds.

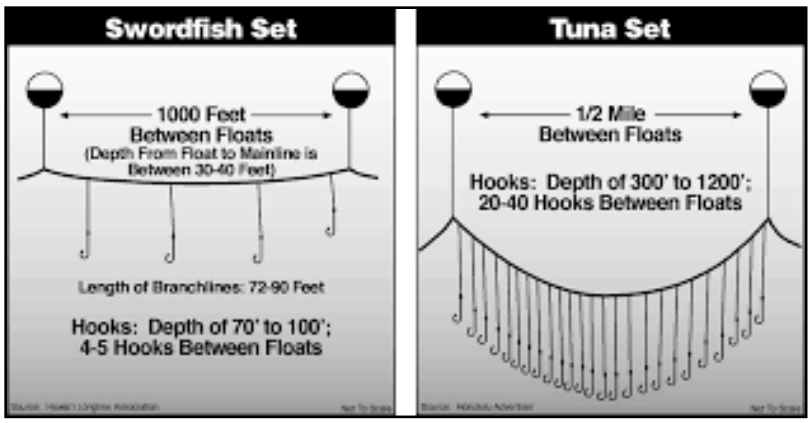

Figure 5.2 Pelagic longline gear deployment techniques

Note: This figure is only included to show basic differences in pelagic longline gear configuration and to illustrate that this gear may be altered to target different species. Source: Hawaii Longline Association and Honolulu Advertiser.

The 1999 Fishery Management Plan (FMP) for Atlantic Tunas, Swordfish, and Sharks established six different limited access permit types: Swordfish Directed, Swordfish Incidental, Swordfish Handgear, Shark Directed, Shark Incidental, and Atlantic Tunas Longline. To reduce bycatch in the pelagic longline fishery, these permits were designed so that the Swordfish Directed and Incidental permits are valid only if the permit holder also holds both an Atlantic Tunas Longline and a Shark permit. Similarly, the Atlantic Tunas Longline permit is valid only if the permit holder also holds both a Swordfish Directed or Incidental permit and a Shark permit; a Handgear permit is not sufficient for a valid Atlantic Tunas Longline permit. The combination of the two permits allows limited retention of species that might otherwise have been discarded.

As of October 2018, approximately 280 Atlantic Tunas Longline limited access permits have been issued. In addition, approximately 185 Swordfish Directed, 72 Swordfish Incidental, 220 Shark Directed, and 268 Shark Incidental limited access permits have had been issued (see Table 4.1). Not all vessels with limited access Swordfish and Shark permits use pelagic longline gear, but these are the only permits that allow for the use of pelagic longline gear in HMS fisheries.

Amendment 7 to the Consolidated Atlantic HMS FMP—Overview of Requirements for Pelagic Longline Vessels

Amendment 7 to the 2006 Consolidated HMS FMP was developed to reduce and account for bluefin tuna dead discards in all categories, optimize fishing opportunities in all categories within the United States' quota, enhance reporting and monitoring, and adjust other management measures. Four components of Amendment 7 affect the U.S. pelagic longline fishery: two new or modified pelagic longline Gear Restricted Areas (GRAs); an individual bluefin tuna quota (IBQ) program; mandatory electronic monitoring (EM) of pelagic longline gear at haulback; and catch reporting of each pelagic longline set using vessel monitoring systems (VMS). A majority of the conservation and management measures in Amendment 7 became effective January 1, 2015, EM requirements in the pelagic longline fishery became effective on June 1, 2015, and trip level accountability requirements in the IBQ program became effective on January 1, 2016.

An important aspect of Amendment 7 is the IBQ program, which requires vessels fishing with pelagic longline gear to account for all bluefin tuna either retained or discarded dead using quota available to the individual vessel, either through quota shares or leased quota through the IBQ system. This program is intended to reduce bluefin tuna dead discards by: capping the amount of catch, both landings and dead discards, by individual vessels; providing strong incentives to reduce interactions with bluefin and increasing flexibility for vessels to continue to operate profitably; accommodating different fishing practices within the pelagic longline fleet; and creating new revenue potential through a market for leasable IBQ allocation.

Eligible Atlantic Tunas Longline permit holders have been issued an IBQ share, which is a percentage of the overall longline quota, and are eligible to receive annual associated quota allocations. Shareholders as well as other permit holders who did not receive a quota share may lease additional quota from other participants to account for landings of bluefin and dead discards and to resolve quota debt that accumulates when incidental catch occurs without quota available to the vessel.

Implementation of the accountability measures has varied slightly by year since the program's inception. NOAA Fisheries has implemented three types of accountability measures since 2015: annual, trip level, and quarterly accountability. Adjustments to the accountability measures balanced the goals of providing flexibility for the fishery and ensuring that quota debt is reconciled in a timely manner, especially as the fishery adjusted to the new program.

In 2015, the first year of the IBQ Program, there was annual accountability such that vessels were responsible for reconciling any quota debt that may have accrued during the year by using allocated IBQ or by leasing quota from other permit holders. In addition, the delay in trip-level accountability, which became effective January 2016, provided time for permitted vessel owners or operators to adapt to fishing under the various new Amendment 7 regulations, including the IBQ Program, VMS reporting, and EM system requirements. If a vessel had quota debt at the end of 2015, that debt carried over into 2016 and was automatically subtracted from the IBQ allocation distributed for 2016.

As of January 1, 2016, an Atlantic Tunas Longline permitted vessel is required to have a minimum IBQ allocation in order to fish with pelagic longline gear. This is known as trip-level accountability. The minimum IBQ allocation required in order to depart on a trip in the Gulf of Mexico is 0.25 mt ww (approximately 551 lb), or 0.125 mt ww (approximately 276 lb) if fishing in the Atlantic, including the Northeast Distant Waters GRA. A larger minimum IBQ allocation is required for the Gulf of Mexico because the average size of the bluefin encountered is larger than in the Atlantic. The two minimum increments reflect the historical average sizes of bluefin catch in the pelagic longline fishery in the two respective areas. Under these measures, a vessel does not have to terminate a trip once the IBQ has been fully used on a particular trip, but they must obtain additional IBQ allocation via lease prior to departing on a subsequent trip. Allowing a vessel on a given trip to retain bluefin beyond their allocated quota provides flexibility and reduces dead discards and waste of a marketable fish.

If a vessel had quota debt at the end of 2016 or 2017, the quota debt carried over into the subsequent year, and the debt was automatically subtracted from IBQ allocation distributed for

2017 or 2018. For those vessels that did not have an annual allocation, the debt remained until addressed via lease or via inseason quota distributions of Reserve quota to the Longline category.

In late 2017, in response to suggestions from the HMS Advisory Panel, and in an effort to meet the various objectives of the IBQ program, NOAA Fisheries published a final rule (82 FR 61489; December 28, 2017) that modified the IBQ accountability rules as explained below.

As of January 27, 2018, NOAA Fisheries replaced trip-level accountability with quarterly accountability to provide additional flexibility and better meet the various objectives of the IBQ program. Under the quarterly system, vessels are allowed to fish with a low IBQ balance or with quota debt during a calendar quarter, provided their IBQ balance returns to the required minimum amount prior to the first trip of the following quarter. Vessels are still required to report bluefin tuna catch at the end of each trip and account for it with IBQ, but this regulatory change provided the flexibility to fish even if the vessel has less than the minimum amount of IBQ or quota debt until the first fishing trip in each calendar quarter. The change provides flexibility for two important operational business decisions made by vessel owners: decisions regarding quota balance and any level of quota debt to maintain subject to full accounting quarterly, and decisions regarding the timing and price at which they lease additional quota.

Amendment 7 also implemented mandatory EM of pelagic longline gear at haulback. To effect this requirement, NOAA Fisheries paid for the installation and equipment costs for these systems on the vessels that received quota shares and for other vessels to the extent funding was available. Amendment 7 also requires vessels fishing with pelagic longline gear to report through VMS the following information within 12 hours of completion of each pelagic longline set: the date the set was made; area in which the set was made; the number of hooks in the set; and the approximate length by standardized size ranges of all bluefin tuna retained, discarded dead, or released alive. If a vessel is fishing both inside and outside of the Northeast Distant Waters on the same trip, that vessel must submit two VMS bluefin catch reports noting the location of the catch. Permit holders must also submit a landing notification at least 3 hours, but no more than 12 hours, prior to any landing. Additional information regarding requirements for pelagic longline vessels is in the HMS Commercial Fishing Compliance Guide (https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-compliance-guides), and the Amendment 7 Compliance Guide and IBQ program FAQ documents (https://www.fisheries.noaa.gov/action/amendment-7-2006-consolidated-hms-fishery-management-plan-bluefin-tuna-management).

Pelagic Longline Observer Program

In 2017, NOAA Fisheries observers in the Pelagic Longline Observer Program (POP) recorded 934 pelagic longline sets, an overall fishery coverage of 12.8 percent. Table 5.4 details the amount of observer coverage in past years for this fleet.

The Pelagic Longline Take Reduction Plan (74 FR 23349; May 19, 2009) recommended that NOAA Fisheries increase observer coverage to 12–15 percent throughout all Atlantic pelagic longline fisheries that interact with pilot whales and Risso's dolphins to ensure representative sampling of fishing effort. If resources are not available to provide such observer coverage for all fisheries, regions, and seasons, the Pelagic Longline Take Reduction Team recommended NOAA Fisheries allocate observer coverage to fisheries, regions, and seasons with the highest

observed or reported bycatch rates of pilot whales. The team recommended that additional coverage be achieved either by increasing the number of NOAA Fisheries observers who have been specially trained to collect additional information supporting marine mammal research, or by designating and training special "marine mammal observers" to supplement traditional observer coverage.

Table 5.4 Observer coverage of the U.S. Atlantic pelagic longline fishery in 2013–2017

Year	Number of sets observed			Percentage of total number of sets		
	Total	Non-EXP	EXP	Total	Non-EXP	EXP
2013	1,528	1,474	54	14.4	14.1	100
2014	1,247	1,230	17	12.5	12.3	100
2015	1,144	1,144	-	14.0	14.0	-
2016	1,230	1,230	-	17.9	17.9	-
2017	897	897	-	12.2	12.2	-

EXP=Experimental fishing operations. Sources: Garrison and Stokes 2014, 2016; unpublished Pelagic Observer Program (POP) data 2017, 2018.

Observer Coverage in the Mid-Atlantic Bight in 2017 to 2018

NOAA Fisheries did not increase the mandatory observer coverage for pelagic longline vessels in the Mid-Atlantic Bight in 2018. Therefore, these coverage rates returned to the 12.8 percent historical levels for this area.

Observer Coverage in the Gulf of Mexico during 2018

NOAA Fisheries continued to increase the rate of mandatory observer coverage in the Gulf of Mexico during 2018 (February 20 through June 15, 2018). The increased coverage obtains additional data on bluefin tuna during the bluefin tuna spawning season in the Gulf of Mexico and contributes to the evaluation of management measures such as the Spring Gulf of Mexico Gear Restricted Areas. Preliminary 2018 estimates for the Gulf of Mexico indicate a coverage rate of approximately 45 percent.

5.1.2 Recent Catch, Landings, Bycatch, and the Individual Bluefin Quota Program

U.S. Atlantic pelagic longline catch, including bycatch, incidental catch, and target catch, is largely related to vessel characteristics and gear configuration. The reported catch, in numbers of fish, is summarized for the whole fishery in Table 5.5. Table 5.6 provides a summary of U.S. Atlantic pelagic longline landings, as reported to ICCAT.

Table 5.5 Reported numbers of catch in the U.S. Atlantic pelagic longline fishery in 2013–2017

Species	2013	2014	2015	2016	2017
Swordfish kept	44,556	32,908	27,730	24,456	23,332
Swordfish discarded	4,756	4,655	5,382	4,437	7,116
Blue marlin discarded	844	718	990	1,050	1,562
White marlin discarded	1,239	1,580	2,885	2,153	2,221
Sailfish discarded	456	445	715	855	657
Spearfish discarded	342	306	837	745	686
Bluefin tuna kept	273	379	320	411	464
Bluefin tuna discarded	266	390	210	582	229
Bigeye, albacore, yellowfin, and skipjack tunas kept	67,083	73,339	54,734	56,978	68,329
Pelagic sharks kept	3,384	3,804	2,208	2,172	2,542
Pelagic sharks discarded	28,151	38,496	45,082	27,900	25,564
Large coastal sharks kept	49	47	50	50	79
Large coastal sharks discarded	7,997	5,905	8,839	9,549	11,533
Dolphin kept	34,250	63,217	53,526	46,376	29,141
Wahoo kept	2,721	3,325	1,563	1,766	1,459
Sea turtle interactions	92	93	357	228	162
Number of Hooks (× 1000)	7,306	7,125	5,856	5,218	5,328

Source: UDP

Table 5.6 Reported landings (mt ww) in the U.S. Atlantic pelagic longline fishery in 2013 –2017

Species	2013	2014	2015	2016	2017
Yellowfin tuna	1,544.4	1,456.2	1,041.4	1,300.2	1403.5
Skipjack tuna	0.5	0.31	0.2	1.1	0.6
Bigeye tuna	508.9	586.7	574.4	386.2	560.7
Bluefin tuna*	190.4	221.9	87.7	105.3	116.4
Albacore tuna	255.3	309.6	228.9	203.0	207.2
Swordfish N.*	2,812.0	1,832.3	1,592.7	1,388.5	1,276.4
Swordfish S.*	0.06	0.0	0.0	0.0	0.0
Total	5,312	4,407	3,525	3,384	3,565

* Includes landings and estimated discards from scientific observer and logbook sampling programs as reported to ICCAT. Source: NMFS 2018.

Individual Bluefin Quota Program and Bluefin Tuna Bycatch

The IBQ program implemented by Amendment 7 enhanced accountability for bluefin tuna at the individual vessel level and is supported by several reporting and monitoring requirements. The broad elements of Amendment 7 and the IBQ program are described above in 5.1.1. Quota allocations under the IBQ program, including annual and inseason distributions of bluefin quota, and quota adjustments based on changes to the overall U.S. bluefin quota pursuant to ICCAT, are described below.

Annual Distribution of Allocation

IBQ allocations are distributed to permitted vessels with IBQ shares on January 1 of each year. A shareholder's share percentage is multiplied by the total pounds of Longline category quota available to derive the amount of allocation in pounds. The shareholder's percentage is defined by the shareholder's tier level: high (1.2 percent), medium (0.6 percent), or low (0.37 percent). If an IBQ shareholder's Atlantic Tunas Longline permit is not associated with a vessel, the relevant annual allocations of IBQ are not released to the shareholder's IBQ account until the permit is associated with a vessel.

Inseason Distribution of Allocation

NOAA Fisheries may transfer bluefin quota from the Reserve category to other quota categories throughout the year. These inseason transfers are based on consideration of regulatory determination criteria relating to the current circumstances in the fishery and the goals and objectives of the 2006 Consolidated HMS FMP, as amended. The regulations and processes pertaining to inseason transfers from the Reserve category to other categories are distinct from those regulations and processes that determine annual IBQ distributions to shareholders. For each year since Amendment 7 was implemented, NOAA Fisheries has transferred quota into the Longline category inseason in order to achieve specific objectives. These objectives include reducing quota debt, encouraging full accounting of bluefin catch by vessels who may be in debt, fostering conditions in which permit holders become more willing to lease IBQ shares to other vessel owners, and reducing uncertainty in the fishery as a whole.

NOAA Fisheries may distribute bluefin quota inseason either to all IBQ share recipients or to only active vessels in the fishery, regardless of whether the vessels are IBQ share recipients. This option provides flexibility with respect to which vessels receive IBQ inseason transfers and allows NOAA Fisheries to achieve the objectives of the IBQ program, such as accounting for bluefin during longline operations and optimizing fishing opportunity for target species. Active vessels, in this context, are those with any fishing activity using pelagic longline gear over the course of the previous and subject year, and fishing activity is quantified using logbook, VMS, and/or EM data. Table 5.7 includes data on the annual (January 1), inseason, and combined (total) distributions of IBQ by shareholder tier.

Table 5.7 IBQ allocations (mt) to the pelagic longline category by share tier (lb) in 2015–2018

	Quota distribution	IBQ (mt)	Date	IBQ (lb) to each eligible shareholder*		
				High tier (~1.2 %)	Medium tier (~0.6 %)	Low tier (~0.37 %)
2015	Annual allocation	137.3	January 1, 2015	3,616	1,808	1,124
	Transfer from reserve category	34.0	July 28, 2015	551	551	551
	ICCAT baseline quota increase	11.0	August 28, 2015	292	146	90
	2015 Total	182.3		4,459	2,505	1,765
2016	Annual allocation	148.3	January 1, 2016	3,913	1,956	1,206
	Transfer from reserve category	34.0	January 4, 2016	551	551	551
	2016 total	182.3		4,464	2,507	1,757
2017	Annual allocation	148.3	January 1, 2017	3,913	1,956	1,206
	Transfer from reserve category**	45.0	March 2, 2017	1,102	1,102	1,102
	2017 total	193.3		5,015	3,058	2,308
2018	Annual allocation	148.3	January 1, 2018	3,913	1,956	1,206
	Transfer from reserve category**	44.5	April 13, 2018	1,102	1,102	1,102
	ICCAT baseline quota increase	15.3	October 5, 2018	404	202	124
	2018 total	208.1		5,419	3,260	2,432

* Only allocated to eligible shareholders, for which the valid permit was associated with a vessel. ** Transfer from Reserve Category to active vessels only (vessels with recent fishing activity).

Table 5.8 summarizes various IBQ program metrics regarding allocation, catch, fishing effort, IBQ leasing, and reporting and monitoring.

Table 5.8 Bluefin catch and other metrics of the IBQ program in 2015–2017

Metric	2015	2016	2017
Permits eligible for IBQ shares	136	136	136
Number vessels fished with pelagic longline gear	104	85	89
Number vessels landing bluefin tuna	59	55	58
Total weight bluefin landed (lb, ww)	157,388	196,142	229,396
Total weight bluefin landed (mt, ww)	71.3	89.0	104.1
Landed in Gulf of Mexico (mt, ww)	3.7	3.5	5.7
Landed in Atlantic (mt, ww)	67.6	85.5	98.1
Number of bluefin landed	323	447	501
Number landed in Gulf of Mexico	15	13	21
Number landed in Atlantic	308	424	480
Quota caught (mt, ww) in Northeast Distant area* (max. 25 mt quota)	24.9	17.3	25
Total bluefin dead discards (mt, ww)	17.1	22.6	11.4
Discarded in Gulf of Mexico (mt, ww)	5.6	7.1	6.5
Discarded in Atlantic (mt, ww)	11.5	14.8	3.7
Discarded in Northeast Distant area* (mt, ww)	0	0.7	1.2
Number trips with pelagic longline gear	1,124	1,025	1,078
Number pelagic longline sets	7,769	6,885	7,305
Number hooks	5,549,451	5,217,547	5,327,587
Number of IBQ leases	49	81	85
Number of participants leasing	44	63	52
Average amount leased per transaction (lb)	2,580	1,743	1,789
Total amount leased (lb)	126,407	141,183	152,050
Average price per pound (weighted average)	$ 3.46	$ 2.52	$ 1.67
Number of trips based on Vessel Monitoring System prelanding declarations	1,030	990	793
Number sets based on Vessel Monitoring System bluefin reports	5,472	5,921	6,507
Number vessels with installed EM systems	111	113	112
Number hard drives received	785 (Jun–Dec)	975	1,020
Number vessels submitting hard drives	91 (Jun–Dec)	85	86

* A map showing the location of the Northeast Distant area is shown in Figure 5.6.

Sources: POP (dead discard data), UDP (landings, effort, dead discard data), IBQ (IBQ leasing data), VMS, and EM data (via Saltwater, Inc., NOAA Fisheries contractor for installation and maintenance of systems, and ERT Corp, NOAA Fisheries contractor for review and storage of data).

Table 5.9 provides data on the number of sets and vessels audited during three-month audit periods. The numbers of pelagic longline sets and vessels audited is variable due to the sample design. The sample design is referred as "two-stage stratified random sampling" with an underlying objective to maximize the opportunity of sampling trips/sets with bluefin interactions. The sample design targets specific geographic regions and seasons based on historical data. It also samples each vessel annually, and samples among vessels in proportion to their annual fishing effort.

Table 5.9 Numbers of pelagic longline sets and vessels audited during three-month audit periods within the bluefin tuna Electronic Monitoring program in 2015–2018

Audit period	Period coverage	PLL sets audited	Vessels audited
1	Jun–Aug 2015	126	43
2	Sept–Nov 2015	70	25
3	Dec 2015–Feb 2016	155	48
4	Mar–May 2016	160	44
5	Jun–Aug 2016	85	28
6	Sep–Nov 2016	77	24
7	Dec 2016*	35	12
8	Jan–Mar 2017	179	48
9	Apr–Jun 2017	181	55
10	July–Sept 2017	52	17
11	Oct–Dec 2017	158	49
12	Jan–Mar 2018	102	29

PLL = pelagic longline gear. * December was limited to a one-month audit period in order to transition alignment with calendar years. Source: EM program.

Compliance with the Amendment 7 Regulations

The data indicate that, in general, compliance with the Amendment 7 regulations is high. For example, one of the reporting requirements is for dealers and vessel operators to report bluefin tuna landings and dead discards in the online IBQ system at the point of sale. The amount of landings of bluefin tuna, as indicated by data entered into the IBQ online system, was very similar to the amount derived from the preexisting mandatory bluefin tuna dealer reports, which was required for all commercially landed bluefin tuna regardless of gear type or geographic area.

In 2017, there was close correlation between the number of bluefin retained, as reported in the VMS, and the number of bluefin landed, as reported on bluefin tuna dealer reports (Figure 5.3). Bluefin tuna dealer reports are maintained in the Commercial Bluefin Tuna Landings Database, also referred to as the electronic bluefin tuna landings database (eBFT).

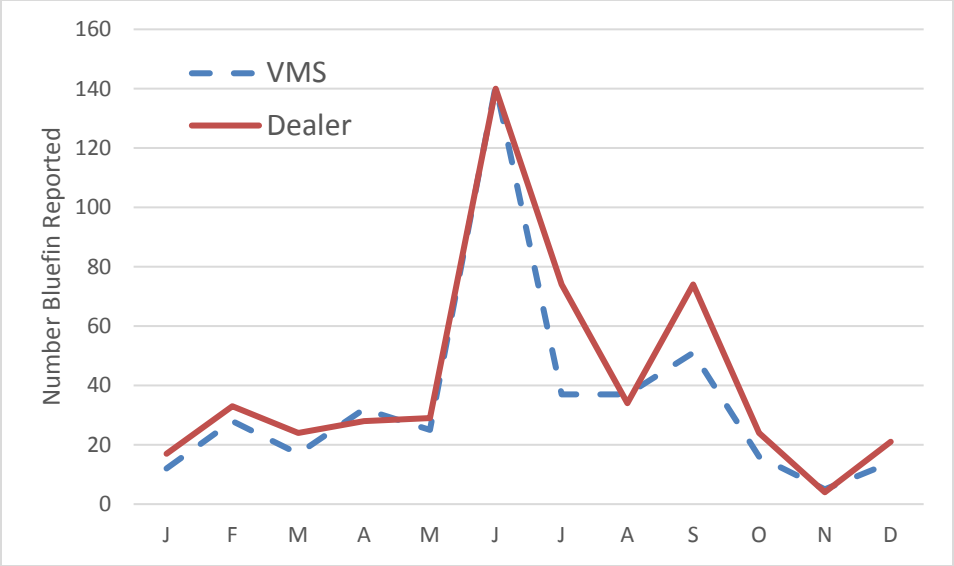

Figure 5.3 Number of bluefin tuna reported retained (VMS) vs. number landed (dealer data) in 2017

Sources: VMS; eBFT (dealer data)

HMS Pelagic Longline Bycatch

Bycatch reduction measures for sharks are often adopted by recommendation from ICCAT. For example, consistent with ICCAT Recommendations 09-07, 10-07, 10-08, and 11-08, the United States has prohibited the retention of bigeye thresher sharks in all fisheries since 1999, prohibited retaining, transshipping, landing, storing, or selling oceanic whitetip sharks or hammerhead sharks caught in association with ICCAT fisheries since 2011, and prohibited retaining on board, transshipping, or landing silky sharks since 2012. In 2012, to be consistent with the ICCAT oceanic whitetip and hammerhead shark prohibitions and an ICCAT silky shark measure, the United States also prohibited the storing, selling, or purchasing of silky sharks caught in association with ICCAT fisheries. Consistent with ICCAT Recommendation 15-06, the United States in 2016 began requiring pelagic longline vessels to release unharmed, to the extent practicable, porbeagle sharks that are alive at the time of haulback. Additionally, the United States in 2018 began requiring pelagic longline vessels to release any shortfin mako live at the time of haulback consistent with ICCAT Recommendation 17-08, and in response, NOAA Fisheries began verifying the landing of only dead shortfin mako sharks using the EM system. The number of releases and the status of ICCAT-prohibited species from pelagic longline vessels in 2017 is presented in Table 5.10.

Although ICCAT has not adopted a recommendation for dusky sharks, NOAA Fisheries has prohibited the retention of this species since 2000. Based upon the results of a 2016 stock assessment update indicating that the Atlantic dusky shark stock remained overfished and was experiencing overfishing, NOAA Fisheries implemented additional management measures to reduce fishing mortality on the stock and rebuild the dusky shark population (82 FR 16478, April 4, 2017). In the pelagic longline fishery these included the adoption of shark release protocols; dusky shark identification and safe handling training; and outreach and fleet communication protocols.

Table 5.10 ICCAT-designated prohibited shark interactions and dispositions in the pelagic longline fishery in 2017

Species	Kept	Released dead	Released alive	Released unk	Lost at surface
Bigeye thresher	0	21	34	0	0
Silky	0	151	148	0	0
Great hammerhead	0	5	2	0	0
Oceanic whitetip	0	11	55	1	1
Smooth hammerhead	0	30	8	0	0
Scalloped hammerhead	1	76	140	0	0
Unidentified hammerhead	0	110	218	1	2
Porbeagle*	0	52	19	0	1

* Vessels can keep porbeagle assuming they are dead at haulback. Source: POP.

Bycatch mortality of marlins, sailfish, swordfish, and bluefin tuna from all fishing nations may affect the ability of these populations to rebuild, and it remains an important management issue. In order to minimize bycatch and bycatch mortality in the domestic pelagic longline fishery, NOAA Fisheries implemented regulations to close certain areas to this gear type and has banned the use of live bait and required the use of weak hooks by pelagic longline vessels in the Gulf of Mexico. Areas where the use of pelagic longline gear is restricted include “pelagic longline closures” and Gear Restricted Areas (GRAs). The locations of the pelagic longline GRAs implemented by Amendment 7 are provided in Figure 5.4. NOAA Fisheries is currently developing a proposed rule to examine existing area-based and weak hook management measures in order to best achieve current management objectives. The proposed rule would take into consideration current relevant information, including the effectiveness of the IBQ program, and to allow sufficient flexibility to adapt to future fishing needs. The Notice of Intent was published March 2 (83 FR 8969), and the proposed rule is anticipated to be published in spring 2019.

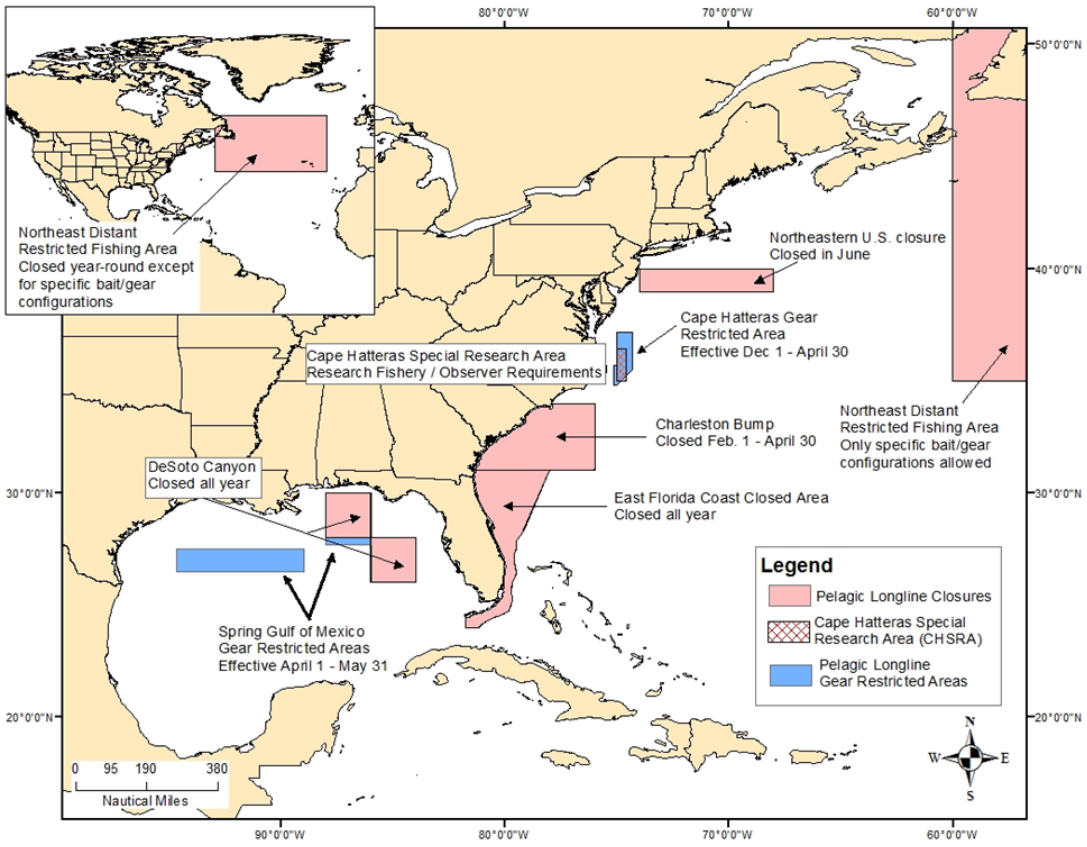

Figure 5.4 Areas closed/restricted to pelagic longline fishing by U.S. flagged vessels

GRAs encompass regions with elevated bluefin interaction rates for pelagic longline vessels, as determined from observer and logbook data. The primary objectives of the GRAs are to reduce bluefin interactions and the potential for dead discards, and to minimize economic and social impacts on the pelagic longline fishery.

The Cape Hatteras GRA is located off the coast of North Carolina and is effective from December through April. A vessel that has been issued, or is required to have been issued, an Atlantic Tunas Longline limited access permit, with other associated permits as required, may be granted conditional access to fish with pelagic longline gear in the Cape Hatteras GRA provided the permit holder/eligible vessel has demonstrated an ability to avoid bluefin and comply with reporting and monitoring requirements. The use of other gear types authorized for pelagic longline permits, such as buoy gear, green-stick gear, or rod and reel gear would be allowed by pelagic longline vessels. Specifically, the criteria for access are: ratio of bluefin interactions to designated species landings; compliance with the Pelagic Longline Observer Program requirements; and compliance with HMS logbook reporting requirements.

The number of vessels not qualified for access to the GRA is shown below in Figure 5.5, along with the reasons for lack of access. “Compliance” in this figure indicates the vessel did not qualify for access to the GRA due to a missing logbook report or a failure to fulfill an observer program requirement. Overall, there have been incremental improvements in bluefin tuna avoidance, observer compliance, and logbook reporting compliance based on the number of vessels with access to the Cape Hatteras GRA. The initial assessment of performance metrics was based on data from 2006 through 2012. Subsequent assessments were based on the most recent complete three-consecutive-year period as shown in Table 5.11. Permit holders are notified annually of the status of access for the relevant vessel. In order to access the Cape Hatteras GRA, permit holders must have the letter on board their vessel stating that the vessel is qualified to access the area.

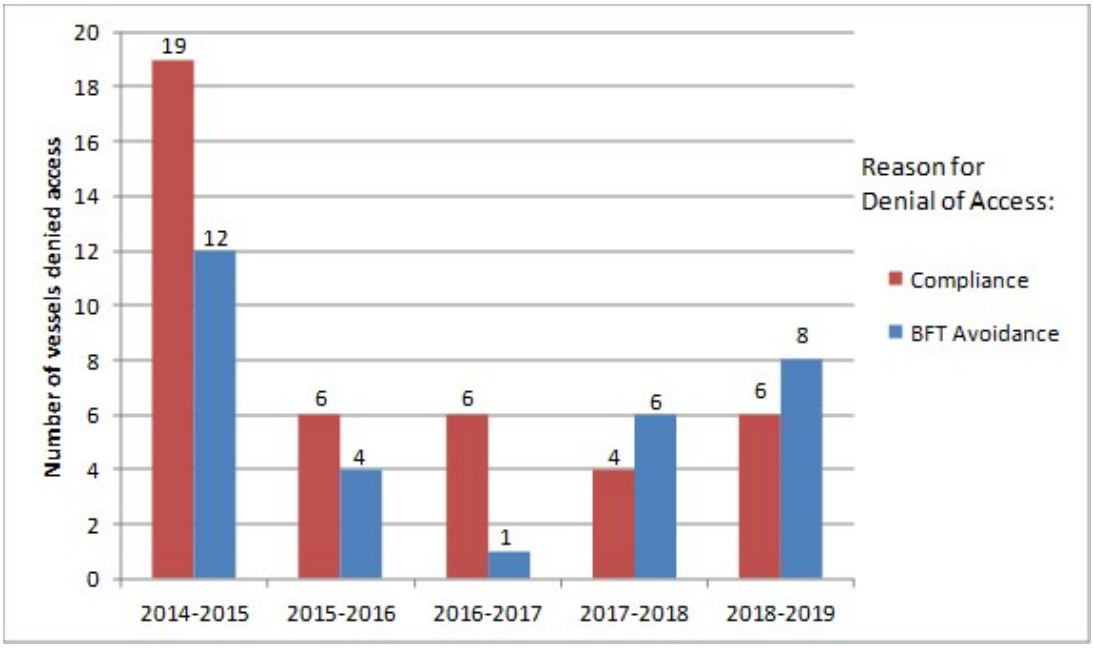

Figure 5.5 Number of vessels without access to the Cape Hatteras Gear Restricted Area in 2014–2019

Table 5.11 Time period of data used to determine gear restricted area access

GRA effective dates	Data used in analysis spans
Dec 1, 2014–April 30, 2015	2006–2012
Dec 1, 2015–April 30, 2016	2012–2014
Dec 1, 2016–April 30, 2017	2013–2015
Dec 1, 2017–April 30, 2018	2014–2016
Dec 1, 2018–April 30, 2019	2015–2017

The Spring Gulf of Mexico GRA consists of two areas in the Gulf of Mexico and limits access to these areas for vessels fishing with pelagic longline gear during the two-month period from April through May of a given year. Other gear types authorized for use by pelagic longline vessels

such as buoy gear, green-stick gear, or rod and reel are allowed in these areas provided the vessel abides by any rules/regulations that apply to those gear types.

Protected Species—Marine Mammals

Many of the marine mammals hooked by U.S. pelagic longline fishermen are released alive, although some animals suffer serious injuries and may die after being released. The observed and estimated marine mammal interactions for 2013–2017 are summarized in Table 5.12. Marine mammals are caught primarily during the third and fourth quarters in the Mid-Atlantic Bight and during the second quarter in the South Atlantic Bight. These geographic areas are illustrated in Figure 5.6. In 2017, the majority of observed interactions were with short-finned pilot whales (Garrison, unpublished data). NOAA Fisheries monitors observed interactions with sea turtles and marine mammals on a quarterly basis and reviews data for action, as necessary.

Table 5.12 Marine mammal interactions in the Atlantic pelagic longline fishery in 2013–2017

Year	Species	Total		Mortality		Serious injury*		Alive*	
		Obs.	Est.	Obs.	Est.	Obs.	Est.	Obs.	Est.
2013	Beaked whale	1	11.0	-	-	1	11.0	-	-
	Bottlenose dolphin	2	9.1	-	-	-	-	2	9.1
	Harbor porpoise	1	13.6	-	-	1	13.6	-	-
	Minke whale	1	12.4	-	-	1	12.4	-	-
	Pantropical spotted dolphin	3	8.8	-	-	1	3.1	2	6.7
	Pilot whale	24	189.6	-	-	15	126.3	9	63.3
	Pygmy sperm whale	1	3.6	-	-	-	-	1	3.6
	Risso's dolphin	2	17.1	-	-	2	17.1	-	-
2014	Beaked whale	1	10	-	-	0	0	1	10
	Minke whale	1	6	-	-	0	0	1	6
	Long-finned pilot whale	2	11	-	-	1	1	1	10
	Pantropical spotted dolphin	1	10	-	-	0	0	1	10
	Risso's dolphin	1	8	-	-	1	8	0	0
	Rough-toothed dolphin	2	4	-	-	2	4	0	0
	Short-finned pilot whale	22	275	-	-	19	234	3	41
	Unidentified dolphin	1	14	-	-	1	14	0	0
2015	Beaked whale	1	4.0	-	-	1	4.0	-	-
	Bottlenose dolphin	1	4.7	-	-	-	-	1	4.7
	Common dolphin	2	14.4	-	-	1	9.0	1	5.4
	Risso's dolphin	2	8.4	-	-	2	8.4	-	-
	Short-finned pilot whale	38	233.5	-	-	32	202.9	6	30.7
	Sperm whale	1	1.3	-	-	1	1.3	-	-
	Unidentified dolphin	2	8.5	-	-	-	-	2	8.5
	Unidentified marine mammal	2	10.5	-	-	1	5.8	1	4.7
2016	Long-finned pilot whale***	0.3	1.3	-	-	0.2	1.1	0.1	0.2
	Risso's dolphin	4	22.0	1	5.6	1.5	10.5	1.5	5.9
	Short-finned pilot whale***	22.7	130.8	-	5.1	19.3	111.1	3.4	14.6
	Unidentified dolphin	2	9.3	-	-	1	1.2	1	8.1
	Unidentified marine mammal	2	4.1	-	-	0.5	0.8	1.5	3.3
	Unidentified whale	1	9.2	-	-	0.5	4.7	0.5	4.5
2017	Common dolphin	1	4.9	-	-	1	4.9	0	-
	Long-finned pilot whale***	1.3	15.6	-	-	0.3	3.3	1	12.3
	Risso's dolphin	1	7.7	-	-	0	-	1	7.7
	Short-finned pilot whale***	29.7	340.3	-	-	14	132.9	15.7	207.4
	Unidentified dolphin	1	5.3	-	-	0	-	1	5.3
	Unidentified marine mammal	2	11.7	-	-	0	-	2	11.7

Obs. = observed; Est. = estimated. * Cases where serious injury cannot be determined from available data are partitioned based upon observed serious injury rates from past interactions. This results in proportional assignment of observed animals to the serious injury and alive categories.** Pantropical spotted dolphin was observed dead in an experimental set. *** Pilot whales are not identified to species at sea by observers. Observed interactions are partitioned between the two species based upon location, water depth, and sea surface temperature at the time of the interaction. Sources: Garrison and Stokes 2014, 2016; Garrison 2016, 2017, 2018—unpublished data.

Protected Species—Sea Turtles

As a result of increased sea turtle interactions in 2001 and 2002, NOAA Fisheries reinitiated consultation for the pelagic longline fishery and completed a new Biological Opinion on June 1, 2004. The June 2004 opinion concluded that long-term continued operation of the Atlantic pelagic longline fishery as proposed was not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or olive ridley sea turtles, but was likely to jeopardize the continued existence of leatherback sea turtles. The Biological Opinion included a reasonable and prudent alternative, which was adopted and implemented within the pelagic longline fishery, and an Incidental Take Statement for 2004–2006 and each subsequent three-year period (NMFS 2004).

On March 31, 2014, in accordance with 50 C.F.R. § 402.16 and the requirements of the 2004 Opinion, the Atlantic HMS Division requested reinitiation of the Endangered Species Act formal Section 7 consultation for the Atlantic pelagic longline fishery. Despite sea turtle takes that were lower than specified in the 2004 Incidental Take Statement, leatherback mortality rates had exceeded the level specified in the reasonable and prudent alternatives outlined in the 2004 Biological Opinion. Additionally, new information has become available about leatherback and loggerhead sea turtle populations and sea turtle mortality. While the reasonable and prudent measures for mortality rate will be re-evaluated during consultation, the overall ability of the 2004 alternatives to avoid jeopardy is not affected, and NOAA Fisheries is continuing to comply with the terms and conditions of the 2004 reasonable and prudent alternatives and the measures pending completion of consultation. NOAA Fisheries also has confirmed that there will be no irreversible or irretrievable commitment of resources that would foreclose the formulation or implementation of any reasonable and prudent alternative measures pending completion of consultation, consistent with section 7(d) of the Act.

Sea turtle takes are summarized by large geographic areas and are illustrated in Figure 5.6. The estimated sea turtle takes for regular fishing and experimental fishing effort for 2012–2017 are summarized for loggerhead sea turtles and leatherback sea turtles in Table 5.13 and Table 5.14, respectively. The data reflect loggerhead interactions are more widely distributed than leatherback interations.

Sea turtle bycatch in the U.S. Atlantic pelagic longline fishery has decreased significantly in the last decade. From 1999 to 2003, the pelagic longline fleet targeting HMS interacted with an average of 772 loggerhead and 1,013 leatherback sea turtles per year, based on observed takes and total reported effort. In 2005, the fleet was estimated to have interacted with 275 loggerhead and 351 leatherback sea turtles outside of experimental fishing operations (Walsh and Garrison, 2006). In 2017, the U.S Atlantic pelagic longline fishery was estimated to have interacted with 78 loggerhead sea turtles and 292 leatherback sea turtles (Garrison, 2018, unpublished data) (see Table 5.15). In 2017, the majority of loggerhead sea turtle interactions occurred in the South Atlantic Bight and Gulf of Mexico areas (Table 5.13). Interactions with leatherback sea turtles were highest in the Mid-Atlantic Bight, South Atlantic Bight, and Gulf of Mexico areas (Table 5.14). The total interactions for the 2013–15 Incidental Take Statement, the most recent and complete three-year period, were below the level established by the statement in the 2004 Biological Opinion for both loggerheads and leatherbacks (see Table 5.15). NOAA Fisheries

monitors observed interactions with sea turtles and marine mammals on a quarterly basis and reviews data for additional appropriate action, as necessary.

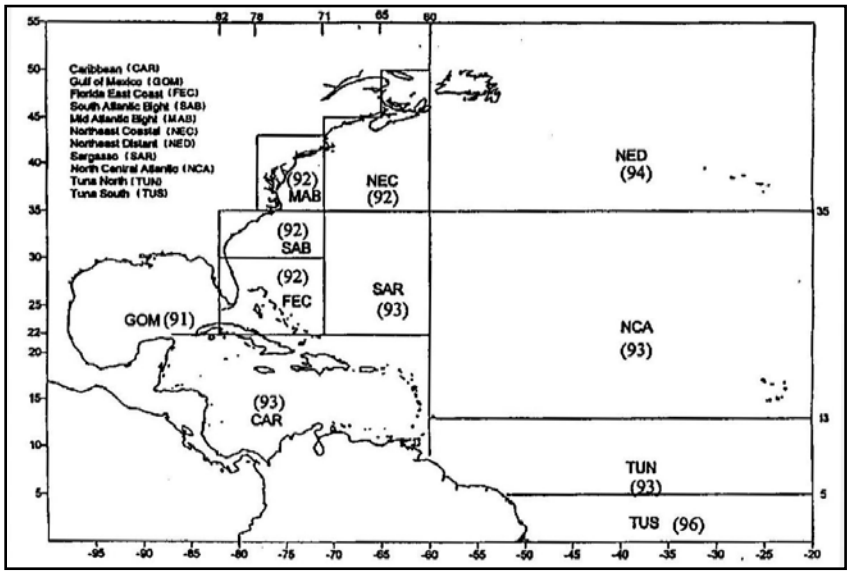

Figure 5.6 Geographic areas used in summaries of pelagic logbook data

The geographic zones are referred to as Caribbean (CAR), Gulf of Mexico (GOM), Florida east coast (FEC), South Atlantic Bight (SAB), Mid-Atlantic Bight (MAB), Northeast Coastal (NEC) area, Northeast Distant (NED) waters, Sargasso Sea (SAR), North Central Atlantic (NCA), Tuna North (TUN) area, and Tuna South (TUS) area. Source: Cramer and Adams 2000.

Table 5.13 Estimated number of loggerhead sea turtle interactions in the U.S. Atlantic pelagic longline fishery by statistical area in 2013–2017

Area	2013	2014	2015	2016	2017
CAR	4	3	1	6	4
GOM	20	23	1	4	18
FEC	50	83	90	49	0
SAB	14	19	18	63	41
MAB	91	56	70	9	4
NEC	139	10	52	17	1
NED	49	27	7	6	4
SAR	11	28	4	0	1
NCA	0	0	0	0	0
TUN	0	0	0	0	5
TUS	0	0	0	0	0
Total	376	259	243	154	78
Experimental fishery (2012–14)	1	2	-	-	-
Total	377	261	243	154	78

The geographic zones are referred to as Caribbean (CAR), Gulf of Mexico (GOM), Florida East Coast (FEC), South Atlantic Bight (SAB), Mid-Atlantic Bight (MAB), Northeast Coastal (NEC) area, Northeast Distant (NED) waters, Sargasso Sea (SAR), North Central Atlantic (NCA), Tuna North (TUN) area, and Tuna South (TUS) area. Sources: Garrison and Stokes 2014, 2016. Garrison 2016, 2017, 2018—unpublished data.

Table 5.14 Estimated number of leatherback sea turtle interactions in the U.S. Atlantic pelagic longline fishery by statistical area in 2013–2017

Area	2013	2014	2015	2016	2017
CAR	3	2	0	0	0
GOM	144	235	99	80	57
FEC	41	9	30	31	0
SAB	11	11	8	21	67
MAB	52	0	61	63	127
NEC	93	9	60	56	8
NED	11	0	24	84	27
SAR	6	2	12	0	5
NCA	0	0	0	0	0
TUN	2	0	5	4	1
TUS	0	0	0	0	0
Total	363	268	299	339	292
Experimental fishery (2012–2017)	3	2	-	-	-
Total	366	270	299	339	292

Sources: Garrison and Stokes 2014, 2016. Garrison 2016, 2017, 2018—unpublished data.

Table 5.15 Estimated sea turtle interactions and sea turtle incidental take levels in the U.S. Atlantic pelagic longline fishery by species in 2010–2017

Species	Total (2010–12)	2013	2014	2015	Total (2013–15)	2016	2017	Total (2016–17)	*Total 3-year ITS Level
Leatherback	1,006	366	279	300	945	339	292	590	1,764
Loggerhead	1,463	377	247	243	867	154	78	216	1,905
Other/unidentified sea turtles	22	0	6	18	24	3	25	3	105

* Applies to all subsequent three-year Incidental Take Statement periods (e.g.; 2010–12, 2013–15, 2016–18); 2017 data are preliminary estimates.

Protected Species—Seabirds

Observer data indicate that seabird bycatch is low in the U.S. Atlantic pelagic longline fishery (Table 5.16 and Table 5.17). In 2017, there were 89 active U.S. pelagic longline vessels in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea that reportedly set approximately 5.3 million hooks. Seven seabirds were observed taken: two unidentified shearwaters, two herring gulls, one northern gannet, one northern fulmar, and one unidentified seabird. Five seabirds were released dead and two seabirds were released alive.

Table 5.16 Status of seabird bycatch in the U.S. Atlantic pelagic longline fishery in 1992–2017

Species	Release status		Total	Percent dead
	Dead	Alive		
Greater shearwater	31	3	34	91.2
Cory's shearwater	2	-	2	100.0
Unidentified shearwater	5	1	6	83.0
Herring gull	17	1	18	94.4
Great black-backed gull	9	1	10	90.0
Laughing gull	3	1	4	75.0
Unidentified gull	15	9	24	62.5
Northern gannet	3	14	17	17.6
Storm petrel	1	-	1	100.0
Unidentified seabird	42	19	61	68.8
Brown pelican	3	1	4	75.0
Parasitic jaeger	1	0	1	100.0
Northern fulmar	1	0	1	100.0
Total	132	50	182	72.5

Source: POP

Table 5.17 Observed seabird bycatch in the U.S. Atlantic pelagic longline fishery in 2012–2017

Year	Quarter	Area	Type of bird	Number observed	Status
2011	3	NED	Northern gannet	1	Dead
2012	4	GOM	Laughing gull	1	Dead
2013	2	GOM	Laughing gull	1	Dead
	4	GOM	Parasitic jaeger	1	Dead
2014	2	GOM	Brown pelican	1	Dead
	3	MAB	Corey's shearwater	1	Dead
2015	2	TUN	Unidentified shearwater	1	Dead
	4	MAB	Greater shearwater	1	Dead
2016	1	GOM	Greater shearwater	1	Dead
	1	GOM	Herring gull	1	Dead
	1	GOM	Northern gannet	1	Alive
	1	MAB	Northern gannets	3	Alive
	1	SAB	Unidentified gull	1	Alive
	1	GOM	Brown pelican	1	Alive
	4	NEC	Herring gull	3	Dead
2017	1	MAB	Herring gull	1	Dead
	1	MAB	Unidentified seabird	1	Dead
	1	MAB	Northern gannet	1	Live
	1	SAB	Herring gull	1	Live
	4	MAB	Northern fulmar	1	Dead
	4	MAB	Shearwater	2	Dead

NED = Northeast Distant area; GOM = Gulf of Mexico; MAB = Mid-Atlantic Bight; TUN = Tuna North area; SAB = South Atlantic Bight; NEC = Northeast Coastal area. Source: POP.

In 2014, NOAA Fisheries released a report titled "Implementation of the United States National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries" and can be accessed at https://www.st.nmfs.noaa.gov/Assets/nationalseabirdprogram/longline_fisheries.pdf.

It highlighted advancements made by the United States toward the objectives of the 2001 U.S. "National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries." Since 2001, the United States has improved research, outreach and education, and domestic management of incidental seabird catch, resulting in a significant decrease in seabird incidental catch in its domestic fisheries.

The Seabirds on the Western North Atlantic and Interactions with Fisheries project, as described in the 2014 report, was carried out at the Southeast Fisheries Science Center. This project aimed to improve the identification of incidental seabird catch on the Western North Atlantic U.S. pelagic longline fishery where, beginning in 2004, all birds observed caught were identified at least to genus and most to species. The project also worked to improve the estimation of incidental catch of the pelagic longline fleet based on observer reports of seabird interactions and allowed for preparation of the U.S. National Report on Seabird Bycatch of the Western North Atlantic U.S. Pelagic Longline Fishery for ICCAT.

Figure 5.7 provides extrapolated estimates of incidental seabird catch in U.S. Atlantic longline fisheries, which includes the Gulf of Mexico and Western North Atlantic fisheries (Li and Browder 2016). The study showed that the highest estimate of seabird bycatch occurred in the Mid-Atlantic Bight, followed by the Northeast Coastal area. Estimated pelagic longline seabird bycatch was higher in summer, fall, and winter than in spring. Longline sets targeting a mixed group of species caught the majority of the total seabird bycatch, and longline sets targeting swordfish and tuna also caught more seabirds than those sets targeting other species.

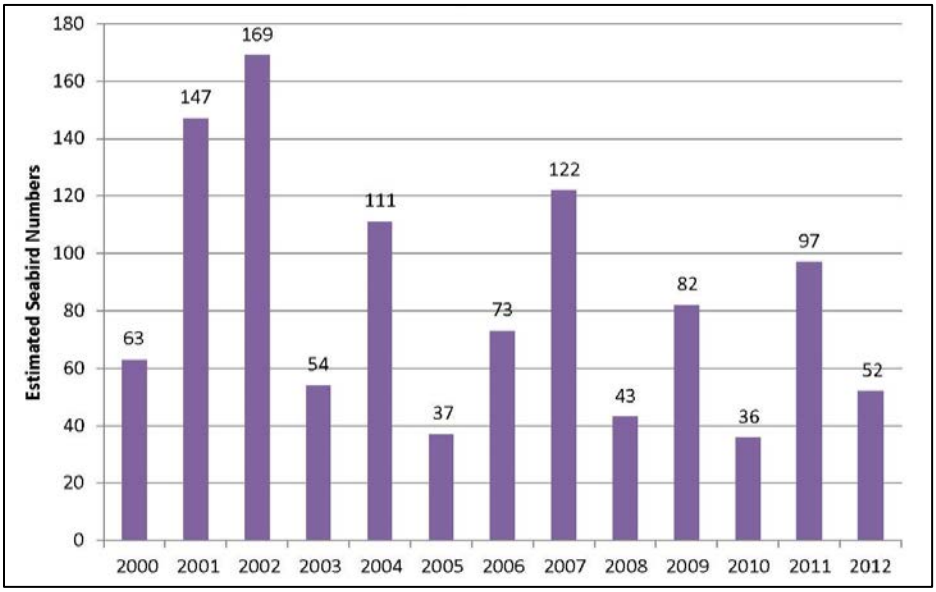

Figure 5.7 Estimated incidental seabird catch in U.S. Atlantic longline fisheries in 2000–2012

Source: Li and Browder 2016

5.1.3 International Issues and Catch

Highly Migratory Species

The U.S. pelagic longline fleet represents a small fraction of the international pelagic longline fleet that competes on the high seas for catches of tunas and swordfish. In recent years, the proportion of U.S. pelagic longline landings of HMS has remained relatively stable in proportion to international landings for the fisheries in which the United States participates. Historically, the U.S. fleet has accounted for less than 0.5 percent of the landings of swordfish and tuna from the Atlantic Ocean south of 5° N. Lat. and does not operate at all in the Mediterranean Sea. Tuna and swordfish landings by foreign fleets operating in the tropical Atlantic and Mediterranean are greater than the catches from the North Atlantic area where the U.S. fleet operates. Within the area where the U.S. longline fleet operates, U.S. longline landings still represent a limited fraction of total landings. From 2013 to 2017, U.S. longline landings have averaged 4.7 percent of total Atlantic longline landings, ranging from a high of 6.0 percent in 2013 to a low of 3.8 percent in 2016 and remaining steady at 4.2 percent in 2017. Table 5.18 contains aggregate longline landings of HMS, other than sharks, for all countries in the Atlantic for the period 2013–2017.

Table 5.18 Estimated international longline landings (mt ww) of HMS (excluding sharks) for all countries in the Atlantic in 2013–2017

Species (region)	2013	2014	2015	2016	2017
Swordfish (N. Atl + S. Atl)	20,501	19,997	20,376	20,139	19,732
Yellowfin tuna (W. Atl)[1]	11,864	8,939	7,434	11,084	8,778
Bigeye tuna	32,245	36,769	40,141	36,321	35,096
Bluefin tuna (W. Atl.)[1]	470	498	553	562	559
Albacore tuna (N. Atl + S. Atl)	20,402	11,981	14,562	16,637	16,608
Skipjack tuna (W. Atl)[1]	1,194	464	206	804	291
Blue marlin (Atl. + Med.)[2]	1,060	1,588	1,259	1,281	1,444
White marlin (Atl. + Med.)[2]	465	367	443	401	371
Sailfish (W. Atl.)[3]	892	738	891	1,191	1,059
Total International longline landings[4]	89,093	81,341	85,865	88,420	83,938
Total U.S. longline landings[5]	5,312	4,407	3,525	3,384	3,565
U.S. landings as a percent of total International landings	6.0%	5.4%	4.1%	3.8%	4.2%

Med = Mediterranean Sea. [1] Note that the United States has not reported participation in the E. Atlantic yellowfin tuna fishery since 1983 and has not participated in the E. Atl bluefin or the E. Atl skipjack tuna fishery since 1982. [2] Includes U.S. and foreign discards. [3] Includes U.S. dead discards. [4] From SCRS 2018. [5] From U.S. National Reports to ICCAT, 2014-2018. Includes swordfish, blue marlin, white marlin, and sailfish longline discards. Sources: U.S. ICCAT National Reports 2014–2018 (NMFS 2014, 2015a, 2016, 2017,2018); SCRS 2018.

Atlantic Sharks

Stock assessments and data collection for international shark fisheries have improved in recent years due to increased reporting requirements adopted by ICCAT. Since 2004, there have been several shark-related Recommendations and Resolutions (e.g., 04-10, 06-10, 07-06, 08-07, 08-08, 09-07, 10-06, 10-07, 11-08, 12-05, 13-10, 14-6, 15-6, and 17-08). Additionally, SCRS has assessed several species of sharks including blue, shortfin mako, and porbeagle sharks. For more

information on ICCAT shark actions, see previous SAFE reports and the ICCAT webpage (http://www.iccat.int/en/). Table 5.19 provides the most recent catch totals for blue, shortfin mako, and porbeagle sharks.

Table 5.19 Estimated International longline landings (mt ww)[1] of pelagic sharks for all countries in the Atlantic in 2013–2017

Species (region)	2013	2014	2015	2016	2017
Blue shark (N. Atl + S. Atl + Med)	57,330	60,634	61,135	68,230	66,123
Shortfin mako (N. Atl + S. Atl + Med)	5,461	5,817	5,397	5,866	5,285
Porbeagle (N. Atl + S. Atl + Med)	144	21	12	5	2
Total International longline catches	62,935	66,472	66,544	74,101	71,410
U.S. blue shark catches[1]	131	161	113	73	62
U.S. shortfin mako catches[1]	360	357	290	272	300
U.S. porbeagle catches[1]	29	14	43	6	14
Total U.S. catches[1]	520	532	446	351	376
U.S. catches[1] as a percent of total International catch	0.8	0.8	0.7	0.5	0.5

Med = Mediterranean Sea. [1]Includes catches and discards. Source: SCRS 2018.

5.2 Purse Seine

5.2.1 Current Management

Purse seine gear consists of a floated and weighted encircling net that is closed by means of a drawstring, known as a purseline, threaded through rings attached to the bottom of the net. The efficiency of this gear can be enhanced by the assistance of spotter planes used to locate schools of tuna. The bluefin tuna baseline percentage quota share for the purse seine category is 18.6 percent of the U.S. quota. The purse seine fishery is managed under a limited entry system with transferable individual vessel quotas (IVQs), excluding any new entrants into this category. Purse seine vessel owners are required to use VMS and must submit through a set report within 12 hours of completion of each purse seine set. Vessel owners may be eligible to receive reimbursement funds (up to $3,100/unit) for procuring the VMS Enhanced Mobile Transmitting Unit. The reimbursement does not cover installation or communication costs.

In 2016, 2017, and 2018, NOAA Fisheries did not open announce a start date for the Atlantic tunas purse seine fishery because there were no active vessels permitted to fish for bluefin tuna with purse seine gear. Continuation of the purse seine fishery will likely be up for consideration in an upcoming rulemaking. Although NOAA Fisheries received an exempted fishing permit (EFP) application for purse seine fishing in 2016 similar to those submitted for 2014 and 2015, no permit was granted. Table 5.20 summarizes observer coverage and bluefin tuna catch for 2013 through 2015, allowing for comparison of results with and without the exempted permit.

Table 5.20 Bluefin tuna purse seine fishery comparison in 2013–2015

	2013	2014 (w/EFP)	2015 (w/EFP)	Average change (w/EFP vs. 2013)
Observer coverage *	60%	100%	100%	
Landings	28.8	37.6	34.0	+7.0 (+24%)
Large medium (73 to <81")	1.85	9.57	11.5	+8.7 (+470%)
Giant (81"+)	26.99	28.07	22.5	+1.7 (+6%)
Dead discards	13.7	4.2	4.9	-9.2 (-67%)
Total BFT catch	42.5	41.8	38.9	-2.2 (-5%)

Note: All BFT weights are in metric tons, whole weight. EFP = exempted fishing permits. * = Minimum 5 percent required by ICCAT, as measured in number of sets or trips. Sources: Northeast Fisheries Observer Program, eBFT.

Consistent with Amendment 7, NOAA Fisheries annually makes a determination when the purse seine category fishery will start (between June 1 and August 15), based on variations in seasonal distribution, abundance or migration patterns of bluefin tuna, cumulative and projected landings in other commercial fishing categories, the potential for gear conflicts on the fishing grounds, or market impacts due to oversupply.

Economic and social aspects of the fisheries are described in Chapter 6 of this report. A brief history of the Atlantic purse seine fishery and regulations is available in Amendment 7 to the 2006 Consolidated HMS FMP.

5.2.2 Recent Catch and Landings

Table 5.21 shows purse seine catch, including landings and dead discards of Atlantic bluefin tuna from 2009 through 2017. Historic purse seine landings made up approximately 20 percent of the total annual U.S. bluefin tuna landings and about 25 percent of total commercial landings. These numbers have dropped significantly over the past 20 years, and in the last five years, purse seine landings have ranged between 0 and 6 percent of the total annual U.S. bluefin tuna landings. In the 1980s and early 1990s, purse seine landings of yellowfin tuna were often over several hundred metric tons with over 4,000 mt ww of yellowfin landings in 1985. Over the past 30 years, the U.S. purse seine fleet has opted via informal agreements with other sectors of the tuna industry not to direct any effort on HMS other than bluefin tuna; therefore, Table 5.21 only includes bluefin tuna.

Table 5.21 Domestic Atlantic bluefin tuna catch (mt ww) for the purse seine fishery in the Northwest Atlantic fishing area in 2009–2017

Species	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bluefin tuna	11.4	0.0	0.0	1.7	42.5	41.8	38.8	0.0	0.0

Source: NMFS 2018

5.2.3 International Issues and Catch

The U.S. purse seine fleet has historically accounted for a small percentage of the total international Atlantic tuna landings. Table 5.22 shows that since 2009, the U.S. purse seine fishery has contributed to less than 0.10 percent of the total purse seine catch reported to ICCAT. In Recommendation 10-10, ICCAT established a minimum standard for scientific fishing vessel observer programs and adopted a minimum of five percent observer coverage of fishing effort in the purse seine fishery, as measured in number of sets or trips.

Table 5.22 Estimated international Atlantic Tuna landings (mt ww) for the purse seine fishery in the Atlantic and Mediterranean in 2009–2017

Tuna species	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bluefin	11,461	4,987	4,306	6,186	8,036	8,277	10,034	11,361	14,520
Yellowfin	81,575	83,693	77,152	80,824	73,091	79,714	92,033	105,367	95,421
Skipjack	98,341	122,067	144,950	166,994	183,346	172,457	192,270	200,285	213,834
Bigeye	21,088	25,203	25,044	24,706	23,607	24,613	26,098	30,506	27,961
Albacore	1,474	429	1,077	672	184	91	491	88	254
Total	213,939	236,379	252,529	279,382	288,264	285,152	320,926	347,607	351,990
U.S. total	11.4	0.0	0.0	1.7	42.5	41.8	38.8	0.0	0.0
U.S. %	< 0.01	0	0	< 0.01	< 0.01	< 0.01	< 0.01	0	0

Source: SCRS 2018

5.3 Commercial Handgear

5.3.1 Current Management

Commercial handgears, including handline, harpoon, rod and reel, buoy gear and bandit gear, are used to fish for Atlantic HMS on private vessels, charter vessels, and headboat vessels. Rod and reel gear may be deployed from a vessel that is anchored, drifting, or underway. In general, trolling occurs while the vessel is underway and consists of dragging baits or lures through, on top of, or even suspended in the air above the water's surface as with green stick fishing. While trolling, vessels often use outriggers to assist in spreading out or elevating baits or lures and to prevent fishing lines from tangling.

Handgear Trip Estimates

Table 5.23 displays the estimated number of rod and reel and handline trips targeting large pelagic species (e.g., tunas, billfishes, swordfish, sharks, wahoo, dolphins, and amberjacks) from Maine through Virginia from 2013 to 2017. The trips include commercial and recreational trips, and are not specific to any particular species. It should be noted that the 2017 estimates are preliminary and subject to change.

Table 5.23 Estimated number of rod and reel and handline trips targeting Atlantic large pelagic species by state in the northeast between 2013–2017

Year	Area							Total
	NH/ME	MA	CT/RI	NY	NJ—north	NJ—south and MD/DE	VA	
Private vessels								
2013	7,100	12,883	2,366	6,648	4,104	11,519	2,187	46,807
2014	4,289	12,758	3,639	6,777	4,589	11,575	1,972	45,559
2015	4,074	12,130	3,336	7,068	3,166	11,741	2,522	44,037
2016	4,224	10,511	3,802	6,481	3,337	11,193	2,754	42,302
2017	5,397	12,088	2,909	9,060	3,843	10,316	2,082	45,695
Charter vessels								
2013	868	3,181	999	1,010	1,113	2,763	399	10,333
2014	836	3,294	592	1,220	1,199	2,172	345	9,658
2015	1,264	3.835	613	1,458	1,167	1,730	499	10,572
2016	669	3,756	552	1,423	1,439	2,798	263	10,900
2017	998	3,934	329	1,866	1,554	2,657	822	12,160

Source: Large Pelagics Survey (LPS)

A commercial handgear swordfish fishery exists primarily off the east coast of Florida, but also occurs in other locations of the Atlantic, Gulf of Mexico, and U.S. Caribbean. The primary handgear is buoy gear, which is generally used at night when fishing for swordfish. The gear consists of one or more floatation devices supporting a single mainline to which no more than two hooks or gangions are attached. Authorized permit holders may not possess or deploy more than 35 floatation devices and may not deploy more than 35 individual buoy gears per vessel. Buoy gear must be constructed and deployed so that the hooks and/or gangions are attached to the vertical portion of the mainline. Floatation devices may be attached to one, but not both ends, of the mainline, and no hooks or gangions may be attached to any floatation device or horizontal portion of the mainline. If more than one floatation device is attached to a buoy gear, no hook or gangion may be attached to the mainline between them. Individual buoy gears may not be linked, clipped, or connected together in any way. Buoy gears must be released and retrieved by hand. All deployed buoy gear must have some type of monitoring equipment affixed to it, such as radar reflectors, beeper devices, lights, or reflective tape. If only reflective tape is affixed, the vessel deploying the buoy gear must possess on board an operable spotlight capable of illuminating deployed floatation devices. If a gear monitoring device is positively buoyant, and rigged to be attached to a fishing gear, it is included in the 35 floatation device vessel limit and must be marked appropriately.

Buoy gear effort, as reported by the fishery, is presented from 2013 to 2017 in Table 5.24.

Table 5.24 Reported buoy gear effort in 2013–2017

Specifications	2013	2014	2015	2016	2017
Number of vessels	46	39	37	42	36
Number of trips	629	467	353	337	252
Average buoy gears deployed per trip	17.95	20.9	21.1	23.6	23.4
Total number of set hooks	12,557	10,740	8,267	8,588	6,282
Average number hooks per gear	1.1	1.1	1.1	1.1	1.1

Source: UDP

The handgear fisheries for all HMS are typically most active during the summer and fall, although fishing also occurs in the South Atlantic and Gulf of Mexico during the winter months. Fishing usually takes place between 5 and 125 miles from shore. Those vessels using bait typically use herring, mackerel, whiting, mullet, menhaden, ballyhoo, butterfish, and squid. The commercial handgear fishery for bluefin tuna occurs mainly in New England and more recently off the coast of southern Atlantic states, such as Virginia, North Carolina, and South Carolina, with vessels targeting large medium and giant bluefin tuna.

Figure 5.8 shows bluefin tuna commercial landings, which are predominately handgear landings, in metric tons (mt), whole weight (ww) by geographic region. The South Atlantic region ends at Cape Hatteras, North Carolina and the Mid-Atlantic region ends at eastern Long Island, New York. Targeting bluefin tuna in the Gulf of Mexico is prohibited. The majority of U.S. commercial handgear fishing activities for BAYS tunas, which peaked in 2002, takes place in the northwest Atlantic. Commercial landings in the Mid-Atlantic region increased notably in 2017. Beyond these general patterns, the availability of Atlantic tunas at a specific location and time is highly dependent on environmental variables that fluctuate from year to year.

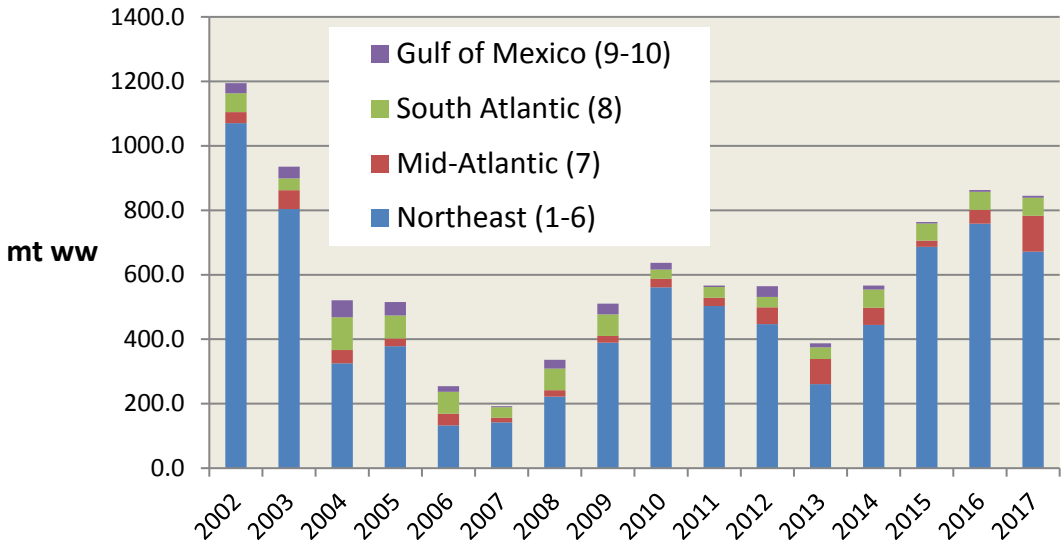

Figure 5.8 Commercial landings (mt ww) of North Atlantic bluefin tuna by U.S. geographic region in 2002–2017

Source: eBFT

Handgear Fisheries Permit Requirements

The U.S. Atlantic tuna commercial handgear fisheries are currently managed through an open access vessel permit program. Vessels that wish to sell their landings of Atlantic tunas must obtain a commercial permit in one of the following categories: General (handgear, including rod and reel, harpoon, handline, bandit gear, and green-stick), Harpoon (harpoon only), or Charter/Headboat (rod and reel, handline, bandit gear, and green-stick) with a commercial endorsement. A Charter/Headboat permit holder who does not sell his catch does not need the commercial endorsement. A Charter/Headboat permit holder who intends to sell his catch must obtain the commercial endorsement when completing the online permit application and will then be subject to the U.S Coast Guard commercial fishing vessel safety requirements. Vessels may also need permits from the states from which they operate in order to land and sell their catch. Federally-permitted vessels are required to sell Atlantic tunas only to federally-permitted Atlantic tunas dealers. Atlantic tunas dealer permits are issued by the permit office at Greater Atlantic Region Fisheries Office, and vessel owners/operators may obtain a list of permitted dealers in their area by calling the (978) 281-9370 or visiting https://www.greateratlantic.fisheries.noaa.gov/aps/permits/data/index.html.

Vessels permitted in the General and Charter/Headboat categories with a commercial endorsement will fish commercially under the General Commercial category rules and regulations for Atlantic tunas. For instance, vessels that possess either of the two permits mentioned above have the ability to retain an agency-specified daily bag limit of 1–5 bluefin tuna measuring 73 inches or greater curved fork length per vessel per day while the general category bluefin tuna fishery is open. The bluefin tuna quota for the General Commercial category is divided into multiple subquotas associated with specific periods of the year. NOAA Fisheries has the authority to transfer quota from one subquota period to another, including earlier in the calendar year. The General Commercial category bluefin tuna fishery opens on January 1 of each year and remains open until the General Commercial category quota allocation has been caught, or until March 31, whichever comes first. The fishery then reopens on June 1 and remains open until December 31 or the quota is filled. Vessel owners/operators should visit https://hmspermits.noaa.gov/ or call 978-281-9260 to verify the bluefin tuna retention limit on any given day. In accordance with the FMP, the General Commercial category receives approximately 47 percent of the U.S. bluefin tuna quota. A brief history of the U.S. General Commercial category fishery is available in Amendment 7 to the 2006 Consolidated HMS FMP.

Vessels that are permitted in the Atlantic Tunas Harpoon category fish under the Harpoon category rules and regulations. For instance, vessels have the ability to keep a range of between two and four bluefin tuna measuring 73 inches to less than 81 inches curved fork length (a size known as “large medium”) per vessel trip per day while the fishery is open. The default retention limit is two bluefin tuna, and NOAA Fisheries has the authority to set the limit in the range of 2–4 fish. There is no limit on the number of bluefin tuna that can be retained measuring longer than 81 inches curved fork length (known as “giant bluefin”) that can be retained as long as the Harpoon category season is open. The Harpoon category season also opens on June 1 of each year and closed November 15 if the quota hasn’t already been filled. The Harpoon category bluefin tuna quota is approximately 3.9 percent of the U.S. quota. A brief history of the Harpoon fishery in the United States is available in Amendment 7 to the 2006 Consolidated HMS FMP.

Atlantic Tunas General, Harpoon, and HMS Charter/Headboat categories are required to report the length of all bluefin tuna retained or discarded dead within 24 hours of the landings or end of each trip using a catch reporting system accessed through a website designated by NOAA Fisheries, a smartphone app, or by calling a phone number. Specifically, vessels must report the number of bluefin tuna retained and the number discarded dead, according to instructions available at: https://hmspermits.noaa.gov/library. The address of the website for reporting is https://hmspermits.noaa.gov/catchReports. These reports are in addition to any information submitted by federally permitted dealers.

The Swordfish General Commercial permit allows permit holders to retain and sell a limited number of swordfish caught on rod and reel, handline, harpoon, green-stick, or bandit gear. The HMS Charter/Headboat permit regulations also allow for the commercial retention of swordfish on non-for-hire trips, provided the permit has a commercial endorsement. Regional swordfish retention limits, along with gear authorizations and reporting requirements, exist for these permits.

The shark commercial handgear fishery plays a very minor role in contributing to the overall shark landings. For information regarding the shark fishery, refer to sections 5.4 and 5.5.3. Economic and social aspects of all the domestic handgear fisheries are described in Chapter 6.

5.3.2 Recent Catch, Landings, and Discards

The proportion of domestic HMS landings harvested with handgear varies by species, with Atlantic tunas comprising the majority of commercial landings. In 2017, bluefin tuna commercial handgear landings accounted for approximately 74 percent of the total U.S. bluefin tuna landings and 86 percent of commercial bluefin tuna landings. Figure 5.9 shows the U.S. Atlantic bluefin tuna landings in metric tons whole weight by category since 1999. Note that the commercial handgear landings are comprised of bluefin tuna landed by both General and Harpoon categories.

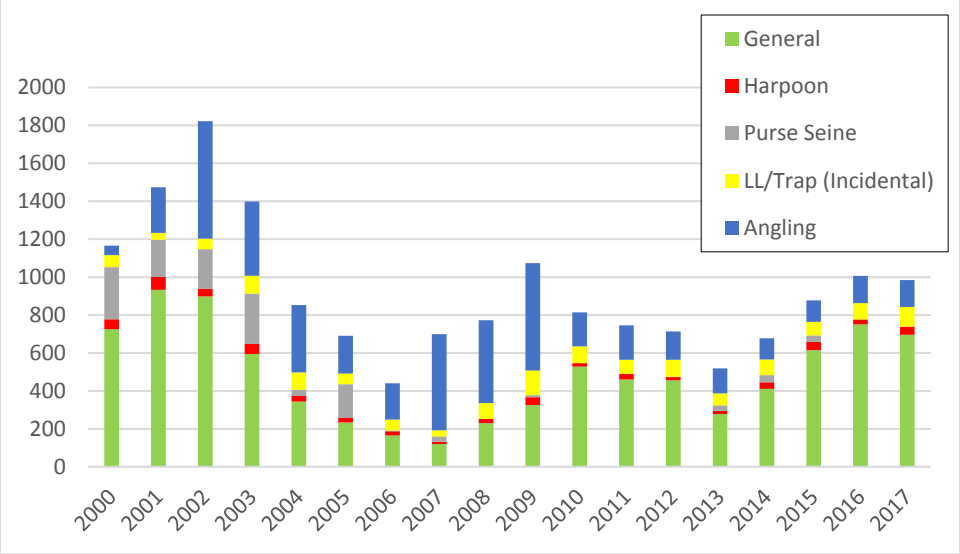

Figure 5.9 Landings of bluefin tuna (mt ww) by fishing category in 2000–2017

LL = Pelagic Longline gear. Source: eBFT.

Also in 2017, two percent of the total yellowfin catch, or five percent of the commercial yellowfin catch, was attributable to commercial handgear. Commercial handgear landings of skipjack tuna accounted for less than 1 percent of total skipjack landings, or about 18 percent of commercial skipjack landings. For albacore, commercial handgear landings accounted for less than 1 percent of total albacore landings, and less than 1 percent of commercial albacore landings. Commercial handgear landings of bigeye tuna accounted for approximately 1 percent of total bigeye landings and 1 percent of total commercial bigeye landings. These species-specific percentages are calculated using values from Table 5.54, Table 5.57, Table 5.58, and Table 5.57. Landings attributed to buoy gear landings are presented in Table 5.25.

Table 5.25 Reported buoy gear landings (lb dw) in 2013–2017

Species	2013	2014	2015	2016	2017
Swordfish	140,038	114,153	85,304	94,451	77,422
Dolphin	486	996	216	733	298
Oilfish	693	362	490	121	109
Shortfin mako shark	1,194	1,117	932	1,709	1,304
Wahoo	70	35	45	58	26
Bigeye tuna	0	0	0	0	207
Blacktip shark	0	13	0	0	0
King mackerel	134	143	29	323	60
Yellowfin tuna	0	0	0	0	0
Hammerhead shark	0	0	0	0	0
Silky shark	0	0	0	0	0
Greater amberjack	0	0	0	0	0
Bonito	0	0	0	0	60
Blackfin tuna	32	84	189	96	86

Source: UDP

Commercial handgear landings of all Atlantic HMS (other than sharks) in the United States by gear and area are shown in Table 5.26 and Table 5.27. Numbers of caught and discarded fish by buoy gear are presented in Table 5.28.

Table 5.26 U.S. Atlantic commercial handgear landings of tunas and swordfish (mt ww) by gear type in 2013–2017

Species	Gear	2013	2014	2015	2016	2017
Bluefin tuna	Rod and reel	249.5	378.9	581.4	722.1	652.8
	Handline	0.5	0.0	0.0	1.1	5.0
	Harpoon	45.0	67.5	77.1	52.9	81.7
	Total	295.0	446.4	658.5	776.1	739.5
Bigeye tuna	Troll	5.0	4.5	6.4	1.0	1.3
	Handline	15.96	16.4	51.3	9.6	3.5
	Total	20.96	20.9	57.7	10.6	4.8
Albacore tuna	Troll	0.2	0.2	0.0	0.03	0.0
	Handline	2.32	2.37	2.7	0.5	0.1
	Total	2.32	2.57	2.7	0.53	0.1
Yellowfin tuna	Troll	30.1	28.7	25.6	17.9	34.3
	Handline	67.0	82.7	66.8	38.4	33.0
	Total	97.1	111.4	92.4	56.3	67.3
Skipjack tuna	Troll	0.0	0.0	0.0	0.0	0.0
	Handline	1.22	2.01	0.7	1.2	0.6
	Total	1.22	2.01	0.7	1.2	0.6
Swordfish	Handline	105.3	87.2	76.4	75.7	58.2
	Harpoon	0.5	0.0	0.0	0.0	0.3
	Total	105.8	87.2	76.4	75.7	58.5

Source: NMFS 2018

Table 5.27 U.S. Atlantic commercial handgear landings of tunas and swordfish (mt ww) by region in 2013–2017

Species	Region	2013	2014	2015	2016	2017
Bluefin tuna	NW Atlantic	295.0	446.4	658.5	776.1	739.5
Bigeye tuna	NW Atlantic	15.9	16.4	51.3	10.4	4.8
	Gulf of Mexico	0.0	0.0	0.0	0.0	0.0
	Caribbean	0.06	0.0	0.0	0.2	0.0
Albacore tuna	NW Atlantic	2.3	2.3	2.7	0.4	0.1
	Gulf of Mexico /Caribbean	0.02	0.07	0.0	0.1	0.0
Yellowfin tuna	NW Atlantic	66.4	82.1	64.3	48.1	55.4
	Gulf of Mexico	0.0	0.0	1.9	6.9	11.8
	Caribbean	0.6	0.6	0.6	1.3	0.08
Skipjack tuna	NW Atlantic	0.8	1.3	0.2	0.3	0.5
	Gulf of Mexico	0.02	0.01	0.0	0.0	0
	Caribbean	0.4	0.7	0.5	0.9	0.1
Swordfish	NW Atlantic	104.8	86.9	70.7	71.3	58.5
	Gulf of Mexico	0.5	0.3	5.5	3.5	2.7
	Caribbean	0	0.3	0.2	0.9	0.0

Source: NMFS 2018

Table 5.28 Reported buoy gear* landings and discards in numbers of fish in 2013–2017

Species	2013	2014	2015	2016	2017
Landings					
Swordfish	2,155	1,856	1,561	1,558	1,297
Dolphinfish	51	182	18	48	28
Oilfish	18	8	12	3	2
Bigeye tuna	0	0	0	0	1
Blackfin tuna	3	10	16	13	9
Wahoo	2	1	1	2	2
Bonito	0	0	0	0	8
King mackerel	14	5	4	43	6
Shortfin mako	13	9	6	11	10
Blacktip shark	0	1	0	0	0
Released alive					
Swordfish	478	447	311	223	439
Dolphinfish	4	15	0	0	0
Blue marlin	1	0	0	0	0
Hammerhead shark	68	32	23	22	27
Thresher shark	1	0	0	0	1
Dusky shark	97	1	2	1	11
Night shark	129	79	83	58	23
Oceanic whitetip shark	1	3	7	1	0
Bigeye thresher shark	1	0	1	0	4
Tiger shark	3	3	0	0	2
Sandbar shark	0	0	0	1	0
Longfin mako shark	4	2	0	1	1
Shortfin mako shark	6	6	1	0	1
Blacktip shark	11	4	0	0	0
Silky shark	33	8	18	6	3
Oilfish	0	0	0	0	1
Blackfin tuna	0	0	0	0	2
Bignose shark	0	0	1	0	0
Released dead					
Swordfish	75	76	45	13	29
Hammerhead shark	0	0	1	0	0
Blackfin tuna	0	0	0	0	2
Night shark	2	1	14	2	0
Sailfish	0	0	0	0	1

*Buoy gear is not an authorized gear for sharks. Source: UDP.

5.4.1 Current Management

Domestic recreational fishermen target various HMS using a variety of handgear, including rod and reel gear. Recreational fishing for federally managed Atlantic HMS in federal waters requires an HMS angling permit. Permit requirements for state waters varies by state and target species. For-hire vessels taking passengers recreational fishing are required to obtain an HMS Charter/Headboat permit. The HMS Charter/Headboat permit also allows for sale of Atlantic tunas on for-hire and non-for-hire trips and the sale of swordfish on non-for-hire trips when combined with a commercial endorsment. Two other commercial permits, the Swordfish General Commercial permit and the Atlantic Tunas General permit, also authorize vessel occupants to fish for all HMS, but only in registered Atlantic HMS tournaments.

There are specific registration and reporting requirements that pertain to Atlantic HMS fishing tournaments. All Atlantic HMS fishing tournaments are required to register with NOAA Fisheries at least four weeks prior to the commencement of tournament fishing activities. Tournament operators may elect to register tournaments by submitting a registration form to NOAA Fisheries, or via online registration. If selected, tournament operators are required to report the results of their tournament to the Atlantic Tournament Registration and Reporting (ATR) system.

All non-tournament recreational landings of Atlantic marlins, roundscale spearfish, sailfish, bluefin tuna (including dead discards), and swordfish must also be reported to NOAA Fisheries through dedicated calls lines or the Automated Landings Reporting System (ALRS) within 24 hours of landing. In Maryland and North Carolina, vessel owners are required to report their billfish, bluefin tuna, and some shark landings through the submission of catch cards at state-operated landings stations. Participation in the Large Pelagics Survey (LPS) or Marine Recreational Information Program surveys (MRIP) does not fulfill reporting obligations; vessel operators must still report bluefin tuna, billfish and swordfish as described above. MRIP funds and conducts various surveys and studies of recreational fishing activities, and LPS is an MRIP survey that is specific to Atlantic HMS. LPS is conducted from Virginia to Maine during June, July, and August, and consists of dockside interviews and phone surveys to collect details on recreational fishing trips, catch, and landings.

5.4.2 Recent Catch, Landings, and Bycatch

The recreational landings presented here for Atlantic HMS consist of information obtained through MRIP, LPS, Southeast Headboat Survey, Texas Headboat Survey, ATR, and ALRS. In 2006, the National Research Council conducted an extensive review of all MRIP surveys and recommended fundamental changes to the way NOAA Fisheries collects recreational data. NOAA Fisheries surveys households in coastal states to estimate recreational fishing effort, and this information is paired with access-site surveys of angler catch rates to estimate recreational catch and harvest of saltwater fish. Since 1979, NOAA Fisheries has used a telephone survey of coastal households called the Coastal Household Telephone Survey (CHTS) to estimate fishing effort from private boat and shore fishing on the Atlantic and Gulf coasts. Telephone surveys have long been an accepted means of survey data collection, but their use has been complicated by the transition of households relying upon cellular rather than landline phones.

To address this concern among others, NOAA Fisheries developed an alternate mail-based survey design to collect fishing effort data entitled the Fishing Effort Survey (FES) to replace the telephone survey design. From 2015 to 2017, the survey was deployed side-by-side the Coastal Household Telephone Survey to collect benchmark data to facilitate comparisons of effort estimates generated from the two survey designs and to allow for the re-estimation of historic MRIP effort and catch estimates.

In 2018, NOAA discontinued the Coastal Household Telephone Survey, replaced it fully with the new FES, and released the re-estimated catch and effort estimate time-series going back to 1981. The new survey method was found to result in significantly higher estimates of recreational fishing effort, catch, and harvest. On average, estimates of private boat effort and catch were found to have doubled, and shore-based fishing effort and catch estimates increased by six times. At the same time, NOAA Fisheries conducted a redesign of the Access Point Angler Intercept Survey (APAIS), which is used to collect catch rate data. This redesign involved implementing stricter procedures for probabilistic sampling and improving the statistical validity of how catch rates were estimated. The APAIS changes were incorporated into the re-estimation of MRIP catch and harvest estimates, but had only minor impacts on the final estimates when compared to the impacts of the new FES. These new catch and harvest estimates are reflected in this report in Tables 5.33 through 5.39. Over the next few years, the new MRIP catch and harvest estimates will be incorporated into new stock assessments to estimate new annual catch limits, but they will not be used for management until new assessments are conducted. More information on the new survey methods, reasons for the survey redesign, how they have affected catch and effort estimates, and implications for management can be found at https://www.fisheries.noaa.gov/recreational-fishing-data/effort-survey-improvements#transition-process.

It is important to note that effort data for the for-hire fleet, which consists of charter and headboat vessels, is primarily collected through the For-Hire Survey (FHS), which was not a part of the survey redesign mentioned above. LPS, which is used to collect precise recreational estimates for tunas, swordfish, billfish, and sharks from Maine to Virginia, was also not part of the redesign. As such, the historic estimates of for-hire and LPS catch and effort have not changed at this time. NOAA Fisheries is beginning the process of redesigning these surveys, but does not anticipate high magnitude changes (as observed with FES re-estimates) to the resulting catch estimates given the smaller populations of known permit holders that have always allowed for highly targeted data collection.

Tuna and swordfish landings for HMS recreational rod and reel fisheries are presented below in Table 5.29 from 2013 through 2017.

Table 5.29 Domestic landings (mt ww)* for the Atlantic tunas and swordfish recreational rod and reel fishery in 2013–2017

Species	Region	2013	2014	2015	2016	2017
Bluefin tuna*	Northwest Atlantic	131.4	99.6	112.9	143.7	140.1
	Gulf of Mexico	0.0	0	0	1.7	1.7
	Total	131.4	99.6	112.9	145.4	141.8
Bigeye tuna**	Northwest Atlantic	337.5	251.9	197.7	126.9	220.1
	Gulf of Mexico	7.0	0.06	0.01	0.2	0
	Caribbean	0.0	1.4	0.5	0	0
	Total	344.5	253.36	198.21	127.1	220.1
Albacore**	Northwest Atlantic	340.3	136.7	12.9	43	27.5
	Gulf of Mexico and Caribbean	0.0	0	0.2	1.3	0
	Total	340.3	136.7	13.1	44.3	27.5
Yellowfin tuna**	Northwest Atlantic	495.4	999.8	795.6	1,610.7	1,778.6
	Gulf of Mexico	191.8	73.2	134.2	266.6	40.3
	Caribbean	0.0	16.2	6.7	34.2	13.2
	Total	687.2	1,089.2	936.3	1,911.5	1,832.1
Skipjack tuna**	Northwest Atlantic	37.7	46.0	32.7	93.2	32.5
	Gulf of Mexico	77.1	9.8	35.7	33.3	62.4
	Caribbean	0.0	9.4	7.2	3.4	1.0
	Total	114.8	65.2	75.6	129.9	95.9
Swordfish	Total	22.0	36.7	46.0	45.8	33.8

* Rod and reel catch and landings estimates of bluefin tuna < 73 in CFL based on statistical surveys of the U.S. recreational harvesting sector. Rod and reel catch of bluefin tuna > 73 in CFL are commercial and may also include a few metric tons of "trophy" bluefin (recreational bluefin ≥ 73 in CFL). ** Rod and reel catches and landings for Atlantic tunas represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. Sources: NMFS 2013a, 2014, 2015a, 2016, 2017, 2018.

Atlantic Billfish Recreational Fishery

Table 5.30 provides a summary of reported billfish and swordfish landings from 2013 through 2017. Due to the rare nature of billfish encounters and the difficulty of monitoring landings outside of tournament events, reports of recreational billfish landings are sparse; however, ATR provides a preliminary source for analyzing recreational billfish tournament landings (see rows marked as “Tournaments”, below). Recreational report totals are developed from analysis of multiple datasets, including ALRS, LPS, Maryland and North Carolina Catch Cards, ATR, and MRIP. In 2012, NOAA Fisheries established a new accounting protocol that analyzes tournament and non-tournament landings reports of billfishes using all available programs (see sources in Table 5.30). The “Total landings of marlin and roundscale spearfish” by year and “Balance remaining from 250 limit” rows summarize international billfish monitoring requirements. Under ICCAT Recommendation 06-09 and as specified in § 635.27(d)(1), the recreational billfish fishery is limited to maximum of 250 combined Atlantic blue and white marlin landings per year. Roundscale spearfish is included in this count. Sailfish and swordfish

are presented underneath the ICCAT accounting rows and do not count towards the 250 marlin limit.

Table 5.30 Atlantic HMS recreational billfish and swordfish landings in numbers in 2013–2017

Species	Recreational reporting	2013	2014	2015	2016	2017
Blue marlin	Tournament*	44	49	40	63	45
	Non-tournament**	11	5	23	17	17
	Total	55	54	63	80	62
White marlin	Tournament*	34	36	46	46	50
	Non-tournament**	15	6	20	14	11
	Total	49	42	66	60	61
Roundscale spearfish	Tournament*	1	2	10	21	6
	Non-tournament**	0	0	0	1	0
	Total	1	2	10	22	6
Total landings of marlin, roundscale spearfish		106	97	100	98	139
Balance remaining from 250 limit		144	153	150	152	111
Sailfish	Tournament*	2	5	1	0	1
	Non-tournament**	171	113	113	114	104
	Total	173	118	114	114	105
Swordfish	Tournament^	16	23	17	42	50
	Non-tournament^^	263	281	315	458	518
	Total***	279	304	332	500	568

* = Tournament billfish (2013–2017) and swordfish (2014-2016) data sources include ATR, MD and NC HMS Catch Cards, LPS, and MRIP. ** = Non-tournament billfish (2013–2017) and swordfish (2014-2016) data sources include ALRS, MD and NC HMS Catch Cards, LPS, and MRIP. ^ = Tournament swordfish (2013) data source is ATR. ^^ = Non-tournament swordfish (2013) data source is ALRS; *** = Total tournament and non-tournament sources include ATR, ALRS, MD and NC HMS Catch Cards, LPS, and MRIP.
Sources: Tournament—ATR, MD and NC HMS Catch Cards, LPS, and MRIP. Non-tournament—ALRS, MD and NC HMS Catch Cards, LPS, and MRIP.

The number of registered tournaments and reported tournament landings by state are shown in Table 5.31.

Table 5.31 Tournament landings of billfishes and swordfish by state or area in 2017

State(s)	Tournaments	White marlin	Blue marlin	Sailfish	Roundscale spearfish	Swordfish
MA	11	0	0	0	0	0
NY	10	0	0	0	0	0
NJ	33	20	6	0	0	1
MD	20	17	0	0	0	0
VA	15	0	0	0	0	0
NC	33	0	6	0	0	0
SC/GA	53	0	4	0	0	0
FL	120	0	5	0	0	48
AL	8	0	2	0	0	5
MS	9	0	8	0	0	0
LA	24	0	0	0	0	0
TX	18	0	4	0	0	0
PR	8	0	0	0	0	0
USVI	6	0	0	0	0	0

Note: Some states are aggregated to protect tournament reporting privacy. Twenty-five registered tournaments were held outside the United States (data not shown). Source: ATR.

Shark Recreational Fishery

Recreational shark landings must be reported to NOAA Fisheries when an angler is required to participate in LPS or MRIP. However, vessel owners in Maryland and North Carolina must report shark landings on catch cards at state-operated landings stations. This requirement was enacted in 2013 in Marland and 2014 in North Carolina. Maryland recreational shark landings are summarized by species in Table 5.32. North Carolina catch cards indicate two shortfin mako sharks were landed and reported in both 2014 and in 2015, and two bull sharks were reported in 2016. No sharks were reported in 2017 via the North Carolina catch card program.

Table 5.32 Recreational shark landings reported from the Maryland Catch Card program in 2013–2017

Species	2013	2014	2015	2016	2017
Atlantic sharpnose	13	13	13	31	40
Blue	0	7	2	2	4
Common thresher	8	12	10	8	10
Scalloped hammerhead	0	1	0	1	0
Shortfin mako	47	53	55	55	61
Spinner	1	0	0	0	0
Smoothhound	0	1	0	2	0
Tiger	0	0	0	0	1
Total	69	87	80	99	116

Source: Maryland Department of Natural Resources

The following tables provide estimated recreational landings for each of the three groups of shark species by region: large coastal sharks (Table 5.33, Table 5.34, and Table 5.35), pelagic

sharks (Table 5.36), and small coastal sharks (Table 5.37 and Table 5.38). Table 5.39 provides estimated recreational landings for smoothhound (smooth dogfish) sharks.

These tables bear two significant changes from previous SAFE reports. First, they contain fully calibrated re-estimates to reflect the new FES and APAIS re-design, as discussed earlier in this section. Secondly, estimates of zero harvest were provided for these tables prior to the 2017 SAFE report. An estimate of zero harvest could indicate the survey missed interviewing any anglers who harvested that species in a given year, or it could indicate no harvest of a particular species occurred (i.e., a true estimate of zero harvest). Given the rare nature of catching some of these species, as can be seen in the highly variable nature of harvest for some species over the time period, missing values are to be expected. Hence, these tables were updated, starting in the 2017 SAFE Report, to provide a more accurate representation of missing values over a zero harvest.

Table 5.33 Estimated recreational harvest of large coastal sharks in the U.S. Atlantic region in 2013–2017 in number of fish per species

Species	2013	2014	2015	2016	2017
Basking[1]	.	.	.	.	
Bignose[2]	.	.	.	.	
Bigeye sand tiger[1]	.	.	.	.	
Blacktip	2,727	2,278	5,306	6,520	1,527
Bull	144	3	2	26	3,750
Caribbean reef[2]	.	.	.	.	.
Dusky[2]	16	2	.	.	.
Galapagos[2]	.	.	.	.	.
Hammerhead, great	.	.	1	.	.
Hammerhead, scalloped	1,274	11,118	.	.	.
Hammerhead, smooth	1,678	.	.	.	.
Hammerhead, unclassified	.	.	.	799	.
Lemon	.	.	119	1,207	764
Night[2]	.	.	.	.	.
Nurse	13	1,064	318	21	2
Sandbar[3]	812	995	259	5	2,608
Sand tiger[1]	.	.	.	.	.
Silky[3]	.	176	46	.	6
Spinner	1,070	1,493	396	761	623
Tiger	8	866	1,481	2,061	.
Whale[1]	.	.	.	.	.
White[1]	.	.	.	.	.
Requiem shark, unclassified	97	19,076	594	732	625
Total	7,838	37,071	8,521	12,132	9,906

[1]Prohibited as of April 1997. [2]Prohibited in the recreational fishery as of July 1, 1999. [3]Prohibited as of July 2008.
Sources: SE Headboat Survey, MRIP (FES/APAIS calibrated).

Table 5.34 Estimated recreational harvest of large coastal sharks in the Gulf of Mexico region, in 2013–2017 in number of fish per species

Species	2013	2014	2015	2016	2017
Basking[1]	.	.	.	.	
Bignose[2]	.	.	.	.	
Bigeye sand tiger[1]	.	.	.	.	
Blacktip	148,558	22,286	23,442	25,997	21,738
Bull	4,904	8,727	920	445	3,301
Caribbean reef[2]	.	.	.	.	.
Dusky[2]	20	131	24	.	.
Galapagos[2]	.	.	.	.	.
Hammerhead, great	7	2	49	2	.
Hammerhead, scalloped	516	79	28	22	58
Hammerhead, smooth	.	.	.	.	.
Hammerhead, unclassified	.	.	.	.	.
Lemon	.	95	15	1,147	.
Night[2]	55	.	.	.	.
Nurse	2	.	1	1	2,282
Sandbar[3]	2,479	71	135	283	28
Sand tiger[1]	.	.	.	.	.
Silky[3]	1,210	.	1	1	177
Spinner	16,319	1,654	4,829	1,730	4,804
Tiger	3	4	2	1	3
Whale[1]	.	.	.	.	.
White[1]	.	.	.	.	.
Requiem shark, unclassified	41,315	6,118	9,831	15,431	13,504
Total	215,388	39,166	39,277	45,059	45,896

[1]Prohibited as of April 1997. [2]Prohibited in the recreational fishery as of July 1, 1999. [3]Prohibited as of July 2008.
Sources: TX PWD, MRIP (FES/APAIS calibrated), Southeast Headboat Survey.

Table 5.35 Estimated recreational harvest of large coastal sharks in Puerto Rico in 2013–2017 in numbers of fish

Species	2013	2014	2015	2016	2017
Dusky[2]	.	.	.	.	.
Lemon	.	12	.	.	.
Hammerhead, scalloped	.	.	.	.	.
Nurse	.	.	.	201	.
Silky[3]	215	85	334	.	.
Caribbean reef[2]	.	.	.	.	.
Total	215	97	334	201	0

[1]Prohibited as of April 1997. [2]Prohibited in the recreational fishery as of July 1, 1999. [3]Prohibited as of July 2008.
Sources: MRIP (FES/APAIS calibrated), Southeast Headboat Survey.

Table 5.36 Estimated recreational harvest of pelagic sharks in the U.S. Atlantic, Gulf of Mexico, and U.S. Caribbean in 2013–2017 in number of fish per species

Species	2013	2014	2015	2016	2017
Bigeye thresher*	.	.	.	.	
Bigeye sixgill*	.	.	.	.	
Blue Shark	4,106	3,639	34,363	.	179
Mako, longfin*	.	.	.	.	.
Mako, shortfin	14,985	42,962	37,805	25,882	46,439
Mako, unclassified	12	5	34	13	3
Lamnidae (mackerel sharks)	.	.	251	.	.
Oceanic whitetip	.	.	132^	.	.
Porbeagle	.	.	.	.	358
Sevengill*	.	.	.	.	.
Sixgill*	.	.	4	.	.
Thresher	.	9,626	41,825	11,114	11,280
Total	19,102	56,233	114,282	37,009	58,258

*Prohibited in the recreational fishery as of July 1, 1999. ^Includes 132 individuals caught in Puerto Rico. Sources: TX PWD, Southeast Headboat Survey, MRIP (FES/APAIS calibrated).

Table 5.37 Estimated recreational harvest of small coastal sharks in the U.S. Atlantic Region in 2013–2017 in number of fish per species

Species	2013	2014	2015	2016	2017
Atlantic angel*	.	.	.	.	
Blacknose	57	7,200	3,782	225	13
Bonnethead	44,637	172,494	10,346	37,832	18,239
Finetooth	.	2,856	5,221	.	1,219
Atlantic sharpnose	107,787	123,370	41,172	155,023	38,784
Caribbean sharpnose*	.	.	.	.	.
Smalltail*	.	.	.	.	.
Total	152,481	305,920	60,522	193,080	58,255

*Prohibited in the recreational fishery as of July 1, 1999. Sources: MRIP (FES/APAIS calibrated), Southeast Headboat Survey.

Table 5.38 Estimated recreational harvest of small coastal sharks in the Gulf of Mexico Region in 2013–2017 in number of fish per species

Species	2013	2014	2015	2016	2017
Atlantic angel*	.	.	.	.	.
Blacknose	232	5,688	1,256	40	2,484
Bonnethead	9,788	50,875	18,006	18,236	20,649
Finetooth	239	138	203	351	2,565
Atlantic sharpnose	76,541	34,118	39,761	74,379	71,904
Caribbean sharpnose*	.	.	.	.	
Smalltail*	.	.	41	.	
Total	86,799	90,819	59,267	93,008	97,601

*Prohibited in the recreational fishery as of July 1, 1999. Sources: TX PWD, MRIP (FES/APAIS calibrated), Southeast Headboat Survey.

Table 5.39 Estimated recreational harvest of smoothhound sharks* in the Gulf of Mexico and U.S. Atlantic Regions in 2013–2017 in number of fish per species

Region	2013	2014	2015	2016	2017
Atlantic	46,115	55,792	88,316	145,689	58,446
Gulf of Mexico	214	7	3	3	.
Total	46,329	55,799	88,319	145,692	58,446

*Atlantic stock includes smooth dogfish. Gulf of Mexico stock includes smooth dogfish, Florida smoothhound, and Gulf smoothhound. Sources: TX PWD, MRIP (FES/APAIS calibrated), Southeast Headboat Survey.

Bycatch Issues

Bycatch can result in death or injury to discarded fish; therefore, bycatch mortality is incorporated into fish stock assessments and into the evaluation of management measures. Bycatch in the recreational rod and reel fishery is difficult to quantify because many fishermen may be valuing the experience of fishing over the catch of a targeted species, thus making it difficult to distinguish between target species and bycatch species. HMS established a catch-and-release fishery management program for the recreational Atlantic billfish fishery in 1999. Since fish released alive under a recreational catch-and-release fishery management program are exempt from the Magnuson-Stevens Fishery Conservation and Management Act's (Magnusons-Stevens Act) definition of bycatch, a result of the this program is that all Atlantic billfish released alive, regardless of size, are not considered bycatch. The recreational white shark fishery is, by regulation a catch-and-release fishery only (50 CFR Part 635.26(c)); therefore, white sharks are not considered bycatch. Dead discards of bluefin tuna are counted as bycatch and must be reported online or via phone.

Most evidence suggests that circle hooks reduce at-vessel and post-release mortality rates for many HMS compared to J-hooks without reducing the catch of target species, although this varies by species, gear configuration, bait, and other factors. By design, circle hooks tend to hook sharks in the jaw more frequently than in the throat or gut (a practice known as deep-hooking), thereby reducing injury and associated mortality compared to J-hooks (Godin et al. 2012, Campana et al. 2009). In a meta analysis of 42 empirical studies, Reinhardt et al. (2017) compared the effects of hook type on catch rate and at-vessel mortality of 43 and 31 species, respectively. Catch rates were statistically significantly higher for a number of sharks, tunas, and sailfish. This study also found statistically significant evidence that at-vessel mortality of fish caught on J-hooks was higher for a number of billfish, swordfish, tunas, and sharks. Willey et al. (2016) examined the frequencies of jaw, throat, gut, and foul hooking of sharks using recreational fishing gear with non-offset circle and J-hooks. Across all species, they found that sharks caught recreationally with circle hooks were deep hooked in 3 percent of the interactions, while sharks caught on J-hooks were deep hooked in 6 percent of the interactions. This equates to a 50 percent reduction in the frequency of deep-hooking with the use of circle hooks (N=624). Campana et al. (2009) observed that 96 percent of the deep hooked blue sharks were severely injured or dead while 97 percent of sharks that were hooked superficially in the mouth or jaw were released healthy and with no apparent trauma. Therefore, assuming that deep hooking in sharks results in comparable post-release mortality rates (96-percent), converting recreational shark fisheries from J-hooks to circle hooks should reduce the mortality rate of hooked sharks by 63 percent ((17.5%-6.0%/17.5%)*96% = 63%).

NOAA Fisheries initiated an outreach program to address bycatch and educate anglers on the benefits of circle hooks. In January 2011, NOAA Fisheries created a brochure that provides guidelines on how to increase the survival of large pelagic species caught with hook-and-line. This brochure was updated in 2017 and is available at https://www.fisheries.noaa.gov/resource/outreach-and-education/careful-catch-and-release-brochure.

In 2017, NOAA Fisheries finalized Amendment 5b to the 2006 Consolidated HMS FMP to end overfishing on, and rebuild, dusky shark stocks. Several measures were included to educate anglers and reduce post-release mortality of dusky sharks caught as bycatch by recreational fishermen. Since dusky sharks are a prohibited species, recreational fishermen are not permitted to target or retain them. A video and quiz on the safe handling and release of prohibited Atlantic sharks is available for anyone to view and take on the HMS permits website (https://hmspermits.noaa.gov/). Angling and Charter/Headboat permit holders must add a shark endorsement onto recreational permits in order to fish for, retain, possess or land sharks. Applicants must complete a brief online shark identification and fishing regulations training course and quiz prior to purchasing or renewing an applicable HMS permit. As of January 1, 2018, anglers fishing recreationally for sharks on a vessel with HMS angling or HMS Charter/Headboat permits must use non-offset, nonstainless steel circle hooks when fishing south of 41° 43’ N latitude (near Chatham, Massachusetts, which is the northern extent of the dusky shark’s U.S. Atlantic range) except when fishing with flies or artificial lures. On March 2 2018, NOAA Fisheries implemented an emergency interim final rule to adopt internationally recommended management measures for shortfin mako (83 FR 8950). This interim rule encouraged anglers to continue catch-and-release practices for shortfin mako, and implemented an 83-inch (210 cm) fork length minimum size for all shortfin mako. As of publication of this SAFE Report, NOAA Fisheries is finalizing an amendment to the 2006 Atlantic HMS FMP to implement permanent measures for shortfin mako.

The number of kept and released fish reported or observed through the LPS dockside intercepts for 2013–2017 are presented in Table 5.40 and Table 5.41.

Table 5.40 HMS retained by the rod and reel fishery as reported in the Large Pelagics Survey* between May–October in 2013–2017

Species	2013	2014	2015	2016	2017
White marlin	14	8	13	10	7
Blue marlin	6	1	4	6	1
Sailfish	.	.	.	1	1
Swordfish	15	16	43	27	14
Giant bluefin tuna	37	56	119	132	194
Large medium bluefin tuna	14	7	29	63	56
Small medium bluefin tuna	29	26	33	28	33
Large school bluefin tuna	97	60	40	128	73
School bluefin tuna	104	147	141	147	224
Young school bluefin tuna	1	4	.	.	3
Bigeye tuna	250	215	240	99	28
Yellowfin tuna	2,719	2,072	1,942	2,968	2,358
Skipjack tuna	109	109	125	181	147
Albacore tuna	1,040	444	310	127	135
Common Thresher shark	31	55	68	43	55
Shortfin Mako shark	179	180	152	129	146
Sandbar[2] shark	.	.	1	.	.
Dusky[1] shark	.	.	.	.	.
Tiger shark	.	2	3	.	.
Porbeagle	6	3	3	5	6
Blacktip shark	.	.	.	.	.
Atlantic sharpnose shark	22	6	13	2	5
Blue shark	12	10	25	39	17
Hammerhead shark	.	.	.	.	.
Smooth hammerhead shark	.	.	.	.	.
Scalloped hammerhead shark	.	.	.	.	.
Unidentified hammerhead shark	.	.	.	.	1
Wahoo	92	59	135	102	78
Dolphin	3,902	5,904	9,814	6,222	5,080
King mackerel	7	2	.	8	5
Atlantic bonito	77	454	46	41	106
Little tunny	84	157	108	262	298
Amberjack	37	25	46	18	8
Spanish mackerel	66	44	165	20	8

* = The LPS covers the geographic region between Virginia and Maine. [1]Prohibited in the recreational fishery as of July 1, 1999. [2]Prohibited as of July 2008. Source: LPS.

Table 5.41 HMS released alive and dead by the rod and reel fishery as reported in the Large Pelagics Survey* between May–October of 2013–2017

Species	2013	2014	2015	2016	2017
White marlin	1,200	1,281	1,528	1,705	735
Blue marlin	109	99	170	113	66
Sailfish	15	16	25	145	19
Swordfish	18	15	14	7	8
Giant bluefin tuna	2	.	.	.	21
Large medium bluefin tuna	1	.	3	2	4
Small medium bluefin tuna	70	35	51	30	29
Large school bluefin tuna	87	40	14	71	48
School bluefin tuna	135	84	277	70	273
Young school bluefin tuna	14	6	29	90	36
Bigeye tuna	5	102	14	12	4
Yellowfin tuna	999	480	920	2,061	558
Skipjack tuna	464	137	217	278	109
Albacore tuna	112	29	11	30	54
Common Thresher shark	10	23	42	20	49
Shortfin Mako shark	206	237	385	128	145
Sandbar shark [2]	44	62	50	90	71
Dusky shark [1]	90	57	102	49	88
Tiger shark	19	32	18	10	13
Porbeagle	22	21	42	29	96
Blacktip shark	89	33	13	.	4
Atlantic sharpnose shark	22	3	36	26	21
Blue shark	2,240	1,894	2,164	1,462	1,316
Hammerhead shark	.	1	7	4	1
Smooth hammerhead shark	.	6	2	3	1
Scalloped hammerhead shark	.	2	2	0	4
Unidentified hammerhead shark	20	23	28	33	30
Wahoo	2	.	2	.	.
Dolphin	209	213	508	314	215
King mackerel	.	.	.	.	.
Atlantic bonito	46	138	55	88	31
Little tunny	133	614	339	875	1,359
Amberjack	56	35	10	62	.
Spanish mackerel	.	.	2	.	2

* = The LPS covers the geographic region between Virginia and Maine. [1]Prohibited in the recreational fishery as of July 1, 1999. [2]Prohibited as of July 2008. Source: LPS.

5.5 Bottom Longline

Bottom longline is the primary commercial gear employed for targeting large coastal sharks in all regions. Small coastal sharks are also caught on bottom longline gear. Gear characteristics vary by region and target species. In 2017, hauls targeting large coastal sharks used bottom longline between 0.7 and 13.9 km (0.4–8.6 miles) long with 44–657 hooks attached. The average soak duration was 6.2 hours. Both circle and J-hooks are used; the type(s) and size of hook depend on which shark species is being targeted. Beginning on January 1, 2018, Shark Directed

permit holders using bottom longline gear are required to use circle hooks as required by Amendment 5b to the 2006 Consolidated HMS FMP. Fishermen targeting large coastal sharks with bottom longline gear most often used 9.0 J-hooks (37.0 percent of the time) and 14.0 circle hooks (26.1 percent of the time). Note that circle hooks were not required in the shark bottom longline fishery in 2017. Hauls targeting sandbar sharks used bottom longline an average of 4.4 km (2.7 miles) long with 27–300 hooks attached. The average soak duration was 5.1 hours. Fishermen targeting sandbar sharks with bottom longline gear most commonly (38.5 percent of the time) used 16.0 circle hooks (Mathers et al. 2018a).

The reported bottom longline effort for fishermen targeting sharks by region from 2010 through 2017 is provided in Table 5.42. The number of trips targeting sharks in the Gulf of Mexico region surpassed the Atlantic region in 2012-2015, but fell below the Atlantic in 2016 and 2017. A targeted shark trip is defined as a trip where 75 percent of the landings, by weight, were sharks.

Table 5.42 Reported bottom longline effort targeting sharks in 2011–2017

Specifications	Region	2011	2012	2013	2014	2015	2016	2017
Number of vessels	Gulf of Mexico	11	20	16	20	18	16	13
	Atlantic	26	21	24	19	14	13	18
Number of trips	Gulf of Mexico	194	379	457	604	527	259	320
	Atlantic	434	281	329	369	330	282	325
Average sets per trip	Gulf of Mexico	1.4	1.2	1.1	1.1	1.1	1.2	1.2
	Atlantic	1.3	1.5	1.5	1.7	1.8	1.4	1.4
Total number of set hooks	Gulf of Mexico	48,112	99,675	105,559	139,709	139,956	89,123	111,945
	Atlantic	183,465	98,094	136,475	193,561	170,032	104,665	109,851
Average number of hooks per set	Gulf of Mexico	213.8	229.0	212.1	206.1	236.1	272.3	292.8
	Atlantic	330.3	237.1	253.5	276.7	294.9	269.6	260.0
Total soak time (hours)	Gulf of Mexico	1,361.0	2,912.0	2,589.5	3,011.0	2,917	1,408	2,132
	Atlantic	3,331.0	2,289.5	2,438.0	2,649.5	2,293	2,041	3,054
Average mainline length (miles)	Gulf of Mexico	3.0	2.8	2.1	1.9	2.1	2.6	2.9
	Atlantic	5.1	3.9	3.4	3.4	3.8	3.6	3.6

Source: UDP

5.5.1 Current Management

For a description of the history of bottom longline fishery management, please see Amendment 6 to the 2006 Consolidated HMS FMP and Amendment 5b to the 2006 Consolidated HMS FMP. Current commercial regulations include limited access vessel permits requirements, commercial quotas, vessel retention limits, a prohibition on landing 20 species of sharks (one of these species can be landed in the shark research fishery), numerous closed areas, gear restrictions, landing restrictions (including requiring all sharks be landed with fins naturally attached), fishing regions, vessel monitoring system requirements, dealer permits, and vessel and dealer reporting requirements.

NOAA Fisheries published Amendment 5b to the 2006 Consolidated HMS FMP on April 4, 2017, which changed shark regulations based on the latest stock assessment for dusky sharks.

The measures specific to bottom longline fishermen include the completion of additional shark identification and fishing regulation training at existing safe handling and release workshops and a requirement to move 1 nautical mile (nmi) after interacting with a dusky shark along with notifying other vessels in the area of the dusky shark interaction. Additionally, beginning on January 1, 2018, all HMS Shark Directed permit holders must use only circle hooks when fishing with bottom longline gear. On July 9, 2018, NOAA Fisheries published a final rule to revise the landings threshold that prompts a closure and the minimum time between filing of the closure with the Federal Register and the closure becoming effective. This action allows a shark fishery to remain open after the fishery's landings have reached or are projected to reach 80 percent of the available overall, regional, and/or sub-regional quota, if the fishery's landings are not projected to reach 100 percent of the applicable quota before the end of the season. This final action also changes the minimum notice time between filing of the closure notice with the Office of the Federal Register and the closure going into effect from five days to four days.

5.5.2 Recent Catch, Landings, and Discards

This section provides information on shark landings, species composition, bycatch, and discards as reported in the shark Bottom Longline Observer Program (BLLOP). Since 2002, shark bottom longline vessels have been required to take an observer if selected. Participants in the shark research fishery are required to take an observer when targeting sandbar sharks. Outside the research fishery and depending on the time of year and fishing season, vessels that target sharks, possessed current valid Shark Directed permit, and reported fishing with longline gear in the previous year were randomly selected for coverage with a target coverage level of 5-10 percent (Mathers et al. 2018a).

In 2017, the BLLOP selected 12 vessels for the entire fishing season, seven within the Shark Research Fishery and seven in the non-research shark bottom longline fishery, with two vessels participating in both sectors. These vessels were observed for a total of 150 bottom longline hauls (defined as setting gear, soaking gear for some duration of time, and retrieving gear) and a total of 83 trips (defined as from the time a vessel leaves the port until the vessel returns to port and lands catch, including multiple hauls therein). Gear characteristics of trips varied by area (Gulf of Mexico or the U.S. Atlantic Ocean) and target species (non-sandbar large coastal sharks or sandbar shark) (Mathers et al. 2018a). In the non-research shark fishery, the BLLOP observed trips from the southern U.S. Atlantic (the coastline from North Carolina to Florida) region and the Gulf of Mexico region. The observed non-research shark fishery hauls targeted coastal shark species in the southern U.S. Atlantic. Approximately 22 trips with 46 hauls were observed in the non-research shark fishery. These trips caught mostly Atlantic sharpnose sharks with blacktip, blacknose, and tiger sharks being the next most caught species (Table 5.43).

Table 5.43 Shark species caught on observed bottom longline trips in the non-shark research fishery targeting sharks in the South Atlantic and Gulf of Mexico in 2017

Species	Total caught	Kept (%)	Discarded dead (%)	Discarded alive (%)	Disposition unknown (%)
Atlantic sharpnose shark	719	90.0	9.9	0.1	0.0
Blacktip shark	477	64.8	24.7	10.1	0.4
Blacknose shark	206	20.9	31.6	47.6	0.0
Tiger shark	176	60.8	0.6	37.5	1.1
Nurse shark	103	2.9	0.0	97.1	0.0
Bull shark	89	94.4	0.0	2.3	3.4
Sandbar shark	51	0.0	2.0	98.0	0.0
Lemon shark	44	93.2	0.0	0.0	6.8
Great hammerhead shark	32	78.1	0.0	21.9	0.0
Bonnethead shark	26	61.5	34.6	3.9	0.0
Spinner shark	23	100.0	0.0	0.0	0.0
Scalloped hammerhead shark	13	30.8	15.4	53.9	0.0
Finetooth shark	9	100.0	0.0	0.0	0.0
Smooth dogfish	5	80.0	20.0	0.0	0.0
Hammerhead shark, uncl.	1	0.0	100.0	0.0	0.0
Requiem shark	1	0.0	0.0	0.0	0.0
Total	1,975				

Source: Mathers et al. 2018a

In 2017, there were seven participants in the Shark Research Fishery. The observed data were combined for the Gulf of Mexico and southern Atlantic to protect confidentiality of vessels consistent with the requirements of the Magnuson-Stevens Act. NOAA Fisheries changed the regulations for vessels participating in the Shark Research Fishery in 2015 by modifying the regional dusky shark bycatch caps for this limited fishery and allowing observers to retain and land up to three whole sharks per trip (Table 5.44). Shark Research Fishery regions are shown in Figure 5.10.

Table 5.44 Summary of shark research fishery management measures in 2014–2017

Management measure	2014	2015	2016	2017
Number of vessels	5	7	5	7
Number of trips per month	1	1	1	1
Captain's meeting held	Yes	Yes	No	Yes
Retention limits	None. All sharks, except for prohibited species, brought to vessel dead must be landed.	Same as previous year.	Same as previous year.	None. All sharks, except for prohibited species, brought to the vessel dead must be landed unless the management group for that species is closed. If the regional non-blacknose small coastal sharks, blacknose, and/or pelagic shark management group is closed, permit holders fishing in those closed regions would not be able to land species from the closed management group.
Gear restrictions	Set limit is two non-concurrent longline sets per trip: first set ≤ 150 hooks with soak time no more than 2 hours and second set ≤ 300 hooks with no soak time limit. Hook restriction is ≤ 500 hooks on board.	Same as previous year.	Same as previous year.	Same as previous year.
Individual vessel quota	Sandbar quota (18.6 mt dw) and LCS research quota (8.0 mt dw) split equally among selected vessels	Sandbar quota (13.3 mt dw) and LCS research quota (5.7 mt dw) split equally among selected vessels.	Sandbar quota (14.5 mt dw) and LCS research quota (8.0 mt dw) split equally among selected vessels.	Sandbar quota (16.3 mt dw) and LCS research quota (9.0 mt dw) split equally among selected vessels.

Management measure	2014	2015	2016	2017
Mid-Atlantic closed area	Vessels can fish in the closed area only when the observer program intends to place a satellite archival tag(s) on a dusky shark(s)	Same as previous year.	Same as previous year.	Same as previous year.
Dusky bycatch cap	Once three dead dusky shark are observed, a three-hour soak time restriction is implemented and no more than three dusky shark interactions are allowed in any of the designated regions (North Atlantic, North Carolina, South Atlantic, the Florida Keys, and the west coast of Florida) through the entire year.	Once three dead dusky sharks are observed, a three-hour soak time restriction is implemented and no more than three dusky shark interactions are allowed in any of the designated regions (North Carolina, the Florida Keys, and the Gulf of Mexico) through the entire year. Once six dead dusky sharks are observed, a three-hour soak time restriction is implemented and no more than six dusky shark interactions are allowed in South Atlantic region through the entire year.	Once two dead dusky sharks are observed, a three-hour soak time restriction is implemented and no more than two dusky shark interactions are allowed in any of the designated regions (North Atlantic, the Florida Keys, and the Gulf of Mexico) through the entire year. Once three dead dusky sharks are observed, a three-hour soak time restriction is implemented and no more than three dusky shark interactions are allowed in any of the designated regions (North Carolina) through the entire year. Once six dead dusky sharks are observed, a three-hour soak time restriction is implemented and no more than six dusky shark interactions are allowed in South Atlantic region through the entire year (see Figure 5.10).	Once three dead dusky sharks are observed, a three-hour soak time restriction is implemented and no more than two dusky shark interactions are allowed in any of the designated regions (North Carolina, the Gulf of Mexico, and the Florida Keys) through the entire year. Once six dead dusky sharks are observed, a three-hour soak time restriction is implemented and no more than six dusky shark interactions are allowed in South Atlantic region through the entire year (see Figure 5.10).

Figure 5.10 Dusky shark bycatch cap regions for the Shark Research Fishery

Fishermen in the Shark Research Fishery targeted sandbar sharks and fished primarily in the Gulf of Mexico and southern Atlantic regions. In 2017, a total of 61 trips with 104 hauls were observed. These trips caught mostly sandbar sharks, and blacktip, tiger, and scalloped hammerhead sharks being the next most caught species (Table 5.45). Dusky sharks were only observed on trips targeting sandbar sharks and not on any trips targeting other shark species.

Table 5.45 Shark species caught on observed bottom longline trips in the sandbar shark research fishery in the Gulf of Mexico and Southern Atlantic in 2017

Species	Total number caught	Kept (%)	Discarded dead (%)	Discarded alive (%)	Disposition unknown (%)
Sandbar shark	3,066	98.2	0.1	0.3	1.4
Blacktip shark	500	98.0	1.4	0.4	0.2
Tiger shark	336	22.0	1.2	75.0	1.8
Scalloped hammerhead shark	186	74.7	4.3	20.4	0.5
Atlantic sharpnose shark	159	27.7	49.7	22.6	0.0
Bull shark	92	83.7	2.2	7.6	6.5
Dusky shark	91	0.0	8.8	90.1	1.1
Great hammerhead shark	89	68.5	2.3	23.6	5.6
Nurse shark	83	0.0	0.0	100.0	0.0
Sand tiger shark	59	0.0	0.0	100.0	0.0
Blacknose shark	54	20.4	24.1	55.6	0.0
Lemon shark	49	85.7	0.0	0.0	14.3
Spinner shark	36	100.0	0.0	0.0	0.0
Silky shark	20	80.0	0.0	15.0	5.0
Hammerhead shark, unclassified	10	0.0	0.0	90.0	10.0
Shark, unclassified	4	50.0	50.0	0.0	0.0
Total	4,834				

Source: Mathers et al. 2018a

5.5.3 Bottom Longline Bycatch

For more detailed information on the fishery classification and requirements under the Marine Mammal Protection Act and the Endangered Species Act, please see the Final Environmental Assessment (EA) prepared for Amendment 9 to the 2006 Consolidated HMS FMP. On July 3, 2014, NOAA Fisheries issued the final determination to list the Central and Southwest Atlantic distinct population segment of scalloped hammerhead shark as a threatened species pursuant to the Endangered Species Act (79 FR 38214). This segment occurs within the management area of Atlantic HMS commercial and recreational fisheries, which are managed by NOAA Fisheries's Office of Sustainable Fisheries, HMS Management Division. On August 27, 2014, NOAA Fisheries published a final rule to list 15 coral species as threatened—five in the Caribbean including Florida and the Gulf of Mexico (*Dendrogyra cylindrus*, *Orbicella annularis*, *O. faveolata*, *O. franksi*, and *Mycetophyllia ferox*). Two Caribbean species already listed as threatened (*Acropora cervicornis* and *A. palmata*) remained listed as threatened.

The 2012 Biological Opinion (NMFS 2012), initiated in response to Amendments 3 and 4 to the Consolidated HMS Fishery Management Plan and the Federal Authorization of a Smoothhound Shark Fishery, included an incidental take statement for listed sea turtles, smalltooth sawfish, or Atlantic sturgeon. Take levels over any three-year period has not exceeded levels authorized in the statement, consistent with the requirements of the 2012 Biological Opinion. Table 5.46 provides information on those observed interactions with protected resources for bottom longline

vessels targeting sharks in the Gulf of Mexico and Atlantic regions. In 2017, three loggerhead sea turtles were observed in the Shark Research Fishery: one was released alive and two were released dead. No protected resources interactions were observed in bottom longline fishing in the Gulf of Mexico and South Atlantic regions outside of the Shark Research Fishery.

Table 5.46 Protected species interactions observed bottom longline trips targeting sharks in the Gulf of Mexico and Atlantic Ocean in 2008–2017

Year	Sea turtles	Sea birds	Marine mammals	Smalltooth sawfish	Total
2008	1 (A)	-	-	2 (A)	3
2009	2 (D)	-	-	5 (A)	7
2010	4 (2A, 2D)	-	-	10 (A)	14
2011	4 (1A, 3D)	-	-	2 (A)	6
2012	2 (A)	-	-	1 (D)	3
2013	-	-	-	2 (A)	2
2014	7 (5A, 2D)	-	-	5 (A)	12
2015	4 (4A, 0D)	-	-	2 (A)	6
2016	9 (7A, 2D)	3 (U)	-	1 (A)	13
2017	3 (1A, 2D)	-	-	-	3
Total	36	3	0	30	69

Note: Letters in parentheses indicate whether the animal was released alive (A), dead (D), or unknown (U). Source: Mathers et al. 2018a.

5.6 Gillnet Fishery

Gillnet gear is the primary gear for vessels directing on small coastal sharks, although such vessels can also catch other shark species. Vessels participating in the shark gillnet fishery typically possess permits for other council and/or state managed fisheries in addition to their shark permit, and will deploy nets in several configurations based on target species, including drift, strike, and sink gillnets. The data presented in this chapter focus on the gillnet fisheries that occur in the Southeast and Gulf of Mexico regions and target small coastal sharks or finfish, as well as the gillnet fisheries in the Northeast region that target smoothhounds sharks or finfish.

The overall gillnet effort targeting sharks by region is available from 2010 through 2017 (Table 5.47). The majority of the vessels and trips targeting sharks occur in the southern portion of the Atlantic region. Most of the data from the Gulf of Mexico region is considered confidential since fewer than three vessels used gillnet gear to target sharks in the region.

Table 5.47 Gillnet gear effort in the U.S. South Atlantic and Gulf of Mexico regions targeting sharks in 2010–2017

Specifications	Region	2010	2011	2012	2013	2014	2015	2016	2017
Number of vessels	Gulf of Mexico	C	3	3	C	C	C	0	3
	Atlantic	37	35	33	22	24	19	21	20
Number of trips	Gulf of Mexico	C	43	46	C	C	C	0	15
	Atlantic	241	291	366	305	354	161	206	127
Average sets per trip	Gulf of Mexico	C	2.9	2.0	C	C	C	n/a	1.7
	Atlantic	1.6	1.6	1.5	1.1	1.2	2.1	1.8	1.4
Total soak time (hours)	Gulf of Mexico	C	743.0	945.0	C	C	C	n/a	128.0
	Atlantic	827.5	763.5	1,074.5	849.0	1,220.5	539.8	852.5	490.7
Average gillnet length (yards)	Gulf of Mexico	C	1,830.2	1,443.5	C	C	C	n/a	696.7
	Atlantic	871.1	757.7	844.4	761.0	771.8	726.7	1,155.1	1,030.0
Average mesh size (inches, stretched mesh)	Gulf of Mexico	C	7.3	7.9	C	C	C	n/a	8.5
	Atlantic	5.8	4.7	4.8	5.0	5.2	5.2	5.2	4.7

Note: Due to confidentiality requirements (C) under the Magnuson-Stevens Act, some of the data are not presented.
Source: UDP.

In addition to these southeast gillnet fisheries, in the Northeast and mid-Atlantic regions, gillnet gear is the predominant gear type used in the smoothhound shark fishery, with smooth dogfish being primarily caught in the Mid-Atlantic region. Generally, fishermen use sink gillnet to target smooth dogfish in the Northeast, although the species is often caught incidentally in bottom otter trawl gear as well. The smooth dogfish sink gillnet fishery is a mixed fishery with a large portion of trips catching and retaining a variety of other species, dominated by bluefish, croaker, and spiny dogfish. Unlike the Southeast and Gulf of Mexico regions, the northeast gillnet fisheries do not specificially target sharks in a given trip but rather a variety of species in any given trip.

In 2017, smooth dogfish were observed caught on a total of 4,040 sets in 1,291 trips by the Northeast Fisheries Observer Program (NEFOP). Table 5.48 outlines summary information for smooth dogfish caught during trips with observers onboard in 2017.

Table 5.48 Smooth dogfish caught on trips observed by the Northeast Fisheries Observer Program in 2017

Gear	Number of trips	Number of sets	Total caught (lb dw)	Kept (%)	Discarded (%)
Otter bottom trawl	1,011	3,135	230,404	78.5%	21.5%
Fixed/anchored gillnet	188	567	91,456	11.4%	88.6%
Sink gillnet	61	213	33,346	1.1%	98.9%
Bottom longline	9	80	7,204	91.1%	8.9%
Shrimp trawl	3	12	778	100.0%	0.0%
Dredge	13	22	148	100.0%	0.0%
Pot/trap	5	6	105	93.0%	7.0%
Handline	3	3	15	100.0%	0.0%
Drift gillnet	2	2	10	100.0%	0.0%
Total	1,295	4,040	363,465		

Source: NEFOP

5.6.1 Current Management

Many of the commercial regulations for the Atlantic shark fishery are the same for both the bottom longline and gillnet fishery, including, but not limited to: seasons, quotas, species complexes, permit requirements, authorized/prohibited species, and retention limits. Examples of regulations that are specific to shark gillnet fishing include requiring that drift gillnets remain attached to the vessel and requiring vessel operators to conduct net checks every two hours when gear is deployed (CFR Title 50 Part 635.21(g)(2)). Sink gillnets can soak for no more than 24 hours, measured from the time the sink gillnet first enters the water to the time it is completely removed from the water (CFR Title 50 Part 635.21(g)(3)).

5.6.2 Recent Catch, Landings, and Discards of the Southeast Gillnet Fisheries

In 2017, a total of 75 sets comprised of various southeast gillnet fisheries were observed by the Southeast Gillnet Observer Program. Four vessels in the strike gillnet fishery were observed making nine strike sets on seven trips. Observed strike gillnet trips exclusively targeted king mackerel. One gillnet vessel was observed making three drift gillnet sets on three trips. Due to vessel confidentiality, these drift gillnet trips cannot be further described. Three vessels in the sink gillnet fishery were observed making 63 sink net sets on seven trips in 2017. Observed sink gillnet trips exclusively targeted Spanish mackerel. No gillnet trips targeting sharks were observed in 2017. Table 5.49 and Table 5.50 of this section outline shark species composition, disposition, and summary information for sharks caught during observed sink and strike gillnet trips with observers onboard in 2017 (Mathers et al. 2018b).

Table 5.49 Shark species caught on observed southeast sink gillnet trips targeting spanish mackerel in 2017

Species	Total number caught	Kept (%)	Discarded alive (%)	Discarded dead (%)
Atlantic sharpnose shark	71	76.1	24.0	0.0
Bonnethead shark	13	53.9	46.2	0.0
Blacktip shark	2	100.0	0.0	0.0
Total	86			

Source: Mathers et al. 2018b

Table 5.50 Shark species caught on observed southeast strike gillnet trips targeting king mackerel in 2017

Species	Total number caught	Kept (%)	Discarded alive (%)	Discarded dead (%)
Blacktip shark	1	0.0	100.0	0.0
Scalloped hammerhead shark	1	0.0	100.0	0.0
Total	2			

Source: Mathers et al. 2018b

5.6.3 Gillnet Bycatch

This section describes the non-shark bycatch observed in the southeast gillnet fisheries (Mathers et al. 2018b).

There was a wider range of fish species caught in the sink gillnet fisheries due to the number of sets observed and gear deployment methods. Predominant species caught in sink gillnets included bluefish, Spanish mackerel, bluerunner jack, and Atlantic sharpnose sharks. All of the observed interactions with protected species between 2000 and 2017 in the observed gillnet fisheries are on Table 5.51.

Sea Turtles and Sea Birds

There were no sea turtles or sea birds observed caught in gillnet gear in 2017 (Mathers et al. 2018b).

Marine Mammals

The Marine Mammal Protection Act Category II classification refers to occasional serious injuries and mortalities. In 2017, there were no observed interactions with marine mammals in gillnet gear (Mathers et al. 2018b).

Smalltooth Sawfish and Atlantic Sturgeon

In 2017, there were no observed interactions with smalltooth sawfish or Atlantic sturgeon in gillnet gear. For sawfish, the last observed interaction occurred in 2003 and the sawfish was released with no visible injuries. There have been no interactions observed to date for Atlantic sturgeon. Given that the rate of observer coverage in these gillnet fisheries is consistent with Atlantic Large Whale Take Reduction Plan, NOAA Fisheries believes that smalltooth sawfish and Atlantic sturgeon interactions in this fishery are rare.

Table 5.51 Protected species interactions in the shark gillnet fishery targeting mixed sharks other than smoothhounds in 2009–2017

Year	Sea turtles	Sea birds	Marine mammals	Smalltooth sawfish	Atlantic sturgeon	Total
2009	2 (A)	1 (A)	1 (D)	-	-	4
2010	-	1 (D)	-	-	-	1
2011	1 (A)	-	-	-	-	1
2012	2 (A)	-	-	-	-	2
2013	-	-	-	-	-	0
2014	-	-	1 (D)	-	-	1
2015	-	-	-	-	-	0
2016	-	-	-	-	-	0
2017	n/a	n/a	n/a	n/a	n/a	n/a
Total	5	2	2	0	0	9

Note: Letters in parentheses indicate whether the animal was released alive (A) or dead (D). Source: Mathers et al. 2018b.

5.7 Green-Stick Gear

Green-stick gear is defined at 50 CFR §635.2 as "an actively trolled mainline attached to a vessel and elevated or suspended above the surface of the water with no more than 10 hooks or gangions attached to the mainline. The suspended line, attached gangions and/or hooks, and catch may be retrieved collectively by hand or mechanical means. Green-stick does not constitute a pelagic longline or a bottom longline gear as defined in this section or as described at §635.21(c) or §635.21(d), respectively." Green-stick gear may be used to harvest BAYS tunas and bluefin tuna aboard Atlantic Tunas General category, HMS Charter/Headboat, and Atlantic Tunas Longline permitted vessels.

Onboard Atlantic Tunas Longline permitted vessels, up to 20 J-hooks may be possessed for use with green-stick gear and no more than 10 J-hooks may be used with a single green-stick gear. J-hooks may not be used with pelagic longline gear and no J-hooks may be possessed onboard a pelagic longline vessel unless green-stick gear is also onboard. J-hooks possessed and used onboard pelagic longline vessels may be no smaller than 1.5 inch (38.1 mm) when measured in a straight line over the longest distance from the eye to any other part of the hook.

5.7.1 Recent Catch and Landings

Recent Atlantic tuna catches are presented earlier in this chapter. Green-stick gear has been used in the U.S. Atlantic tuna fisheries since the mid-1990s. Determining historical landings attributed to this gear, however, was not easily quantifiable due to the lack of reporting mechanisms available in fisheries data collection programs in the past. Limited data allowed the catch to be characterized and presented in the 2008 SAFE Report (NMFS 2008a). In 2008, a green-stick gear code was designated for use in existing reporting systems, such as trip tickets in the Southeast and electronic reporting programs in the Northeast. Following this, NOAA Fisheries has, with some success, encouraged states to utilize the green-stick gear code in their trip ticket programs. With these gear code additions, data on landings specific to green-stick gear are expected to improve. Beginning in 2013, the HMS eDealer electronic reporting system was required to be used by Atlantic HMS dealers, improving the precision of green-stick landings data. Table 5.52 presents greenstick landings data from this system.

Table 5.52 Select landings with greenstick gear (lb ww) in 2013–2017

Species	Region	2013	2014	2015	2016	2017
Yellowfin tuna	Atlantic	43,175	57,064	44,673	35,334	77,753
	Gulf of Mexico	19,212	1,082	-	1,055	10,540
Bigeye tuna	Atlantic	-	-	-	1,666	-
	Gulf of Mexico	-	-	-	-	-
Albacore/skipjack	Atlantic					-
	Gulf of Mexico					-

Note: Additional landings of other species have occurred, but cannot be displayed due to confidentiality requirements. Source: eDLR

NOAA Fisheries and the Louisiana Department of Wildlife and Fisheries investigated the catch and bycatch of green-stick gear in 2012–2017 in the northern Gulf of Mexico through a study funded by the NOAA Bycatch Reduction Engineering Program. The final report from that study is available on request from the NOAA Fisheries Atlantic HMS Management Division.

5.8 Safety Issues

The following section highlights occupational safety statistics and safety issues in fisheries. The U.S. Coast Guard maintains websites for each of its regions (https://www.uscg.mil/Units/Organization/), many of which provide regulatory and safety information and region-specific statistics. The U.S. Coast Guard also maintains a blog, the Coast Guard Maritime Commons, which provides safety alerts, news bulletins, and regulatory information: http://mariners.coastguard.dodlive.mil/.

5.8.1 Commercial Fisheries

Commercial fishing is one of the most dangerous occupations in the United States (Lambert et al. 2015). The Bureau of Labor Statistics data indicates that there were 24 fatalities in the fishing industry in 2016 (inclusive of finfish and shellfish fishing) (https://www.bls.gov/news.release/pdf/cfoi.pdf), equivalent to a work-related fatality rate of 86 deaths per 100,000 full time equivalent workers (23 percent higher than for all U.S. workers). Statistical data on vessel safety may be obtained from the U.S. Coast Guard, including "Analysis of Fishing Vessel Casualties – A Review of Lost Fishing Vessels and Crew Fatalities 1992–2010" (Dickey 2011) and accessed at http://www.fishsafe.info/FVStudy_92_10.pdf.

In 2017, the National Institute for Occupational Safety and Health published new reports summarizing commercial fishing fatality data in the Gulf of Mexico and Atlantic region (https://www.cdc.gov/niosh/topics/fishing/pubs.html; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5958543/). Between 2000 and 2014, 164 and 225 commercial fishing deaths occurred respectively in Gulf of Mexico and Atlantic east coast fisheries; the majority of fatalities were due to vessel disasters (e.g., sinking, capsizing, fires, groundings) and falls overboard (as a result of losing balance, tripping or slipping, or becoming entangled in gear). Two of these incidents occurred in Gulf of Mexico shark fisheries. In all fatal falls, none of the victims wore personal floatation devices (Case et al. 2018).

National Standard 10 of the Magnuson-Stevens Act mandates that measures enacted under the Magnuson-Stevens Act promote the safety of human life at sea. In August 2015, NOAA Fisheries finalized a Technical Memorandum titled "Guidance on Fishing Vessel Risk Assessments and Accounting for Safety at Sea in Fishery Management Design" (Lambert et al. 2015). The Technical Memorandum provides two tools (a safety checklist and a risk assessment methodology) that can be used by fishery managers to evaluate safety within fisheries, determine if proposed management measures create a safety concern, and develop solutions for reducing risk and improving safety. NOAA Fisheries will include these factors in future actions to ensure safety at sea is appropriately considered. The U.S. Coast Guard provides a "Commercial Fishing Vessel Checklist Generator" that can be specifically tailored to fishing vessels and accessed at https://www.dco.uscg.mil/FishSafe.

New Safety Regulations for Commercial Fisheries

This section reviews some (not all) new regulations that might affect Atlantic HMS fishermen. The Coast Guard Authorization Act of 2010 and the U.S. Coast Guard and Maritime Transportation Act of 2012 included several new regulations that were implemented between 2013–2016. A summary of these new requirements may be accessed at http://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/MSIB/2014/018_14_12-1-2014.pdf.

Construction and Safety Standards

Since July 1, 2013, all newly constructed commercial fishing vessels must meet the following standards:

- **Vessels less than 50 feet** must be constructed in a manner that provides a level of safety equivalent to the minimum standards for recreational vessels.
- **Vessels that are 50 feet or longer** must meet a class society's construction standards, be issued class documents and remain in class if the vessel operates beyond 3 nm from the territorial sea baseline, or if the vessel has more than 16 individuals on board (regardless of where the vessel is being operated).
- **Vessels that are 79 feet or longer** must be assigned a load line if operated outside the boundary line.

Since 1988, fish processing vessels are required by law to be built and maintained to specific rules (standards) that have been established by a class society, a process known as classification or classing. Once a vessel is classed with a certificate indicating it meets minimum safety requirements, the vessel is subject to periodic inspection to verify continued alignment with requirements. Losing a classification certificate could prevent a vessel from operating legally. In 2010 and 2012, U.S. law expanded this requirement to catcher vessels and fish tender vessels that are built after July 1, 2013 and are over 50 feet in length. The Coast Guard Authorization Act of 2015 further amended these requirements so that new catcher and fish tender vessels between 50–79 feet in length do not necessarily need to be classed. Instead, these ships can be designed and constructed to equivalent standards and overseen by naval architects and marine surveyors, which the U.S. Government Accountability Office (GAO) refers to as an "alternative-to-class" approach. The GAO recommended that more information be collected (https://www.gao.gov/products/GAO-18-16).

Other recent safety regulations include:

- The implementation of dockside safety examinations to be fully compliant with existing fishing vessel safety regulations (46 CFR 41–47, Subchapter E, "Load Lines"): http://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Commercial-Regulations-standards-CG-5PS/Marine-Safety-Center-MSC/ or http://www.fishsafewest.info/PDFs/MSIB_CFVSReq.pdf.

- Clarification on the type of survival craft that must be used and recommendations to transition from in-water to out-of-water survival craft: http://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/MSIB/2016/004_16_2-18-2016.pdf.

The U.S. Coast Guard also provides information bulletins to keep commercial and recreational fleets and the public informed of safety issues. For example:

- In January 2017, the Coast Guard released a document entitled "*Voluntary Safety Initiatives and Good Marine Practices for Commercial Fishing Vessels,"* which provided safety measures and best practices for older commercial fishing vessels (i.e., those 50 feet

or greater in length, operating beyond 3 nmi from shore, and that are more than 25 years of age): http://docs.wixstatic.com/ugd/b66831_17d92499038a4322b9c1fea39d4db260.pdf.

- On July 13, 2017, the Coast Guard released Commercial Fishing Vessel Marine Safety Information Bulletin 008-17 (HMS Permitted Handgear Vessels) to provide the Coast Guard's current interpretation on the applicability of commercial fishing vessel safety requirements and regulations for those vessels fishing for Atlantic HMS (http://mariners.coastguard.dodlive.mil/2017/07/13/7132017-msib-008-17-application-of-commercial-fishing-vessel-requirements-on-atlantic-hms-permitted-handgear-vessels/):

    - Charter/Headboats must have a Coastwise Endorsement on its Coast Guard Certificate of Documentation, or a State Registration that includes or designates commercial operations.

    - Charter/Headboats must have a Coast Guard-licensed master when operating in that capacity, whether the vessel is federally-documented or state-registered.

    - Charter operations that take customers out to fish are considered engaged in coastwise trade. If catch is sold, the vessel is engaged in commercial fishing activity and is subject to 46 CFR Part 28 requirements for safety and survival equipment and must complete a dockside safety examination.

- On October 6, 2017, the U.S. Coast Guard published a marine safety alert concerning vessel stability and watertight integrity following an accident in the Bering Sea that resulted in multiple casualties and loss of the vessel: http://mariners.coastguard.dodlive.mil/2017/10/06/1062017-marine-safety-alert-1117-remain-upright-by-fully-understanding-vessel-stability/.

- On November 13, 2017 the U.S. Coast Guard published a marine safety alert to raise awareness of a recall on fire extinguishers that may be used by mariners: https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/CG-5PC/INV/Alerts/1217.pdf.

- On March 20, 2018, the U.S. Coast Guard published a marine safety alert concerning flaws in vessel immersion suits that could compromise the integrity of the suit in performing life-saving functions: https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/CG-5PC/INV/Alerts/0318.pdf.

- In response to the 2018 sinking of the Fishing Vessel *Destination* in the Bering Sea, the National Transportation Safety Board issued a safety alert concerning the effects of ice accumulation from freezing spray on vessel stability: https://www.ntsb.gov/safety/safety-alerts/Documents/SA-074.pdf.

- On November 28, 2018, the Federal Communications Commission (FCC) published an enforcement advisory concerning the "*proliferation in the use and marketing of noncompliant devices that operate on radio frequencies assigned to Automatic Identification Systems (*AIS*), which are authorized exclusively for marine navigation safety communications*." Specifically, the FCC reminded commercial fishermen that it is illegal to use AIS devices to mark and track fishing nets and fishing net buoys. These devices may be advertised as "AIS Fishing Net Buoys." The devices transmit a vessel identification signal without essential navigation safety information and interfere with authorized equipment. More information is available at: https://docs.fcc.gov/public/attachments/DA-18-1211A1.pdf.

5.8.2 Recreational Fisheries

Safety at sea is not just an issue for commercial fisheries. In 2017, there were 11,961,568 recreational vessels registered by states. The following summarizes recreational boating statistics, inclusive of recreational fishing activities for 2017:

- The U.S. Coast Guard reported 4,291 accidents involving 658 deaths, approximately 46 million dollars in damages, and 2,629 injuries as a result of recreational boating accidents.
- The fatality rate for 2017 was 5.5 deaths per 100,000 registered recreational vessels. Where cause was known, most fatalities (76 percent) were associated with drowning. Approximately 84.5 percent of drowning victims were not wearing a life jacket at the time of fatality.
- Alcohol use was a leading contributing factor in fatal boating accidents where the primary cause is known (19 percent). The top five contributing factors in accidents included operator inattention, improper lookout, operator inexperience, machinery failure, and alcohol use.
- From a summary of accident reports, approximately 677 vessels were engaged in fishing activities at the time of accidents, which resulted in 181 deaths and 299 injuries.

Recreational boating statistics are published annually by the U.S. Coast Guard Office of Auxiliary and Boating Safety (USCG 2017; http://www.uscgboating.org/library/accident-statistics/Recreational-Boating-Statistics-2017.pdf).

New Safety Regulations for Recreational Fisheries

Regulations for recreational boaters, including recreational fishermen, are summarized on the following U.S. Coast Guard website: http://www.uscgboating.org/regulations/. Recreational fishermen are also subject to safety regulations published by other federal agencies and from state and local agencies or entities.

5.8.3 Additional Resources

The Coast Guard Authorization Act of 2010 and the Coast Guard and Maritime Transportation Act of 2014 directed the establishment of a Fishing Safety Training and Research Grant programs, which are intended to respectively: (1) enable qualified person and entities to conduct

commercial fishing vessel safety training for vessel operators and crew, and to purchase safety equipment; and (2) conduct research on methods for improving safety in the commercial fishing sector. The Coast Guard received appropriations (~ 6 million) for these programs in FY2017. Application information is available on www.grants.gov by searching for "Commercial Fishing Occupational Safety Research" or the "Commercial Fishing Occupational Safety Training Projects Grants."

5.9 Fishery Data: Landings by Species

The purpose of this section is to provide a summary of recent domestic landings of HMS by gear and species, allowing for interannual comparisons. The following tables (Table 5.53–Table 5.58) of Atlantic HMS landings are taken from the 2018 National Report of the United States to ICCAT (NMFS 2018). Landings for sharks (Table 5.59–Table 5.66) are summarized from eDealer and are based on landings through 2017.

Table 5.53 U.S. landings (mt ww) of Atlantic bluefin tuna by area and gear in 2013–2017

Area	Gear	2013	2014	2015	2016	2017
Northwest Atlantic	Longline*	153.0	171.7	70.1	82.4	72.1
	Handline	0.5	0.0	0.0	1.1	5.0
	Purse seine	42.5	41.8	38.8	0.0	0.0
	Harpoon	45.0	67.5	77.1	52.9	81.7
	Commercial rod and reel	249.5	378.9	581.4	722.1	652.8
	Recreational rod and reel	131.4	99.6	112.9	143.7	140.1
Gulf of Mexico	Longline	33.5	41.3	9.3	10.7	11.7
	Recreational rod and reel	0.0	0.0	0.0	1.7	1.7
NC Area 94a	Longline	3.5	8.9	8.3	12.0	32.6
Caribbean	Longline	0.4	0.0	0.0	0.2	0.0
All areas	All gears	658.9	810.0	898.8	1,026.8	997.8

NC = North Central Atlantic. * Includes landings and estimated discards from scientific observer and logbook sampling programs. Source: NMFS 2018

Table 5.54 U.S. landings (mt ww) of Atlantic yellowfin tuna by area and gear in 2013–2017

Area	Gear	2013	2014	2015	2016	2017
NW Atlantic	Longline	539.9	671.0	438.9	480.4	723.1
	Rod and reel*	495.4	997.8	795.6	1,610.7	1,778.6
	Troll	30.1	28.7	25.6	16.6	28.5
	Gillnet	0.8	1.3	0.8	2.3	0.5
	Trawl	0.0	0.3	0.0	0.0	0.0
	Handline	66.4	82.1	64.3	31.4	26.9
	Trap	0.0	0.0	0.0	0.0	0.0
	Unclassified	2.1	7.7	2.5	2.5	22.9
Gulf of Mexico	Longline	834.9	701.2	490.8	695.2	592.4
	Rod and reel*	191.8	53.2	134.2	266.6	40.3
	Handline	0.0	9.7	1.9	5.6	6.0
	Unclassified	0.0	0.0	0.0	0.03	0.0
Caribbean	Longline	169.6	80.7	109.9	123.6	86.9
	Handline	0.6	0.6	0.6	1.3	0.08
	Gillnet	0.0	0.0	0.0	0.0	0.0
	Rod and reel*	0.0	16.2	6.6	34.2	13.2
NC Area 94a	Longline	0.0	1.7	1.8	1.0	1.1
SW Atlantic	Longline	-	-	-	-	-
All areas	All gears	2,331.6	2,666.2	2,073.9	3,272.6	3,326.4

NC = North Central Atlantic. * = Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. Source: NMFS 2018.

Table 5.55 U.S. landings (mt ww) of Atlantic skipjack tuna by area and gear in 2013–2017

Area	Gear	2013	2014	2015	2016	2017
NW Atlantic	Longline	0.5	0.3	0.2	0.9	0.3
	Rod and reel*	37.7	46.0	32.7	93.2	32.5
	Gillnet	0.27	6.7	0.2	0.7	0.09
	Trawl	0.0	0.0	1.1	0.0	1.5
	Handline	0.8	1.3	0.2	0.8	0.5
	Unclassified	0.7	2.7	0.06	0.2	0.8
Gulf of Mexico	Longline	0.0	0.01	0.0	0.2	0.3
	Rod and reel*	77.1	9.8	35.7	33.4	62.4
	Handline	0.02	0.01	0.0	0.0	0.0
Caribbean	Longline	0.0	0.0	0.0	0.0	0.0
	Gillnet	0.0	0.0	0.0	0.0	0.0
	Rod and reel*	0.0	9.4	7.2	3.4	1.0
	Handline	0.0	0.7	0.5	0.9	0.1
	Trap	-	-	-	-	-
All areas	All gears	117.5	77.0	77.9	133.8	99.3

* = Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. Source: NMFS 2018.

Table 5.56 U.S. landings (mt ww) of Atlantic bigeye tuna by area and gear in 2013–2017

Area	Gear	2013	2014	2015	2016	2017
Northwest and North Central Atlantic	Longline	490.9	574.5	557.7	360.2	535.1
	Gillnet	0.06	0.08	0.5	0.0	0.0
	Rod and reel*	337.5	251.9	198.0	126.9	220.1
	Troll	5.0	4.5	6.4	1.0	1.3
	Handline	15.9	16.4	51.3	9.4	3.5
	Trawl	0.0	0.0	0.1	0.1	0.0
	Unclassified	6.2	3.5	.025	0.4	2.4
Gulf of Mexico	Longline	9.2	6.8	9.2	6.6	10.5
	Rod and reel*	7.0	0.06	0.01	0.2	0.0
	Handline	0.0	0.0	0.0	0.0	0.0
	Unclassified	0.0	0.0	0.0	0.0	0.0
Caribbean	Longline	8.6	5.4	7.5	5.6	15.1
	Rod and reel*	0.0	2.9	0.5	0.0	0.0
	Handline	0.0	0.0	0.0	0.2	0.0
SW Atlantic	Longline	0.2	0.05	0.0	13.8	0.0
All areas	All gears	880.6	866.1	831.4	524.6	788.2

* = Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. Source: NMFS 2018.

Table 5.57 U.S. landings (mt ww) of Atlantic albacore tuna by area and gear in 2013–2017

Area	Gear	2013	2014	2015	2016	2017
Northwest Atlantic	Longline	139.9	187.0	83.9	59.9	92.9
	Gillnet	0.02	3.6	0.5	3.3	0.2
	Handline	2.3	2.3	2.7	0.7	0.1
	Trawl	0.0	0.0	1.7	0.5	1.7
	Trap	0.0	0.0	0.0	0.0	0.0
	Troll	0.2	0.2	0.0	0.03	0.0
	Rod and reel*	340.3	136.7	12.9	43	27.5
	Unclassified	0.6	6.8	0.0	0.0	0.0
Gulf of Mexico and Caribbean	Longline	115.4	122.6	145.0	143.1	114.3
	Rod and reel*	0.0	0.0	0.2	1.3	0.0
	Handline	0.02	0.07	0.0	0.1	0.0
NC Area 94a	Longline	-	-	-	-	-
Southwest Atlantic	Longline	-	-	-	-	-
All areas	All gears	598.7	459.4	246.9	252.0	236.8

NC = North Central Atlantic. * = Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. Source: NMFS 2018.

Table 5.58 U.S. catches and landings (mt ww) of Atlantic swordfish by area and gear in 2013–2017

Area	Gear	2013	2014	2015	2016	2017
Northwest Atlantic	Longline*	1,720.5	1,200.4	1,088.6	835.4	788.1
	Gillnet	0.0	0.0	0.0	0.0	0.0
	Handline	104.8	86.9	70.7	71.2	58.2
	Trawl	2.9	5.3	2.8	6.0	5.8
	Harpoon	0.5	0.0	0.0	0.0	0.3
	Rod and reel**	21.7	35.1	45.1	22.5	22.6
	Unclassified	1.6	0.4	0.0	0.0	0.0
	Unclassified discards	0.0	0.0	0.0	0.0	0.0
Gulf of Mexico	Longline*	531.6	307.4	127.4	175.8	249.6
	Handline	0.5	0.3	5.5	3.5	2.7
	Rod and reel**	0.3	1.5	1.0	4.8	10.5
	Unclassified discards	0.0	0.0	0.0	0.0	0.0
Caribbean	Longline*	20.8	16.5	8.8	72.4	88.3
	Rod and reel**	0.0	0.07	0.0	0.0	0.7
	Handline	0.0	0.3	0.2	0.9	0.0
	Unclassified discards	0.0	0.0	0.0	0.0	0.0
North Central Atlantic	Longline*	539.1	308.0	367.9	304.9	150.4
	Handline	.0.0	0.0	0.2	0.0	0.0
Southwest Atlantic	Longline*	0.06	0.0	0.0	0.0	0.0
All areas	All gears	2,944.0	1,962.2	1,718.4	1,497.5	1,377.2

* = Includes landings and estimated dead discards from scientific observer and logbook sampling programs. ** = Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. Source: NMFS 2018.

Table 5.59 Commercial landings (lb dw) of large coastal sharks in Atlantic region in 2012–2017

Large coastal sharks	2012	2013	2014	2015	2016	2017
Aggregated LCS						
Blacktip	215,403	256,277	282,009	176,136	248,470	205,138
Bull	24,504	33,980	32,372	49,927	31,417	23,802
Lemon	21,563	16,791	13,047	45,448	19,205	12,005
Nurse	81	0	0	0	0	0
Silky	29	186	289	992	446	702
Spinner	10,643	26,892	25,716	4,113	55,610	62,314
Tiger	23,245	16,561	29,062	36,425	14,896	6,324
Total aggregated LCS carcass weight	295,468 (134 mt dw)	350,687 (159 mt dw)	464,803 (211 mt dw)	313,041 (142 mt dw)	370,045 (168 mt dw)	310,286 (141 mt dw)
Hammerhead sharks						
Great	371	7,406	13,538	36,892	20,454	17,646
Scalloped	15,800	27,229	24,652	13,197	12,329	4,919
Smooth	3,967	1,521	601	304	125	1,193
Unclassified	9,617	0	0	0	0	0
Total hammerhead carcass weight	29,755 (13 mt dw)	36,156 (16 mt dw)	38,791 (18 mt dw)	50,393 (23 mt dw)	32,908 (15 mt dw)	23,758 (11 mt dw)
Shark Research Fishery						
Sandbar*	46,446 (21 mt dw)	46,868 (21 mt dw)	82,308 (37 mt dw)	112,610 (51 mt dw)	62,984 (29 mt dw)	47,023 (21 mt dw)
Unclassified sharks						
Unclassified, assigned to LCS	53,705 (24 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total LCS carcass weight	425,374 (193 mt dw)	433,711 (197 mt dw)	585,887 (266 mt dw)	620,028 (281 mt dw)	465,937 (211 mt dw)	381,067 (173 mt dw)

* = Some unauthorized non-shark research fishery sandbar shark landings exist. Sources: PDC (Pelagic Dealer Compliance) and ALS (Accumulated Landings System) for 2012; eDealer (2013–2017).

Table 5.60 Commercial landings (lb dw) of large coastal sharks in the Gulf of Mexico region in 2012–2017

Large coastal sharks	2012	2013	2014	2015	2016	2017
Blacktip sharks						
Blacktip	405,015 (184 mt dw)	531,440 (241 mt dw)	444,812 (202 mt dw)	644,058 (292 mt dw)	413,414 (188 mt dw)	530,037 (240 mt dw)
Aggregated LCS						
Bull	255,892	279,379	259,825	274,195	154,820	171,298
Lemon	29,362	12,869	5,259	13,023	32,034	25,039
Nurse	11	0	0	62	95	C
Silky	0	1,714	7	612	111	C
Spinner	49,647	68,576	61,607	43,185	65,578	46,870
Tiger	26,209	14,062	16,796	18,536	38,534	51,688
Total aggregated LCS carcass weight	361,121 (164 mt dw)	376,600 (171 mt dw)	343,494 (156 mt dw)	349,613 (159 mt dw)	291,172 (132 mt dw)	295,677 (134 mt dw)
Hammerhead sharks						
Great	99	28,591	29,783	33,439	30,474	18,136
Scalloped	33,216	1,101	5,299	6,290	26,503	15,151
Smooth	0	0	0	0	0	0
Unclassified	8,005	0	0	0	0	0
Total hammerhead carcass weight	41,320 (19 mt dw)	29,692 (13 mt dw)	35,082 (16 mt dw)	39,729 (18 mt dw)	56,977 (26 mt dw)	33,287 (15 mt dw)
Shark Research Fishery						
Sandbar*	23,854 (19 mt dw)	37,582 (13 mt dw)	38,036 (17 mt dw)	53,250 (24 mt dw)	52,244 (24 mt dw)	C
Unclassified shark						
Unclassified, assigned to LCS	188,566 (85 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	2,221 (1 mt dw)	0 (0 mt dw)
Total LCS carcass weight	1,019,876 (463 mt dw)	975,314 (442 mt dw)	661,424 (300 mt dw)	1,086,650 (493 mt dw)	816,028 (370 mt dw)	934,534 (424 mt dw)

C = landings are not disclosed due to reasons of confidentiality. *Unauthorized non-Shark Research Fishery sandbar shark landings are included. Sources: PDC and ALS (2012), eDealer (2013–2017).

Table 5.61 Commercial landings (lb dw) of small coastal sharks in Atlantic region in 2012–2017

Small coastal sharks (SCS)	2012	2013	2014	2015	2016	2017
Blacknose sharks						
Blacknose	37,873 (17 mt dw)	33,382 (15 mt dw)	38,437 (17 mt dw)	45,405 (21 mt dw)	26,842 (12 mt dw)	17,241 (8 mt dw)
Non-blacknose SCS						
Bonnethead	19,907	22,845	13,221	5,885	1,688	6,077
Finetooth	15,922	19,452	19,026	8,712	5,647	19,874
Sharpnose, Atlantic	345,625	183,524	198,568	293,128	175,890	251,289
Total non-blacknose SCS carcass weight	381,454 (173 mt dw)	225,821 (102 mt dw)	230,815 (105 mt dw)	307,725 (140 mt dw)	183,225 (83 mt dw)	277,240 (126 mt dw)
Unclassified shark						
Unclassified, assigned to small coastal	492 (1 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total SCS carcass weight	419,819 (190 mt dw)	259,203 (118 mt dw)	269,252 (122 mt dw)	353,130 (160 mt dw)	210,067 (95 mt dw)	294,481 (134 mt dw)

Sources: PDC and ALS (2012); eDealer (2013–2017).

Table 5.62 Commercial landings (lb dw) of small coastal sharks in the Gulf of Mexico region in 2012–2017

Small Coastal Sharks (SCS)	2012	2013	2014	2015	2016	2017
Blacknose sharks						
Blacknose	14,379 (7 mt dw)	2,009 (1 mt dw)	3,160 (1 mt dw)	2,096 (1 mt dw)	5 (<1 mt dw)	0 (0 mt dw)
Non-blacknose SCS						
Bonnethead	2,601	4,436	8,391	968	9	588
Finetooth	130,278	60,118	64,023	60,169	33,431	54,511
Sharpnose, Atlantic	100,253	116,133	89,674	137,121	126,626	88,454
Total non-blacknose SCS carcass weight	233,132 (106 mt dw)	180,687 (82 mt dw)	162,088 (74 mt dw)	198,258 (90 mt dw)	160,066 (73 mt dw)	143,553 (65 mt dw)
Unclassified shark						
Unclassified, assigned to small coastal	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	2,719 (1 mt dw)	344 (<1 mt dw)
Total SCS carcass weight	247,511 (112 mt dw)	182,695 (83 mt dw)	165,248 (75 mt dw)	200,354 (91 mt dw)	162,790 (74 mt dw)	143,887 (65 mt dw)

Sources: PDC and ALS (2012); eDealer (2013–2017).

Table 5.63 Commercial landings (lb dw) of smoothhound sharks in Gulf of Mexico and Atlantic regions in 2016–2017*

Region	2016	2017
Atlantic **	701,727	831,761
Gulf of Mexico ***	0	0
Total smoothhound carcass weight	701,727 (318 mt dw)	831,761 (377 mt dw)

* Smoothhound shark quota effective March 15, 2016 (80 FR 73128; November 25, 2015). ** In the U.S. Atlantic region, smoothhound sharks are smooth dogfish. *** In the Gulf of Mexico region, smoothhound sharks are smooth dogfish, Florida smoothhound, and Gulf smoothhound. Source: eDealer.

Table 5.64 Commercial landings (lb dw) of U.S. Atlantic pelagic sharks in 2012–2017

Pelagic Sharks	2012	2013	2014	2015	2016	2017
Blue sharks						
Blue	17,200 (8 mt dw)	9,767 (4 mt dw)	17,806 (8 mt dw)	1,114 (1 mt dw)	607 (<1 mt dw)	4,272 (2 mt dw)
Porbeagle sharks						
Porbeagle	4,250 (2 mt dw)	54 (1 mt dw)	6,414 (3 mt dw)	0 (0 mt dw)	0 (0 mt dw)	C (<1 mt dw)
Pelagic sharks other than blue or porbeagle						
Mako, shortfin	198,841	199,177	218,295	141,720	160,829	184,993
Mako, unclassified	0	0	0	0	0	0
Oceanic whitetip	258	62	22	0	0	0
Thresher	63,965	48,768	116,012	72,463	78,219	61,990
Total other pelagic carcass weight	263,064 (119 mt dw)	248,007 (112 mt dw)	334,329 (152 mt dw)	214,183 (97 mt dw)	239,048 (108 mt dw)	246,983 (112 mt dw)
Unclassified shark						
Unclassified, assigned to pelagic	28,932 (13 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total pelagic carcass weight	313,446 (142 mt dw)	257,828 (117 mt dw)	358,549 (163 mt dw)	215,297 (98 mt dw)	239,655 (109 mt dw)	251,375 (114 mt dw)

C = landings are not disclosed due to reasons of confidentiality. Sources: PDC and ALS (2012); eDealer (2013–2017).

Table 5.65 Commercial landings (lb dw) of shark fins in 2012–2017

Fins	2012	2013	2014	2015	2016	2017
Atlantic LCS and SCS fins						
Blacktip	0	2,047	288	177	274	192
Bull	0	23	120	14	256	41
Hammerhead, great	0	82	518	272	387	70
Hammerhead, scalloped	0	7	0	6	0	0
Hammerhead, smooth	0	0	0	11	0	0
Lemon	0	1,457	0	0	0	0
Spinner	0	3	0	0	0	0
Tiger	0	134	5	3	0	0
Unclassified LCS	15,370	0	0	0	0	0
Blacknose	0	3	4	15	0	0
Bonnethead	0	315	1	14	0	0
Finetooth	0	91	0	0	0	0
Sharpnose, Atlantic	0	202	2	6	7	40
Unclassified SCS	0	0	0	0	0	0
Smoothhound *	NA	NA	NA	NA	25,107	28,316
Unclassified	0	16,609	19,868	20,824	15,603	14,731
Total Atlantic fin weight	15,370 (7 mt dw)	20,973 (10 mt dw)	20,806 (9 mt dw)	21,342 (10 mt dw)	41,634 (19 mt dw)	43,395 (20 mt dw)
Gulf of Mexico LCS and SCS fins						
Blacktip	0	20,939	16,141	23,819	12,917	17,660
Bull	0	12,019	10,132	12,996	3,677	4,934
Hammerhead, great	0	220	351	729	585	408
Hammerhead, scalloped	0	3	44	45	757	214
Lemon	0	61	23	110	0	106
Silky	0	58	0	0	0	0
Spinner	0	2,463	1,833	1,015	1,344	1,676
Tiger	0	76	150	40	46	490
Unclassified LCS	40,693	0	0	0	0	0
Bonnethead	0	14	196	28	0	0
Finetooth	0	2,866	2,092	1,593	870	1,451
Sharpnose, Atlantic	0	277	10	249	242	64
Unclassified SCS	0	0	0	0	0	0
Unclassified	0	6,103	6,209	8,955	13,213	14,538
Total Gulf of Mexico fin weight	40,693 (18 mt dw)	45,099 (20 mt dw)	37,256 (17 mt dw)	49,579 (22 mt dw)	33,651 (15 mt dw)	41,541 (19 mt dw)
Pelagic shark fins						
Blue	0	0	0	0	0	109
Mako, shortfin	0	1,303**	451	1,119	299	447
Porbeagle	0	2**	0	0	0	0
Thresher	0	1,638	512	405	448	625
Unclassified Pelagic	0	0	0	0	0	0
Total pelagic fin weight	0 (0 mt dw)	3,151 (1 mt dw)	963 (1 mt dw)	1,524 (1 mt dw)	747 (1 mt dw)	1,181 (<1 mt dw)
Total fin weight	56,063 (25 mt dw)	69,187 (30 mt dw)	59,025 (27 mt dw)	72,445 (33 mt dw)	76,032 (34 mt dw)	86,117 (39 mt dw)

* Smoothhound shark quota effective March 15, 2016 (80 FR 73128; November 24, 2015). ** NOAA Fisheries determined that the porbeagle shark fins should have been reported as shortfin mako fins after the 2014 SAFE Report was published. Sources: PDC and ALS (2012); eDealer (2013–2017).

Table 5.66 Commercial landings (lb dw) of prohibited shark species in 2012–2017

Prohibited sharks	2012	2013	2014	2015	2016	2017
Previously classified LCS and SCS, landed in Atlantic						
Basking[1]	0	0	0	0	0	0
Bignose[2]	0	0	0	0	0	0
Bigeye sand tiger[1]	0	0	0	0	0	0
Caribbean reef[2]	0	0	0	0	0	0
Dusky[2]	172	0	0	0	0	0
Galapagos[2]	0	0	0	0	0	0
Narrowtooth[2]	0	0	0	0	0	0
Night[2]	0	0	0	0	0	0
Sand tiger[1]	66	0	0	0	0	0
Whale[1]	0	0	0	0	0	0
White[1]	0	0	0	0	0	0
Atlantic angel[2]	171	0	0	0	0	0
Sharpnose, Caribbean[2]	0	38	0	0	0	0
Total Atlantic carcass weight	409 (1 mt dw)	38 (1 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Previously classified LCS and SCS, landed in Gulf of Mexico						
Basking[1]	0	0	0	0	0	0
Bignose[2]	109	0	0	0	0	0
Bigeye sand tiger[1]	0	0	0	0	0	0
Caribbean reef[2]	0	0	0	0	272	335
Dusky[2]	0	0	0	0	0	0
Galapagos[2]	0	0	0	0	0	0
Narrowtooth[2]	0	0	0	0	0	0
Night[2]	0	0	0	0	0	0
Sand tiger[1]	0	0	0	0	0	0
Whale[1]	0	0	0	0	0	0
White[1]	0	0	0	0	0	0
Atlantic angel[2]	0	0	0	0	0	0
Sharpnose, Caribbean[2]	0	0	0	0	0	0
Total Gulf of Mexico carcass weight	109 (1 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	272 (<1 mt dw)	335 (<1 mt dw)
Previously classified pelagic sharks						
Bigeye thresher[2]	276	0	0	0	0	0
Bigeye sixgill[2]	0	0	0	0	0	0
Mako, Longfin[2]	362	112	147	0	0	0
Sevengill[2]	0	0	0	0	0	60
Sixgill[2]	0	0	0	0	0	0
Total pelagic carcass weight	638 (<1 mt dw)	112 (<1 mt dw)	147 (<1 mt dw)	0 (0 mt dw)	0 (0 mt dw)	60 (<1 mt dw)
Total prohibited carcass weight	1,156 (<1 mt dw)	150 (<1 mt dw)	147 (<1 mt dw)	0 (0 mt dw)	272 (<1 mt dw)	394 (<1 mt dw)

[1]Prohibited since April 1997. [2]Prohibited in the commercial fishery as of June 21, 2000. Sources: PDC and ALS (2012); eDealer (2013–2017).

5.10 Total Allowable Catch and Annual Catch Limit for Atlantic HMS Management Groups

In 2006, the Magnuson-Stevens Act was amended to require that FMPs include a mechanism for specifying annual catch limits (ACLs) at a level such that overfishing does not occur (Magnuson-Stevens Act section 303(a)(15)). Thus, NOAA Fisheries establishes total allowable catch (TAC) and ACL for certain shark stocks, consistent with the Magnuson-Stevens Act. These TACs and ACLs are established from information provided through stock assessments. For sharks assessed through the Southeast Data, Assessment, and Review (SEDAR), the overfishing limit is equal to the TAC, and the discard, recreational, and research catch estimates are deducted from the TAC. These deductions constitute the sector ACLs, while the remainder is used to provide the commercial sector ACL. More details on these calculations and the establishment of TACs and ACLs can be found in the amendments to the 2006 Consolidated HMS FMP that focused on shark management, including Amendment 2 (2008), Amendment 3 (2010), Amendment 5a (2013a), Amendment 6 (2015), Amendment 9 (2015), and Amendment 5b (2017). The specific ACLs for sharks are in Table 5.67 below. An upcoming amendment to the FMP (Amendment 14) will consider changes to the management thresholds for shark species, including consideration of an allowable biological catch (ABC) control rule and other means of establishing the overfishing limits, allowable catches, and ACLs.

Table 5.67 Total allowable catches (TAC) and annual catch limits (ACL) of current shark management groups (mt dw)

Fishery	TAC = ACL	Commercial Sector ACL	Recreational sector ACL	Dead discard sector ACL
Aggregated LCS—Atlantic	346.2	204.6	141.7	N/A[1]
Aggregated LCS—Eastern Gulf of Mexico	175.2	103.6	71.7	N/A
Aggregated LCS—Western Gulf of Mexico	147.6	87.2	60.4	N/A
LCS Shark Research Fishery	50.0	50.0	N/A	0
Blacktip—Gulf of Mexico	413.4	256.6	60.3	96.2
Blacktip—Eastern Gulf of Mexico	40.5	25.1	5.9	9.4
Blacktip—Western Gulf of Mexico	372.9	231.5	54.4	86.7
Hammerhead—Atlantic	41.2	27.1	2.5	11.4
Hammerhead—Eastern Gulf of Mexico	20.4	13.4	1.3	5.6
Hammerhead—Western Gulf of Mexico	18.1	11.9	1.1	5.0
Sandbar	158.3	90.7	39.7	25.9
Non-blacknose SCS—Atlantic	489.3	264.1	100.6	122.4
Non-blacknose SCS—Gulf of Mexico	999.0	112.6	66.2	818.7
Blacknose—Atlantic	21.2	17.2	0.4	3.5
Blacknose—Gulf of Mexico	34.9	0	2.6	32.3
Prohibited species[2]	0	0	0	0
Pelagic shark complex	488.0	Undefined	Undefined	Undefined
Porbeagle shark	11.3	1.7	0.1	9.5
Blue shark[3]	273.0	Undefined	Undefined	Undefined
Smoothhound—Atlantic	1,430.6	1,201.7	188.4	39.1
Smoothhound—Gulf of Mexico	509.6	336.4	0.6	169.8

Note: Data include major mortality and do not include other mortality such as exempted fishing permits or estimated post-release mortality. [1]Allocated in ACL for recreational fishery. [2]Prohibited species are measured in individuals, not mt dw. [3]Blue shark and pelagic shark TAC are not allocated between commercial, recreational, or discards. Sources: NMFS 2008b, 2013b, 2015b, 2015c.

Atlantic tunas, billfishes, and swordfish have TACs established on an international level by ICCAT. The Standing Committee on Research and Statistics (SCRS) of ICCAT conducts the international stock assessments of these species. After reviewing the SCRS stock assessment, ICCAT often establishes an appropriate Atlantic-wide TAC for each species, and if needed, also allocates that TAC among contracting parties, non-contracting parties, entities, or fishing entities. Section 104(b)(1) of the Magnuson-Stevens Act included an exception to the section 303(a)(15) requirements for ACLs where stocks are managed under international agreements in which the United States participates. The 2016 final National Standard 1 Guidelines (84 FR 71858, October 18, 2016) stated that the exception "applies to stocks or stock complexes subject to management under an international agreement, which is defined as 'any bilateral or multilateral treaty, convention, or agreement which relates to fishing and to which the United States is a party.'" The guidelines also state that status determination criteria, maximum sustainable yield, and optimum yield still need to be specified for such stocks (see 50 CFR 600.310 (h)(1)(ii)). Thus, for species managed by ICCAT, NOAA Fisheries has not specified ACLs as defined under the Magnuson-Stevens Act.

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6 ECONOMIC STATUS OF HMS FISHERIES

Development of conservation and management measures for Atlantic HMS fisheries is facilitated when there is an economic baseline against which the action or fishery may be evaluated. In this analysis, NOAA Fisheries used the past eight years of data to facilitate the analysis of trends. It also should be noted that all dollar figures are reported in nominal dollars (i.e., current dollars). If analysis of real dollar (i.e., constant dollar) trends controlled for inflation is desired, price indexes for 2010 to 2017 are provided in Table 6.1. To determine the real price in base year dollars, divide the base year price index by the current year price index and then multiply the result by the price that is being adjusted for inflation.

Table 6.1 Inflation price indexes in 2010–2017

Year	CPI-U	GDP deflator	PPI unprocessed finfish
2010	218.1	101.2	381.5
2011	224.9	103.3	388.1
2012	229.6	105.2	367.4
2013	233.0	106.9	438.2
2014	236.7	108.8	525.6
2015	237.0	110.0	610.2
2016	240.0	111.4	690.4
2017	245.1	107.9	674.9

Sources: The CPI-U is the standard Consumer Price Index for all urban consumers (1982–1984=100) produced by U.S. Department of Labor Bureau of Labor Statistics. The source of the Producer Price Index (PPI) for unprocessed finfish (1982=100) is also the Bureau of Labor Statistics. The Gross Domestic Product (GDP) Implicit Price Deflator (2012=100) is produced by the U.S. Department of Commerce Bureau of Economic Analysis.

6.1 Commercial Fisheries

All of the information and data presented in this section were obtained from *Fisheries of the United States* (NMFS 2018a). In 2017, 9.9 billion pounds valued at $5.4 billion were landed for all fish species by U.S. fishermen at U.S. ports. In 2016, 9.6 billion pounds valued at $5.3 billion were landed for all fish species by U.S. fishermen at U.S. ports. The overall value of landings between 2016 and 2017 increased by 2.1 percent. The total value of commercial HMS landings in 2017 was $38.3 million. Revenues of HMS fisheries are further discussed in section 6.1.2.

The estimated value of the 2017 domestic production of all fishery products was $5.4 billion, up $110 million (2.1 percent) from 2016. The total import value of fishery products was $38.4 billion in 2017. This is an increase of $2.5 billion from 2016. The total export value of fishery products was $29.0 billion in 2017. This is an increase of $984 million from 2016.

6.1.1 Ex-Vessel Prices

The average ex-vessel prices per pound, dw for 2010 to 2017 by species and area are summarized in Table 6.2. Prices are reported in nominal dollars. The ex-vessel price depends on a number of factors including the quality of the fish (e.g., freshness, fat content, method of storage), the weight of the fish, the supply of fish, and consumer demand.

Table 6.2 Average ex-vessel prices per pound for Atlantic HMS by area in 2010–2017

Species	Area	2010	2011	2012	2013	2014	2015	2016	2017
Bigeye tuna	Gulf of Mexico	$5.79	$5.64	$6.19	$3.18	$3.54	$5.76	$6.06	$5.52
	South Atlantic	4.03	4.73	4.75	5.14	5.25	5.00	5.01	5.21
	Mid-Atlantic	5.86	6.38	6.90	6.35	6.66	5.88	5.64	5.47
	North Atlantic	4.79	5.39	5.67	5.49	5.25	4.79	5.45	4.53
Bluefin tuna	Gulf of Mexico	5.42	6.38	7.16	6.72	6.49	5.75	5.88	5.20
	South Atlantic	8.75	7.34	8.20	7.52	8.06	7.27	6.79	6.15
	Mid-Atlantic	8.94	10.64	10.95	9.02	7.66	7.20	5.98	6.21
	North Atlantic	8.38	10.21	11.57	8.60	7.87	6.37	7.23	6.52
Yellowfin tuna	Gulf of Mexico	3.72	3.65	3.51	3.65	3.86	4.27	3.49	3.76
	South Atlantic	3.53	3.93	4.63	3.64	3.69	3.46	3.18	3.34
	Mid-Atlantic	3.43	3.45	4.46	4.72	4.53	4.07	4.24	4.26
	North Atlantic	2.80	3.39	4.22	3.89	3.52	3.18	3.57	3.48
Albacore tuna	Gulf of Mexico	1.40	1.09	0.68	0.77	0.77	0.75	0.70	1.05
	South Atlantic	1.36	1.42	1.64	2.06	1.86	1.70	1.80	1.93
	Mid-Atlantic	1.30	1.19	1.25	1.41	1.27	1.34	1.38	1.35
	North Atlantic	1.56	1.55	1.34	1.80	1.20	1.34	1.93	1.49
Skipjack tuna	Gulf of Mexico	-	0.90	0.75	-	-	-	-	0.71
	South Atlantic	1.13	1.25	1.10	0.80	0.75	0.68	0.88	0.87
	Mid-Atlantic	-	0.60	1.06	0.88	1.12	0.72	0.76	1.11
	North Atlantic	-	-	-	0.93	-	-	-	1.44
Swordfish	Gulf of Mexico	3.53	4.15	3.42	3.46	3.42	2.67	3.03	3.09
	South Atlantic	4.63	4.84	4.97	4.99	4.85	4.30	4.75	4.57
	Mid-Atlantic	4.43	4.44	4.51	4.45	4.66	3.86	4.31	3.96
	North Atlantic	4.61	4.22	4.49	4.61	4.43	3.25	4.67	4.37
Large coastal sharks	Gulf of Mexico	0.48	0.38	0.40	0.46	0.52	0.49	0.60	0.53
	South Atlantic	0.65	0.61	0.75	0.77	0.72	0.78	0.73	0.86
	Mid-Atlantic	0.64	0.54	0.67	0.65	0.78	0.74	0.70	0.95
	North Atlantic	-	-	-	-	-	-	-	-
Pelagic sharks	Gulf of Mexico	1.47	1.54	1.33	1.45	1.31	1.00	1.84	1.47
	South Atlantic	1.27	1.46	1.74	1.66	1.47	1.57	1.62	1.62
	Mid-Atlantic	1.19	1.30	1.39	1.69	1.37	1.19	1.31	1.18
	North Atlantic	1.28	1.48	1.68	2.03	2.00	1.68	1.93	2.03
Small coastal sharks	Gulf of Mexico	0.55	0.58	0.66	0.33	0.37	0.35	0.38	0.41
	South Atlantic	0.79	0.81	0.99	0.71	0.74	0.76	0.73	0.98
	Mid-Atlantic	0.57	0.59	0.68	0.83	0.80	0.81	0.89	0.93
	North Atlantic	-	-	-	-	-	-	-	-
Smoothhound	Gulf of Mexico						-	-	-
	South Atlantic						0.71	0.84	0.94
	Mid-Atlantic						0.67	0.77	0.73
	North Atlantic						0.35	0.47	0.37
Shark fins	Gulf of Mexico	16.48	15.11	14.97	11.05	9.75	9.92	11.47	11.37
	South Atlantic	15.35	14.91	11.00	6.04	9.57	10.26	8.50	7.88
	Mid-Atlantic	6.83	3.50	2.79	1.45	1.77	1.95	2.36	2.44
	North Atlantic	2.40	1.60	1.86	1.90	-	0.80	-	-

Note: Gulf of Mexico includes Texas, La, Miss, Ala, and the west coast of Fla. The south Atlantic includes the east coast of Fla, Ga, S.C., and N.C. Mid-Atlantic includes N.C., Va, Md, Del, N.J., N.Y., and Conn. North Atlantic includes

R.I., Mass, N.H., and Maine. For bluefin tuna, all N.C. landings are included in the mid-Atlantic. Sources: HMS eDealer and dealer weighout slips from the SEFSC, NEFSC, and eBFT.

Average ex-vessel prices for bluefin tuna have decreased 15.5 percent since 2016. The ex-vessel prices for bluefin tuna can be influenced by many factors, including market supply and the Japanese yen/U.S. dollar (¥/$) exchange rate. Figure 6.1 shows the average ¥/$ exchange rate, plotted with average ex-vessel bluefin tuna prices, from 1971 to 2017.

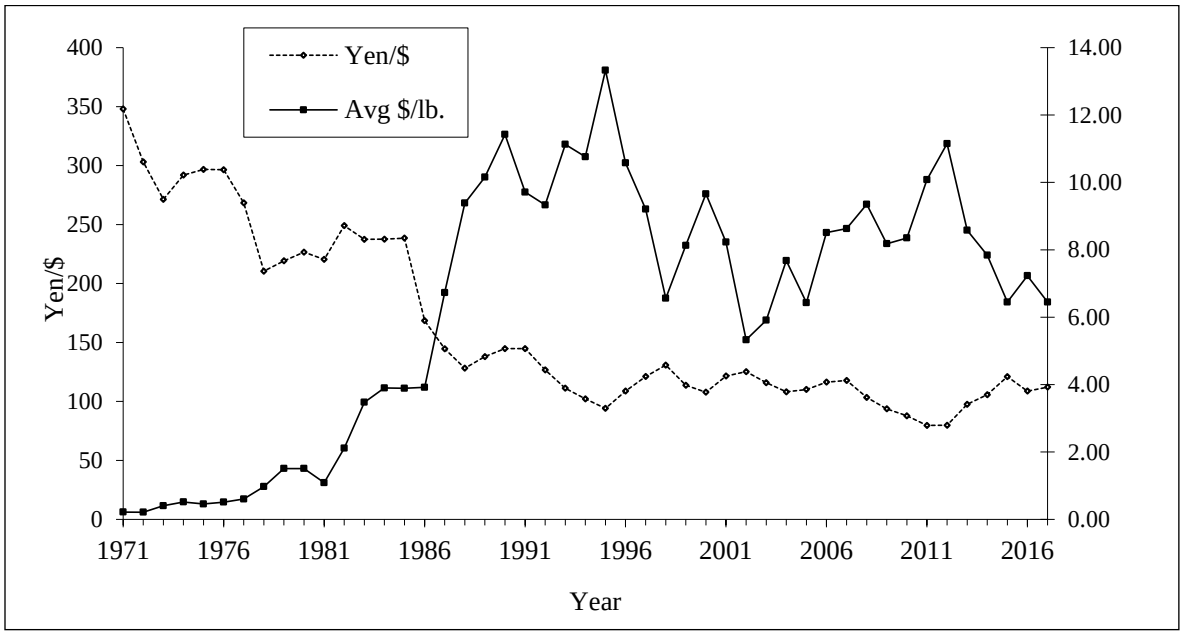

Figure 6.1 Average annual yen/$ exchange rate and average U.S. bluefin tuna ex-vessel $/lb (dw) for all gears in 1971–2017

Sources: Federal Reserve Bank (research.stlouisfed.org) and NOAA Fisheries Northeast HMS Branch

6.1.2 Revenues

Table 6.3 summarizes the average annual revenues of the Atlantic HMS fisheries based on average ex-vessel prices. Data for Atlantic HMS landings weight is as reported per eDealer in 2013–2016 and weight reported to NOAA Fisheries Northeast HMS Office by Atlantic bluefin tuna dealers per the electronic Bluefin tuna (eBFT) dealer reporting system. These values indicate that the estimated total annual revenue of Atlantic HMS fisheries has increased in 2017 to $38.3 million from $37.5 million in 2016. From 2016 to 2017, the Atlantic tuna fishery's total revenue increased by $1.9 million. From 2016 to 2017, the annual revenues for the shark fisheries increased by $0.3 million. Finally, the annual revenues for swordfish decreased by $1.3 million from 2016 to 2017 due to a decrease in both landings weight and ex-vessel price.

Table 6.3 Estimates of the total ex-vessel annual revenues of Atlantic HMS fisheries in 2010–2017

Species		2010	2011	2012	2013	2014	2015	2016	2017
Bigeye tuna	Ex-vessel ($/lb dw)	$5.22	$5.77	$6.42	$5.72	$5.79	$5.35	$5.26	$5.33
	Weight (lb dw)	799,934	1,122,619	1,039,585	851,669	1,063,914	1,129,017	711,488	991,718
	Fishery revenue	$4,175,655	$6,477,512	$6,674,136	$4,673,419	$5,716,850	$5,454,461	$3,454,060	$5,371,772
Bluefin tuna	Ex-vessel ($/lb dw)	$8.35	$10.08	$11.15	$8.58	$7.84	$6.45	$7.23	$6.45
	Weight (lb dw)	1,119,937	996,661	995,583	682,533	1,002,549	1,347,920	1,522,634	1,490,321
	Fishery revenue	$9,351,474	$10,046,343	$11,100,750	$5,826,566	$7,810,287	$8,716,613	$11,008,644	$9,581,816
Yellowfin tuna	Ex-vessel ($/lb dw)	$3.52	$3.60	$4.16	$3.91	$3.96	$3.71	$3.53	$3.70
	Weight (lb dw)	2,154,728	2,676,682	4,349,482	2,580,759	2,779,487	1,965,050	2,351,936	2,637,684
	Fishery revenue	$7,584,643	$9,636,055	$18,093,845	$11,214,871	$11,833,261	$8,494,781	$9,622,286	$10,918,095
Skipjack tuna	Ex-vessel ($/lb dw)	$1.13	$1.17	$1.06	$0.85	$0.98	$0.72	$0.88	$0.92
	Weight (lb dw)	16,269	12,931	17,804	3,857	17,919	3,421	6,213	6,216
	Fishery revenue	$18,451	$15,164	$18,949	$3,204	$14,478	$2,269	$5,597	$6,633
Albacore tuna	Ex-vessel ($/lb dw)	$1.36	$1.29	$1.31	$1.70	$1.49	$1.46	$1.56	$1.63
	Weight (lb dw)	290,827	491,133	489,800	402,400	554,428	409,210	373,792	364,723
	Fishery revenue	$394,754	$632,450	$639,370	$583,230	$800,870	$593,911	$563,784	$652,948
Total tuna	Fishery revenue	$21,524,977	$26,807,524	$36,527,050	$22,301,290	$26,175,746	$23,262,035	$24,654,371	$26,531,264
Swordfish	Ex-vessel ($/lb dw)	$4.40	$4.50	$4.41	$4.66	$4.65	$4.07	$4.54	$4.32
	Weight (lb dw)	3,676,324	4,473,140	5,561,605	4,099,851	2,952,835	2,576,537	2,448,044	2,019,857
Total swordfish	Fishery revenue	$16,186,878	$20,130,595	$24,534,334	$19,178,743	$13,887,650	$10,175,662	$10,351,695	$9,012,183
Large coastal sharks	Ex-vessel ($/lb dw)	$0.60	$0.53	$0.59	$0.64	$0.65	$0.66	$0.68	$0.72
	Weight (lb dw)	1,566,741	1,469,142	1,445,597	1,392,440	1,368,178	1,593,989	1,276,747	1,311,408
	Fishery revenue	$938,044	$779,993	$854,916	$683,359	$764,162	$885,305	$720,802	$746,642
Pelagic sharks	Ex-vessel ($/lb dw)	$1.23	$1.35	$1.43	$1.67	$1.48	$1.40	$1.54	$1.51
	Weight (lb dw)	312,195	314,314	314,084	247,833	353,623	215,298	239,850	251,153
	Fishery revenue	$382,527	$425,831	$449,759	$384,419	$504,860	$323,129	$387,688	$386,446
Small coastal sharks	Ex-vessel ($/lb dw)	$0.69	$0.75	$0.87	$0.54	$0.56	$0.57	$0.56	$0.74
	Weight (lb dw)	397,766	590,174	667,501	439,704	434,377	553,419	370,118	437,094
	Fishery revenue	$272,590	$441,269	$578,126	$275,346	$342,887	$410,305	$253,406	$364,181
Smoothhound	Ex-vessel ($/lb dw)	-	-	-	-	-	$0.65	$0.75	$0.70
	Weight (lb dw)	-	-	-	-	-	915,723	702,400	832,631
	Fishery revenue	-	-	-	-	-	$570,805	$502,717	$567,076
Shark fins*	Ex-vessel ($/lb dw)	$14.02	$11.90	$8.96	$6.08	$7.71	$8.46	$8.36	$7.97
	Weight (lb dw)	113,835	118,682	121,359	150,853	110,560	105,189	76,048	85,877
	Fishery revenue	$1,596,472	$1,412,129	$1,086,979	$738,189	$672,200	$839,642	$660,378	$726,961
Total sharks	Fishery revenue	$3,189,633	$3,059,222	$2,969,779	$2,081,313	$2,284,109	$3,029,186	$2,524,991	$2,791,306
Total HMS	Fishery revenue	$40,901,488	$49,997,341	$64,031,163	$43,561,346	$42,347,505	$35,896,078	$37,531,057	$38,334,753

* Shark fin total weight for 2008 through 2012 was estimated using 5% of all sharks landed. In 2013–2016, shark fin total weight was based on reported shark fin landings reported to eDealer. Sources: eDealer, eBFT, PDC.

A variety of fishing gears are used to harvest Atlantic HMS. Figure 6.2 displays the percent composition of the $38.3 million ex-vessel annual revenues landed in 2017 by fishing gear category. Based on eDealer and eBFT, approximately 67 percent of 2017 total revenues in the fishery were landed by pelagic longline gear. In addition, 22 percent of landings by value were from vessels using commercial rod and reel gear, 2 percent were from bottom longline gear, 2 percent were from gillnet, and 6 percent werefrom other gear categories. These other gear categories include harpoon, purse seine, buoy gear, green-stick, hand line, and other miscellaneous gears.

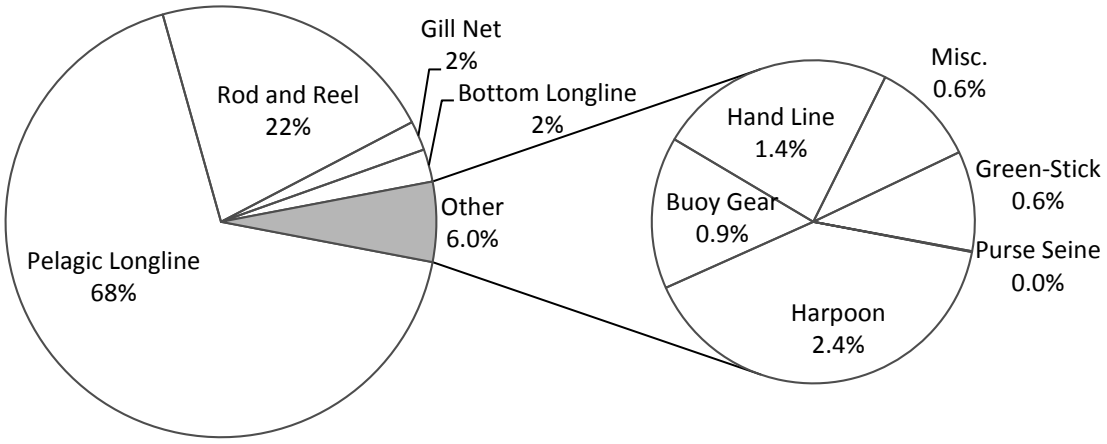

Figure 6.2 Percent of 2017 total ex-vessel revenues of Atlantic HMS fisheries by gear

Sources: eDealer, eBFT

6.1.3 Operating Costs

NOAA Fisheries has collected operating cost information from commercial permit holders via logbook reporting. Each year, 20 percent of active Atlantic HMS commercial permit holders are selected to report economic information along with their Atlantic HMS logbook or Coastal Fisheries logbook submissions. In addition, NOAA Fisheries also receives voluntary submissions of the trip expense and payment section of the logbook form from non-selected vessels.

The primary expenses associated with operating an Atlantic HMS permitted pelagic longline commercial vessel include labor, fuel, bait, ice, groceries, other gear, and light sticks on swordfish trips. Unit costs are collected on some of the primary variable inputs associated with trips. The unit costs for fuel, bait, and light sticks are reported in Table 6.4. Fuel costs increased

(16.0 percent) from 2016 to 2017, while the cost per pound for bait increased (20.0 percent) from 2016 to 2017. The unit cost per light stick remained unchanged from 2016 to 2017.

Table 6.4 Pelagic longline vessel median unit costs for fuel, bait, and light sticks in 2010–2017

Input unit costs ($)	2010	2011	2012	2013	2014	2015	2016	2017
Fuel (per gallon)	2.50	3.40	3.50	3.35	3.25	2.20	1.81	2.10
Bait (per lb)	0.90	1.31	1.50	1.59	1.33	1.15	1.25	1.50
Light sticks (per stick)	0.25	0.25	0.30	0.30	0.30	0.30	0.35	0.35

Source: UDP (United Data Processing)

Table 6.5 provides the median total cost per trip for the major variable inputs associated with Atlantic HMS trips taken by pelagic longline vessel. Fuel costs are one of the largest variable expenses. Total median pelagic longline vessel fuel costs per trip increased 21.6 percent from 2016 to 2017.

Table 6.5 Median input costs for pelagic longline vessel trips in 2010–2017

Input costs ($)	2010	2011	2012	2013	2014	2015	2016	2017
Fuel	2,386	2,814	2,784	2,860	2,567	1,920	1,850	2,250
Bait	1,895	3,150	3,000	3,000	2,565	2,250	2,244	1,939
Light sticks	500	633	750	750	750	720	700	919
Ice costs	430	600	675	584	660	750	900	1,080
Grocery expenses	780	900	900	900	900	900	900	900
Other trip costs	1,500	1,622	1,289	1,200	500	603	800	775

Source: UDP

Labor costs are also an important component of operating costs for HMS pelagic longline vessels. Table 6.6 lists the number of crew on a typical pelagic longline trip. The median number of crew members has been consistent at three from 2010 to 2017. Most crew and captains are paid based on a lay system. According to Atlantic HMS logbook reports, owners are typically paid 50 percent of revenues. Captains receive a 25 percent share, and crew in 2016 received 25 percent on average. These shares are typically paid out after costs are netted from gross revenues. Median total shared costs per trip on pelagic longline vessels ranged from $6,033–$9,949 from 2010 to 2017.

Table 6.6 Median labor inputs for pelagic longline vessel trips in 2010–2017

Labor	2010	2011	2012	2013	2014	2015	2016	2017
Number of crew	3	3	3	3	3	3	3	3
Owner share (%)	50	50	50	50	50	50	50	50
Captain share (%)	23	23	25	23	25	25	25	25
Crew share (%)	25	25	28	25	25	25	25	25
Total shared costs ($)	7,295	9,949	8,266	8,032	6,699	6,426	6,033	6,385

Source: UDP

In 2017, median reported total trip sales were $20,156. In 2016, median reported total trip sales were $20,400. After adjusting for operating costs, median net earnings per trip were $12,475 in 2016. Median net earnings per trip decreased slightly to $12,338 in 2017.

The primary expenses associated with operating an Atlantic HMS-permitted bottom longline commercial vessel include labor, fuel, bait, ice, groceries, and other miscellaneous expenses. These expenses are reported in the Coastal Fisheries Logbook for vessels that have been selected for reporting economic information. Bottom longline trips primarily target shark species and are of short duration. Table 6.7 provides the median reported trip input costs from 2010 to 2017.

Table 6.7 Median input costs for bottom longline vessel trips in 2010–2017

Input costs	2010	2011	2012	2013	2014	2015	2016	2017
Fuel	$130	$184	$175	$124	$162	$156	$120	$124
Bait	$50	$50	$100	$75	$85	$50	$61	$60
Ice costs	$50	$50	$36	$40	$48	$36	$50	$36
Grocery expenses	$50	$50	$50	$25	$50	$40	$40	$20
Misc. trip costs	$15	$34	$26	$30	$24	$54	$20	$20
Number of crew	2	2	2	2	2	2	2	2
Days at sea	1	2	1	1	1	1	1	1

Source: UDP

In 2017, median reported total trip sales were $1,110 for vessels using bottom longline gear. In 2016, median reported total trip sales were $1,018. After adjusting for operating costs, median net earnings per bottom longline trip were $798 in 2016. Median net earnings per trip increased slightly to $801 in 2017.

It should be noted that operating costs for the Atlantic HMS commercial fleet vary considerably from vessel to vessel. The factors that impact operating costs include unit input costs, vessel size, fishing gear, target species, and geographic location, among other things.

6.2 Fish Processing and Wholesale Sectors

Consumers spent an estimated $102.2 billion for fish products in 2017, including $69.6 billion at food service establishments, $32.5 billion in retail sales for home consumption, and $39.8 million for industrial fish products. The commercial marine fishing industry contributed $50.9 billion (in value added) to the U.S. Gross National Product in 2017 (NMFS 2018a).

6.2.1 Dealers

NOAA Fisheries does not currently have specific information regarding the costs and revenues for Atlantic HMS dealers. In general, dealer costs include purchasing fish, paying employees to process the fish, rent or mortgage, and supplies to process the fish. Some dealers may provide loans to the vessel owner, money for vessel repairs, fuel, ice, bait, etc. In general, outlays and revenues of dealers are not as variable or unpredictable as those of a vessel owner; however, dealer costs may fluctuate depending upon supply of fish, labor costs, and equipment repair.

Although NOAA Fisheries does not have specifics regarding HMS dealers, there is some information on the number of employees for processors and wholesalers in the United States provided in *Fisheries of the United States* (NMFS 2018a). Table 6.8 provides a summary of available information.

Table 6.8 Processors and wholesalers: plants and employment in 2017

Area and state	Processing[1]		Wholesale[2]		Total	
	Plants	Employment	Plants	Employment	Plants	Employment
New England						
Maine	35	755	184	1,389	219	2,144
New Hampshire	7	*	10	98	17	95
Massachusetts	50	2,226	152	2,416	202	4,642
Rhode Island	9	*	30	*	39	*
Connecticut	4	78	19	*	23	78
Total	105	3,056	395	3,903	500	6,959
Mid-Atlantic						
New York	20	405	275	2,201	295	2,606
New Jersey	19	604	77	979	96	1,583
Pennsylvania	5	88	33	737	38	825
Delaware	3	*	7	24	10	24
District of Columbia	-	-	3	*	3	*
Maryland	18	355	43	764	61	1,119
Virginia	35	1,444	64	533	99	1,977
Total	100	2,896	502	5,238	602	8,134
South U.S. Atlantic						
North Carolina	27	665	65	694	92	1,359
South Carolina	3	*	22	170	25	170
Georgia	6	719	35	810	41	1,529
Florida	41	1,634	311	2,639	352	4,273
Total	77	3,018	433	4,313	510	7,331
Gulf of Mexico						
Alabama	34	1,431	12	253	46	1,684
Mississippi	23	2,468	21	127	44	2,595
Louisiana	63	1,697	103	735	166	2,432
Texas	51	1,622	140	1,383	191	3,005
Total	171	7,218	276	2,498	447	9,716
Inland states or other						
Areas**, total	60	1,847	245	3,501	305	5,348

[1] Based on North American Industry Classification System (NAICS) 3117 as reported to the Bureau of Labor Statistics. [2] Based on North American Industry Classification System (NAICS) 42446 as reported to the Bureau of Labor Statistics. *Included with Inland States. **Includes Puerto Rico and U.S. Virgin Islands. Source: NMFS 2018a.

6.2.2 Processing Sector

NOAA Fisheries does not currently collect wholesale price information from dealers.

NOAA Fisheries has information regarding the mark-up percentage paid by consumers. A mark-up or margin is the difference between the price paid for the product by the consumer and the wholesale or dockside value for an equivalent weight of the product. This information is presented in Table 6.9. Primary wholesalers and processors received on average an 80 percent margin on sales in 2017, which is the same margins observed in 2016.

Table 6.9 Summary of the mark-up and consumer expenditures for the primary wholesale and processing of domestic commercial marine fishery products in 2015–2017

	2015	2016	2017
Purchase of fishery inputs ($)	10,924,641,000	10,202,656,000	10,921,347,000
Mark-up of fishery inputs (%)	62	80	80
Total mark-up ($)	6,791,794,000	8,154,970,000	8,765,404,000
Value added of total mark-up (%)	60	60	60
Value added within sector ($)	4,101,187,000	4,933,744,000	5,286,632,000
Total value of sales within sector ($)	17,716,435,000	18,357,627,000	19,686,751,000

Source: NMFS 2018a

6.3 International Trade

Several regional fishery management organizations, including the International Commission for the Conservation of Atlantic Tunas (ICCAT), have taken steps to improve the collection of international trade data in order to estimate landings related to these fisheries and to identify potential compliance problems with certain regional organizations management measures. This section describes the international HMS trade programs and provides a review of U.S. HMS export activity, U.S. HMS import activity, and trade data use in HMS management.

6.3.1 International HMS Trade Programs

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

HMS Trade Documentation Programs

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

Port Act of 2006. On April 1, 2016 (81 FR 18796), NOAA Fisheries implemented the electronic version of the ICCAT Bluefin Tuna Catch Documentation (eBCD) program for Atlantic bluefin tuna. On December 9, 2016, (81 FR 88975) NOAA Fisheries promulgated the Seafood Import Monitoring Program (SIMP), which added shark and tuna importers to the list of traders required to obtain the IFTP and report trade data to NOAA Fisheries via the International Trade Data System (effective January 1, 2018). Trade monitoring programs established by NOAA Fisheries for HMS are described in greater detail in the 2011 HMS SAFE Report. Further information on the IFTP and associated reporting requirements is available on the HMS website.

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

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

Trade in Appendix II species is regulated using CITES export permits issued by the country that listed the species in Appendix II and certificates of origin issued by all other countries. Changes to the lists of species in Appendix I and II and to agreement resolutions and decisions are made at meetings of the Conference of Parties, which are convened every 2–3 years. Countries may list species for which they have domestic regulation in Appendix III at any time.

The next meeting of the Conference of the Parties to CITES (CoP18) is scheduled for May 23–June 3, 2019. During CoP17 (September 24–October 5, 2016), silky and thresher sharks were added to Appendix II. The listings had a 12-month delayed effective period in order to ensure smooth implementation and went into effect October 2017. During CoP16, three species of hammerhead shark (scalloped, smooth, and great), porbeagle shark, and oceanic whitetip sharks were added to Appendix II. The CoP16 Appendix II listings were effective September 14, 2014. Whale, basking, and white sharks have been listed on Appendix II since the early 2000s. Any dealer who intends to import or export shark species listed on a CITES appendix or any fisherman who lands these species from the high seas, must have the appropriate permits from the U.S. Fish and Wildlife. More information is available at https://www.fws.gov/international/permits/by-species/sharks-and-rays.html

6.3.2 U.S. Exports of HMS

Exports may include merchandise of both domestic and foreign origin. The Census Bureau defines exports of domestic merchandise to include commodities that are grown, produced, or

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

Atlantic and Pacific Bluefin Tuna Exports

Table 6.10 gives bluefin tuna export data for exports from the United States since 2007 and includes data from the NOAA Fisheries eBCD program and U.S. Census Bureau data. The Census Bureau usually reports a greater amount of bluefin tuna exported when compared to the amount reported by NOAA Fisheries. Additional quality control measures are taken by NOAA Fisheries to ensure data for other species (e.g., Southern bluefin tuna) or other transaction types (e.g., re-exports) are not erroneously included with bluefin tuna export data. However, in 2016 and 2017,the eBCD program export amount exceeded the amount of exports tracked by U.S. Census Bureau. This is likely due to the effectiveness of the eBCD program, implemented in 2016, allowing for increased timely data access and improved summary data accuracy. Bluefin tuna re-export data are listed separately in section 6.3.3 (Table 6.19).

Table 6.10 United States exports of Atlantic and Pacific bluefin tuna in 2007–2017

Year	Atlantic BFT commercial landings[1] (mt dw)	Atlantic BFT exports[2] (mt dw)	Pacific BFT exports[2] (mt dw)	Total U.S. exports[2] (mt dw)	Total U.S. exports[3] (mt)	Value of U.S. exports[3] ($ MM)
2007	196.4	85.4	8.2	93.6	238	2.90
2008	266.4	146.5	0.0	146.5	177	2.49
2009	408.5	236.2	0.0	236.2	300	4.05
2010	509.5	334.2	0.0	334.2	346	4.90
2011	453.6	329.5	0.8	330.5	293	4.03
2012	451.8	334.5	0.0	334.5	511	4.91
2013	283.0	139.0	0.0	139.0	296	2.92
2014	454.2	195.3	160.8	356.1	381	3.36
2015	763.8	265.4	150.4	415.8	527	5.52
2016	863.1	375.1	287.7	662.8	624	5.95
2017	676.4	284.2	212.8	497.0	473	5.65

$ MM = in millions of dollars. Note: Most Pacific exports were in (whole) form, although some exports were of dressed and gilled/gutted fish. Atlantic exports were almost entirely dressed, but also included whole and other product forms (dw). Data are preliminary and subject to change. Sources: [1] Atlantic HMS Management Division, [2] eBCD, and [3] U.S. Census Bureau.

In the time series shown in Table 6.10 and depicted in Figure 6.3, U.S. exports of Atlantic bluefin tuna generally increased when commercial landings increased. For most of the time series, domestic consumption of U.S. landings remained fairly constant (i.e., between 100–200 mt); however, domestic landings consumption increased to over 400 mt per year after 2014.

Most U.S. bluefin tuna exports are destined for the sushi markets in Japan. Figure 6.3 shows the U.S. domestic landings of Atlantic bluefin tuna that are exported and consumed in the United States from 2006 to 2017.

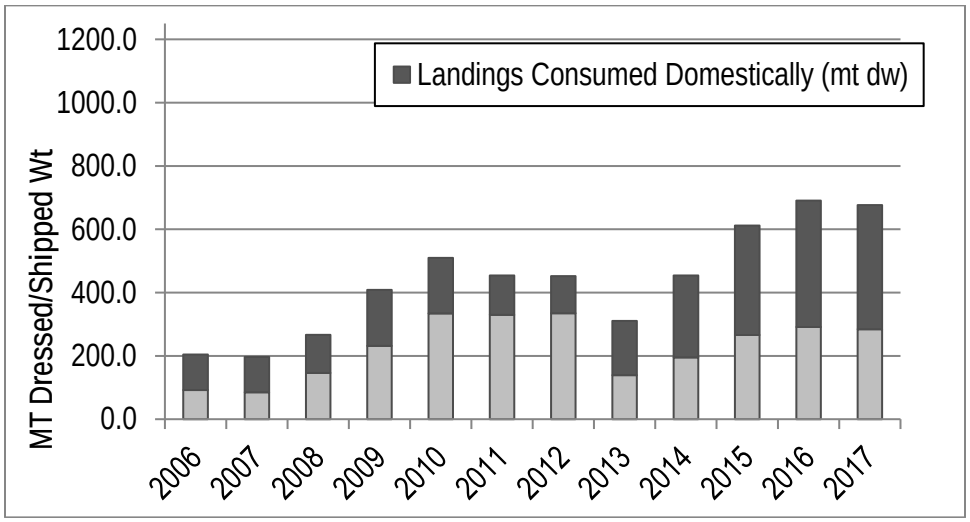

Figure 6.3 Annual U.S. domestic landings of Atlantic bluefin tuna divided into U.S. export and U.S. domestic consumption in 2006–2017

Sources: Atlantic HMS Management Division (eBCD), U.S. Census Bureau

Figure 6.4 demonstrates these landings as a percentage of the commercial U.S. bluefin tuna catch that was exported from 1996–2017. Exports have ranged from a low of 40 percent in 2007 to a high of 89 percent in 1996. Exports have more recently demonstrated a longer period of decline, remaining steady near 43% from 2014–2017. This is following a two-year peak above 70% (2011–2012).

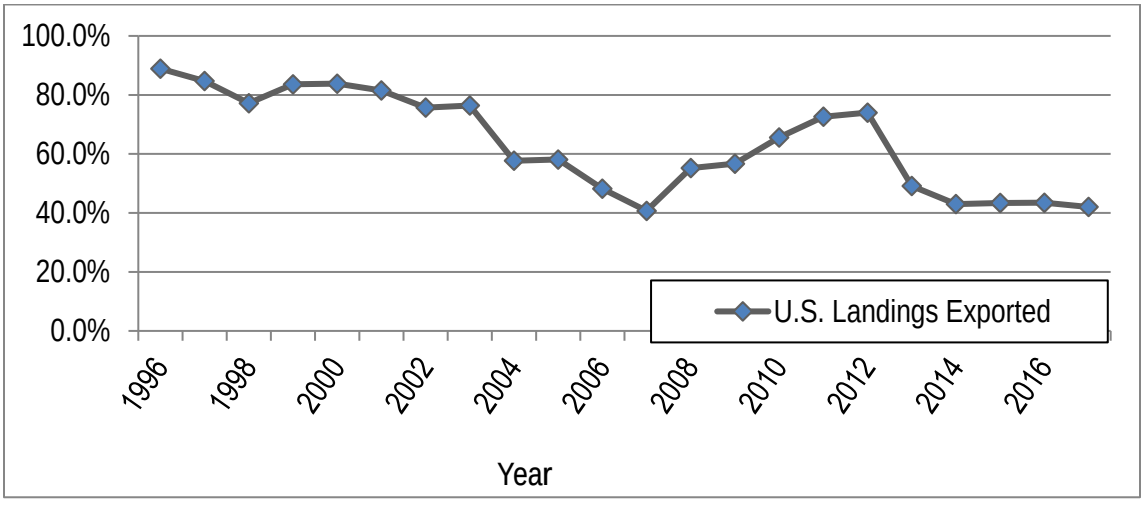

Figure 6.4 Annual percentage by weight of commercially-landed U.S. Atlantic bluefin tuna exported in 1996–2017

Sources: Atlantic HMS Management Division (eBCD), U.S. Census Bureau

Other Tuna Exports

Export data for other tunas is gathered by the U.S. Census Bureau and includes trade data for albacore, yellowfin, bigeye, and skipjack tuna from all ocean areas of origin combined. The value of annual albacore exports has exceeded the value for any other tuna export since the beginning of the time series, and has remained over $20 million per year for the time series (Table 6.11). Most albacore exports are Pacific in origin as Atlantic landings have ranged between 189–640 mt during the time series in Table 6.11, but total U.S. exports has ranged from 15,251 mt in 2013 to a low of 6,154 in 2017. These totals also reflects the lowest amount of frozen product exported during the time series. The total exports for 2017 dropped a large amount from the second highest value of the time series in 2016.

Table 6.11 U.S. Atlantic landings and total U.S. exports of albacore tuna in 2007–2017

		U.S. exports (from all ocean areas)[2]					
		Fresh		Frozen		Total for all exports	
Year	Atlantic landings (mt ww)[1]	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2007	532	275	0.84	11,731	25.52	12,006	26.35
2008	257	997	2.69	7,958	22.54	8,955	25.23
2009	189	417	1.02	9,903	22.58	9,510	23.60
2010	315	1,269	3.25	8,528	23.31	9,798	26.56
2011	422	531	1.47	9,807	23.73	10,338	25.20
2012	418	1,256	4.46	9,787	26.51	11,043	30.97
2013	599	1,481	4.88	13,770	34.73	15,251	39.62
2014	458	2,970	8.56	8,905	27.52	11,875	36.09
2015	248	1,733	5.18	7,121	21.41	8,855	26.59
2016	250	983	2.83	13,749	37.61	14,732	40.44
2017	237	205	0.58	5,949	29.77	6,154	30.36

$ MM = in millions of dollars. Note: Landings may be calculated on a calendar or fishing year basis; exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change. Sources: [1] NMFS 2018, [2] U.S. Census Bureau.

Yellowfin and skipjack tuna U.S. Atlantic landings and U.S. exports from all ocean areas are shown in Table 6.12 and Table 6.13, respectively. Annual yellowfin tuna exports were greater and more valuable than exports for skipjack or bigeye tuna (Table 6.14) and were unusually high in 2017, reflecting a large increase in the export of frozen product. Total yellowfin tuna exports for 2012–2015 were consistent at about 850 mt per year), but decreased by almost half in 2016 before increasing to 2017 levels of 1,184 mt.

Table 6.12 U.S. Atlantic landings and total U.S. exports of yellowfin tuna in 2007–2017

Year	Atlantic landings (mt ww)[1]	U.S. exports (from all ocean areas)[2]					
		Fresh		Frozen		Total for all exports	
		Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2007	5,529	148	1.75	138	0.44	286	2.19
2008	2,407	198	2.09	4,140	9.06	4,338	11.16
2009	2,802	221	2.51	274	0.66	495	3.17
2010	2,482	211	2.31	70	0.33	281	2.64
2011	3,010	278	3.03	56	0.23	334	3.26
2012	4,100	311	3.35	535	1.91	846	5.26
2013	2,332	224	2.55	624	1.88	848	4.43
2014	2,630	332	2.46	554	1.33	886	3.78
2015	2,076	213	1.02	634	1.87	847	2.89
2016	3,274	82	0.84	401	1.44	483	2.29
2017	3,326	84	1.00	1,730	4.65	1,184	5.54

$ MM = in millions of dollars. Note: Landings may be calculated on a calendar or fishing year basis; exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change. Sources: [1] NMFS 2018, [2] U.S. Census Bureau.

Table 6.13 shows variability in the amount and value of exported fresh and frozen skipjack tuna over the 11-year time series without any perceptible pattern. Landings have ranged between 54–134 mt. Total value peaked in 2013 while total exports peaked in 2009.

Table 6.13 U.S. Atlantic landings and total U.S. exports of skipjack tuna in 2007–2017

Year	Atlantic landings (mt ww)[1]	U.S. exports (from all ocean areas)[2]					
		Fresh		Frozen		Total for all exports	
		Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2007	67	17	0.06	77	0.12	94	0.18
2008	67	31	0.15	350	0.41	381	0.56
2009	119	206	0.54	530	0.71	737	1.25
2010	54	194	0.57	126	0.17	319	0.73
2011	87	162	0.47	14	0.05	176	0.52
2012	112	46	0.17	293	1.17	334	1.34
2013	118	10	0.04	575	3.40	585	3.43
2014	76	152	0.23	77	0.52	228	0.75
2015	78	23	0.09	116	0.18	139	0.27
2016	134	47	0.12	26	0.13	73	0.25
2017	99	31	.08	148	0.38	180	0.46

$ MM = in millions of dollars. Note: Landings may be calculated on a calendar or fishing year basis; exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change. Sources: [1] NMFS 2018, [2] U.S. Census Bureau.

Bigeye tuna exports and Atlantic landings are given in Table 6.14. Atlantic landings were fairly consistent from 2012–2015 but fell in 2016 to the fourth lowest value of the time series. Unlike most other products discussed, Atlantic landings for bigeye tuna exceed total U.S. exports

annually. Bigeye tuna exports included more fresh than frozen product, except in 2008 and 2012 when exports of frozen product were greater. Total amount and value of exports peaked in 2012 and have dropped substantially since then, excluding 2017 when exports rose up to the third highest in the time series.

Table 6.14 U.S. Atlantic landings and total U.S. exports of bigeye tuna in 2007–2017

		U.S. Exports (from all ocean areas)[2]					
		Fresh		Frozen		Total for all exports	
Year	Atlantic landings (mt ww)[1]	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2007	527	128	1.38	65	0.14	193	1.52
2008	489	145	1.72	318	0.96	462	2.68
2009	515	121	1.53	78	0.19	199	1.72
2010	571	141	1.96	37	0.11	179	2.07
2011	719	199	2.13	44	0.13	243	2.26
2012	867	293	2.38	386	1.14	679	3.52
2013	880	147	1.36	25	0.13	172	1.49
2014	866	66	0.66	8	0.85	73	0.74
2015	839	26	0.27	13	0.10	39	0.36
2016	525	37	0.45	6	0.10	43	0.54
2017	788	316	1.85	15	0.12	331	1.98

$ MM = in millions of dollars. Note: Landings may be calculated on a calendar or fishing year basis; exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change. Sources: [1]NMFS 2018, [2]U.S. Census Bureau.

Shark Exports

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

Table 6.15 indicates the magnitude and value of shark exports by the United States from 2007–2017 (not including smoothhound sharks). While the amount and value of shark exports was greatest in 2008 and has been relatively high since 2012, due mostly to large amounts of frozen product, value fell in 2017. Exports of dried shark fins were highest in 2009 (56 mt) but have been much lower since then, ranging between 11 and 19 mt for 2011–2017. In 2017, HTS codes were implemented identifying sharks fins as “frozen” and “fresh,” improving tracking of the product. The value of fins in the new HTS categories of fresh and frozen are much lower per unit than dried shark fins (Table 6.16).

Table 6.15 Amount and value of U.S. shark products exported in 2007–2017

Year	Shark fins, dried*		Fresh shark, non-specified		Frozen shark, non-specified		Total for all exports	
	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2007	19	1.78	502	1.05	695	1.35	1,216	4.18
2008	11	0.69	559	1.21	4,122	7.21	4,692	9.11
2009	56	2.82	254	0.72	320	1.33	630	4.87
2010	36	2.89	222	0.67	244	0.52	502	4.08
2011	15	1.51	333	0.89	59	0.22	407	2.62
2012	11	0.99	436	1.08	1,054	4.52	1,501	6.58
2013	12	0.79	196	0.57	1,043	5.21	1,250	6.57
2014	19	0.98	218	0.57	828	5.31	1,064	6.86
2015	18	1.02	273	0.66	930	4.92	1,221	6.60
2016	12	0.85	285	0.61	1,499	7.38	1,794	8.83
2017*	11	0.62	474	0.89	730	2.05	1,305	3.79

$ MM = millions of dollars. * = New HTS codes for shark fins were implemented in 2017, allowing for tracking of fresh and frozen shark fins (see total shark fin exports in Table 6.16, below). Note: Exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change. Source: U.S. Census Bureau.

Table 6.16 Amount and value of total U.S. shark fin products exported in 2017

Year	Dried		Fresh		Frozen		Total	
	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($MM)
2017	11	0.62	2	0.01	88	0.22	101	0.85

$ MM = in millions of dollars. Note: U.S. shark fin products include fresh and frozen shark fin tracking, with new HTS codes implemented in 2017, in addition to dried shark fins. Source: U.S. Census Bureau.

Swordfish Exports

Swordfish HTS categories were modified in 2007 and again in 2012. The low cost and year round availability of swordfish imports into the United States are believed to have reduced the marketability of U.S. domestic swordfish. A modest export market for U.S. swordfish product has been available since 2007, but total exports have generally decreased over the course of the time series (Table 6.17).

Table 6.17 Amount and value of U.S. swordfish product exported in 2008–2017

	Swordfish fillet				Swordfish				Swordfish meat					
	Fresh		Frozen		Fresh		Frozen		Fresh		Frozen		Total	
Year	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2008	24	0.25	48	0.34	121	0.89	1.2	0.01	-	-	154.0	0.88	349	2.4
2009	43	0.38	19	0.23	133	0.81	12	0.04	-	-	24	0.13	231	1.6
2010	98	0.71	16	0.15	134	0.78	1	0.01	-	-	3	0.02	252	1.7
2011	32	0.26	31	0.28	134	0.80	72	0.45	-	-	1	0.01	269	1.8
2012	0	0.01	4	0.05	141	0.82	11	0.09	7	0.09	5	0.03	168	1.1
2013	0	0	18	0.09	160	0.87	13	0.13	2	0.04	2	0.02	196	1.2
2014	1	0.01	14	0.14	115	0.63	22	0.06	3	0.04	1	0.01	156	0.9
2015	1	0.01	24	0.23	94	.56	20	0.12	1	0.01	9	0.04	148	1.0
2016	1	0.01	5	0.04	87	.46	38	0.31	6	0.07	3	0.02	140	0.9
2017	1	0.01	9	0.08	64	0.36	9	0.03	3	0.06	0	0	102	0.6

$ MM = in millions of dollars. Source: U.S. Census Bureau.

Re-exports of Atlantic HMS

For purposes of international trade tracking of HMS, the term “re-export” refers to a product that has been “entered for consumption” into the United States and then exported to another country, with or without further processing in the United States (from 50 CFR Part 300, Subpart M, International Trade Documentation and Tracking Programs for HMS). For most HMS species for most years, re-export activity is a small fraction of export activity and well below relative reference points of 1,000 mt and/or one million dollars annually. Re-exports of yellowfin tuna (fresh or frozen) and shark fins most frequently exceed these values. Annual re-export figures in excess of these relative reference points are given in Table 6.18.

Table 6.18 Re-exports of HMS (excluding bluefin tuna) in excess of 1,000 mt and/or one million U.S. dollars in 2007–2017

Year	Product	Amount (mt)	Value ($ MM)
2007	Yellowfin tuna, fresh	208	2.91
	Yellowfin tuna, frozen	506	1.80
2008	Yellowfin tuna, fresh	224	3.40
	Shark fins, dried	26	1.37
2009	Yellowfin tuna, fresh	162	2.18
2010	Yellowfin tuna, fresh	130	1.88
	Yellowfin tuna, frozen	340	1.12
2011	Yellowfin tuna, fresh	117	1.85
	Swordfish fillet, frozen	302	2.70
	Shark fins, dried	23	1.42
2012	Yellowfin tuna, fresh	123	2.26
	Yellowfin tuna, frozen	515	1.63
	Shark fins*	41	1.86
	Shark, unspecified, frozen	405	1.46
2013	Yellowfin tuna, fresh	102	1.80
2014	Yellowfin tuna, fresh	65	1.17
2015	None	-	-
2016	None	-	-
2017	None	-	-

$ MM = in millions of dollars. * In 2012, the product classification “shark fin, dried” in the HTS was renamed “shark fins.” Source: U.S. Census Bureau.

Table 6.19 shows the re-exports of bluefin tuna, with imports in the next section, since 2006. Re-exports of bluefin tuna in 2013 were particularly high, with 2010 being the second higest re-export year in the time series.

Summary of Atlantic HMS Exports

As indicated in the previous section, the value of HMS exports (from all ocean areas combined) is nationally dominated by tuna products. In 2017, fresh and frozen tuna products accounted for 10,864 mt dw of the 1.3 million mt dw of principal fresh and frozen seafood products exported from the United States, as indicated in “Fisheries of the United States, 2017” (NMFS 2018a). The value of these HMS tuna products accounted for $51.2 million, out of a national total of $5.0 billion.

Data reflecting international trade of HMS species harvested from all ocean areas are of limited value for describing trade of HMS harvested from the Atlantic Ocean. For example, Atlantic landings of albacore tuna (commercial and recreational) for 2016 were reported in the 2016 U.S. National Report to ICCAT as 250 mt (Table 6.11). National trade data show that over 14,732 mt of albacore were exported in 2016, indicating the majority of albacore exports were Pacific Ocean product. Trade tracking programs such as the bluefin tuna, swordfish, and bigeye tuna consignment document programs are more accurate for tracking the international disposition of Atlantic HMS.

6.3.3 U.S. Imports of HMS

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

Atlantic and Pacific Bluefin Tuna Imports

United States imports and re-exports of bluefin tuna for 2007 through 2017, as reported through both CBP and eBCD program data, are shown in Table 6.19.

Table 6.19 U.S. imports and re-exports of Atlantic and Pacific bluefin tuna in 2007–2017

	BFT catch document program		U.S. customs and border protection	
Year	Imports (mt)	Re-exports (mt)	Imports (mt)	Value ($ MM)
2007	584.6	17.7	697.1	13.97
2008	412.7	16.8	487.1	11.91
2009	407.7	33.6	476.8	10.29
2010	512.3	61.5	682.5	15.75
2011	442.5	35.1	555.4	14.01
2012	400.2	25.9	770.4	14.74
2013	569.0	71.3	1,177.5	20.52
2014	670.4	40.7	1,087.2	20.75
2015	861.0	32.7	1,243.9	21.46
2016	1338.0	39.8	1,303.5	25.65
2017	1,777.2	38.1	1,760.5	33.20

$ MM = in millions of dollars. Note: Most imports of bluefin tuna (BFT) were in dressed form, and some were round and gilled/gutted fish, fillets or belly meat (dw); data are preliminary and subject to change. Sources: eBCD, U.S. CBP.

The rise in popularity of sashimi in the United States has created a market for imports of Atlantic and Pacific bluefin tuna (Table 6.19). U.S. consumption of Atlantic bluefin tuna is calculated by adding landings and imports and removing the total amount of exports and re-exports. U.S. consumption has increased over the last four years to an all-time high for the time series in 2017 (Figure 6.5). Consumption of domestic landings had been fairly consistent, ranging between about 100 and 200 mt per year until 2015 when domestic landings consumption climbed to about 400 mt, where it has remained. Consumption of imported bluefin tuna has been more variable but has increased substantially each year since 2015.

Figure 6.6 shows U.S. domestic landings of Atlantic bluefin tuna and trade of bluefin tuna since 2005. The United States annually imported more bluefin tuna than it exported. This trade gap has increased since 2015 and was greatest in 2017.

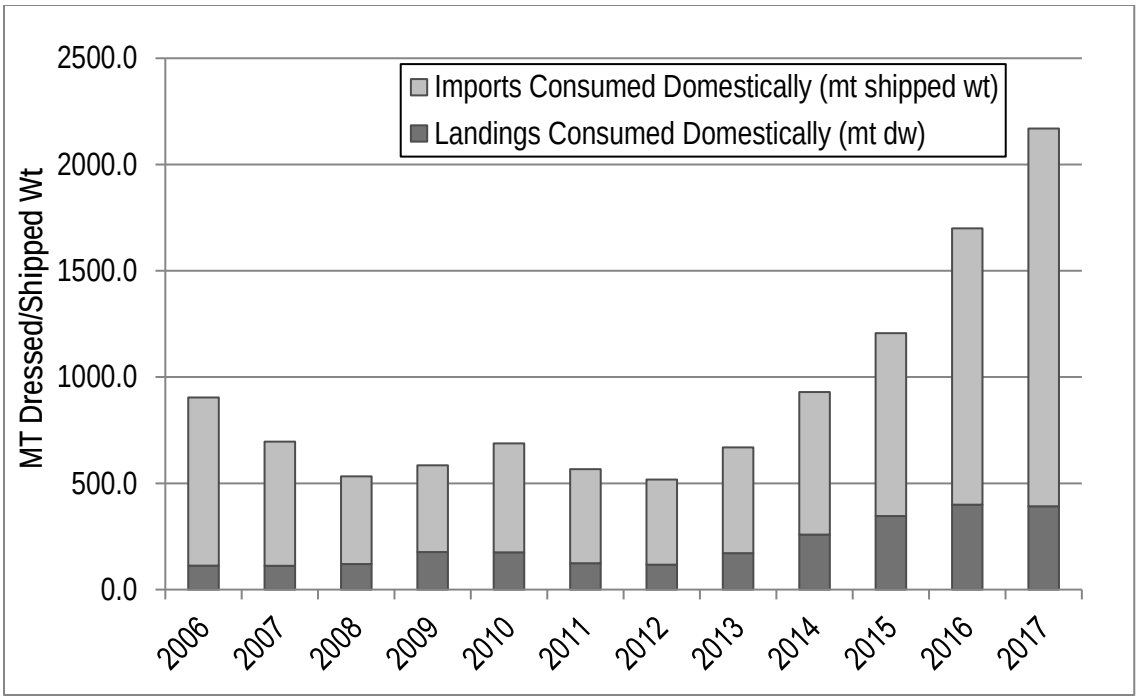

Figure 6.5 U.S. annual consumption of Atlantic and Pacific bluefin tuna, by imports and U.S. landings in 2006–2017

NOTE: Annual U.S. imports, re-exports, exports (mt shipped wt), and landings (mt dw) are also depicted. Consumption = landings + imports – exports – re-exports.

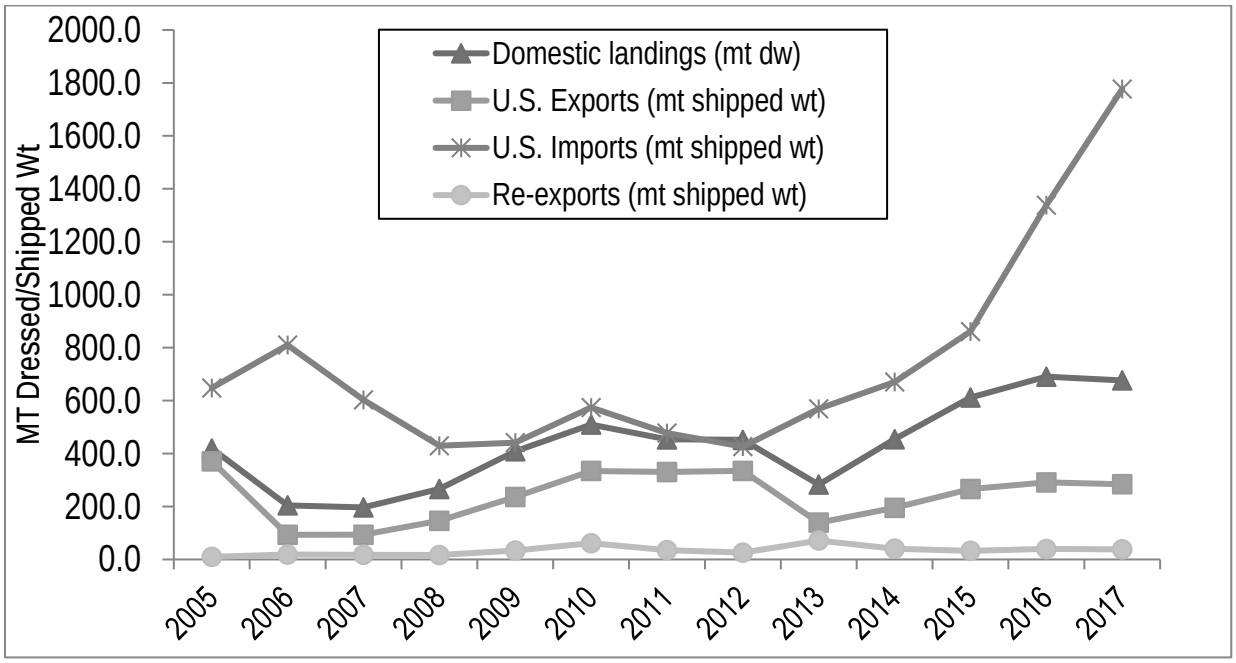

Figure 6.6 U.S. domestic landings of Atlantic bluefin tuna, and exports, imports and re-exports of Atlantic and Pacific bluefin tuna in 2005–2017

Other Tuna Imports

CBP collects species-specific import information for bigeye tuna, grouped to include all ocean areas. The total amount of bigeye tuna imports has generally been between 4,000 and 5,000 mt since 2010, as shown in Table 6.20. Value of total fresh and frozen bigeye imports dropped in 2016 and 2017 from 2015 levels but otherwise remained the highest level since 2009.

Table 6.20 U.S. imports of Bigeye tuna from all ocean areas combined in 2007–2017

	Fresh		Frozen		Total for all Imports	
Year	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2007	5,617	42.30	1,512	3.19	7,129	45.49
2008	5,462	41.43	2,597	5.31	8,059	46.74
2009	5,459	41.72	1,125	2.36	6,584	44.08
2010	4,025	32.39	316	0.73	4,340	33.12
2011	3,011	26.72	487	1.01	3,498	27.73
2012	3,723	33.43	580	1.22	4,304	34.65
2013	4,023	35.51	498	1.02	4,521	36.52
2014	4,126	35.61	338	0.68	4,465	36.30
2015	5,023	45.17	6	0.02	5,029	45.20
2016	4,217	36.91	36	0.09	4,253	37.00
2017	3,876	34.01	193	0.44	4,070	34.44

$ MM = in millions of dollars. Note: Imports may be whole weight (ww) or dressed (product) weight (dw). Data are preliminary and subject to change. Source: U.S. Census Bureau.

Annual yellowfin tuna imports into the United States for all ocean areas combined are in Table 6.21. As indicated by the data in this section, yellowfin tuna products are imported in the greatest quantity of all fresh and frozen tuna products. The annual total amount of yellowfin imports was the greatest during 2007 at about 23,000 mt. Total amount has been fairly consistent since 2010, but rose slightly in 2016 and 2017. Most imported yellowfin products were fresh.

Table 6.21 U.S. imports of Yellowfin tuna from all ocean areas combined in 2007–2017

	Fresh		Frozen		Total for all imports	
Year	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2007	17,985	137.42	5,506	44.26	23,492	181.69
2008	15,904	129.59	3,847	27.97	19,751	157.56
2009	14,199	112.34	2,868	24.73	17,067	137.07
2010	15,985	128.69	2,077	16.91	18,062	145.60
2011	15,635	141.83	2,398	17.56	18,033	159.39
2012	15,829	152.66	2,076	25.84	17,905	178.52
2013	16,031	156.58	2,602	24.69	18,633	181.27
2014	16,160	155.73	2,029	13.94	18,183	169.62
2015	15,532	146.76	2,657	18.62	18,189	165.38
2016	16,550	150.96	3,207	24.91	19,757	175.87
2017	16,278	150.94	3,385	31.44	19,663	182.38

$ MM = in millions of dollars. Note: Imports may be whole weight (ww) or dressed (product) weight (dw). Data are preliminary and subject to change. Source: U.S. Census Bureau.

The amount of fresh and frozen albacore product imported from all ocean areas (Table 6.22) was greatest in 2011 (4,462 mt) and lowest in 2006 (1,543 mt) without any perceptible pattern. The greatest value of albacore imports was also in 2011 ($10.22 million). Imports for both fresh and frozen product and value have increased each year since 2014. Products in airtight containers (e.g., cans and foil pouches) are not included in these data.

Table 6.22 U.S. imports of Albacore tuna from all ocean areas combined in 2007–2017

	Fresh		Frozen		Total for all Imports	
Year	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2007	945	3.86	718	1.98	1,664	5.86
2008	703	2.95	1,632	4.73	2,335	7.68
2009	718	3.07	1,493	3.46	2,211	6.53
2010	519	2.19	1,860	5.17	2,380	7.36
2011	669	3.05	3,794	7.17	4,462	10.22
2012	748	3.53	1,178	2.61	1,926	6.14
2013	858	3.57	2,199	4.27	3,057	7.84
2014	844	3.49	1,362	3.14	2,205	6.63
2015	962	4.25	1,373	3.04	2,335	7.29
2016	1,014	5.07	2,240	4.26	3,254	9.33
2017	1,072	5.06	2,369	6.19	3,441	11.25

$ MM = in millions of dollars. Note: Imports may be whole weight (ww) or dressed (product) weight (dw). Data are preliminary and subject to change. Source: U.S. Census Bureau.

Skipjack tuna imports into the United States are comprised mainly of frozen product (Table 6.23). The total amount of skipjack imports has generally been decreasing since 2007, except for an increase in 2012. Products in airtight containers (e.g., cans, foil pouches) are not included in these data.

Table 6.23 U.S. imports of Skipjack tuna from all ocean areas combined in 2007–2017

	Fresh		Frozen		Total for all imports	
Year	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2007	31	0.06	835	0.73	866	0.79
2008	14	0.02	685	0.77	699	0.79
2009	20	0.04	498	0.63	519	0.67
2010	36	0.09	542	0.79	578	0.87
2011	2	0.05	594	0.92	595	0.96
2012	23	0.05	866	1.16	890	1.21
2013	38	0.11	272	0.51	310	0.62
2014	70	0.13	395	0.62	467	0.75
2015	4	0.03	230	0.36	233	0.39
2016	0	0	251	0.37	251	0.37
2017	0	0	129	0.24	129	0.24

$ MM = in millions of dollars. Note: Imports may be whole weight (ww) or dressed (product) weight (dw). Data are preliminary and subject to change. Source: U.S. Census Bureau.

Swordfish Imports

Table 6.24 indicates the amount and value of swordfish products imported into the United States from 2006 to 2017, as recorded by the U.S. Census Bureau, for all ocean areas combined. The annual totals for products and value are fairly consistent over the time series, with total import amount and value ranging from approximately 7,000 to 11,000 mt and $56 million to $88 million, respectively.

Table 6.24 Imported swordfish products in 2007–2017

Year	Fresh (mt)				Frozen (mt)					Total for all imports	
	Steaks			Other	Fillets	Steaks			Other	(mt)	($ MM)
							Meat				
	Fillets*	Steaks	Meat	Other	Fillets	Steaks	> 6.8 kg	**≤ 6.8 kg**	Other		
2007	174	84		5,412	2,520	171	118	737	205	9,422	70.85
2008	96	13		5,658	2,673	170	55	207	88	8,962	68.98
2009	53	10		5,312	1,632	112	96	23	33	7,272	55.85
2010	125	2		5,228	2,077	153	277	45	31	7,939	68.33
2011	74	1		5,060	2,116	139	1,384	471	12	9,258	68.64
2012	13	2	66	5,478	2,013	604	825	43	15	8,993	77.01
2013	31	2	62	6,011	1,394	457	182	4	12	8,093	71.38
2014	31	0	24	7,137	1,575	512	153	<1	32	9,442	82.00
2015	2	162	15	7,751	1,833	578	454	38	56	10,890	87.85
2016	3	20	2	7,780	1,905	266	379	2	10	10,367	87.36
2017	9	4	1	7,100	2,831	325	862	2	18	11,150	85.79

$ MM = in millions of dollars. Note: Imports may be whole weight (ww) or dressed (product) weight (dw). Data are preliminary and subject to change. Source: U.S. Census Bureau.

Table 6.25 summarizes swordfish import data collected by the NOAA Fisheries Swordfish Statistical Document Program for the 2017 calendar year. According to these data, most swordfish imports were Pacific Ocean product from Central and South America. Most North Atlantic imports came from Canada, and South Atlantic product came from Brazil. CBP data located at the bottom of the table reflect a larger amount of imports than reported by the import monitoring program and may be used by NOAA Fisheries staff to follow up with importers, collect statistical documents that have not been submitted, and enforce dealer reporting requirements. The CBP data may include product that is improperly labelled as swordfish.

Table 6.25 U.S. imports of swordfish by flag of harvesting vessel and area of origin in 2017

Flag of harvesting vessel	Atlantic (mt dw)	North Atlantic (mt dw)	South Atlantic (mt dw)	Pacific (mt dw)	Western Pacific (mt dw)	Indian (mt dw)	Not provided (mt dw)	Total (mt dw)
Australia				1.20	182.86	1.29		121.00
Brazil	0.84	0.54	345.36	0.85				347.59
Canada		412.40						412.40
Chile				183.13				183.13
China				18.23				18.23
Chinese Taipei			4.85			30.06		34.91
Costa Rica				590.46				590.46
Ecuador				1703.07				1703.07
EU-France				0.13	0.16	4.27		4.56
Fiji Islands				11.47	10.20			21.67
Guatemala				22.77				22.77
Guyana			2.54					2.54
India			0.21					0.21
Indonesia						203.89		203.89
Malaysia						17.20		17.20
Maldives				0.12		61.62		61.74
Marshall Islands				3.13				3.13
Mauritus						14.25		14.25
Mexico		23.33		231.82				255.15
Mozambique						116.58		116.58
New Zealand					269.73			269.73
Nicaragua				3.12				3.12
Panama				294.15				294.15
Polynésie Française				1.32				1.32
Republic of Kiribati						6.93		6.93
Seychelles			1.49			37.12		38.61
South Africa		0.25	57.37	0.52		3.45		61.59
Sri Lanka				157.39				157.39
St. Vincent and the Grenadines		3.70						3.70
Tanzania						3.00		3.00
Tonga				0.94				0.94
Trinidad and Tobago		25.94						25.94
Vanuatu				72.81				72.81
Vietnam		3.22		214.79				218.01
Total imports reported by SDs								5,356.07
Total imports reported by U.S. Customs & Border Protection								10,445.52
Total imports not reported by SDs								5,089.45

Source: NOAA Fisheries Swordfish Statistical Document Program

Shark Imports

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

Table 6.26 summarizes Census Bureau data on shark imports for 2007 through 2017. Imports of fresh and frozen shark have generally decreased over the time series but increased in 2016 and 2017. Imports of shark fins have been variable between a range of 21 mt and the 2017 amount of 143 mt, which is the third highest in the time series. In 2017, fresh and frozen shark fins were given new HTS codes (Table 6.27) which inflated the annual figure. Dried shark fins imports for 2017 totalled 35 mt, which is within the variability of the time series. As of July 2, 2008, shark fin importers, exporters, and re-exporters are required to be permitted under NOAA Fisheries HMS International Trade Program regulations (73 FR 31380). Permitting of shark fin traders was implemented to assist in enforcement and monitoring the trade of this valuable commodity.

Table 6.26 U.S. imports of shark products from all ocean areas combined in 2007–2017

	Shark fins, dried**		Fresh shark, non-specified		Frozen shark, non-specified		Total for all imports	
Year	(mt)	($ MM)	(mt)	($ MM)	(mt)	($ MM)	(mt)	($ MM)
2007	29	1.68	548	1.03	174	1.04	751	3.75
2008	29	1.74	348	0.72	189	1.88	566	4.34
2009	21	0.97	180	0.37	125	1.50	326	2.83
2010	34	1.18	114	0.33	34	1.16	182	2.66
2011	58	1.79	72	0.22	32	1.20	162	3.21
2012*	43	0.77	88	0.30	9	0.07	141	1.14
2013	63	0.74	153	0.46	3	0.05	219	1.25
2014	35	0.45	105	0.35	8	0.20	146	0.99
2015	24	0.29	88	0.32	21	0.26	133	0.87
2016	56	0.69	67	0.23	108	0.60	231	1.52
2017**	35	0.54	65	0.26	30	0.20	238	1.30

$ MM = in millions of dollars. * = In 2012, the product classification “shark fin, dried” in the HTS was renamed “shark fins.” ** = New HTS codes for shark fins were implemented in 2017, allowing for tracking of fresh and frozen shark fins. See total shark fin exports in Table 6.27. Note: Imports may be whole weight (ww) or dressed (product) weight (dw). Data are preliminary and subject to change. Source: U.S. Census Bureau.

Table 6.27 U.S. imports of total shark fin products in 2017

Year	Fresh		Frozen		Dried		Total	
	(mt)	($ MM)	(mt)	($ MM)	(mt)	($ MM)	(mt)	($ MM)
2017	44	0.15	65	0.14	35	0.54	143	0.83

$ MM = in millions of dollars. Note: HTS code for shark fins was sub-divided into fresh, frozen and dried in 2017.
Source: U.S. Census Bureau

6.3.4 The Use of Trade Data for Management Purposes

Trade data has been used in a number of ways to support the international management of HMS. When appropriate, the Standing Committee on Research and Statistics uses trade data on bluefin tuna, swordfish, bigeye tuna, and yellowfin tuna that are submitted to ICCAT as an indication of landings trends. These data can then be used to augment estimates of the fishing mortality of these species, which improves scientific stock assessments. Trade data can also be used to assist in assessing compliance with ICCAT recommendations and identify those countries whose fishing practices diminish the effectiveness of ICCAT conservation and management measures. For examples of the use of trade data, please see section 5.3.4 of the 2011 HMS SAFE Report.

6.4 Recreational Fisheries

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

6.4.1 Recreational Angling

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

In 2011, NOAA Fisheries conducted the National Marine Recreational Fishing Expenditure Survey (NES) to collect national level data on trip and durable good expenditures related to marine recreational fishing and estimate the associated economic impact (Lovell et al. 2013). Nationally, marine anglers were estimated to have spent $4.4 billion on trip related expenses (e.g., fuel, ice, bait) and $19 billion on fishing equipment and durable goods (e.g., fishing rods, tackle, boats). Using regional input-output models, these expenditures were estimated to have generated $56 billion in total economic impacts, and supported 364 thousand jobs in the United States in 2011.

This survey also included a separate survey of HMS Angling permit holders from the Large Pelagics Survey (LPS) region, from Maine to Virginia, plus North Carolina (Hutt et al. 2014). Estimated trip-related expenditures and the resulting economic impacts for HMS recreational fishing trips are presented in Table 6.28. For the HMS Angler Expenditure Survey, randomly selected HMS Angling permit holders were surveyed every two months and asked to provide data on the most recent fishing trip in which they targeted HMS. Anglers were asked to identify the primary HMS they targeted and their expenditures related to the trip. Of the 2,068 HMS anglers who returned a survey, 1,001 anglers indicated they targeted a species of tuna (i.e., bluefin, yellowfin, bigeye, or albacore tuna) on their most recent private boat trip, or simply indicated they fished for tuna in general without identifying a specific species. Of the rest of those surveyed, 88 reported on trips targeting billfish (i.e., blue marlin, white marlin, or sailfish), 105 reported on trips targeting shark (i.e., shortfin mako, thresher shark, or blacktip shark), and 874 either reported on trips that did not target HMS or failed to indicate what species they targeted. Average trip expenditures ranged from $534/trip for tuna trips to $900 for billfish trips. Boat fuel was the largest trip-related expenditure for all HMS trips and made up about 73 percent of trip costs for billfish trips, which is not unexpected given the predominance of trolling as a fishing method for billfish species such as marlin. Total trip-related expenditures for 2011 were estimated by expanding average trip-related expenditures by estimates of total directed boat trips per species group from the LPS and Marine Recreational Information Program (MRIP) surveys. Total expenditures were then divided among the appropriate economic sectors and entered into an input-output model to estimate total economic output and employment supported by the expenditures within the study region (coastal states from Maine to North Carolina). Overall, $23.2 million of HMS angling trip-related expenditures generated approximately $31.3 million in economic output and supported 216 full time jobs from Maine to North Carolina in 2011. An updated trip expenditures survey of Atlantic HMS Angling permit holders from Maine to Texas is currently being conducted for 2016, and a final report will be issued in spring 2019.

Table 6.28 HMS recreational fishing trip related expenditures and economic impacts for directed HMS private boat trips between Maine and North Carolina in 2011

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

Sources: 2011 mail survey of Atlantic HMS Angling permit holders, *LPS.

In 2014, NOAA Fisheries conducted a partial update of the NES that collected data on marine angler expenditures on fishing equipment and durable goods related to recreational fishing (e.g., boats, vehicles, tackle, electronics, second homes). This survey covered Atlantic HMS anglers from Maine to Texas. HMS anglers in the Northeast (Maine to Virginia) were found to spend $12,913 on average for durable goods and services related to marine recreational fishing, of which $5,284 could be attributed to HMS angling (based on their ratio of HMS trips to total marine angling trips). The largest expenditures items for marine angler durable goods among HMS anglers in the Northeast were for new boats ($3,305), used boats ($2,835), boat

maintenance ($1,532), and boat storage ($1,486). HMS anglers in the Northeast were estimated to have spent a total of $61 million on durable goods for HMS angling, which in turn were estimated to generate $73 million in economic output and support 697 jobs from Maine to Virginia in 2014 (Lovell et al. 2016). HMS anglers in the Southeast (North Carolina to Texas) were found to spend $29,532 on average for durable goods and services related to marine recreational fishing, of which $15,296 could be attributed to HMS angling (based on their ratio of HMS trips to total marine angling trips). The largest expenditures items for marine angler durable goods among HMS anglers were for new boats ($8,954), used boats ($6,579), boat maintenance ($3,028), boat storage ($1,813), and rods and reels ($1,608). HMS anglers were estimated to have spent a total of $108 million on durable goods for HMS angling which in turn estimated to generate $152 million in economic output, and support 1,331 jobs from North Carolina to Texas in 2014 (Lovell et al. 2016).

In 2015, researchers with the Virginia Institute of Marine Sciences funded by NOAA Fisheries conducted a survey of HMS Angling permit holders from Maine to North Carolina to estimate the economic value of recreational bluefin tuna fishing (Goldsmith et al. 2018). Survey participants were presented with examples of hypothetical fishing trips that varied by the size of bluefin tuna caught, bag limit regulations, and trip costs. They found the overall average willingness-to-pay (WTP) for a bluefin trip to be $1,285 per angler trip. Increasing the bag limit by one school-sized bluefin tuna increased WTP by approximately $160, while increasing the bag limit by an additional large school/small medium or large medium/giant bluefin tuna increased WTP by approximately $289–$360 per angler trip. Overall, the 2015 bluefin tuna private boat fishery was estimated to have a value of $14 million in addition to the angling expenditures of $8.7 million.

6.4.2 Atlantic HMS Tournaments

For detailed information about HMS tournaments, please see the 2006 Consolidated HMS Fishery Management Plan (FMP) and sections 5.4.2 (landings) and 4.2 (HMS tournament registration) of this document. NOAA Fisheries conducted an Atlantic HMS Tournament Economic Study for 2016. This study was conducted in two parts. The first part involved a survey of all Atlantic HMS tournaments on their costs and earnings associated with the operation of a tournament. The second part involved a survey of HMS tournament participants on their expenditures associated with participating in an HMS tournament. For the second part, half of Atlantic HMS tournaments were selected to distribute surveys to their participants. The goal of this targeted survey was to provide expenditure data on a unique group of saltwater angling trips that are largely under-represented in national surveys. A final report is expected in 2019.

6.4.3 Atlantic HMS Charter and Party Boat Operations

At the end of 2004 and 2012, NOAA Fisheries collected market information regarding advertised charterboat rates. The analysis of this data focused on advertised rates for full day charters. Full day charters vary from 6 to 14 hours long with a typical trip being 10 hours. The average price for a full day boat charter was $1,053 in 2004 and $1,200 in 2012. Sutton et al. (1999) surveyed charterboats throughout Alabama, Mississippi, Louisiana, and Texas in 1998 and found the average charterboat base fee to be $762 for a full day trip. Holland et al. (1999) conducted a similar study on charterboats in Florida, Georgia, South Carolina, and North Carolina and found the average fee for full day trips to be $554, $562, $661, and $701, respectively. Comparing

these two studies conducted in the late 1990s to the average advertised daily HMS charterboat rate in 2004 and 2012, it is apparent that there has been a significant increase in charterboat rates.

In 2013, NOAA Fisheries executed a logbook study to collect cost and earnings data on charter and headboat trips targeting HMS throughout the entire Atlantic HMS region (Maine to Texas) (Hutt and Silva 2015). The HMS Cost and Earning Survey commenced in July 2013, and ended in November 2013. Data from the survey indicate that 47 percent of HMS Charter/Headboat permit holders who responded to the survey did not plan to take for-hire trips to target HMS from July to November of 2013.

The HMS most commonly targeted by for-hire vessels varied by region and between charter and headboats (Table 6.29). Overall, the HMS most commonly targeted by charter boats included yellowfin tuna (45 percent), sailfish (37 percent), marlin (32 percent), and coastal sharks (32 percent). The reported percentages add to greater than 100 percent as most HMS for-hire trips targeted multiple species. This was especially apparent for trips targeting tuna or billfish species as the majority of these trips reported targeting at least two other species. The exception was HMS trips targeting coastal sharks with only 5 percent or fewer reporting targeting other species.

Table 6.29 Percent* of HMS Charter/Headboat trips by region and target species in 2013

	North Atlantic		South Atlantic		Gulf of Mexico		Overall	
Species	CH	HB	CH	HB	CH	HB	CH	HB
Bluefin tuna	35.0	0.0	3.0	-	0.0	3.0	9.0	2.0
Yellowfin tuna	57.0	100.0	44.0	-	35.0	53.0	45.0	67.0
Albacore tuna	14.0	89.0	6.0	-	0.0	0.0	7.0	28.0
Bigeye tuna	48.0	100.0	2.0	-	5.0	20.0	12.0	45.0
Skipjack tuna	3.0	0.0	10.0	-	2.0	0.0	7.0	0.0
Marlin	14.0	17.0	40.0	-	23.0	30.0	32.0	26.0
Swordfish	13.0	89.0	3.0	-	10.0	10.0	6.0	34.0
Sailfish	0.0	0.0	56.0	-	15.0	10.0	37.0	7.0
Pelagic sharks	27.0	6.0	0.0	-	0.0	8.0	5.0	7.0
Coastal sharks	7.0	0.0	30.0	-	64.0	48.0	32.0	33.0
Other species	11.0	83.0	40.0	-	14.0	13.0	30.0	34.0

* = Percentages exceed 100 percent as most trips targeted multiple species. Note: North Atlantic includes: RI, MA, NH, and ME. Mid-Atlantic includes: CT, NY, NJ, DE, MD, and VA. South Atlantic includes: NC, SC, and GA. Gulf of Mexico includes: AL, MS, LA, and TX. Florida was reported separately as currently available data did not permit separating Atlantic and Gulf of Mexico trips. Source: Hutt and Silva 2015.

Of the 19 headboat trips that reported targeting coastal sharks, none reported targeting any other species. The HMS most commonly targeted by headboats were yellowfin tuna (37 percent), bigeye tuna (45 percent), swordfish (34 percent), and coastal sharks (33 percent). In the North Atlantic region, the two HMS most commonly targeted by both charter and head boats were yellowfin tuna (57 and100 percent, respectively) and bigeye tuna (48 and 100 percent, respectively). The third HMS most commonly targeted in the North Atlantic by charter boats was bluefin tuna (35 percent) which was not targeted on any reported headboat trips. HMS charters in the South Atlantic were most likely to report targeting sailfish (56 percent), yellowfin tuna (44 percent), and marlins (40 percent). In the Gulf of Mexico, HMS charter and head boats were most likely to report targeting coastal sharks (64 and 48 percent, respectively), yellowfin tuna (35 and 53 percent respectively), and marlins (23 and 30 percent, respectively).

In the Northeast, the average net return per HMS charter boat trip was $969 (Table 6.30). Inflows from charter fees averaged $2,450 per trip. Northeast charter boat trips averaged $1,229 in material costs with their greatest material expenditures being for fuel ($966) and bait ($129). In the Southeast, the average net return per HMS charter boat trip was $534. Inflows from charter fees averaged $1,223 per trip. Southeast charter boat trips averaged $496 in material costs with their greatest material expenditures being for fuel ($376) and bait ($46). The lower costs and revenues reported for this region were likely due to the fact that only one overnight trip was reported in the Southeast for the survey. In the Gulf of Mexico, the average net return per HMS charter boat trip was $1,028. Inflows from charter fees averaged $2,111 per trip. Gulf of Mexico charter boat trips averaged $858 in material costs, with their greatest material expenditures being for fuel ($631) and bait ($70).

Table 6.30 Average costs and revenues for HMS charter boat trips by region in 2013

	Northeast Region (n = 95)	Southeast Region (n = 297)	Gulf of Mexico (n = 86)
	Maine to Virginia	North Carolina to East Fla	West Florida to Texas
Outflow			
Material costs	$1,228.62	$495.66	$857.56
Fuel costs	966.79	376.32	631.03
Fuel price	3.96	3.74	3.64
Gallons used	244.14	100.62	173.36
Bait costs	129.05	45.76	69.99
Tackle costs	61.01	37.74	58.22
Ice costs	56.28	13.52	42.95
Other costs	15.49	22.32	55.37
Payouts			
Captain	109.16	101.56	111.34
Crew	144.11	97.42	114.13
Inflow			
Total fare	2,450.40	1,223.02	2,111.44
Daily fare	1,791.67	1,201.55	1,422.19
Net return	968.51	528.38	1,028.41

Source: Hutt and Silva 2015

In the Northeast, the LPS estimated that there were 4,936 charter trips from July–November in 2013 that targeted HMS (Table 6.31). Extrapolating the average gross revenue per HMS trip in the Northeast resulted in an estimate of $12.1 million in gross revenue from July–November of 2013. Of that gross revenue, $7.3 million went towards covering trip expenditures (fuel, bait, ice, crew, etc.), and $4.8 million went to owner net return and other annual operation costs. An input-output analysis in IMPLAN (Minnesota IMPLAN 2010) estimated that these expenditures generated $31.9 million in total economic output, $8.0 million in labor income, and 460 full and part-time jobs (Table 6.32).

In the Southeast, the MRIP estimated that there were 3,008 charter trips from July–November, 2013, that targeted HMS (Table 6.31). Extrapolating the average gross revenue per HMS trip in the Southeast resulted in an estimate of $3.7 million in gross revenue from July–November 2013. Of that gross revenue, $2.1 million went towards covering trip expenditures (fuel, bait, ice, crew, etc.), and $1.6 million went to owner net return and other annual operation costs. Analysis in

IMPLAN estimated that these expenditures generated $10.6 million in total economic output, $2.9 million in labor income, and 243 full and part-time jobs (Table 6.32).

In the Gulf of Mexico, excluding Texas, the MRIP estimated that there were 1,505 charter trips from July–November 2013 that targeted HMS (Table 6.31). Extrapolating the average gross revenue per HMS trip in the Gulf of Mexico resulted in an estimate of $3.2 million in gross revenue from July–November 2013. Of that gross revenue, $1.6 million went towards covering trip expenditures (fuel, bait, ice, crew, etc.), and $1.5 million went to owner net return and other annual operation costs. Analysis in IMPLAN estimated that these expenditures generated $8.8 million in total economic output, $2.2 million in labor income, and 428 full- and part-time jobs (Table 6.32).

Table 6.31 Total costs and earnings for HMS charter boats by region in July–November 2013

		Northeast	Southeast	Gulf of Mexico[2]
Total HMS charter trips[1]		4,936	3,008	1,505
Inflow (gross revenue)		12,095,174	3,678,938	3,176,799
Outflow (expenses)	Fuel	4,772,097	1,131,996	949,426
	Bait	636,991	137,996	105,305
	Tackle	301,145	113,525	87,596
	Ice	277,798	40,669	64,621
	Other	76,459	67,140	83,308
	Hired captain	538,814	305,500	167,518
	Crew / mates	711,327	293,047	171,716
Owner net return plus fixed costs		4,780,544	1,589,411	1,547,309

[1]Charter boat trips that indicated HMS were their primary or secondary target species. Excludes head boat trips. [2]The estimate of HMS for-fire trips in the Gulf of Mexico does not include trips originating from Texas, as the state does not participate in the MRIP survey. Source: Hutt and Silva 2015.

Table 6.32 Estimated total expenditures and economic impacts generated by Atlantic HMS charter boat trip operations by region in July–November 2013

Region	Total expenses (X $1,000)	Economic impacts		
		Employment	Labor income (X $1,000)	Total output (X $1,000)
Northeast	$12,095	460	$8,011	$31,929
Southeast	$3,679	243	$2,848	$10,587
Gulf of Mexico	$3,177	428	$2,226	$8,847
Total	$18,951	1,131	$13,085	$51,363

Source: Hutt and Silva 2015

This study estimated 1,131 jobs were generated as a result of HMS charter vessel operations during the study period (Table 6.32). This number is a conservative estimate and does not include jobs created by additional travel expenditures generated by the HMS anglers that charter HMS for-hire vessels. Furthermore, most HMS for-hire vessels also take out trips targeting other species, and these trips were not included in this study's analysis and are not reflected in the estimated employment figures.

6.5 Review of Regulations under Section 610 of the Regulatory Flexibility Act

The Regulatory Flexibility Act, 5 U.S.C. 601, requires that federal agencies take into account how their regulations affect "small entities," including small businesses, small governmental jurisdictions, and small organizations. In order to assess the continuing effect of an agency rule on small entities, the Regulatory Flexibility Act contains a provision in Section 610 that requires federal agencies to review existing regulations on a periodic basis that had or will have a significant economic impact on a substantial number of small entities. Regulations must be reviewed within 10 years of the publication date of the final rule.

NOAA Fisheries published the most recent plan for this required periodic review of regulations in the Federal Register in 2017 (82 FR 26419, June 7, 2017). This plan required review of rules issued during 2011 using the criteria established in Section 610 of the Regulatory Flexibility Act. Final rules should be reviewed to determine whether they should be continued without change, or whether they should be amended or rescinded, consistent with the stated objectives of applicable statutes. Section 610 of the Regulatory Flexibility Act requires NOAA Fisheries to consider the following factors when reviewing rules to minimize any significant economic impact of the rule on a substantial number of small entities:

1. The continued need for the rule.
2. The nature of complaints or comments received concerning the rule from the public.
3. The complexity of the rule.
4. The extent to which the rule overlaps, duplicates, or conflicts with other Federal rules, and, to the extent feasible, with State and local government rules.
5. The length of time since the rule has been evaluated or the degree to which technology, economic conditions, or other factors have changed in the area affected by the rule.

Table 6.33 reviews the six Atlantic HMS regulations issued in 2011.

Table 6.33 Regulatory Flexibility Act Section 610 Review of Atlantic highly migratory species regulations in 2010

Name of Action, Date, and FR Cite	Atlantic Highly Migratory Species; Bluefin Tuna Bycatch Reduction. RIN-0648-BA39 (76 FR 18653, April 5, 2011)
Current Status of Rule (Expired, Rescinded, Superseded, Amended, or Continuing)	Continuing.
Description of Management Measures and Complexity	This rule requires vessels with pelagic longline gear onboard, at all times, in all areas of the Gulf of Mexico open to pelagic longline fishing, to possess onboard and use only circle hooks meeting current size and offset restrictions as well as being constructed of only round wire stock that is no larger than 3.65 mm in diameter. Weak hooks can allow incidentally hooked bluefin tuna to escape capture because the hooks are more likely to straighten when a large fish is hooked. NOAA Fisheries does not consider this a complex rule given that the requirements are for the use a specific type of hook in one region.
Economic Impacts of Management Measures and Nature of Public Comments	This rule was expected to result in some minor increases in equipment costs for the new hooks, likely impact vessel operations, and also potentially impact catch rates and thus potentially reduce vessel revenues. Direct cost of purchasing weak hooks was expected to increase expenses by $.02 per hook. Assuming that an average of 1,600 hooks per vessel are needed initially to equip vessels with enough required hooks for one trip, the compliance cost, on a per vessel basis, would be approximately $576. Hook replacement rates were also anticipated to increase with use of the weak hook. The weak hook requirement was also expected to impact vessel catch rates and thus potentially reduce vessel revenues. Based on the Gulf of Mexico pelagic longline bluefin mitigation research results, catch rates for several commercially important species were found to be lower using the new weak hooks versus the standard 16/0 circle hooks. Based on observer reports of the number of bluefin discarded versus retained in the Gulf of Mexico, the researchers estimate that the experimental results indicate that the use of weak hooks would result in approximately a 14 percent reduction in bluefin retained for sale given the bluefin incidental retention limits. The total catch of wahoo using the weak hook was reduced by 26.6 percent. The research also observed reduction in the number of yellowfin tuna and swordfish retained for sale. Weak hooks in the experiment resulted in a 7 percent reduction in yellowfin tuna retained for sale and 41.2 percent reduction in swordfish retained for sale. No other commercially targeted species observed during the research exhibited catch rate differences between weak hooks and conventional circle hooks. Using vessel logbook catch data, NMFS translated the reductions in catch observed in the research experiment into potential fishery revenue impacts that may result from requiring the use of weak hooks in the Gulf of Mexico. Based on the research results, the estimated per trip reduction in revenues that would potentially result from requiring the use of weak hooks in the Gulf of Mexico is approximately $2,265. Based on HMS logbook reports from 2006 to 2009, the average number of pelagic longline trips taken per vessel per year in the Gulf of Mexico is 9.7; therefore, NOAA Fisheries estimated a reduction of $21,974 in commercial fishing revenues per vessel per year in the Gulf of Mexico resulting

	from switching to weak hooks (9.7 trips/vessel/yr * $2,265 = $21,974). Alternatively, if this economic analysis only considers the statistically significant reductions in catch at the 5 percent level (only including reductions for bluefin and wahoo which equals $139 less per trip), as used in the research study, the estimated reduction in annual catch revenues per vessel in the Gulf of Mexico would be $1,351. This lower estimate may also represent the potential improvements in catch rates that may occur over time as fishermen adapt to the new weak hook technology. On March 2, 2018, NOAA Fisheries published a Notice of Intent to conduct scoping and develop a Draft of Environmental Impact Statement (DEIS, 83 FR 8969). The scoping document for this notice included options for modifying the weak hook requirement. NOAA Fisheries conducted five public meetings on the scoping document as well as a public webinar. The comment period on the scoping document ended May 1, 2018. During the scoping period, NOAA Fisheries received a large number of comments urging NOAA Fisheries to retain a seasonal weak hook requirement. Pelagic longline fishermen and dealers would like NOAA Fisheries to remove regulations that are redundant in effect, since longline participants already have to operate within the confines of the individual bluefin quota (IBQ) program. Pelagic longline fishermen and dealers believe that such deregulation might allow pelagic longline fishermen to more fully harvest the ICCAT swordfish quota. Some commenters suggested considering designating bluefin hotspots and in those spots require the use of weak hooks. Some noted that weak hooks are successful when targeting yellowfin tuna but not successful when targeting swordfish. Some members at the HMS Advisory Panel meeting suggested removal of the requirement to emphasize individual accountability but noted that some fishermen will keep using them. Finally, some recommended that NOAA Fisheries should adjust the proposed seasonal requirement to span January to June instead of March to June. NOAA Fisheries is reviewing the comments and expects to have a proposed rulemaking out in 2019.
Overlap with other State or Federal Rules	This final rule does not duplicate or conflict with any other Federal rules. However, since the implementation of an IBQ Program under Amendment 7, the need to specify the use of week hooks in the Gulf of Mexico may be somewhat reduced given that individual vessel owners now have an incentive under this catch share program to reduce their interactions with bluefin tuna using whatever techniques they deem best (which could include the continued use of week hooks) to minimize their use of IBQ.
Changes in Technology, Economic Conditions, or Other Factors since Last Evaluation	Continued reductions of bluefin tuna catch in the Gulf of Mexico pelagic longline fishery have been observed since the implementation of weak hooks. In 2015, NOAA Fisheries implemented Amendment 7 to the 2006 Consolidated Atlantic HMS FMP, which included pelagic longline fishery gear restricted areas (GRAs), IBQ, and catch reporting of each pelagic longline set using vessel monitoring systems. Fishery trends since implementation of Amendment 7 include extensive reductions in bluefin tuna landings and dead discards. However, effort within the pelagic longline fishery has also decreased and quotas established for target species (e.g., swordfish) have not being met for some time. Since implementation of the IBQ program, NOAA Fisheries received comments from pelagic longline participants, Advisory Panel members (at Spring and Fall 2017 and Fall 2018 Atlantic HMS Advisory Panel meetings), and other interested parties to examine whether older fleet-wide measures such as gear requirements, area restrictions, or time/area closures may no longer be necessary to reduce bluefin tuna bycatch and still meet the objectives of the Amendment 7. Since 2012, annual revenue for the pelagic longline fishery has declined from a high of $47.5 million in 2012 to a low of $25.6 million in 2016. Revenue for the fleet rebounded a bit in 2017 to $27.1 million.
Recommendation to Continue, Rescind, or Amend and Rationale	NOAA Fisheries concludes this rule be recommended for amendment given the changes to the fishery as a result of Amendment 7. The individual accountability measures of Amendment 7 overlap with the weak hook requirement in their goals of reducing bluefin tuna discards. There has been a substantial decrease in bluefin discards since the implementation of Amendment 7, and therefore, the weak hook requirements may no longer be

	needed to address this issue, especially given the implementation of the IBQ Program. As a follow-on to the NOI mentioned above, NOAA Fisheries anticipates releasing a DEIS and proposed rule in 2019 to consider amending weak hook requirements.
Name of Action, Date, and FR Cite	Atlantic Highly Migratory Species; Atlantic Bluefin Tuna Quotas and Atlantic Tuna Fisheries Management Measures. RIN 0648-BA65 (76 FR 39019, July 5, 2011)
Current Status of Rule (Expired, Rescinded, Superseded, Amended, or Continuing)	Amended
Description of Management Measures and Complexity	This rule modified the Atlantic bluefin tuna base quotas for all domestic fishing categories; established bluefin quota specifications for the 2011 fishing year; reinstated pelagic longline target catch requirements for retaining bluefin in the Northeast Distant (NED) GRA (one bluefin tuna for 2,000 lb of target species, etc.); amended the Atlantic tunas possession-at-sea and landing regulations to allow removal of Atlantic tunas tail lobes; and clarified the transfer-at-sea regulations for Atlantic tunas. NOAA Fisheries considers that this was a simple rule given that it modified only annual quotas and a few provisions of the commercial bluefin regulations.
Economic Impacts of Management Measures and Nature of Public Comments	NOAA Fisheries estimated the average impact to establish the 2011 and 2012 bluefin quota for all domestic fishing categories would have on individual categories and the vessels within those categories. The 2010 ICCAT recommendation reduced the U.S. baseline bluefin quota for 2011 and 2012 to 923.7 mt and provides 25 mt for incidental catch of bluefin related to directed longline fisheries in the NED. This action distributed the baseline quota of 923.7 mt to the domestic fishing categories based on the allocation percentages established in the Consolidated HMS FMP. In 2010, the annual gross revenues from the commercial bluefin fishery were approximately $8.9 million. As of October 2010, there were 8,311 vessels permitted to land and sell bluefin under four commercial bluefin quota categories (including HMS Charter/Headboat vessels). The commercial categories and their 2010 gross revenues are General ($7.8 million), Harpoon ($202,643), Purse Seine ($0), and Longline ($878,908). In the final rule, NOAA Fisheries estimated that implementing the 2010 ICCAT recommendation in accordance with the Consolidated HMS FMP and consistent with Atlantic Tunas Conservation Act (ATCA) was likely to have a slightly positive impact for fishermen. The economic impacts to the United States and to local economies was estimated to be similar in distribution and scale to 2010 (e.g., annual commercial gross revenues of approximately $8.9 million, as described above) and in the short term, may have provided fishermen additional fishing opportunities, subject to the availability of bluefin to the fishery. In the long term, however, the final rule indicated that stock growth may be hindered and negative impacts could result. It is difficult to estimate average potential ex-vessel revenues to commercial participants primarily because revenues depend heavily on the availability of large medium and giant bluefin to the fishery. The potential revenue losses per commercial quota category in the final rule was estimated based on each category's baseline quota reduction and price-per-pound information from 2010 (i.e., $206,251 for the General category, $13,944 for the Harpoon category, $25,150 for the Longline category, and $1,093 for the Trap category); although the purse seine category had no bluefin landings in 2010, potential revenue losses of $69,639 were estimated. Because the directed commercial categories had underharvested their subquotas in 2004–2008, the potential decreases in ex-vessel revenues above overestimate the likely actual economic impacts to those categories relative to recent conditions. Additionally, there has been substantial interannual variability in ex-vessel revenues per category in recent years due to

	recent changes in bluefin availability and other factors. Generally, the interannual differences in ex-vessel revenues per category have been larger than the potential impacts described above. Success rates of catching a bluefin tuna vary widely across participants in each category (due to extent of vessel effort and availability of commercial-sized bluefin to participants where they fish) but for the sake of estimating potential revenue loss per vessel, category-wide revenue losses can be divided by the number of permitted vessels in each category. Because HMS Charter/Headboat vessels may fish commercially under the General category quota and retention limits, Charter/Headboat permitted vessels were considered along with General category vessels when estimating potential General category ex-vessel revenue changes. Potential ex-vessel revenue losses (per vessel) as a result of this rule's implementation were estimated as follows: General category (including HMS Charter/Headboat vessels): $26; Harpoon category: $480; Longline category (incidental): $101; Trap category (incidental): $182; and purse seine category: $13,928. Section 6 describes potential revenue losses per commercial quota category based on each category not having access to quota that would be available through the carrying forward of 2010 underharvest, were it not for the ICCAT recommendation that limits the amount of underharvest that may be carried forward to 10 percent of a Contracting Party's total quota beginning effective for 2011. Potential ex-vessel revenue losses (per vessel) resulting from this change are estimated as follows: General category (including HMS Charter/Headboat vessels): $107; Harpoon category: $4,808; Longline category (incidental): $1,014; Trap category (incidental): $519; and purse seine category: $139,278. These values overestimated potential revenue losses for vessels that actively fish and are successful in landing at least one Bluefin tuna. The reinstatement of target catch requirements for pelagic longline vessels in the NED was estimated to result in a potential loss to the Longline category fishery of $341,228. When calculated for the universe of vessels participating in the NED over the 5 years prior to this rule (range of 6-10 vessels), it was estimated to represent average potential ex-vessel reductions of $34,123 to $56,871 per vessel. When calculated across Longline category vessels, it was estimated to be $1,376 per vessel. Acknowledging that the 2009 number of bluefin taken in the NED in 2009 may have been anomalous, NOAA Fisheries also provided a figure in the final rule for potential revenue loss of $42,408. This potential revenue loss would represent average potential ex-vessel reductions of $4,241 to $7,068 per vessel. When calculated across Longline category vessels, the reduction was estimated to be $171 per vessel. However, this target catch requirement was expected to result in positive short- and long-term economic impacts for the majority of bluefin fishery participants, including Longline category participants, as it would increase the likelihood that the Longline category quota will be available through the end of the year, without interruption, and decrease the potential need for reallocation from directed quota categories or quota reductions in subsequent years to cover Longline category excesses. The modifications to the regulations concerning Atlantic tunas possession at sea and landing and Atlantic tunas transfer at sea were intended to facilitate Atlantic tunas storage and provide clarification, respectively. While these changes would apply to all vessels holding Atlantic tunas, HMS Charter/Headboat, and HMS Angling category permits (totaling approximately 33,000 vessels), they were not expected to have significant economic impacts. Several comments received during the proposed rule stage stated that the proposed deduction of the dead discard estimate from the U.S. bluefin baseline quota would result in a de facto reallocation of quota shares from those established in the Consolidated HMS FMP, which would be economically damaging to the directed fisheries. Following consideration of public comment and the availability of updated (2010) dead discard estimates, NOAA Fisheries decided to account for one half of the dead discard estimate up front and directly against the Longline category quota, through the specifications process, which will mitigate some of the economic impacts associated with adjusting the baseline quota for dead discards. For the final 2011 quota specifications, this rule maintained the directed categories at their baseline quotas, which reflect application of the allocation scheme established in the Consolidated HMS FMP to the 2011 baseline U.S. bluefin tuna quota. For the Longline category, NOAA Fisheries

	deducted half of the 2010 dead discard estimate of 122.3 mt from the 2011 baseline Longline quota and applied half of the underharvest allowed to be carried forward to 2011. This resulted in a 61.1 mt quota for the Longline category that did not include the 25-mt allocation for the NED. NOAA Fisheries held the remainder of the 2010 underharvest allowed to be carried forward to 2011 (47.4 mt) within the Reserve category, for an adjusted Reserve category quota of 70.5 mt. NOAA Fisheries intended to maintain this underharvest in the Reserve category until later in the fishing year for maximum flexibility in accounting for 2011 landings and dead discards.
Overlap with other State or Federal Rules	This final rule does not duplicate, overlap, or conflict with any other federal rules.
Changes in Technology, Economic Conditions, or Other Factors since Last Evaluation	Since 2012, annual revenue for the pelagic longline fishery has declined from a high of $47.5 million in 2012 to a low of $25.6 million in 2016. Revenue for the fleet rebounded a bit in 2017 to $27.1 million. The general category fishery landed $8.7 million worth of bluefin tuna in 2011 and $9.2 million in 2012. In 2013, revenues declined to $4.4 million in 2013 but rebounded to $5.9 million in 2014. In more recent years, the general category fisheries landed $9,669,190 in ex-vessel gross revenue from bluefin tuna in 2016 and $7,830,919 in 2017. The harpoon category landed $458,464 of bluefin in 2011, $346,246 in 2012, $254,150 in 2013, and $544,778 in 2014. In more recent years, the harpoon category landed $379,035 in ex-vessel gross revenue from bluefin in 2016 and $496,968 in 2017.
Recommendation to Continue, Rescind, or Amend and Rationale	This rule is continuing as currently amended to meet the objectives of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and the 2006 Consolidated HMS FMP.
Name of Action, Date, and FR Cite	Atlantic Highly Migratory Species; Modification of the Retention of Incidentally-Caught Highly Migratory Species in Atlantic Trawl Fisheries. RIN 0648-BA45 (76 FR 49368, August 10, 2011)
Current Status of Rule (Expired, Rescinded, Superseded, Amended, or Continuing)	Continuing
Description of Management Measures and Complexity	This rule modifies the permitting requirements and retention limits for Atlantic highly migratory species that are incidentally-caught in Atlantic trawl fisheries. This action reduced regulatory dead discards of incidentally-caught Atlantic swordfish in the *Illex* squid trawl fishery by establishing a new Incidental HMS Squid Trawl permit for all valid *Illex* squid moratorium permit holders. The Incidental HMS Squid Trawl permit will allow up to 15 swordfish per trip to be retained. The final rule also establishes a retention limit for smoothhound sharks in all Atlantic trawl fisheries.
Economic Impacts of Management Measures	This rule implemented a new permit (referred to as the Incidental HMS Squid Trawl permit) for *Illex* squid moratorium permit holders to retain up to 15 swordfish per trip, which is the current squid trawl limit. Because this rule allowed *Illex* squid trawl vessels to retain swordfish caught incidentally during normal squid trawl fishing activities, thereby converting dead swordfish discards into landings, this rule was expected to provide some minor

and Nature of Public Comments	economic benefits to *Illex* squid trawl vessels. Specifically, this provision of the rule was estimated to provide a moderate increase in annual revenues from between $3,849.30–$4,145.40 annually for each of the 13 active *Illex*/*Loligo* squid trawl vessels that have not been issued HMS permits. In aggregate, this rule provision could produce from $50,041–$54,007 annually in additional revenue amongst all 13 active *Illex*/*Loligo* squid trawl vessels. Also, by implementing a permit requirement, NMFS obtained important fishery management information, such as the identification of participants in the squid trawl fishery that may occasionally catch swordfish. This information has helped in outreach efforts. The Federal Incidental HMS Squid Trawl permit requirement requires a permit application similar to other current HMS permits. The information collected on the application includes vessel information and owner identification and contact information. A modest fee to process the application and an annual renewal fee of approximately $20 was estimated in the analysis associated with the rule, but no fee has been implemented to date for this permit. This rule provision converted dead swordfish discards into landings, provided minor economic benefits to some small entities, reduced economic waste, provided additional fishery management information, and was not expected to alter current levels of fishing effort or have other adverse ecological consequences, including impacts on protected species, target species, non-target species, and essential fish habitat. This rule also allowed for the retention of smoothhound sharks caught incidentally in trawl gear, in an amount not to exceed 25 percent of the total catch, by weight. This retention limit went into place after Amendment 9 regarding smoothhound sharks was implemented in 2016. At the time, this rule estimated that this provision would provide moderate direct short-and long-term positive social and economic impacts. Some trawl fishermen supplemented fishing revenue with smoothhound shark products. Calculating the exact level of revenue that would continue to be earned through smoothhound shark sales by trawl fishermen was difficult due to incomplete reporting and data. However, based upon the average annual total smoothhound shark trawl revenue estimate of $68,968, the rule estimated that fishermen stood to experience moderate positive social and economic impacts. NOAA Fisheries received some comments regarding the economic impacts of this rule during the public comment period for the proposed rule. Commenters supported the implementation of the preferred alternative because it will provide economic benefits by reducing dead discards of swordfish and converting them into landings. Commenters noted that it was painful for so many *Illex* squid trawl vessels to discard incidentally-caught dead swordfish just because they do not have the correct HMS permits. The swordfish stock at the time was, and currently is, fully rebuilt, so there was potential for more landings. The positive economic impacts to an individual vessel was expected to be helpful. The preferred alternative was also expected to be a great benefit to New Jersey ports, especially Cape May, where many *Illex* vessels unload. Several commenters stated that while the ecological impacts would be negligible, the economic benefits could be large for many trawl fishermen. NOAA Fisheries did not expect that trawl fishing effort levels or rates would change as a result of this final rule. As such, no new direct, indirect, or cumulative ecological impacts were expected. However, continuing to allow trawl fishermen to retain and sell incidentally-caught smoothhound sharks, rather than prohibiting trawl landings, was expected to maintain some revenue from the species. The allowance to retain and sell a limited number of smoothhound sharks was expected to maintain revenues at levels just below the 10-year average of $68,968 annually across the entire trawl fishery. One commenter disagreed with the statement in the economic impact analysis that businesses supporting trawl fisheries do not rely on smoothhound shark landings, especially as the statement applies to Ocean City, MD. Smoothhound sharks are overwhelmingly caught and retained incidentally in Atlantic trawl fisheries while fishing for other species. They are not the primary reason for fishermen to embark on a trawl trip. NOAA Fisheries is establishing a trawl retention limit that will allow 89 percent of historical trips that landed smoothhound sharks to continue to occur.

	Because the retention of trawl-caught smoothhound sharks was expected to continue to be allowed at historical levels, businesses supporting trawl trips are not likely to be affected by this rulemaking.
Overlap with other State or Federal Rules	This final rule does not duplicate, overlap, or conflict with any other federal rules.
Changes in Technology, Economic Conditions, or Other Factors since Last Evaluation	There have been no substantial technological or economic changes associated with the Atlantic trawl fisheries that incidentally catch HMS species.
Recommendation to Continue, Rescind, or Amend and Rationale	This rule is continuing to meet the objectives of the Magnuson-Stevens Act and the 2006 Consolidated HMS FMP and NOAA Fisheries therefore it is recommended that this rule continue.
Name of Action, Date, and FR Cite	Atlantic Highly Migratory Species; Atlantic Shark Management Measures. RIN 0648-BA69 (76 FR 53652, August 29, 2011)
Current Status of Rule (Expired, Rescinded, Superseded, Amended, or Continuing)	Amended
Description of Management Measures and Complexity	In this rule, NOAA Fisheries prohibited the retention of oceanic whitetip sharks and scalloped, smooth, and great hammerhead sharks in the Atlantic pelagic longline, HMS Angling and HMS Charter/Headboat fisheries for tuna and tuna-like species consistent with ICCAT Recommendations 10-07 and 10-08. This rule was not considered to be a complex rule.
Economic Impacts of Management Measures and Nature of Public Comments	Under this rule, the ICCAT shark recommendations were applied to pelagic longline vessels fishing commercially for tuna and tuna-like species. The rule prohibited retention of oceanic whitetip and hammerhead sharks by pelagic longline vessels. On average, from 2005 through 2009, 12 vessels/year kept oceanic whitetip sharks, and less than 2 percent of the total pelagic longline trips kept oceanic whitetip sharks. An average of 1,462 lb of oceanic whitetip sharks were landed annually by these 12 pelagic longline vessels on average from 2005 through 2009. From 2005 through 2009, on average, 25 pelagic longline vessels/year kept hammerhead sharks, and less than 2 percent of the total pelagic longline trips kept hammerhead sharks. On average, 9,493 lb of hammerhead sharks were landed from 25 pelagic longline vessels per year from 2005 through 2009. Gross average annual revenues from oceanic whitetip and hammerhead shark meat and fins from the 25 pelagic longline vessels that fished for tuna or tuna-like species and kept oceanic whitetip or hammerhead sharks from 2005 through 2009 were approximately $9,155 per year across all vessels (37 vessels) or $247 per vessel per year. NMFS preferred Alternative 2 at that time, because it would implement ICCAT shark recommendations and would have minor adverse socioeconomic impacts on the pelagic longline fishery. This rule also applied the ICCAT shark recommendations to vessels holding a General category permit when fishing in an HMS tournament or holding either an HMS Angling or Charter/Headboat permit fishing either recreationally or commercially for tuna and tuna-like species. This rule

	prohibited retention of oceanic whitetip and hammerhead sharks along with tuna and tuna-like species by vessels fishing recreationally and by Charter/Headboat permit holders fishing commercially. Although there are no instances of oceanic whitetip or hammerhead sharks retained along with tuna or tuna-like species in the LPS or MRFS data from 2005 through 2009, NOAA Fisheries estimated that this rule provision could have limited fishing opportunities and led to fewer fishing trips. Charter/Headboats could experience a decrease in trips as much of their business is based on providing recreational anglers the opportunity to catch hammerhead and oceanic whitetip sharks. However, because none of the surveyed Charter/Headboat trips landed oceanic whitetip and hammerhead sharks along with tuna or tuna-like species, NMFS anticipated the impacts to Charter/Headboats to be minor. Although NOAA Fisheries did not receive comment specifically on the initial regulatory flexibility analysis (IRFA), public comments were received in regards to the increase in regulatory discards by prohibiting the retention of oceanic whitetip and hammerhead sharks in the commercial pelagic longline fishery. This rule was estimated to lead to an annual increase in oceanic whitetip and hammerhead sharks discards of 50 and 181 sharks, respectively, by converting average annual landings into regulatory discards. NOAA Fisheries estimated that vessels that landed oceanic whitetip and hammerhead sharks from 2005-2009 would incur annual economic losses of $109 and $314, respectively, from having to discard these sharks. Logbook data indicate that under existing regulations, between 2005 and 2009, 87 percent of hammerhead sharks and 75 percent of oceanic whitetip sharks caught on pelagic longline were discarded. NOAA Fisheries does not know the rationale behind these discards but assumes that vessel operators are choosing to discard these fish either because of existing retention limits or economic reasons. Participants using pelagic longline gear typically target tuna and swordfish, which are both higher valued species than sharks. Retaining sharks on vessels with limited hold space may affect product quality of other higher-valued species. Also, vessels may be limited by current large coastal and pelagic shark retention limits, depending on what type of commercial shark permit they hold (directed or incidental), which may also be the cause of these discards. Therefore, no changes were made in the rule resulting from public comments in response to the IRFA.
Overlap with other State or Federal Rules	This final rule does not duplicate, overlap, or conflict with any other Federal rules.
Changes in Technology, Economic Conditions, or Other Factors since Last Evaluation	The status of oceanic whitetip sharks and scalloped, smooth, and great hammerhead sharks has not changed since this rule was implemented. Since 2012, annual revenue for the pelagic longline fishery has declined from a high of $47.5 million in 2012 to a low of $25.6 million in 2016. Revenue for the fleet rebounded a bit in 2017 to $27.1 million.
Recommendation to Continue, Rescind, or Amend and Rationale	NOAA Fisheries recommends continuing with this rule to meet the objectives of the Magnuson-Stevens Act and the 2006 Consolidated HMS FMP.
Name of Action, Date, and FR Cite	Atlantic Highly Migratory Species; Adjustments to the Atlantic Bluefin Tuna General and Harpoon Category Regulations Atlantic Highly Migratory Species; Adjustments to the Atlantic Bluefin Tuna General and Harpoon Category Regulations. RIN 0648-AX85 (76 FR 74003, November 30, 2011)
Current Status of Rule (Expired, Rescinded,	Amended

Superseded, Amended, or Continuing)	
Description of Management Measures and Complexity	NOAA Fisheries adjusted the Atlantic bluefin tuna fishery regulations to increase the general category maximum daily retention limit; allow the general category season to remain open until the January subquota is reached, or March 31, whichever happens first; and increase the harpoon category daily incidental retention limit. NOAA Fisheries considers that this was a simple rule given that it just allows for flexibility in the retention daily retention limits and season end date.
Economic Impacts of Management Measures and Nature of Public Comments	An increase in the maximum possible daily retention limit to five fish per vessel was estimated to have positive economic impacts if NOAA Fisheries sets the daily retention limit to four or five fish via inseason action, due to the increased potential to land additional large medium and giant bluefin tuna rather than discarding fish in excess of the current maximum daily retention limit (e.g., if a fourth commercial size bluefin tuna is caught in one day). The economic analysis associated with the rule indicated that, based on 2010 data, ex-vessel revenues per trip could increase on average by approximately $5,250 per active vessel, depending on availability of large medium and giant bluefin tuna to the fishery. Allowing a higher maximum daily retention limit was also expected to reduce the trip costs per fish landed and thus improve profitability of trips when additional fish are available. NOAA Fisheries received numerous comments on this proposed rule during the comment period. NOAA Fisheries received some comments expressing concern that increasing the general category daily retention limit could have negative economic consequences from oversupplying the market, which could result in lower ex-vessel prices.
Overlap with other State or Federal Rules	This final rule does not duplicate, overlap, or conflict with any other federal rules.
Changes in Technology, Economic Conditions, or Other Factors since Last Evaluation	Since this rule was implemented, NOAA Fisheries did increase the daily retention limit to 5 in 2013 and 2016 for the general Category. The daily retention limit for the harpoon Category was raise to 4 in 2012, 2013, and 2014. With the implementation of Amendment 7, the default daily retention limit was set to 2. The general category fishery landed $8.7 million worth of bluefin tuna in 2011 and $9.2 million in 2012. In 2013, revenues declined to $4.4 million in 2013 but rebounded to $5.9 million in 2014. In more recent years, the general category fisheries landed $9,669,190 in ex-vessel gross revenue from bluefin tuna in 2016 and $7,830,919 in 2017. The harpoon category landed $458,464 of bluefin in 2011, $346,246 in 2012, $254,150 in 2013, and $544,778 in 2014. In more recent years, the harpoon category landed $379,035 in ex-vessel gross revenue from bluefin in 2016 and $496,968 in 2017.
Recommendation to Continue, Rescind, or Amend and Rationale	This rule is continuing as amended and is needed to manage the general category and harpoon category quota throughout the year.

Name of Action, Date, and FR Cite	Atlantic Highly Migratory Species; Vessel Monitoring Systems. RIN 0648-BA64 (76 FR 75492, December 2, 2011)
Current Status of Rule (Expired, Rescinded, Superseded, Amended, or Continuing)	Amended
Description of Management Measures and Complexity	This rule required fishermen to replace Mobile Transmitting Unite (MTU) vessel monitoring system (VMS) unites with Enhanced Mobile Transmitting Unit (E-MTU) VMS in Atlantic HMS fisheries. These units have to be installed by a qualified marine electrician to improve the reliability of the VMS data transmitted from HMS vessels. The vessel owner or operator must also follow procedures indicated on the NMFS-approved installation and activation checklist and submit a statement certifying compliance with the checklist to NMFS completed by a qualified marine electrician. At least 2 hours prior to departure for each trip, a vessel owner or operator must initially report to NMFS any HMS the vessel will target on that trip and the specific type(s) of fishing gear, using NOAA Fisheries-defined gear codes, that will be on board the vessel and the owner or operator must report advanced notice of landing to NMFS using an attached VMS terminal.
Economic Impacts of Management Measures and Nature of Public Comments	Costs of compliance with for this rule was estimated to be $3,971; $3,830; $3,737 per vessel for pelagic longline, bottom longline, and shark gillnet vessels, respectively, in the first year. These are the costs of compliance, pre-reimbursement. Reimbursement funds of $3,100 per VMS unit reduced the costs to $745 per vessel, on average, across all fisheries. Costs in year two (and beyond) is limited to the costs of sending/receiving declaration reports ($0.06 per report) and providing vessel location information on an hourly basis ($1.56 per vessel per day) and was estimated to be $471; $331; and $237 per vessel for pelagic longline, bottom longline, and shark gillnet vessels, respectively. The total gross cost of compliance in the first year for all combined HMS vessels was $1,292,398 and the potential reimbursement funds would cover $1,019,900 of that cost. The Agency received comments concerning the Initial Regulatory Flexibility Analysis for this rule stating that the Agency's estimate of $200 for installation of E-MTU VMS units by a qualified marine electrician was not appropriate for vessels that may be docked at remote ports far from larger population centers because of the travel time necessary for a qualified marine electrician. As a result, the estimate for installation of E-MTU VMS units by a qualified marine electrician was increased from $200 to $400 in response to these comments. Comments were also received on the delayed implementation date discussed in the Initial Regulatory Flexibility Analysis (IRFA) and proposed rule. The Agency implemented a delayed implementation date to mitigate economic impacts and provide stakeholders with some additional time to get new E-MTU units installed and operating. Commenters asked for additional time, up to six months, to comply with the new requirements and for the effective date to coincide with a period of low fishing activity. NOAA Fisheries implemented this final rule with two effective dates. As of January 1, 2012, this rule required all E-MTU VMS units to be installed by a qualified marine electrician. As of March 1, 2012, this rule required all vessel owners and/or operators to have an E-MTU VMS unit installed on their vessel and must use the unit to provide position reports, declare target species and fishing gear possessed onboard two hours prior to departing on a fishing trip, and provide notification of landing three hours in advance of returning to port. The selected delayed effective dates coincided with a period of reduced fishing activity for many HMS participants affected by the new requirement. This date also balances the need for fishermen to save money for the initial costs of buying the unit with the need to expedite the requirement so fishermen are ensured access to the reimbursement. A six-month phase in period, as suggested by the public comment, would

	increase the likelihood that reimbursement funds are not available to fishermen, thus was not chosen. The delayed implementation date also allowed vendors of type approved E-MTUs to ensure they have an adequate supply of units in stock.
Overlap with other State or Federal Rules	This final rule does not duplicate, overlap, or conflict with any other federal rules.
Changes in Technology, Economic Conditions, or Other Factors since Last Evaluation	The hardware technology for E-MTU VMS has remained relatively the same since the rule was implemented. New software was implemented late in 2014 to support the Amendment 7 VMS reporting requirements (area fished, bluefin interactions, and number of hooks). The operating cost for vessels increased as a result of the need to send in these VMS reports after each pelagic longline set. The affected number of vessels impacted by this rule has decreased as the number of active vessels in the fleet has decreased since this rule was implemented.
Recommendation to Continue, Rescind, or Amend and Rationale	Given the importance of VMS data for monitoring and reporting of the HMS fleet, NOAA Fisheries recommends that this rule continue.
Name of Action, Date, and FR Cite	Atlantic Highly Migratory Species; Atlantic Shark Management Measures; Amendment 3; Final Rule. RIN 0648-AW65 (75 FR 30483, June 2, 2010)
Current Status of Rule (Expired, Rescinded, Superseded, Amended, or Continuing)	Amended
Description of Management Measures and Complexity	This final rule implemented the management measures described in Final Amendment 3 to the Atlantic HMS FMP. These management measures were designed to rebuild overfished species and prevent overfishing of Atlantic sharks. This final rule implemented the final conservation and management measures in Amendment 3 for blacknose sharks, shortfin mako sharks, and smooth dogfish. In order to reduce confusion with spiny dogfish regulations, this final rule placed both smooth dogfish and Florida smoothhound into the ''smoothhound shark complex.'' This final rule also announced the opening date and 2010 annual quotas for small coastal sharks (SCS). These changes affected all fishermen, commercial and recreational, who fish for sharks in the Atlantic Ocean, the Gulf of Mexico, and the Caribbean Sea. NOAA Fisheries considers that this was a complex rule given that it was a major amendment to the fishery management plan with many provisions.
Economic Impacts of Management Measures and Nature of Public Comments	Amendment 3 to the Consolidated HMS FMP modified the SCS management group and reduced the overall quota. Previously, the SCS group included finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks which were managed under a 454 mt dw quota. To end overfishing and rebuild the blacknose shark stock, Amendment 3 established a separate quota of 19.9 mt dw for blacknose sharks and reduced the SCS quota for the remaining non-blacknose SCS to 221.6 mt dw. These two quotas were also linked so that if one was reached or exceeded, then both would close. NOAA Fisheries estimated these quota reductions would lead to a loss of $116,832 in blacknose shark landings, or $2,290 per permit holder with reported blacknose shark landings. The reduction in the remaining non-blacknose SCS quota was estimated to generate a loss of $42,484 in revenue overall and $622 per directed shark permit holder.

	In addition to modifying the SCS quotas, Amendment 3 also included measures for shortfin mako sharks and smooth dogfish. Amendment 3 determined to address potential overfishing for shortfin mako sharks through international action at ICCAT and promotion of live release by U.S. fishermen. Amendment 3 also added smooth dogfish to NOAA Fisheries management and established a federal permit and quota after a two-year delay to 2012. Neither of these measures were determined to have significant economic impacts. NOAA Fisheries received a comment regarding the ability to distribute the small SCS quota across all the permit holders. NOAA Fisheries examined the per vessel impacts of the proposed SCS quotas across all permit holders in the Initial Regulatory Flexibility Analysis (IRFA) and also in this Final Regulatory Flexibility Analysis. Based on data from 2004 to 2007 for Shark Directed and Incidental permit holders who landed non-blacknose SCS, the average directed shark permit holder earned $9,427 in average annual gross revenues, and the average Shark Incidental permit holder earned $707 in average annual gross revenues from non-blacknose SCS landings. For those permit holders who actually landed blacknose shark during that same time period, the average Shark Directed permit holder earned $3,640 in average annual gross revenues, and the average Shark Incidental permit holder earned $1,722 in average annual gross revenues from blacknose shark landings. NOAA Fisheries acknowledges that the availability of SCS quota proposed in the DEIS would be limited if spread across all permit holders. NOAA Fisheries made changes to the SCS quotas based, in part, on the comments received. The preferred alternative in the Final Environmental Impact Statement for SCS was 221.6 mt versus 56.9 mt preferred under the DEIS. The preferred alternative for blacknose shark quota was raised from 14.9 mt under the DEIS to 19.9 mt in the final statement. Another comment NOAA Fisheries received noted that the fins attached rule decreased fishing effort on SCS because it is too much work processing the sharks twice in hot weather. Prices are lower for SCS because the fins on rule decreased the quality due to increased processing time. NOAA Fisheries acknowledged that the fins on rule could decrease the quality of the product due to increased processing time. However, other factors such as market demand and decreased supplies might also affect prices. NOAA Fisheries indicated it would examine the impacts of leaving fins on sharks on the prices for SCS as information becomes available. NOAA Fisheries also received comments that the preferred blacknose shark recreational alternative in the DEIS would eliminate the recreational fishery and that there are no analyses of the economic benefits to the nation associated with this defacto allocation to the commercial sector. NOAA Fisheries notes that blacknose sharks rarely reach a size greater than the current federal minimum size, therefore, the current 54" fork length size limit creates a defacto retention prohibition of blacknose sharks in federal waters. NOAA Fisheries determined that prohibiting the retention of blacknose sharks in the recreational fishery could have some negative social and economic impacts on recreational fishermen, including tournaments and Charter/Headboats, if the prohibition of blacknose sharks resulted in fewer charters. However, since blacknose sharks are not one of the primary species targeted by recreational anglers, in tournaments or on charters and they rarely reach a size greater than the current federal minimum size, NOAA Fisheries did not anticipate much negative social and economic impacts on recreational anglers, tournaments, or in the Charter/Headboat sector. Leaving blacknose sharks under the existing 54" fork length size limit was the preferred alternative because the effect was the same as prohibiting the retention of blacknose sharks, thereby contributing to the rebuilding of the species. A few commenters, including the State of Virginia, noted that there is no indication that finning has been, is, or is likely to become a problem in the smooth dogfish fishery because of the economics of the fishery. The State of Virginia notes that the smooth dogfish fishery subsists as a high volume and labor intensive endeavor, as a typical whole round weight of 1,000 pounds contains 200–250 individual dogfish. In a typical processed catch of smooth dogfish, the dockside value of the fins represents 20–30 percent of the price paid to fishermen for their total catch, and fishermen return dockside with meat and fins in separate containers. Delaying the removal of fins and tail until landing would result in decreased marketability. Smooth dogfish are harder than other species to extract from the net, butcher and clean, with the result that labor costs represent a higher

	percentage of the total value of the product. Cutting fins at sea is important practically to the fishery in order to maintain proper product freshness. In the absence of processing, there would be a loss of profitability to the industry because of the increased labor with re-handling each carcass. NOAA Fisheries agreed that the smooth dogfish fishery is likely a labor intensive operation. While the delay in the removal of fins and tails until landing could reduce the quality and marketability of smooth dogfish, it was unclear whether any decreases in ex-vessel prices would exceed potential cost savings from reduced labor needs at sea associated with finning on the vessel. There would potentially be an increase in operating costs at dealers, if they end up processing the fins from the smooth dogfish carcasses.
Overlap with other State or Federal Rules	This final rule does not duplicate, overlap, or conflict with any other federal rules.
Changes in Technology, Economic Conditions, or Other Factors since Last Evaluation	Since 2010, annual revenue for the SCS fishery has varied considerably since 2013. SCS revenue was $272,590 in 2010, $410,305 in 2015, and $253,406 in 2016. Early closure of the non-blacknose SCS quota due to the quota linkage with the blacknose fishery has resulted in significant loss of revenue in some years, but the establishment of an 8 shark/ trip limit for blacknose sharks in 2017 will minimize the occurrence of early closures in the future allowing for full utilization of the commercial non-blacknose SCS quota.
Recommendation to Continue, Rescind, or Amend and Rationale	Amendment 6 to the Consolidated HMS FMP made major changes to the management of the SCS fishery by prohibiting retention of blacknose sharks in the Gulf of Mexico and in the Atlantic north of 34º 00' N latitude. The linkage between the blacknose and non-blacknose SCS quotas in the Atlantic was also removed north of the 34º 00' N latitude boundary to allow for further exploitation of the non-blacknsoe SCS quota in a region where blacknose landings are minimal. Amendment 6 also increased the non-blacknose SCS commercial quota in both the Atlantic and Gulf of Mexico. Amendment 9 to the Consolidated HMS FMP implemented the smooth dogfish/smoothhound shark measures that were delayed in Amendment 3. These included establishment of an open access commercial smoothhound shark permit. As authorized by the Shark Conservation Act, this permit allows for the removal of fins at sea from smooth dogfish so long as they make up at least 25 percent of retained catch on board by weight, and the fin-to-carcass ratio does not exceed 12 percent. Amendment 9 also established regional smooth dogfish quotas in the Atlantic and Gulf of Mexico and required shark recreational anglers to obtain an HMS Angling or Charter/Headboat permit to retain smooth dogfish caught in federal waters. Dealers purchasing smooth dogfish caught in federal waters were also required to obtain a HMS dealer permit. Overall, NOAA Fisheries concludes this rule is continuing as currently amended to meet the objectives of the Magnuson-Stevens Act and the 2006 Consolidated HMS FMP.
Name of Action, Date, and FR Cite	Atlantic Highly Migratory Species; 2011 Commercial Fishing Season and Adaptive Management Measures for the Atlantic Shark Fishery. RIN 0648-AY98 (75 FR 76302, December 8, 2010)
Current Status of Rule (Expired, Rescinded, Superseded, Amended, or Continuing)	Continuing
Description of Management Measures and Complexity	This final rule implemented adaptive management measures in the Atlantic shark fisheries to extend the shark fishing season by allowing for delaying the opening date of the different shark fisheries or inseason reductions of trip limits for non-sandbar large coastal sharks (LCS) to slow down the harvest of sharks within a given fishing season. It also established specifications for the 2011 shark season. These changes affect all commercial shark fishermen in the Atlantic and Gulf of Mexico, but those impacts were expected to be beneficial as the measures were intended to

	extend the shark season and ensure more equitable utilization of the resource across fishing regions. NOAA Fisheries considers this to be a low complexity rule as it only increased flexibility in the inseason management of the shark fishery.
Economic Impacts of Management Measures and Nature of Public Comments	This final rule implemented two adaptive management measures in the Atlantic shark fisheries. The first allowed NOAA Fisheries to delay opening the regional shark fisheries if it is determined that doing so would provide the most benefit to most of the fishermen while also considering the ecological needs of the different shark species. The second allowed NOAA Fisheries to make inseason adjustments to daily trip limits for non-sandbar LCS in order to extend the fishing season and ensure a more equitable distribution of landings to fishermen in different regions. Both measures were expected to have neutral to slightly positive overall economic impacts to the non-sandbar LCS fishery as they do not modify the overall quota, but they were expected to have an overall positive effect on the fishery by ensuring a more equitable distribution of landings and revenue generated by the fishery. Reductions in trip limits could have minor negative impacts on if the trip limit is set too low, reducing per trip revenue to the point of encouraging fishermen to switch to other fisheries, and converting the shark fishery to an indirect fishery until the trip limit is increased. This could be advantageous from a management perspective if the quota has been largely filled, and an indirect fishery would be preferable to a closed fishery to minimize dead discards. NOAA Fisheries received comments both for and against this rule on economic grounds. NOAA Fisheries received comments expressing opposition to increased flexibility in setting season opening dates on the grounds that commercial fishermen need certainty to make good business decisions and because a short season is more economically beneficial. NOAA Fisheries still conducts annual proposed and final rulemaking to establish the quotas and season opening dates. As part of these rulemaking, interested parties could provide comments and have notice of the season opening dates, as is currently the process. In addition, NOAA Fisheries provides five days notice of changes in shark trip limits, as is currently done with the closing of a particular shark fishery when 80 percent of a given quota is harvested. Such a process provides the same amount of notice to fishermen and associated shark industries of changes in the fishery as is currently provided. NOAA Fisheries believes that five days notice of changes provides enough time for business decisions while also providing NOAA Fisheries with the ability and flexibility to manage the fishery, as appropriate. NOAA Fisheries acknowledges that shorter seasons may result in some reduced trip-related expenses. A shorter season may result in less fuel expenditures for travel, lower costs associated with changing over gear types, and reduced crew turnover. A shorter season may reduce the at-sea time associated with harvesting the shark quota and, therefore, provide fishermen with more time to pursue other fisheries. However, there are both social and private costs potentially associated with shorter seasons. Shorter fishing seasons often result in derby-style fishing conditions, which can result in fishing under unsafe conditions, such as poor weather and long hours. Derby fishing can also result in a market glut of fish during the early part of a fishing season when there is heavy fishing if there is insufficient demand for the product during that short period. Furthermore, when fishing in other fisheries, such as snapper/grouper or mackerel fisheries, fishermen are likely to encounter sharks. If the season for sharks is closed, those sharks caught as bycatch need to be discarded, resulting in fishing inefficiencies and increased mortality of sharks. NOAA Fisheries received comments from fishermen in various states indicating their preference for season starting dates at different times of the year based on the seasonal availability of sharks in their region. Florida fishermen generally preferred early season openings in January or February when sharks are more abundant in their waters, while fishermen in North Carolina and further north preferred opening the season in July when sharks would be more abundant in their region. Consistent with National Standard 4, NOAA Fisheries must not discriminate between residents of different states. NOAA Fisheries must consider fishing opportunities that are fair and equitable to all fishermen. Having the flexibility to open the non-sandbar LCS fishery later in the year would allow the furtherance of equitable fishing opportunities to all fishermen in the Atlantic region; fishermen

	in the south Atlantic and north Atlantic would all have the ability to harvest a portion of the non-sandbar LCS quota in the Atlantic region with such an opening date. NOAA Fisheries received comments from fishermen in the Gulf of Mexico supporting various opening dates for the shark fishing season. Some fishermen supported opening the season early in the year when few other fisheries are open. Other fishermen in the Gulf commented that shark meat is easier to sell around Lent and supported flexibility in setting season opening dates so that they could be set around Lent each year. Finally, other fishermen around Louisiana supported delaying the opening until July when discharge from the Mississippi River is lower and sharks are easier to catch. NOAA Fisheries believes the diversity in preferences for season opening dates in the Gulf of Mexico region further justifies the need for continued flexibility in setting season opening dates and inseason adjustments of trip limits to ensure the fishery remains open for as much of the year as possible. NOAA Fisheries also received comment that we should not lower the trip limit to extend the season. Anything less than 33 non-sandbar LCS per trip would shut the fishery down since it would not be profitable for federal fishermen. With the implementation of Amendment 2, NOAA Fisheries anticipated that setting the trip limit at 33 non-sandbar LCS would lead to non-sandbar LCS being caught in an incidental manner in other fisheries, as the reduced trip limit would no longer provide an economically viable targeted fishery for non-sandbar LCS. However, an analysis of logbook data indicated that the non-sandbar LCS fishery had harvested, on average, less than the 33 non-sandbar LCS per trip limit. Specifically, the Coastal Fisheries Logbook data indicate that between the implementation of Amendment 2 (*i.e.*, 2008-2009) and this rule, the overall average number of non-sandbar LCS landed per trip in the Gulf of Mexico and Atlantic regions was 21 and 13, respectively. Additionally, NOAA Fisheries was aware that many shark fishermen continued to direct large coastal sharks, particularly during times when other fisheries are closed. Therefore, it seemed that targeted non-sandbar LCS trips were conducted at lower harvest levels than the previous trip limit. In this final rule, NOAA Fisheries did not change the trip limits. However, NOAA Fisheries did implement criteria for trip limit adjustments through inseason actions to provide fishermen more equitable access to the relevant shark resource throughout their appropriate region.
Overlap with other State or Federal Rules	This final rule does not duplicate, overlap, or conflict with any other federal rules.
Changes in Technology, Economic Conditions, or Other Factors since Last Evaluation	Since 2010, annual revenue in the non-sandbar LCS fishery has fluctuated slightly. Annual revenues in 2010 were $938,044, declined to $683,359 in 2013 but rose back to $885,305 in 2015 and was $720,802 in 2016. The flexibility provided in this rulemaking have allowed NOAA Fisheries to regulate the length of the season in such a way as to make sure it remains open throughout the year in most years, thus assuring a more equitable distribution of landings across regions.
Recommendation to Continue, Rescind, or Amend and Rationale	This rule is continuing as currently amended to meet the objectives of the Magnuson-Stevens Act and the 2006 Consolidated HMS FMP. The rule has increased management flexibility of the non-sandbar LCS fishery which has allowed for more equitable utilization of the resource across Atlantic and Gulf of Mexico regions.

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7 COMMUNITY PROFILES

National Standard 2 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires each SAFE Report to contain "pertinent economic, social, community, and ecological information for assessing the success and impacts of management measures or the achievement of objectives of each Fishery Management Plan" (50 CFR 600.315(d)(3). This chapter updates information on the highly migratory species (HMS) fishing communities identified and described in the 2006 Consolidated HMS Fishery Management Plan and its amendments. Background information on the legal requirements and summary information on the community studies conducted to choose the communities profiled in this document can be found in previous HMS SAFE Reports and was most recently updated in the 2011 HMS SAFE Report. Some information that has been detailed in previous SAFE Reports, such as decadal census data, is not repeated here. The 2011 and 2012 HMS SAFE Reports summarized demographic profiles from the results of the 2010 U.S. census, comparing 1990, 2000, and 2010 Bureau of the Census data. A profile for the U.S. Virgin Islands was not created because of the limited availability of 1990, 2000, and 2010 Census data for the territory. The descriptive community profiles in the 2011 HMS SAFE Report include information provided by Wilson et al. (1998), Kirkley (2005), Impact Assessment, Inc. (2004), and obtained from MRAG Americas, Inc. (2008), along with 2010 Bureau of the Census data.

Of the 24 communities profiled in previous SAFE Reports, 10 were originally selected due to higher proportions of HMS landings in the town, the relationship between the geographic communities and the fishing fleets, the existence of other community studies, and input from the HMS and Billfish Advisory Panels (which preceded the combined HMS Advisory Panel that currently exists). Profiles of the remaining 14 communities, although not selected initially, were incorporated because they were identified as communities that could be impacted by changes to HMS regulations due to the number of HMS permits associated with these communities. The communities profiled are not intended to be an exhaustive record of all HMS-related communities in the United States; rather the objective is to give a broad perspective of representative areas.

7.1 Community Impacts from Hurricanes

This section is an overview of the impacts on HMS communities caused by hurricanes during 2017 (National Hurricane Center 2017).

During the 2017 Atlantic hurricane season, 17 named storms formed, of which 10 became hurricanes, and six reached major hurricane strength based on the Saffir-Simpson Hurricane Wind Scale. Of the 17 storms that formed during the 2017 Atlantic hurricane season, seven made landfall on the continental United States and U.S. territories. Those storms included, Tropical Storm Cindy, Tropical Storm Emily, Hurricane Harvey, Tropical Storm Philippe, Hurricane Irma, Hurricane Nate, and Hurricane Maria.

Three of the seven storms that made landfall were tropical storms. Tropical Storm Cindy made landfall on June 20, 2017, near the Louisiana-Texas border, and affected areas over the northern Gulf coastal region. Rainfall totals of 7–10 inches occurred over areas of Mississippi, Alabama, and the Florida Panhandle. This storm produced approximately 10 tornadoes from Alabama to Florida. Tropical Storm Emily made landfall on July 31, 2017 south of Tampa Bay, Florida and

crossed west central Florida before moving east across the state into the Atlantic Ocean. Due to the track of Tropical Storm Emily, rainfall associated with the storm was quite widespread across Florida, with a maximum total of seven inches around Naples, Florida. This storm is estimated to have cost a total of nearly $10 million in damages across Florida.

Tropical Storm Phillippe was a short-lived storm that lasted between October 28 and 29 of 2017 and brought rains to portions of Cuba and southern Florida. While much of South Florida received rain amounts of 2 to 4 inches, several areas received much more with the highest storm total amounts of 10.9 inches at Boynton Beach and 10.1 inches near Lighthouse Point, Florida.

Hurricane Harvey was the first major hurricane of the 2017 Atlantic hurricane season to make landfall in the United States, and caused a damage estimate of $125 billion. It made landfall on August 26, 2017, at Rockport and Fulton, Texas, near Corpus Christi, as a Category 4 storm causing catastrophic flooding from the storm surge and torrential rains. Storm surge ranged between 4–10 feet above ground level in Texas, and rainfall estimates totaled 60 inches in certain areas of Texas, particularly around the Houston and east Texas areas. Additionally, Harvey produced heavy rain over Louisiana, peaking at 23 inches near Vinton, Louisiana.

Hurricane Irma made landfall on September 10, 2017, as a Category 4 hurricane in the Florida Keys and struck southwestern Florida as a Category 3 storm. It brought heavy wind and rain to many areas as it moved northward up the Florida peninsula, with the peninsula and Keys receiving totals of 10–15 inches, coastal Georgia receiving between 5–10 inches, and inland Georgia and South Carolina receiving 3–7 inches of rain.

Hurricane Nate made landfall on October 8, 2017, on the northern Gulf Coast, near the mouth of the Mississippi River, as a Category 1 hurricane. Nate produced 3 to 7 inches of rain from the central Gulf coast to the southern Appalachian Mountains and over portions of Kentucky. It is estimated to have caused $225 million dollars in damage to property and agriculture.

Hurricane Maria made landfall on September 20, 2017 and is considered the costliest hurricane during the 2017 hurricane season. High winds and heavy rains caused flooding and mudslides across most of the island of Puerto Rico, with one location receiving nearly 38 inches of rain. Power outages were pervasive across Puerto Rico for months following the storm. The damage in Puerto Rico and the U.S. Virgin Islands from Hurricane Maria is estimated at $90 billion.

7.2 Community Impacts from 2010 Deepwater Horizon/BP Oil Spill

On April 20, 2010, an explosion and subsequent fire damaged the Deepwater Horizon MC252 oil rig, which capsized and sank approximately 50 miles southeast of Venice, Louisiana. Oil flowed for 86 days into the Gulf of Mexico from a damaged well-head on the sea floor. In response to the Deepwater Horizon MC252 oil spill, NOAA Fisheries issued a series of emergency rules (75 FR 24822, May 6, 2010; 75 FR 26679, May 12, 2010; 75 FR 27217, May 14, 2010) closing a portion of the Gulf of Mexico exclusive economic zone to all fishing and analyzed the environmental impacts of these closures in an Environmental Assessment. Between May and November 2010, NOAA Fisheries closed additional portions of the Gulf of Mexico to fishing. The maximum closure was implemented on June 2, 2010, when fishing was prohibited in approximately 37 percent of the Gulf of Mexico exclusive economic zone. Significant portions of state territorial waters in Alabama (40 percent), Florida (2 percent), Louisiana (55 percent),

and Mississippi (95 percent) were closed to fishing (Upton 2011). After November 15, 2010, approximately 0.4 percent (1,041 square miles) of the federal fishing area was kept closed immediately around the Deepwater Horizon wellhead through April 19, 2011, when the final oil spill closure area was lifted (NOAA 2011).

Socioeconomic impacts from the oil spill on HMS communities include losses in HMS revenue and negative psychological impacts. One study (Sumaila et al. 2012) estimated the loss in commercial pelagic fish revenue, which includes HMS species, at $35–58 million over the next seven years. The study also estimated that Gulf of Mexico recreational fisheries could lose 11,000–18,000 jobs, and have an overall economic loss of $2.5–4.2 billion (Sumaila et al. 2012).

On April 20, 2011, BP agreed to provide up to $1 billion toward early restoration projects in the Gulf of Mexico (Deepwater Horizon Oil Spill Final Phase IV Early Restoration Plan and Environmental Assessments, 2015). The intention of the agreement was to expedite the start of restoration in the Gulf in advance of the completion of the injury assessment process.

In September 2015, the Deepwater Horizon Oceanic Fish Restoration Project (previously referred to as that Pelagic Longline Bycatch Reduction Project), was released to restore pelagic fish that were affected by the spill. The project aims to reduce the number of fish (including marlin, sharks, bluefin tuna, and smaller individuals of the target species) incidentally caught and killed in pelagic longline fishing gear by compensating pelagic longline fishermen who agree to voluntarily refrain from pelagic longline fishing in the Gulf during an annual six-month “repose” period that coincides with the bluefin tuna spawning season. The project also provides participating fishermen with two alternative gear types (green-stick and/or buoy gear) to allow for the continued harvest of yellowfin tuna and swordfish during the repose period when pelagic longline gear is not used.

Demographic data for coastal counties was evaluated, taking into consideration communities that could be disproportionately affected by the Oceanic Fish Restoration Project. It found that the dispersed low income minority Vietnamese-American populations in Louisiana who actively participate in the Gulf of Mexico pelagic longline fishery and commute to fishing ports exist; however, the project would not disproportionately affect minority or low income populations. The project is voluntary in nature, and as such, any fishermen in the Gulf of Mexico pelagic longline fishery can choose whether to participate in the repose and alternative gear provisioning. During the repose project, fish dealers, fuel suppliers, and ice/bait/equipment suppliers may experience negative economic effects; however, these effects are anticipated to be minor and short-term due to the limited duration of the repose period. Furthermore, negative economic effects may be partially mitigated by the use of alternative fishing gear.

A pilot project was implemented in 2017 for a shortened four-month repose from March 1 through June 30, 2017. Seven eligible vessel owners, all based in Louisiana, were selected to participate in the pilot. Pilot participants were limited to one state to allow for effective communication of best practices and detailed analysis of a regional specific segment of the Gulf market. Participants fished using greenstick gear on 25 fishing trips for a total of 280 days at sea, averaging 3–4 trips per vessel. Observer records showed clear bycatch reduction benefits, with fewer bycatch species caught using the alternative gear, and live releases of what bycatch was caught.

The 2018 repose contained several enhancements. Beginning in 2018, and in subsequent project years, the repose period is established from January 1 to June 30. Participation expanded to include participants throughout the Gulf States. The Gulf of Mexico was separated into two focus regions: the Western Gulf, including vessels with hailing ports in Louisiana, Mississippi, Alabama and Texas; and the Eastern Gulf, with vessels hailing from Florida and along the Atlantic Coast, with all participating vessels having a history of pelagic longline fishing in the Gulf of Mexico. Participants experienced greater alternative gear choices, including greenstick gear options for yellowfin tuna, buoy gear for swordfish, buoy gear for yellowfin tuna (under an EFP), and deep drop gear for swordfish. Participants were able to fish using alternative gear for up to 60 sea-days and were compensated for alternative gear trips taken during the repose period. Additional information can be found at http://sero.nmfs.noaa.gov/deepwater_horizon/index.html and http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/Final-Phase-IV-ERP-EA.pdf, http://www.gulfspillrestoration.noaa.gov/.

7.3 Social Indicators of Fishing Community Vulnerability and Resilience

The NOAA Fisheries Office of Science and Technology presents community profiles by region (e.g., Northeast, mid-Atlantic, Southeast, Gulf of Mexico) at http://www.st.nmfs.noaa.gov/humandimensions/community-profiles/index. Information on community vulnerability and resilience is presented by the same office in a technical memo at http://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index.

Jepsen and Colburn (2013) originally developed a series of social indicators of vulnerability and resilience for over 3,800 U.S. coastal communities. These indices are regularly updated based on new data, and the most recent indices and scores can be found on the NOAA Fisheries Social Indicators webpage listed above. Nine social indicators are presented in this document for 25 communities selected for having a greater than average number of Atlantic HMS permits associated with them (Table 7.1). This series of indices developed by NOAA Fisheries used social indicator variables that could assess a coastal community's vulnerability or resilience to potential economic disruptions such as those resulting from drastic changes in fisheries quotas and seasons or natural and anthropogenic disasters. Indices and index scores were developed using factor analyses of data from the U.S. Census, permit sales, landings reports, and recreational fishing effort estimates from the Marine Recreational Information Program (MRIP) survey (Jepsen and Colburn 2013). The nine social indices developed by Jepsen and Colburn (2013) can be divided into two categories: 1) fishing engagement and reliance, and 2) social vulnerability. For each index, the community is ranked as scoring high (one standard deviation or more above the mean score), medium high (0.5 to 0.99 standard deviations above the mean score), medium (0 to 0.49 standard deviations above the mean score), or low (below the mean score) on the index scale.

Fishing Reliance and Engagement Indices

Jepsen and Colburn (2013) developed two indices each to measure community reliance and engagement with commercial and recreational fishing, respectively. Commercial fishing engagement was assessed based on pounds of landings, value of landings, number of commercial fishing permits sold, and number of dealers with landings. Commercial fishing reliance was assessed based on value of landings per capita; number of commercial permits per capita; dealers with landings per capita; and data on the percentage of people employed in agriculture, forestry,

and fishing from the Bureau of Labor Statistics. The recreational fishing engagement index was measured using MRIP estimates of the number of charter, private boat, and shore recreational fishing trips originating in each community. The recreational fishing reliance index was generated using the same fishing trip estimates adjusted to a per capita basis. MRIP data is not available for the state of Texas, so the recreational indexes for Texas were instead calculated based on recreational permit data from NOAA Fisheries and boat ramp data from the state of Texas. As such, recreational index scores for Texas communities are only comparable to other communities within the state.

In Table 7.1, fishing reliance and engagement index scores are presented for 25 HMS communities. Ten of the twenty-five HMS communities scored either high or medium high on at least three indicators of fishing reliance and engagement, and only one community (Port Aransas, Texas) failed to score at least medium high on one of the four indices. Five communities that scored high on all four indices included Montauk, New York; Barnegat Light, New Jersey; Cape May, New Jersey; Dulac, Louisiana; and Grand Isle, Louisiana, indicating that these communities have greater than normal dependence on the recreational and commercial fishing sectors for jobs and economic support. New Bedford, MA scored high or medium high on both fishing engagement indices, while scoring medium or low on both fishing reliance indices indicating that while New Bedford has a significant fishing community, it is not a massive component of the city's overall population. Conversely, Atlantic Beach, North Carolina; Islamorada, Florida; and Orange Beach, Alabama all scored high or medium high on the recreational fishing indices, while scoring low or medium on both commercial fishing indices suggesting these communities have greater than normal dependence on the recreational fishing sector for jobs and economic support.

Social Vulnerability Indices

Five indices of social vulnerability developed by Jepsen and Colburn (2013) are presented in Table 7.1. The personal disruption index includes the following community variables representing disruptive forces in family lives: percent unemployment, crime index, percent with no diploma, percent in poverty, and percent separated females. The population composition index shows the presence of populations who are traditionally considered more vulnerable due to circumstances associated with low incomes and fewer resources. The poverty index includes several variables measuring poverty levels within different community social groups including the percent receiving government assistance, percent of families below poverty line, percent over age of 65 in poverty, and percent under age of 18 in poverty. The labor force index characterizes the strength and stability of the labor force and employment opportunities that may exist. A higher ranking indicates fewer employment opportunities and a more vulnerable labor force. Finally, the housing characteristics index is a measure of infrastructure vulnerability and includes factors that indicate housing that may be vulnerable to coastal hazards such as severe storms or coastal flooding. The only HMS community to score high or medium high on all five indices of social vulnerability was Fort Pierce, Florida, while Dulac, Louisiana, and Freeport, Texas scored high or medium high on four indices. Three other HMS communities scored high or medium high on three social vulnerability indices: New Bedford, Massachussetts; Apalachicola, Florida; and Grand Isle, Louisiana. These scores suggest these communities would likely experience greater difficulty recovering from economic hardships caused by job losses in the recreational and commercial fishing sectors.

Table 7.1 Social vulnerability indices for 25 HMS communities.

Community	Population	Fishing engagement and reliance				Social vulnerability				
		Commercial engagement	Commercial reliance	Recreational engagement	Recreational reliance	Personal disruption	Population composition	Poverty	Labor force	Housing
Gloucester, MA	29,237	HIGH	MEDIUM	HIGH	LOW	LOW	LOW	LOW	LOW	LOW
Nantucket, MA	7,787	MEDIUM	MEDIUM	HIGH	HIGH	LOW	LOW	LOW	LOW	LOW
New Bedford, MA	94,873	HIGH	MEDIUM	MED HIGH	LOW	HIGH	MED HIGH	HIGH	MEDIUM	MEDIUM
Narragansett, RI	15,786	HIGH	MEDIUM	HIGH	MEDIUM	LOW	LOW	LOW	MEDIUM	LOW
Montauk, NY	3,471	HIGH	HIGH	HIGH	HIGH	LOW	LOW	LOW	MEDIUM	LOW
Barnegat Light, NJ	592	HIGH	HIGH	HIGH	HIGH	LOW	LOW	LOW	HIGH	LOW
Brielle, NJ	4,772	MEDIUM	LOW	HIGH	MEDIUM	LOW	LOW	LOW	MED HIGH	LOW
Cape May, NJ	3,576	HIGH	HIGH	HIGH	HIGH	LOW	LOW	LOW	HIGH	MED HIGH
Ocean City, MD	7,093	HIGH	MEDIUM	HIGH	HIGH	LOW	LOW	LOW	HIGH	MED HIGH
Atlantic Beach, NC	1,618	MEDIUM	MEDIUM	HIGH	HIGH	LOW	LOW	MEDIUM	MEDIUM	HIGH
Beaufort, NC	4,119	HIGH	MEDIUM	HIGH	MED HIGH	MED HIGH	LOW	LOW	LOW	MED HIGH
Morehead City, NC	9,030	MED HIGH	MEDIUM	HIGH	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM	HIGH
Wanchese, NC	1,753	HIGH	MED HIGH	MED HIGH	HIGH	LOW	LOW	MED HIGH	LOW	MED HIGH
Fort Pierce, FL	42,744	MED HIGH	LOW	HIGH	MEDIUM	HIGH	HIGH	HIGH	MED HIGH	MED HIGH
Islamorada, FL	6,318	MEDIUM	LOW	HIGH	MED HIGH	LOW	LOW	LOW	MEDIUM	LOW
Pompano Beach, FL	103,234	MEDIUM	LOW	HIGH	LOW	MED HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM
Port Salerno, FL	10,070	LOW	LOW	MED HIGH	MEDIUM	LOW	LOW	LOW	MEDIUM	MEDIUM
Apalachicola, FL	2,129	MED HIGH	MEDIUM	HIGH	HIGH	HIGH	MEDIUM	HIGH	LOW	MED HIGH
Destin, FL	12,840	HIGH	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	MEDIUM
Madeira Beach, FL	4,297	MED HIGH	MEDIUM	HIGH	MEDIUM	LOW	LOW	LOW	MEDIUM	MEDIUM
Panama City, FL	36,405	HIGH	LOW	HIGH	LOW	MEDIUM	MEDIUM	MED HIGH	MEDIUM	MED HIGH
Orange Beach, AL	5,629	LOW	LOW	HIGH	HIGH	MEDIUM	LOW	LOW	MED HIGH	MEDIUM
Dulac, LA	1,116	HIGH	HIGH	HIGH	HIGH	HIGH	MEDIUM	HIGH	HIGH	HIGH
Grand Isle, LA	1,002	HIGH	HIGH	HIGH	HIGH	MED HIGH	LOW	MEDIUM	HIGH	MED HIGH
Freeport, TX	12,108	MED HIGH	LOW	LOW	LOW	HIGH	HIGH	MED HIGH	MEDIUM	HIGH
Port Aransas, TX	3,677	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM	MED HIGH

Note: Social indicator scores provided by NOAA Fisheries Office of Science and Technology's Social Indicators program. Source: Jepson and Colburn 2013.

Chapter 7 References

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8 BYCATCH, INCIDENTAL CATCH, AND PROTECTED SPECIES

"Bycatch" in fisheries is a term that generally refers to discarded fish or interactions between fishing operations and protected species. There are legal requirements pertaining to bycatch under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), and the Migratory Bird Treaty Act (MBTA). In 1998, NOAA Fisheries developed a report, "Managing the Nation's Bycatch: Priorities, Programs and Actions for the National Marine Fisheries Service," that evaluated NOAA Fisheries' bycatch reduction efforts by region and identified national-level recommendations to further enhance bycatch reduction. The 1998 report established a national bycatch goal to implement conservation and management measures for living marine resources that will minimize, to the extent practicable, bycatch and the mortality of bycatch that cannot be avoided. In 2003, NOAA Fisheries developed the first National Bycatch Strategy, which identified actions to reduce bycatch. In 2004, the United States published a report entitled "Evaluating Bycatch: A National Approach to Standardized Bycatch Monitoring Programs," which established goals for bycatch estimates.

In December 2016, NOAA Fisheries issued a "National Bycatch Reduction Strategy" (https://www.fisheries.noaa.gov/national/bycatch/national-bycatch-reduction-strategy) to guide and coordinate efforts to reduce bycatch and bycatch mortality in support of sustainably managing fisheries and recovering and conserving protected species. Specifically, the national strategy highlights the United States' commitment to continuing to reduce and minimize bycatch now and into the future. For the purposes of this strategy, reducing bycatch includes efforts to minimize the amount of bycatch, as well as to minimize the mortality, serious injury, and adverse impacts of bycatch. In addition, reducing bycatch can also include actions that increase utilization of fish that would otherwise be economic discards, taking into account conservation and management requirements. NMFS (2016) also issued a second update of its U.S. National Bycatch Report (https://www.st.nmfs.noaa.gov/observer-home/first-edition-update-2),which provides a compilation of data and national and regional overviews of bycatch in fisheries. NOAA Fisheries does not use the National Bycatch Report for day-to-day management of fisheries.

8.1 Bycatch Reduction and the Magnuson-Stevens Act

Under the Magnuson-Stevens Act, "bycatch" has a very specific meaning: "Fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program" (16 U.S.C. §1802(2)). Fish is defined as finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds (§1802(12)). Birds and marine mammals are therefore not considered bycatch under the Magnuson-Stevens Act.

National Standard 9 of the Magnuson-Stevens Act requires that fishery conservation and management measures shall, to the extent practicable, minimize bycatch and minimize the mortality of bycatch that cannot be avoided (16 U.S.C. §1851(a)(9)). In many

fisheries, it is not practicable to eliminate all bycatch and bycatch mortality. Some relevant examples of fish caught in Atlantic highly migratory (HMS) fisheries as bycatch or incidental catch are marlin, undersized swordfish, and bluefin tuna by commercial fishing gear; undersized swordfish and tunas in recreational hook and line fisheries; species for which there is little or no market such as blue sharks; species caught and released in excess of a bag limit; and prohibited species such as those in the prohibited shark complex and longbill spearfish. Table 8.1 lists methods that are employed to reduce bycatch in the Atlantic HMS fisheries. Final Amendment 5b to the 2006 Consolidated HMS Fisheries Management Plan (FMP), which went into effect by by January 1, 2018, expanded the use of several of these methods in HMS fisheries. Amendment 11 to the 2006 Consolidated HMS FMP proposed additional expansions to the use of these measures (July 27, 2018, 83 FR 35590).

Table 8.1 Bycatch reduction methods in the Atlantic HMS fisheries

Commercial fisheries	Recreational fisheries
Gear modifications (including hook and bait types).	Circle hooks (mortality reduction only).
Circle hooks.	Formal voluntary or mandatory catch-and-release program for all fish or certain species.
Weak hooks.	Prohibiting retention of fish.
Time/area closures.	Education/outreach.
Performance standards.	De-hooking devices (mortality reduction only).
Education/outreach.	
Effort reductions (i.e.,limited access).	
De-hooking devices (mortality reduction only).	
Prohibiting retention of fish.	
Gear modifications (including hook and bait types)	

As very few legal fishing gears are perfectly selective for the target species of each fishing operation, expecting to eliminate bycatch of all non-target species in Atlantic HMS fisheries would be impractical. The goal of bycatch reduction, therefore, is to minimize the amount of bycatch to the extent practicable and safely minimize the mortality of species caught as bycatch.

8.1.1 Standardized Bycatch Reporting Methodology

Section 303(a)(11) of the Magnuson-Stevens Act requires all FMPs to "establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery" (16 U.S.C. § 1853(11)). The scope of the Standardized Bycatch Reporting Methodology requirement is limited to the Magnuson-Stevens Act definition of "bycatch" (see Section 8.1 for definition). Requirements pertaining to the collection, reporting, and recording of bycatch data are set forth in the 2006 Consolidated HMS FMP, its amendments, and the implementing regulations. NOAA Fisheries provides an overview of bycatch in Atlantic HMS fisheries through 2010 in its 2011 SAFE Report (NMFS 2011) and an updated overview of bycatch, including observer coverage rates, in Chapter 5 of this report.

On January 19, 2017, NOAA Fisheries published its final guidance on the requirements and implementation of Standardized Bycatch Reporting Methodologies in all fisheries managed under the Magnuson-Stevens Act (82 FR 6317). That final rule required that a standardized reporting methodology must meet the specific purpose under §600.1610, may be different for different fisheries, and must address information about the characteristics of bycatch in the fishery, feasibility, data uncertainty, and data use. The methods for Atlantic HMS were described in the 2006 Consolidated Atlantic HMS FMP and are further described with updated information in this SAFE Report. Under §600.1605, "standardized reporting methodology" means an established, consistent procedure or procedures used to collect, record, and report bycatch data in a fishery, which may vary from one fishery to another. Bycatch assessment is not part of the standardized reporting methodology but must be considered. The purpose of a standardized reporting methodology is to collect, record, and report bycatch data in a fishery that, in conjunction with other relevant sources of information, are used to assess the amount and type of bycatch occurring in the fishery and inform the development of conservation and management measures that, to the extent practicable, minimize bycatch and bycatch mortality. The 2006 Consolidated Atlantic HMS FMP, as amended, and this SAFE Report fulfill the Standardized Bycatch Reporting Methodology requirements by establishing and describing standardized reporting methodology that meets this purpose and regulations at §600.1610. In 2019, NOAA Fisheries plans to update SBRM descriptions for some fishing gears within Amendment 12.

NOAA Fisheries scientists and managers continue to consult as necessary on reporting methodology design considerations, including changes in monitoring and reporting technology, to improve the quality of target and non-target catch estimates as needed while considering cost, technical, and operational feasibilities. NOAA Fisheries uses mandatory self-reported logbook data (HMS and Coastal Fisheries Logbook programs, including a supplemental discard report), at-sea observer data (the Pelagic Longline, Southeast Gillnet, and Bottom Longline Observer Programs), mandatory recreational fish landings reports, online reporting of dead discards of bluefin tuna in the commercial harpoon and hook and line fisheries (Atlantic Catch and Landings Reporting Site), and survey data (recreational fishery dockside intercept and telephone surveys) to produce bycatch estimates for HMS fisheries. The incidental catch of bluefin tuna in the pelagic longline fishery is monitored electronically via camera array (EM), and catch reporting via vessel monitoring systems (VMS). Post-release mortality of HMS is considered in stock assessments to the extent that the data allow. Fishing mortality estimates from these sources of information, as incorporated in stock assessments, are critical to understanding the overall status and outlook of a stock, as well as helping to understand the available options for conservation and management measures for the stock and potential implications for the ecosystem in which it lives.

HMS Pelagic Longline Fishery

The amount and type of bycatch occurring in the pelagic longline fishery is described in Section 5.1.2. NOAA Fisheries utilizes both self-reported logbook data and observer data to monitor bycatch in the pelagic longline fishery. The incidental catch of bluefin tuna in the pelagic longline fishery is also monitored via EM using a camera array and VMS. In

2018, per emergency action, the landing of shortfin mako sharks, only if dead at haulback, is also monitored via EM. Logbook reporting on the Trip Summary/Trip Set forms for Atlantic HMS (maintained in the Southeast Fisheries Science Center (SEFSC) United Data Processing (UDP) database, formerly the Fisheries Logbook System or FLS), are mandatory, and reporting rates are generally high (Garrison and Stokes 2016). Due to the management focus on HMS fisheries, there has been close monitoring of reporting rates, and observed trips can be directly linked to reported effort. In general, the gear characteristics and amount of observed effort is consistent with reported effort, which helps to maintain the certainty of data.

The observer program has been in place since 1992 to document finfish bycatch, characterize fishery behavior, and quantify interactions with protected species (Beerkircher et al. 2002). Data collection priorities have been to collect catch and effort data of the U.S. Atlantic pelagic longline fleet on HMS, although information is also collected on interactions with protected species. The program is mandatory for those vessels selected, and all vessels with Swordfish Directed and Incidental permits are selected. The program had a target coverage level of five percent of the U.S. fleet within the North Atlantic waters north of 5^{o} N. latitude, as was agreed to by the United States at the International Commission for the Conservation of Atlantic Tunas (ICCAT). Actual coverage levels achieved from 1992–2003 ranged from two to nine percent depending on quarter and year. Observer coverage was 100 percent for vessels participating in the Northeast Distant Waters (NED) experimental fishery during 2001–2003. Overall observer coverage in 2003 was 11.5 percent of the total sets made, including the NED experiment. The program began requiring an eight percent coverage rate due to the requirements of the 2004 Biological Opinion (BiOp) for Atlantic pelagic longline Fishery for HMS (NMFS 2004a). Observer coverage in 2005–2007 ranged from 7.5–10.8 percent. NOAA Fisheries increased the coverage of the pelagic longline fleet operating in the Gulf of Mexico during March/April through June for 2007–2010 to monitor bluefin tuna interactions, attempting 100 percent observer coverage from 2007 to 2009 and 50 percent since 2010. NOAA Fisheries increased mandatory observer coverage for pelagic longline vessels in the Mid-Atlantic Bight, including the Cape Hatteras gear restricted area (GRA), from December 1, 2015 through April 30, 2016, and December 1, 2016 through April 30, 2017. Expanding observer coverage in this area was intended to help scientists better understand bluefin tuna stock structure, biology and behavior, and assist in the rebuilding of the stock. The general increasing trend in observer coverage has reduced data uncertainty.

Fishery observer effort is allocated among 11 large geographic areas and by calendar quarter based upon the historical fishing range of the fleet (Fairfield-Walsh and Garrison 2006). The target annual coverage is eight percent of the total reported sets, and observer coverage is randomly allocated based upon reported fishing effort during the previous fishing year/quarter/statistical reporting area (Beerkircher et al. 2002). Bycatch rates of protected species (catch per 1,000 hooks) are quantified based upon observer data by year, fishing area, and quarter (Garrison 2005). The estimated bycatch rate is then multiplied by the fishing effort (number of hooks) in each area and quarter, as reported in United Data Processing (UDP), to obtain estimates of total interactions for each species of marine mammal and sea turtle (Garrison 2005).

Amendment 7 to the 2006 Consolidated HMS FMP requires vessels fishing with pelagic longline gear to report through VMS the following information within 12 hours of completion of each pelagic longline set: date the set was made; area in which the set was made; number of hooks in the set; and approximate length of all bluefin tuna retained, discarded dead, or released alive (by standardized size ranges). If a vessel is fishing both inside and outside of the NED on the same trip, that vessel must submit two VMS bluefin catch reports noting the location of the catch. Permit holders must also submit a landing notification at least three hours, but no more than 12 hours, prior to any landing. These requirements went into effect January 1, 2015. Observer coverage, bycatch and disposition, and protected species interactions in this fishery are reported in section 5.1.

Bluefin Tuna Purse Seine Fishery

Recent catch and landings for the U.S. Atlantic purse seine fishery are reported in section 5.2.2. Since 2015, there have been no active vessels permitted to fish for bluefin tuna, thus no effort or catch. In Recommendation 10-10, ICCAT established a minimum standard for scientific fishing vessel observer programs and adopted a minimum of five percent observer coverage of fishing effort in the purse seine fishery, as measured in number of sets or trips. This coverage rate is feasible and should provide a reasonable level of data certainty should vessels in this fishery become active. Amendment 7 to the 2006 Consolidated HMS FMP requires purse seine vessel owners to use VMS and must submit through a set report within 12 hours of completion of each purse seine set. Specifically, the report must include: date the set was made; area in which the set was made; and approximate length of all bluefin tuna retained, discarded dead, or released alive (by standardized size ranges), including reporting of zero bluefin on a set. These requirements went into effect January 1, 2015.

Shark Bottom Longline Fishery

Recent catch and landings for the bottom longline fishery are reported in sections 5.5.2 and 5.5.3. Since 2002, shark bottom longline vessels have been required to take an observer if selected. As a condition of participation in the shark research fishery, vessels are subject to 100 percent observer coverage of shark research fishery trips, which allows for targeting sandbar sharks. Outside the research fishery, and depending on the time of year and fishing season, vessels that target sharks, possess current valid Shark Directed permits, and reported fishing with longline gear in the previous year are randomly selected for observer coverage with a target coverage level of 5 to 10 percent for shark directed trips. These coverage rates are feasible and provide a reasonable level of data certainty. NOAA Fisheries utilizes both self-reported logbook data and observer data to monitor bycatch in the shark bottom longline fishery. Logbook reporting is mandatory. Most bottom longline fishermen use the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook form (maintained in the UDP) supplied by the SEFSC. Reporting rates using this logbook and the supplemental discard report form are generally high (Garrison and Stokes, 2016). The shark bottom longline fishery has relatively low observed bycatch rates. Historically, finfish bycatch has averaged approximately five percent in the bottom longline fishery. Observed protected species bycatch (sea turtles) has typically been much lower, less than 0.01 percent of the total observed catch. Disposition of discards is recorded by observers and in logbooks, and these can be used

to estimate discard mortality. Observer coverage, bycatch and disposition, and protected species interactions in this fishery are reported in section 5.5.

Shark Gillnet Fishery

Recent catch and landings for the gill net fishery are reported in sections 5.6.2 and 5.6.3. Various southeast gillnet fisheries including strike, sink, and trammel gillnet fisheries, are observed at varying rates by the SEFSC Gillnet Observer Program (GNOP), or the Northeast Fisheries Observer Program (NEFOP) which specifically interacts with mid-Atlantic smooth dogfish fisheries. The coverage rates provide a reasonable level of data certainty considering the feasibility of observed trips from a cost and operational perspective. NOAA Fisheries utilizes both self-reported logbook data and observer data to monitor bycatch in the shark gillnet fishery. Logbooks, and the supplemental discard report form in the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook program (supplied by the SEFSC and maintained in the UDP) and/or Northeast vessel trip reporting (VTR), are mandatory. Reporting rates using the SEFSC logbooks are generally high (Garrison and Stokes 2016). Disposition of discards is recorded by observers and can be used to estimate discard mortality. Observer coverage, bycatch and disposition, and protected species interactions in this fishery are reported in Section 5.6.

HMS Commercial Handgear Fishery

Recent catch and landings for the commercial handgear fishery are reported in section 5.3.2. The commercial handgear fishery is not currently selected for observer coverage as selection is not feasible from a cost perspective given the expense of additional pelagic observer capacity. Commercial handgear fishermen, including those in the harpoon fishery, are required to report bluefin tuna dead discards online; this requirement was effective January 2015. Vessels targeting bluefin tuna with harpoon gear have not been selected for observer coverage since the deliberate fishing nature of the gear is such that bycatch is expected to be low. Bycatch in the swordfish harpoon fishery is expected to be virtually, if not totally, non-existent; therefore, bycatch mortality would be near zero. Vessels in the buoy gear fishery are selected for mandatory logbook reporting of catch and effort. The combination of online reporting of bluefin tuna dead discards and logbook reporting, as applicable, in the commercial handgear fishery provides a reasonable level of data certainty considering the feasibility of observed trips and comprehensive logbook reporting from a cost and operational perspective. As technological advances occur and costs decrease for methods such as electronic logbook reporting, the feasibility of additional reporting methods may be reassessed.

Recreational Handgear Fishery

Recent catch and landings for the recreational handgear fishery are reported in section 5.4.2. The recreational handgear fishery is not currently selected for observer coverage as selection is not feasible from a cost and operational perspective. The recreational landings database for Atlantic HMS consists of information obtained through surveys, including the Marine Recreational Information Program (MRIP) survey, Large Pelagics Survey (LPS), Southeast Headboat Survey, Texas Headboat Survey, tournament data through the Rcreational Billfish Survey (RBS) or Atlantic Tournmaent Registration and Reporting (ATR) system, and the HMS Recreational Reporting Program for non-

tournament swordfish, billfishes, and bluefin tuna via https://hmspermits.noaa.gov/. Descriptions of these surveys, the geographic areas they include, and their limitations are discussed in the 2006 Consolidated HMS FMP (NMFS 2006) and Section 5.4.

Historically, fishery survey strategies (including MRIP, LPS, and RBS/ATR) have not captured all landings of recreationally-caught swordfish. Although some swordfish handgear fishermen have commercial permits, many others land swordfish strictly for personal consumption; therefore, NOAA Fisheries has implemented regulations to improve recreational swordfish and billfish monitoring and conservation. These regulations stipulate that all non-tournament recreational landings of swordfish and billfish must be reported by phone at (800) 894-5528 or online at https://hmspermits.noaa.gov/. All reported recreational swordfish landings are counted toward the incidental swordfish quota. Reported domestic landings of Atlantic tunas and swordfish are presented in Section 5.4.2. Bycatch in the recreational BAYS spearfishing fishery is expected to be virtually, if not totally, non-existent; therefore, bycatch mortality would be near zero. As a whole, the combination of applicable surveys and mandatory landings reporting provide a reasonable level of data certainty considering the feasibility from a cost and operational perspective.

Green-stick Fishery

Recent catch and landings for the greenstick fishery are reported in section 5.7.1. The Standardized Bycatch Reporting Methodology for the commercial greenstick fishery is identical to that described for the commercial handgear fishery above but is listed under its own subheading because it is not considered a handgear.

8.1.2 Bycatch Reduction in HMS Fisheries

The NOAA Fisheries HMS bycatch reduction program includes an evaluation of current data collection programs, implementation of bycatch reduction measures (see Table 8.1) such as gear modifications and time/area closures, and continued support of data collection and research relating to bycatch. Further details on bycatch and bycatch reduction measures can be found in Section 3.5 of the 1999 Atlantic Tunas, Swordfish and Sharks FMP (NMFS 1999), Regulatory Amendment 1 to the 1999 FMP (NMFS 2000), Regulatory Adjustment 2 to the 1999 FMP (NMFS 2002), Amendment 1 to the 1999 FMP (NMFS 2003), the 2006 Consolidated HMS FMP (NMFS 2006), and HMS SAFE Reports. In addition, an HMS Bycatch Reduction Implementation Plan was developed in late 2003 and updated through 2010, which identified priority issues to be addressed in the following areas: 1) monitoring; 2) research; 3) management; and 4) education/outreach. Individual activities in each of these areas were identified, and new activities may be added or removed as they are addressed or identified.

8.2 Bycatch Mortality

The reduction of bycatch mortality is an important component of National Standard 9. Atlantic HMS regulations state that all fish must be released in a manner that increases their chances of survival. Research has shown that removing fish from the water significantly increases the likelihood of post-release mortality due to injuries associated with the stress of being hooked or caught in a net that are not immediately apparent.

Because of these stress injuries, post-release mortality may not be anticipated by the fisherman who releases the fish, even in a rapid and safe manner. Thus, regulations require releasing Atlantic HMS without removing the fish from the water. Ongoing research uses data on release techniques and from pop-up satellite tags to examine in situ mortality rates of Atlantic HMS. Information on bycatch mortality of these fish will continue to be collected and in the future may be used to estimate bycatch mortality in stock assessments. A summary of bycatch species, data collection methods, and management measures by fishery/gear type are found in Table 8.2. For details on protected species as bycatch in pelagic longline, shark bottom longline, and shark gillnet fisheries, please refer to Table 5.10–Table 5.17, Table 5.46, and Table 5.51, respectively.

The bycatch reporting methodologies of the Atlantic HMS fisheries and observer coverage rates (for fisheries with observer coverage) are provided in the respective Fishery Data Update sections: 5.1 Pelagic Longline; 5.2 Purse Seine; 5.3 Commercial Handgear; 5.4 Recreational Handgear; 5.5 Bottom Longline; and 5.6 Gillnet Fishery.

All bycatch data are collected with respect to fishing gear type. The number and location of discarded fish are recorded, as is the disposition of the fish (i.e., released alive vs. released dead) through collection methods described in 8.1.1. Adjustments to reporting methodologies are implemented as conditions or practices change in the fisheries or new research reveals alternate methodologies. Post-release mortality of HMS is considered in stock assessments to the extent that the data allow.

Table 8.2 Summary of bycatch species, Marine Mammal Protection Act category, Endangered Species Act requirements, data collections, and management measures for the Atlantic HMS fisheries

Fishery/gear type	Bycatch species	MMPA category	ESA requirements	Bycatch data collection	Management measures (year implemented)
Pelagic longline	Bluefin tuna Billfish Undersize target species Marine mammals Sea turtles Seabirds Non-target finfish Prohibited SHK species LCS species after closure	Category I	Jeopardy findings in 2000 & 2004; RPA implemented 2001–04; ITS, Terms & Conditions, Reasonable and Prudent Measures (RPMs); Consultation reinitiated in 2014	Permit requirement (1985); logbook requirement (SWO—1985; SHK—1993); observer requirement (1992), EFPs (2001–present); VMS reporting (2015)	BFT target catch requirements (1981); quotas (SWO—1985; SHK—1993); prohibit possession of billfish (1988); minimum size (1995); gear marking (1999); line clippers, dipnets (2000); MAB closure (1999); limited access (1999); limit the length of mainline (1996–1997 only); move 1 nm after an interaction (1999); voluntary vessel operator workshops (1999); GOM closure (2000); FL, Charleston Bump, NED closures (2001); gangion length, corrodible hooks, de-hooking devices, handling & release guidelines (2001); NED experiment (2001–03); VMS (2003); circle hooks and bait requirements (2004); mandatory safe handling and release workshops (2006); sea turtle control device (2008); closed area research (2008–10); marine mammal handling and release placard, 20 nm mainline restriction in MAB, observer and research requirements in Cape Hatteras Spec. Research Area (CHSRA), increased observer coverage in PLL fishery (2009), weak hook requirement in GOM (2011); IBQ, GRAs, EM, VMS reporting (2015); sharks released not retained by dehooker or cutting gangion < 3 ft from hook, shark identification course for vessel owners and operators, move 1 nm after dusky shark interaction and notify other vessels (2017).

Fishery/gear type	Bycatch species	MMPA category	ESA requirements	Bycatch data collection	Management measures (year implemented)
Shark bottom longline	Prohibited shark species Target species after closure Sea turtles Smalltooth sawfish Non-target finfish	Category III	ITS, Terms & Conditions, RPMs	Permit requirement (1993); logbook requirement (1993); observer coverage (1994)	Quotas (1993); trip limit (1994); gear marking (1999); handling & release guidelines (2001); line clippers, dipnets, corrodible hooks, de-hooking devices, move 1 nm after an interaction (2004); South Atlantic closure, VMS (2005); shark identification workshops for dealers (2007); sea turtle control device (2008); shark research fishery (2008); shark identification course for vessel owners and operators, move 1 nm after dusky shark interaction and notify other vessels (2017); circle hooks (2018).
Northeast sink and mid-Atlantic shark gillnet (smoothhound)	Marine mammals	Category I			Sink gillnet soak time limits and net check requirements for drift gillnets (2016)
Northeast, Southeast U.S. Atlantic, and Gulf of Mexico shark gillnet	Prohibited shark species Sea turtles Marine mammals Non-target finfish Smalltooth sawfish	Category II	ITS, Terms & Conditions, RPMs	Permit requirement (1993); logbook requirement (1993); observer coverage (1994)	Quotas (1993); trip limit (1994); gear marking (1999); deployment restrictions (1999); 30-day closure for leatherbacks (2001); handling & release guidelines (2001); net checks (2002); whale sighting (2002); VMS (2004; revised 2016); closure for right whale mortality (2006); shark identification workshops for dealers (2007); sink gillnet soak time limits and net check requirements for drift gillnets (2016); shark identification course for vessel owners and operators, move 1 nm after dusky shark interaction and notify other vessels (2017).
Bluefin tuna purse seine	Undersize target species Non-target finfish	Category III	ITS, Terms & Conditions	Permit requirement (1982); observer requirement (1996, 2001 only); EFPs	Quotas (1975); limited access, individual vessel quotas (1982); minimum size (1982); VMS requirements and reporting (2015)

Fishery/gear type	Bycatch species	MMPA category	ESA requirements	Bycatch data collection	Management measures (year implemented)
				(2002-03); VMS reporting (2015)	
Bluefin tuna & swordfish harpoon	Undersize target species	Category III	ITS, Terms & Conditions	Permit requirement (BFT—1982; SWO—1987); SWO logbook requirement (1987); online catch reporting (2015)	Quotas (BFT—1982; SW0—1985); minimum size (BFT—1982; SWO—1985); online catch reporting (2015)
Handgear—Commercial	Undersize target species Non-target finfish	Category II	ITS, Terms & Conditions	Permit requirement (BFT—1982; SWO—1987; SHK—1993); logbook requirement (SWO—1985; SHK—1993); online catch reporting (2015)	Regulations vary by species (including quotas, minimum sizes, retention limits, landing form), online catch reporting (2015).
Handgear—For-Hire	Undersize target species Non-target finfish	Category III	ITS, Terms & Conditions	LPS (1992); MRFSS (1981); Online catch reporting (2015)	Regulations vary by species (including minimum sizes, retention limits, landing form), BFT quotas, online catch reporting (2015); circle hooks when fishing for sharks south of Chatham, MA, online shark identification and management measure video and quiz to obtain shark endorsement (2018).

MMPA = Marine Mammal Protection Act; ESA = Endangered Species Act; RPA = reasonable and prudent alternative; ITS = Incidental Take Statement; RPM = reasonable and prudent measures; EFPs = exempted fishing permits; VMS = Vessel Monitoring System; BFT = bluefin tuna; SWO = swordfish; SHK = shark; MAB = Mid-Atlantic Bight; GOM = Gulf of Mexico; NED = North East Distant; PLL = pelagic longline; IBQ = individual bluefin quota; GRAs = gear restricted areas; EM = electronic monitoring; LPS = Large Pelagics Survey; MRFSS = Marine Recreational Fishing Statistics Survey (now the Marine Recreational Information Program or MRIP).

Domestic fishery landings and bycatch data are taken from the U.S. Annual Report to ICCAT, directly from NOAA Fisheries program databases for commercial landings (HMS and Coastal Fisheries Logbook Programs, Northeast VTRs, Observer Programs (POP, BLLOP, GNOP, NEFOP), eDealer, Atlantic Catch and Landings Reports, and eBFT), and recreational landings (LPS, the RBS/ATR, and the MRIP). NOAA Fisheries permits data are assembled from the Office of Science and Technology's International Trade Permit, Regional Permits Offices, HMS Permits, HMS exempted fishing permits, HMS Display Permits, HMS scientific research permits, and HMS ATR.

NOAA Fisheries submits annual data (Task II) to ICCAT on mortality estimates (dead discards). These data are included in this chapter and the U.S. National Report to ICCAT to evaluate bycatch trends in Atlantic HMS fisheries.

HMS Pelagic Longline Fishery

Pelagic longline vessels must comply with gear and deployment restrictions to minimize bycatch and bycatch mortality. Gangions must be at least 10 percent longer than the length of floatlines if the two lengths combined are less than 100 m, allowing hooked sea turtles enough length to breathe at the surface. Vessels may possess only corrodible 18/0 or larger circle hooks with an offset of 10 degrees or less or 16/0 non-offset circle hooks (outside of the NED), and must use only whole finfish or squid bait, decreasing the chance of an animal swallowing the hook. Vessels fishing in the Gulf of Mexico may not use live bait and may possess or deploy only circle hooks that are constructed of round wire stock with a diameter no larger than 3.65 mm to increase the self-release and survival rate of spawning bluefin tuna that come into contact with the gear. Vessel owners and operators must attend a protected species safe handling, release, and identification workshop every three years, must carry NOAA Fisheries-approved dehooking devices onboard, and must store and post careful handling release protocols and guidelines in the wheelhouse to minimize injury to protected species when interactions occur. Any dusky sharks and protected species that becomes entangled or hooked must be immediately released, and gear must be immediately retrieved and moved at least 1 nautical mile (nmi) from that location before fishing is resumed to avoid interacting with the species again. Vessels must account for all incidental landings and retain all legal-sized bluefin tuna that are dead upon haulback to reduce dead discards in the fishery. Per ICCAT requirements, porbeagle sharks must be relased unharmed, to the extent practicable, if they are alive at the time of haulback and if tunas, swordfish, and/or billfish are onboard vessels. Silky, hammerhead sharks, and oceanic white tip sharks may not be retained. Per an emergency rule, in 2018, vessels also are required to release all live shortfin mako sharks but may land shortfin mako sharks that are dead at haulback.

NOAA Fisheries collects data on the disposition (released alive or dead) of bycatch species from logbooks submitted by fishermen in the pelagic longline fishery. Observer reports also include disposition of the catch as well as information on hook location, trailing gear, and injury status from protected species interactions. These data are used to estimate post-release mortality of sea turtles and marine mammals based on guidelines for each (Angliss and DeMaster 1998, Ryder et al. 2006). See Table 5.15 for sea turtle and marine mammal interactions in the pelagic longline fishery.

Bluefin Tuna Purse Seine Fishery

NOAA Fisheries has limited observer data on the bluefin tuna purse seine fishery; however, data are collected through VMS, in which the vessel must declare the start and end of their trip and submit an HMS bluefin tuna catch report for each set, including the number of dead discards. There are no recorded instances of non-tuna finfish, other than minimal numbers of blue sharks, caught in tuna purse seines. Anecdotal evidence indicates that if fish are discarded, they are easily released out of the net with minimal bycatch mortality.

Shark Bottom Longline Fishery

The bottom longline fishery includes the shark research fishery, which is required to take an observer when targeting sandbar sharks, and the limited access fishery in which vessels are randomly selected for observer coverage and may be required to use a VMS. Vessel owners and operators must attend a protected species safe handling, release, and identification workshop every three years, must carry NOAA Fisheries-approved dehooking devices onboard and use them in the event of a protected species interaction, and must store and post careful handling release protocols and guidelines in the wheelhouse to minimize injury to protected species when interactions occur. Any dusky shark and protected species that becomes entangled or hooked must be immediately released, and gear must be immediately retrieved and moved at least one nmi from that location before fishing is resumed to avoid interacting with the species again. Marine mammal entanglements must be reported to NOAA Fisheries under the Marine Mammal Authorization Program. Time/area closures are implemented in this fishery to reduce bycatch, and require the proper stowage of gear if the vessel is within a closed area. Bottom longline gear must include only corrodible hooks to prevent long-term injury of bycatch, which cannot be released safely if the hook is removed. Disposition of discards and protected species interactions are recorded by observers and can be used to estimate discard mortality. On January 1, 2018, circle hook requirements by all HMS directed shark permit holders using bottom longline gear became effective. Per an emergency rule, in 2018, bottom longline fishermen were not allowed to land shortfin mako sharks. Observer coverage, bycatch and disposition, and protected species interactions in this fishery are reported in section 5.5.

NOAA Fisheries collects data on the disposition (released alive or dead) of bycatch species from logbooks submitted by fishermen in the bottom longline fishery. Observer reports also include disposition of the catch as well as information on hook location, trailing gear, and injury status of protected species interactions. Protected species interactions are summarized in Table 5.46.

Shark Gillnet Fishery

Vessel owners and operators that hold a shark limited access permit must attend a protected species safe handling, release, and identification workshop every three years. Vessel owners and operators that hold only a smoothhound shark permit are not required to attend the workshops. Fishermen using gillnet gear must limit soak times to 24 hours when using sink gillnet gear and conduct a net check at least every two hours when using drift gillnet gear to look for and remove any sea turtles, marine mammals, or smalltooth sawfish. If a marine mammal is taken, the vessel operator must immediately cease fishing operations and contact NOAA Fisheries consistent with the Marine Mammal Authorization Program. Smalltooth sawfish must not be removed from the water while being removed from the net. Dusky sharks must be released immediately and vessels

must move 1 nmi after a dusky shark interaction and notify other vessels. Per an emergency rule, in 2018, gillnet fishermen were not allowed to land shortfin mako sharks.

NOAA Fisheries collects data on the disposition (released alive or dead) of bycatch species from logbooks submitted by fishermen in the shark gillnet fishery. Observer reports include disposition of the catch, as well as information on injury status of protected species interactions, and can be used to estimate discard mortality. Observer coverage, bycatch and disposition, and protected species interactions in this fishery are reported in section 5.6.

HMS Commercial Handgear Fishery

Vessels targeting bluefin tuna with harpoon gear have not been selected for observer coverage since the deliberate fishing nature of the gear is such that bycatch is expected to be low. Bycatch in the swordfish harpoon fishery is expected to be virtually, if not totally, non-existent; therefore, bycatch mortality would be near zero. Disposition of bycatch reported in logbooks is used to estimate mortality of bycatch in the swordfish buoy gear fishery. Bycatch and disposition in the buoy gear fishery are reported in section 5.3.

HMS Recreational Handgear Fishery

The LPS (dockside and telephone survey) collects data on disposition of bycatch (released alive or dead) in recreational Atlantic HMS fisheries from Virginia to Maine during June through October. Rod and reel discard estimates can be monitored through the expansion of survey data derived from the LPS; however, the actual numbers of fish discarded for many species are low. Post-release mortality estimation of billfishes has been examined in a review by Graves and Horodosky (2015). NOAA Fisheries distributes educational outreach materials on the careful catch and release of Atlantic HMS to recreational fishing tournaments, where a large audience of recreational fishermen can be reached. Bycatch data collected by the LPS are reported in section 5.4. To reduce dusky shark mortality, starting January 1, 2018, fishermen wishing to fish for sharks must watch an online shark identification video and take a quiz in order to obtain a shark endorsement on their Angling permit. These fishermen will also be required to use circle hooks when fishing for sharks south of Chatham, MA.

NOAA Fisheries developed a Code of Angling Ethics as part of implementing Executive Order 12962—Recreational Fisheries. NOAA Fisheries implemented a national plan to support, develop, and implement programs that were designed to enhance public awareness and understanding of marine conservation issues relevant to the wellbeing of fishery resources in the context of marine recreational fishing. This code is consistent with National Standard 9, minimizing bycatch and bycatch mortality. These guidelines are discretionary, not mandatory, and are intended to inform the angling public of NOAA Fisheries views regarding what constitutes ethical angling behavior. Part of the code covers catch-and-release fishing and is directed towards minimizing bycatch mortality. For a detailed description of the code, please refer to Section 3.9.8.3 of the 2006 Consolidated HMS FMP (NMFS 2006).

8.3 Protected Species Interactions in HMS Fisheries

This section examines the interaction between protected species and Atlantic HMS fisheries managed under the 2006 Consolidated HMS FMP. A more detailed review of the three acts—the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the

Migratory Bird Treaty Act (MBTA)—primarily affecting protected species, along with a description of the Pelagic Longline Take Reduction Team (PLTRT), Pelagic Longline Take Reduction Plan (PLTRP), and measures to address protected species concerns, is available on the NOAA Fisheries Office of Protected Resources website (https://www.fisheries.noaa.gov/about/office-protected-resources) and discussed in the 2011 HMS SAFE Report (NMFS 2011). The interaction of seabirds and longline fisheries is considered under the United States "National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries." Bycatch of HMS in other fisheries is also discussed in the 2011 HMS SAFE Report.

8.3.1 Interactions and the Marine Mammal Protection Act

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

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

Table 8.3 outlines the marine mammal species that occur off the Atlantic and Gulf coasts that are or could be of concern with respect to potential interactions with HMS fisheries.

Table 8.3 Atlantic and gulf coast marine mammal species potentially of concern in HMS fisheries interactions

Common name	Scientific name
Atlantic spotted dolphin	*Stenella frontalis*
Beaked whales, mesoplodon	*Mesoplodon spp.*
Bottlenose dolphin	*Tursiops truncatus*
Common dolphin	*Delphinis delphis*
Cuvier's beaked whale	*Ziphius cavirostris*
Dwarf sperm whale	*Kogia sima*
Harbor porpoise	*Phocoena phocoena*
False killer whale	*Pseudorca crassidens*
Long-finned pilot whale	*Globicephela melas*
Minke whale	*Balaenoptera acutorostrata*
Pantropical spotted dolphin	*Stenella attenuate*
Pygmy sperm whale	*Kogia breviceps*
Risso's dolphin	*Grampus griseus*
Short-finned pilot whale	*Globicephela macrorhynchus*

Source: NOAA Fisheries (https://www.fisheries.noaa.gov/national/marine-mammal-protection/2017-list-fisheries).

Under MMPA requirements, NOAA Fisheries produces an annual list of fisheries (LOF) that classifies domestic commercial fisheries, by gear type, relative to their rates of incidental mortality or serious injury of marine mammals. Additional information and references to current and historical list of fisheries can be found at https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries.

The LOF includes three classifications:

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

The final MMPA list of fisheries for 2018 became effective March 9, 2018 (February 7, 2018; 83 FR 5349). The list of fisheries also identifies species with which the Atlantic HMS fisheries interact. The Atlantic Ocean, Caribbean, and Gulf of Mexico large pelagic longline fishery is classified as Category I (frequent serious injuries and mortalities incidental to commercial fishing) and the southeastern Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities). The following Atlantic HMS fisheries are classified as Category III (remote likelihood or no known serious injuries or mortalities): Atlantic tuna purse seine; Gulf of Maine and mid-Atlantic tuna, shark, and swordfish, hook-and-line/harpoon; southeastern Mid-Atlantic and Gulf of Mexico shark bottom longline; and mid-Atlantic, southeastern Atlantic, and Gulf of Mexico pelagic hook-and-line/harpoon fisheries. Commercial passenger fishing vessel (Charter/Headboat) fisheries are subject to Section 118 and are listed as a Category III fishery. Recreational vessels are not categorized since they are not considered commercial

fishing vessels. The MMPA category for each of the Atlantic HMS Fisheries is included in Table 8.2 (Section 8.2), above.

Owners of vessels or gear engaging in a Category I and/or II fishery(ies) are required to register with NOAA Fisheries under the MMPA and to accommodate an observer aboard their vessels if requested. Vessel owners or operators, or fishermen in Category I, II, and III fisheries must report all incidental mortalities and serious injuries of marine mammals during the course of commercial fishing operations to NOAA Fisheries Office of Protected Resources on the Mortality/Injury Reporting Form. There are currently no regulations requiring recreational fishermen to report marine mammal interactions, nor are they authorized to have incidental takes (*i.e.*, they are illegal); however, voluntary reporting of injured, entangled, or stranded marine mammals to (877) 942-5343 is encouraged.

Marine mammal interactions, observed and estimated, are summarized for each fishery in section 5 (Fishery Data). Commercial passenger fishing vessel (Charter/Headboat) fisheries are subject to Section 118 and are listed as a Category III fishery.

In addition to the requirements described in section 8.1 to minimize bycatch mortality, management measures under the Magnuson-Stevens Act have been implemented to decrease interactions between Atlantic HMS fisheries and marine mammals. All owners and operators of vessels fishing with pelagic longline or gillnets must attend a protected species safe handling, release, and identification workshop every three years. The workshop curriculum includes compliance with the Right Whale Ship Strike Reduction Rule and the PLTRP, the Atlantic Large Whale Take Reduction Plan (ALWTRP), the Harbor Porpoise Take Reduction Plan, and the Bottlenose Dolphin Take Reduction Plan.

The PLTRT was formed to address the incidental mortality and serious injury of long-finned pilot whales and short-finned pilot whales in the mid-Atlantic region of the Atlantic pelagic longline fishery. Under section 118 of the MMPA, the PLTRT is charged with developing a Take Reduction Plan (TRP) to reduce bycatch of pilot whales in the Atlantic pelagic longline fishery to a level approaching a zero mortality rate within five years of implementation of the plan. The PLTRT developed a final plan (May 19, 2009, 74 FR 23349) effective June 18, 2009. The plan implemented a suite of management strategies to reduce mortality and serious injury of pilot whales and Risso's dolphins in the Atlantic pelagic longline fishery. NOAA Fisheries finalized the following three regulatory measures: (1) establish a Cape Hatteras Special Research Area (CHSRA), with specific observer and research participation requirements for fishermen operating in that area; (2) set a 20–nm (37.02 km) upper limit on mainline length for all pelagic longline sets within the Mid-Atlantic Bight (MAB); and (3) require an informational placard on handling and release of marine mammals be displayed both in the wheelhouse and on the working deck of all active pelagic longline vessels in the Atlantic fishery. NOAA Fisheries also finalized the following non-regulatory measures: (1) increased observer coverage in the MAB to 12–15 percent to ensure representative sampling of pilot whales and Risso's dolphins; (2) encouraged vessel operators to maintain daily communication with other local vessel operators regarding protected species interactions throughout the pelagic longline fishery with the goal of identifying and exchanging information relevant to avoiding protected species bycatch; (3) recommended that NOAA Fisheries update the guidelines for handling and releasing marine mammals and NOAA Fisheries and the industry to develop new technologies, equipment, and

methods for safer and more effective handling and release of marine mammals; and (4) recommending NOAA Fisheries pursue research and data collection goals in the PLTRT regarding pilot whales and Risso's dolphins. More information on the take reduction team can be found at https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-take-reduction-plans-and-teams. The PLTRT last met in December 2015 in Virginia Beach, Virginia to discuss progress under the plan, interactions and the ESA. Two webinars/teleconferences have been held (September and October 2016) to discuss possible revisions to consensus recommendations.

Major changes to the ALWTRP were implemented in a final rule that published on October 5, 2007 (72 FR 57104). Regulations that affect HMS fisheries, specifically gillnet fisheries, include: 1) a closed area for all gillnet fisheries from November 15–April 15 from 29º 00' N to 32º 00' N from shore eastward to 80º 00'W and off South Carolina, within 35 nmi of the coast (Southeast US Restricted Area North); 2) a restricted area from December 1–March 31 from 27º 51'N to 29º 00'N from shore eastward to 80º 00'W (Southeast US Restricted Area South); 3) additional seasonal boundaries for EEZ waters east of 80º 00'W from 26º 46.50'N to 32º 00'N (Other Southeast Gillnet Waters); and 4) a monitoring area specific to the Atlantic shark gillnet fishery that extends from the area along the coast from 27º 51'N south to 26º 46.50'N eastward to 80º 00'W (Southeast U.S. Monitoring Area) effective December 1–March 31. Specific compliance requirements for fishing in these areas vary and are summarized in the Guide to the Atlantic Large Whale Take Reduction Plan (ALWTRP). For additional information, see the ALWTRP website at http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/. Amendment 9 to the 2006 Consolidated HMS FMP requires federal directed shark permit holders with gillnet gear on board to use VMS only in the Southeast U.S. Monitoring Area, pursuant to ALWTRP requirements. The Amendment 9 measures became effective on March 15, 2016.

The Harbor Porpoise Take Reduction Team (TRT) met December 12, 2018 via webinar to review 2017 abundance and bycatch estimates for harbor porpoise, as well as compliance with closed areas, gear modifications, and use of pingers. The agenda and presentation can be accessed at the Harbor Porpoise TRT website at https://www.greateratlantic.fisheries.noaa.gov/protected/porptrp/trt/Meetings/2018meetingDecember.html.

NOAA Fisheries published a final rule on April 22, 2006, to implement the Bottlenose Dolphin TRP. Included in the final rule are: 1) effort reduction measures; 2) gear proximity requirements; 3) gear or gear deployment modifications; and 4) outreach and education measures to reduce dolphin bycatch below the stock's potential biological removal level. The final rule also includes time/area closures and size restrictions on large mesh fisheries to reduce incidental takes of endangered and threatened sea turtles, as well as to reduce dolphin bycatch.

8.3.2 Interactions and the Endangered Species Act

The ESA of 1973 as amended (16 U.S.C. §1531 et seq.) provides for the conservation and recovery of endangered and threatened species of fish, wildlife, and plants. The listing of a species is based on the status of the species throughout its range or in a specific portion of its range in some instances. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. §1532(20)] if no action is taken to stop the decline of the species.

Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. §1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NOAA Fisheries, is authorized to list marine and anadromous fish species, marine mammals (except for walruses and sea otters), marine reptiles (such as sea turtles), and marine plants. The Secretary of the Interior, acting through the U.S. Fish and Wildlife Service (USFWS), is authorized to list walruses and sea otters, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species. A listing of species under the ESA that are encountered in Atlantic HMS Fisheries is included in Table 8.4.

Table 8.4 Species under the ESA encountered in Atlantic HMS fisheries

Marine mammals	Status
Blue whale *(Balaenoptera musculus)*	Endangered
Fin whale *(Balaenoptera physalus)*	Endangered
Northern Atlantic right whale *(Eubalaena glacialis)*	Endangered
Sei whale *(Balaenoptera borealis)*	Endangered
Sperm whale *(Physeter macrocephalus)*	Endangered
Sea turtles	
Green turtle *(Chelonia mydas)*	* Threatened
Hawksbill sea turtle *(Eretmochelys imbricata)*	Endangered
Kemp's ridley sea turtle *(Lepidochelys kempii)*	Endangered
Leatherback sea turtle *(Dermochelys coriacea)*	Endangered
Loggerhead sea turtle *(Caretta caretta)*	Threatened
Olive ridley sea turtle *(Lepidochelys olivacea)*	Threatened
Critical habitat	
Northern Atlantic right whale	Endangered
Finfish	
Smalltooth sawfish *(Pristis pectinata)*	Endangered
Atlantic Sturgeon, Gulf Subspecies (*Acipenser oxyrinchus desotoi*)	Threatened
Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)	**Endangered/Threatened
Oceanic whitetip shark (*Carcharhinus longimanus*)	Threatened
Scalloped hammerhead shark (*Sphyrna lewini*)	***Threatened

*Green sea turtles in the Florida breeding population were changed from endangered to threatened on April 6, 2016 (81 FR 20057). ** Atlantic sturgeon have five distinct population segments (DPS). The population in the Gulf of Maine is considered threatened. The other population segments—New York bight, Chesapeake Bay, Carolina, and South Atlantic—are all considered endangered. *** Scalloped hammerhead sharks have 4 DPS. The populations in Central and Southwest Atlantic are considered threatened. The other populations in the Northwest Atlantic and Gulf of Mexico DPS are not considered threatened.

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

Sea Turtles

NOAA Fisheries has taken numerous steps to reduce sea turtle bycatch and bycatch mortality in domestic longline fisheries. On March 30, 2001, NOAA Fisheries implemented via interim final rule requirements for U.S. flagged vessels with pelagic longline gear on board to have line clippers and dipnets to remove gear on incidentally captured sea turtles (66 FR 17370). Specific handling and release guidelines designed to minimize injury to sea turtles were also implemented. NOAA Fisheries published a final report, which provides the detailed guidelines and protocols. A copy can be found at http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_sa/turtle_sawfish_release/documents/pdfs/turtle_release_protocols.pdf.

A BiOp completed on June 14, 2001found that the actions of the pelagic longline fishery as proposed would jeopardize the continued existence of loggerhead and leatherback sea turtles. This document reported that the pelagic longline fishery interacted with an estimated 991 loggerhead and 1,012 leatherback sea turtles in 1999. The estimated take levels for 2000 were 1,256 loggerhead and 769 leatherback sea turtles (Yeung 2001).

On July 13, 2001 (66 FR 36711), NOAA Fisheries published an emergency rule that closed the NED area to pelagic longline fishing (effective July 15, 2001), modified how pelagic longline gear may be deployed effective August 1, 2001, and required that all longline vessels (pelagic and bottom) post safe handling guidelines for sea turtles in the wheelhouse. On December 13, 2001 (66 FR 64378), NOAA Fisheries extended the emergency rule for 180 days through July 8, 2002. On July 9, 2002, NOAA Fisheries published a final rule (67 FR 45393) that closed the NED to pelagic longline fishing. As part of the reasonable and prudent alternative, the BiOp required NOAA Fisheries to conduct an experiment with commercial fishing vessels to test fishery-specific gear modifications to reduce sea turtle bycatch and mortality. This rule also required the length of any gangions to be 10 percent longer than the length of any floatline on vessels where the length of both is less than 100 meters; prohibited stainless steel hooks; and required gillnet vessel operators and observers to report any whale sightings and required gillnets to be checked every 30 minutes to 2 hours.

The experimental program required in the BiOp was initiated in the NED area in 2001 in cooperation with the U.S. pelagic longline fleet that historically fished on the Grand Banks fishing grounds. The goal of the experiment was to test and develop gear modifications that might prove useful in reducing the incidental catch and post-release mortality of sea turtles captured by pelagic longline gear while striving to minimize the loss of target catch. The experimental fishery had a three-year duration and utilized 100 percent observer coverage to assess the effectiveness of the measures. The gear modifications tested in 2001 included blue-dyed squid and moving gangions away from floatlines. In 2002, the NED experimental fishery examined the effectiveness of whole mackerel bait, squid bait, circle and “J” hooks, and reduced daylight soak time in reducing the capture of sea turtles. The experiment tested various hook and bait type combinations in 2003 to verify the results of the 2002 experiment.

On November 28, 2003, based on the conclusion of the three-year NED experiment and preliminary data that indicated that the Atlantic pelagic longline fishery may have exceeded the ITS in the June 14, 2001 BiOp, NOAA Fisheries published a Notice of Intent to prepare an Supplemental Environmental Impact Statement to assess the potential effects on the human

environment of proposed alternatives and actions under a proposed rule to reduce sea turtle bycatch (68 FR 66783). A BiOp for the Atlantic pelagic longline fishery was completed on June 1, 2004 (NMFS 2004a). The BiOp concluded that the long-term continued operation of the Atlantic pelagic longline fishery, authorized under the 1999 FMP, was not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or olive ridley sea turtles; and was likely to jeopardize the continued existence of leatherback sea turtles.

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

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

A May 20, 2008 BiOp issued under Section 7 of the ESA for Amendment 2 concluded, based on the best available scientific information, that Amendment 2 was not likely to jeopardize the continued existence of endangered green, leatherback, and Kemp's ridley sea turtles; the endangered smalltooth sawfish; or the threatened loggerhead sea turtle.

On March 31, 2014, the Office of Sustainable Fisheries requested reinitiation of consultation on the pelagic longline BiOp due to new information on mortality rates and total mortality estimates for leatherback turtles that exceed those specified in the reasonable and prudent alternative (RPA), changes in information about leatherback and loggerhead populations, and new information on sea turtle mortality. On October 30, 2014, NOAA Fisheries requested reinitiation of ESA Section 7 consultation on the continued operation and use of several HMS gear types (bandit gear, bottom longline, buoy gear, handline, and rod and reel) and associated fisheries management actions in the 2006 Consolidated Atlantic HMS FMP and its amendments, after Central and Southwest Atlantic distinct population segments (DPS) of scalloped hammerhead sharks and seven Caribbean species of corals were determined to occur within the management area of Atlantic HMS fisheries. See below in this section for more information on reinitiation of ESA Section 7 consultation in HMS fisheries.

Smalltooth Sawfish

NOAA Fisheries designated critical habitat for smalltooth sawfish in September 2009 (74 FR 45353). In the non-smoothhound portion of the gillnet fishery, only one smalltooth sawfish non-lethal take in a shark gillnet had been documented in the 15 years before 2011 (Carlson and Richards 2011, NOAA Fisheries, unpublished data). The animal was released in good condition and likely survived the interaction. No smalltooth sawfish captures in shark gillnet gear were observed in 2004–2011 (Carlson and Richards 2011, NOAA Fisheries, unpublished data). Based on this information, in the 2012 BiOp (NMFS 2012), NOAA Fisheries estimated that one smalltooth sawfish may be taken annually and that take would be non-lethal. In the gillnet fishery that focuses on smoothhound sharks in the mid-Atlantic and Northeast regions, as of 2012, no smalltooth sawfish takes had ever been documented. Similar to the non-smoothhound component, based on this information, NOAA Fisheries estimated that that one smalltooth sawfish may be taken annually in the smoothhound portion of the gillnet fishery and that take would be either lethal or non-lethal (NMFS 2012).

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

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

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

The Central and Southwest Atlantic DPS of scalloped hammerhead sharks and seven Caribbean species of corals have been determined to occur within the management area of Atlantic HMS fisheries. Therefore, on October 30, 2014, NOAA Fisheries requested reinitiation of ESA Section 7 consultation on the continued operation and use of several HMS gear types (bandit gear, bottom longline, buoy gear, handline, and rod and reel) and associated fisheries management actions in the 2006 Consolidated Atlantic HMS FMP and its amendments. These management

actions were previously consulted in the 2001 Atlantic HMS BiOp and the 2012 Shark and Smoothhound BiOp, to assess potential adverse effects of these gear types on the Central and Southwest DPS of scalloped hammerhead sharks and seven threatened coral species. NOAA Fisheries has preliminarily determined that the ongoing operation of the fisheries is consistent with existing BiOps and is not likely to jeopardize the continued existence of, or result in an irreversible or irretrievable commitment of resources that would foreclose formulation or implementation of any RPA measures on, the threatened coral species. With the listing of oceanic whitetip shark in 2018 (January 30, 2018, (83 FR 4153), this consultation will also consider oceanic whitetip sharks.

With regard to the ongoing reinitiation of ESA Section 7 consultation on the Atlantic pelagic longline fishery, the effects of HMS fishery interactions with the central and southwest Atlantic DPS of scalloped hammerhead shark, oceanic whitetip shark (January 2018), and the seven threatened coral species (July 2014) will be considered in the ongoing pelagic longline consultation. This will most effectively evaluate the effects of the pelagic longline fishery on all listed species in the action area.

8.3.3 Interactions and the Migratory Bird Treaty Act

The NPOA-Seabirds was released in February 2001, and calls for detailed assessments of longline fisheries and, if a problem is found to exist within a longline fishery, for measures to reduce seabird bycatch within two years. Because interactions appear to be relatively low in Atlantic HMS fisheries, the adoption of immediate measures is unlikely. The NPOA can be downloaded from NOAA Fisheries at https://www.fisheries.noaa.gov/resource/document/national-plan-action-reduction-seabird-incidental-catch-longline-fisheries. The 2014 report on the "Implementation of the United States National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries" was submitted to the UN Food and Agriculture Organization in June 2014 and can be found at https://www.st.nmfs.noaa.gov/Assets/nationalseabirdprogram/longline_fisheries.pdf.

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

Bycatch of seabirds in the shark bottom longline fishery has been virtually non-existent. A single pelican has been observed killed from 1994 through 2013. No expanded estimates of seabird bycatch or catch rates for the bottom longline fishery have been made due to the rarity of seabird takes.

8.3.4 Additional Measures to Address Protected Species Concern

NOAA Fisheries has taken a number of actions designed to reduce interactions with protected species. Bycatch reduction measures (Table 8.1) have been implemented through the 1999 FMP (NMFS 1999), in Regulatory Amendment 1 to the 1999 FMP (NMFS 2000), in Regulatory Adjustment 2 to the 1999 FMP (NMFS 2002), in Amendment 1 to the 1999 FMP (NMFS 2003), and in the June 2004 Final Rule for Reduction of Sea Turtle Bycatch and Bycatch Mortality in the Atlantic Pelagic Longline Fishery (69 FR 40734). NOAA Fisheries closed the Southeast U.S.

Restricted Area to gillnet fisheries from February 15, 2006, to March 31, 2006, as a result of an entanglement and subsequent mortality of a right whale with gillnet gear (71 FR 8223). NOAA Fisheries continues to monitor observed interactions with marine mammals and sea turtles on a quarterly basis and reviews data for appropriate action, if any, as necessary. A final rule requiring the possession and use of an additional sea turtle control device as an addition to the existing requirements for sea turtle bycatch mitigation gear in pelagic and bottom longline fisheries was effective October 23, 2008 (73 FR 54721). For a summary of bycatch management measures, please refer to Section 8.2.

8.4 Bycatch of HMS in Other Fisheries

The following section summarizes the bycatch of HMS in any federal or state-managed fishery which captures them. NOAA Fisheries continues to solicit bycatch data on HMS from all state, interjurisdictional, and Federal data collection programs.

8.4.1 Squid Mid-Water Trawl

U.S. squid trawl fishermen, using mid-water gear, landed 7.9 mt ww of yellowfin tuna, skipjack tuna, albacore tuna, bigeye tuna, and swordfish in 2017 incidental to the squid, mackerel, and butterfish trawl fishery (Table 8.5). Bycatch of HMS in other trawl fisheries may be included as a portion of the overall reported trawl landings in Table 8.5. Landings decreased slightly from 2016 for swordfish; while landings of tunas in trawl fisheries are relatively minor. Swordfish landings remain low relative to the directed fishery landings. An Incidental HMS Squid Trawl permit allows squid trawl fishermen with an *Illex* squid trawl moratorium permit to land up to 15 swordfish per trip, although regulatory discards may still occur.

Table 8.5 Atlantic HMS landed (mt ww) incidental to trawl fisheries in 2013–2017

Species	2013	2014	2015	2016	2017
Yellowfin tuna	0.0	0.3	0.0	0.0	0.5
Skipjack tuna	0.0	0.0	0.07	0.0	1.5
Bigeye tuna	0.0	0.0	0.09	0.1	0.0
Albacore tuna	0.0	0.0	1.7	0.4	0.1
Swordfish	2.9	5.3	2.9	6.0	5.8
Total	2.9	5.6	4.8	6.5	7.9

Source: NMFS 2018

8.4.2 Shrimp Trawl Fishery

For a summary of shark bycatch in the shrimp trawl fishery, please see the 2011 HMS SAFE Report. More recent estimates of blacknose shark bycatch in the shrimp fisheries can be found in the most recent blacknose stock assessment, SEDAR 21 (Cortés and Baremore 2011). Estimates of Atlantic sharpnose and bonnethead shark bycatch in the shrimp fisheries can be found in the most recent stock assessment reports for each (SEDAR 34a, SEDAR 34b).

8.5 Pelagic Longline Time/Area Closures and Gear Restrictions in Reducing Bycatch

Since 2000, NOAA Fisheries has implemented a number of time/area closures and gear restrictions in the Atlantic Ocean and Gulf of Mexico to reduce discards and bycatch of a number of species (e.g., juvenile swordfish, bluefin tuna, billfish, sharks, sea turtles) in the pelagic

longline fishery. Circle hooks have been a requirement since July 2004. In the Gulf of Mexico, only “weak” circle hooks may be used in order to reduce the bycatch of spawning bluefin tuna. The effectiveness of the closures and combined closures and circle hook requirement, as evidenced by the amount of bycatch, are summarized in this section. A brief summary of the prohibition of live bait in the Gulf of Mexico pelagic longline fishery is available in the 2011 HMS SAFE Report. Amendment 7, effective January 1, 2015, implemented GRAs for the pelagic longline fishery in the Gulf of Mexico and Atlantic in order to reduce interactions between pelagic longline gear and bluefin tuna. The Amendment 7 Gulf of Mexico GRAs prohibit the use of pelagic longline gear during April and May, and the Amendment 7 Cape Hatteras GRA provides conditional access to the area for vessels fishing with pelagic longline from December through April. NOAA Fisheries is currently developing a proposed rule adjusting existing area-based and weak hook management measures to best achieve the current management objectives and allow for sufficient flexibility to adapt to future fishing needs (83 FR 8969). The NOI was published March 2 (83 FR 8969), and the proposed rule is anticipated to be published in Spring 2019.

The combined effects of the individual area closures and gear restrictions were examined by comparing the reported catch and discards from 2005–2017 to the averages for 1997–1999 throughout the U.S. Atlantic fishery. Previous analyses attempted to examine the effectiveness of the time/area closures only by comparing the 2001–2003 reported catch and discards to the base period (1997–1999) chosen and are included here for reference. The percent changes in the reported numbers of fish caught and discarded were compared to the predicted changes from the analyses in Regulatory Amendment 1 to the 1999 FMP (NMFS 2000). Overall effort, expressed as the number of hooks fished, declined by 26.2 percent during 2005–2017 from 1997–1999 (Table 8.6). Declines were noted for both the numbers of kept and discards of almost all species examined including swordfish, tunas, pelagic sharks, billfish, and sea turtles. The only positive changes from the base period were the numbers of bluefin tuna and dolphin kept, and spearfish and large coastal shark discards. The reported number of bluefin tuna kept increased by 59.2 percent for 2005–2017 compared to 1997–1999 (Table 8.6). The total number of reported discards (live and dead) of bluefin tuna decreased by 11.1 percent between the same time periods, which is less than the predicted 10.7 percent increase from the analyses in Regulatory Amendment 1. The number of bluefin tuna kept and discarded may be further influenced by the regulatory measures implemented through Amendment 7. The number of dolphin kept increased by 7.6 percent (Table 8.7). Reported billfish (blue marlin, white marlin, and sailfish) discards decreased by 33–60 percent from 1997–1999 to 2005–2017 (Table 8.7). The reported discards of spearfish increased by 68.3 percent, although the absolute number of discards were lower than the other billfish species. The reported number of turtle interactions decreased by 71.0 percent from 1997–1999 to 2005–2017.

The reported declines in swordfish kept and discarded, BAYS tuna kept (Table 8.6) and large coastal sharks kept (Table 8.7) decreased more than the predicted values developed for Regulatory Amendment 1. Reported discards of pelagic sharks, all billfish (with the exception of spearfish for which no predicted change was developed in Regulatory Amendment 1), and turtle interactions also declined more than the predicted values. The number of LCS discards increased by 18.3 percent from 1997–1999 to 2005–2017. The numbers of bluefin tuna discards and dolphin kept were higher than the predicted values.

The reported distribution of effort by area over the same time periods was also examined for changes in fishing behavior (Table 8.8). Overall, total reported effort decreased by 26.2 percent from 1997–1999 to 2005–2017. Increases in the number of hooks set were noted in three areas. The SAR area exhibited increases in reported effort more than ten-fold from the period 1997–1999; however, this effort represents only 2.7 percent of the overall effort reported in the fishery. Also note that effort in the SAR has decreased each year since 2014. Effort increased in the FEC area by 11.4 percent and in the SAB by 10.3 percent. The reported effort in the MAB decreased slightly from what was reported in 1997–99 (1.6% decrease). Reported effort declined by 35–75 percent in all other areas. Large declines of 63.3 percent in the SAT area (Tuna North and Tuna South combined) and 75.0 percent in the CAR were reported; however, these represent less than three percent and less than one percent of total reported effort, respectively. The GOM, representing 34.3 percent of the total reported effort, declined 35.4 percent compared to the 1997–99 period.

Concern over the status of bluefin tuna and the effects of the pelagic longline fishery on bluefin tuna led to a re-examination of a previous analysis which compared the reported catch and discards of select species or species groups from the MAB and NEC to that reported from the rest of the fishing areas (Table 8.9). The number of bluefin tuna discards reported from the MAB/NEC had been increasing from 2006–2010 but decreased beginning in 2011 and remained low through 2015. Bluefin tuna discards from these areas increased in 2016 to 449 fish but decreased to 124 fish in 2017. The reported number of bluefin kept in these areas increased in 2016 to 245 and then decreased to 175 fish in 2017 (Table 8.9). The reported number of bluefin kept from areas other than the MAB/NEC (Table 8.10) decreased from 246 in 2015 to 166 in 2016 and increased in 2017 to 289. The number of bluefin discarded increased from 64 in 2015 to 133 in 2016 and then decreased in 2017 to 105. Changes in behavior of fishermen when retaining bluefin tuna may have been influenced by the management measures implemented under Amendment 7. Reporting accuracy may also have improved with the implementation of electronic monitoring under Amendment 7.

The time/area closures and live bait prohibition in the Gulf of Mexico have been successful at reducing bycatch in the HMS pelagic longline fishery. Reported discards of all species of billfish except spearfish have declined. The reported number of turtles caught, swordfish discarded, and pelagic shark discards have declined while the discards of large coastal sharks increased in 2017. However, the number of bluefin tuna kept increased in 2016 and 2017. Bluefin tuna discards (live and dead) decreased in 2017.

Table 8.6 Number of swordfish, bluefin tuna, yellowfin tuna, bigeye tuna, and total BAYS (bigeye, albacore, yellowfin and skipjack tuna) reported landed or discarded in the U.S. Atlantic pelagic longline fishery (2013–2017) and percent changes since 1997–99

Year	Number of hooks set (x1000)	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	Total BAYS kept	Total BAYS discards
1997–99	8,533.1	69,131	21,519	238	877	72,342	2,489	21,308	1,133	101,477	4,224
(A) 2001–03	7,364.1	50,838	13,240	212	607	55,166	1,827	13,524	395	76,116	3,069
2013	7,305.9	44,556	4,765	273	266	39,988	941	15,472	513	67,073	2,376
2014	7,125.2	32,908	4,655	379	380	41,799	647	17,020	459	73,339	1,973
2015	5,855.9	27,730	5,382	320	210	28,346	1,412	16,236	519	54,734	3,117
2016	5,217.6	24,456	4,427	411	582	36,807	3,658	11,835	1,064	56,978	7,898
2017	5,237.6	18,333	7,116	464	229	43,030	2,839	15,907	757	68,329	6,558
(B) 2005–17	6,294.0	37,568	7,682	379	780	42,633	1,510	13,211	487	64,287	3,456
% dif (A)	-13.7	-26.5	-38.5	-10.9	-30.8	-23.7	-26.6	-36.5	-65.1	-25.0	-27.3
% dif (B)	-26.2	-45.7	-64.3	59.2	-11.1	-41.1	-39.3	-39.3	-57.0	-36.7	-18.2
Pred [1]		-24.6	-41.5		-1.0					-5.2	
Pred [2]		-13.0	-31.4		10.7					10.0	

Note: (A) and (B) are average values for the years indicated. Predicted values from Regulatory Amendment 1, where Pred 1 = without redistribution of effort, Pred 2 = with redistribution of effort. Source: UDP.

Table 8.7 Number of pelagic sharks, large coastal sharks, dolphinfish, and wahoo reported landed or discarded and number of billfish (blue and white marlin, sailfish, and spearfish) and sea turtles reported caught and discarded in the U.S. Atlantic pelagic longline fishery (2013–2017) and percent changes since 1997–99

Year	Pelagic sharks kept	Pelagic shark discards	Large coastal sharks kept	Large coastal shark discards	Dolphinfish kept	Dolphinfish discards	Wahoo kept	Wahoo dscards	Blue marlin discards	White marlin discards	Sailfish discards	Spearfish discards	Sea turtles
1997–99	3,898	52,093	8,860	6,308	39,711	608	5,172	175	1,621	1,973	1,342	213	596
(A) 2001–03	3,237	23,017	5,306	4,581	29,361	322	3,776	74	815	1,045	341	139	429
2013	3,809	28,800	50	8,629	34,448	181	2,721	59	851	1,243	458	342	99
2014	3,804	38,496	47	5,880	63,217	205	3,235	74	718	1,580	445	306	93
2015	2,208	45,082	50	8,839	53,526	1,413	1,563	163	990	2,855	715	837	253
2016	2,172	27,900	50	9,549	46,376	1,108	1,766	180	1,050	2,153	855	745	228
2017	2,542	25,567	79	11,533	29,141	936	1,459	170	1,562	2,221	657	686	162
(B) 2005–17	3,096	33,998	548	7,459	42,715	592	2,446	109	802	1,312	543	358	173
% diff (A)	-17.0	-55.8	-40.1	-27.4	-26.1	-47.0	-27.0	-57.7	-49.7	-47.0	-74.6	-34.7	-28.0
% diff (B)	-20.6	-34.7	-93.8	18.3	7.6	-2.6	-52.7	-37.6	-50.5	-33.5	-59.5	68.4	-71.0
Pred [1]	-9.5	-2.0	-32.1	-42.5	-29.3				-12.0	-6.4	-29.6		-1.9
Pred [2]	4.1	8.4	-18.5	-33.3	-17.8				6.5	10.8	-14.0		7.1

Note: (A) and (B) are average values for the years indicated. Predicted values from Regulatory Amendment 1 where Pred [1] = without redistribution of effort, Pred [2] = with redistribution of effort. Source: UDP.

Table 8.8 Reported distribution of hooks set by area in 2013–2017 and percent change since 1997–99

Year	CAR	GOM	FEC	SAB	MAB	NEC	NED	SAR	NCA	TUN+TUS	Total
1997–99	328,110	3,346,298	722,580	813,111	1,267,409	901,593	511,431	14,312	191,478	436,826	8,533,148
(A) 2001–03	175,195	3,682,536	488,838	569,965	944,929	624,497	452,430	76,130	222,070	127,497	7,364,086
2013	38.090	2,304,802	1,239,326	1,185,433	1,450,434	516,159	152,896	242,920	11,758	164,079	7,305,897
2014	21,390	2,219,684	1,171,402	1,133,640	1,232,857	507,525	343,220	367,598	10,530	117,377	7,125,223
2015	30,435	1,465,502	926,512	1,046,018	1,207,746	519,349	225,011	277,506	13,250	144,648	5,855,977
2016	158,359	1,618,640	625,484	947,527	982,870	378,990	210,031	116,920	17,650	161,116	5,217,547
2017	294,346	1,533,435	538,406	975,186	1,322,882	210,413	214,453	97,925	3,788	136,753	5,327,587
(B) 2005–17	82,029	2,160,044	804,615	896,913	1,246,519	491,852	263,682	171,342	16,732	160,227	6,293,953
% diff (A)	-46.6	10.0	-32.3	-29.9	-25.4	-30.7	-11.5	431.9	16.0	-70.8	-13.7
% diff (B)	-75.0	-35.4	11.4	10.3	-1.6	-45.4	-48.4	1,097.0	-91.3	-63.3	-26.2

Note: (A) and (B) are average values for the years indicated. CAR = Caribbean; GOM = Gulf of Mexico; FEC = Florida east coast; SAB = South Atlantic Bight; MAB = Mid-Atlantic Bight; NEC = Northeast Coastal; NED = Northeast Distant Waters; SAR = Sargasso Sea; NCA = North Central Atlantic; TUN+TUS = Tuna North and Tuna South areas. Source: UDP.

Table 8.9 Number of bluefin tuna, swordfish, pelagic and large coastal sharks, billfish, and sea turtles reported kept and/or discarded in the Mid-Atlantic Bight and Northeast Coastal areas combined in 2013–2017

Year	Hooks set (x1000)	BFT kept	BFT discards	SWO kept	SWO discards	PEL kept	PEL discards	LCS kept	LCS discards	Billfish discards	Sea turtle interactions
2013	1,966.6	1,966.6	55	107	9,806	2,766	2,711	17,958	9	1,366	693
2014	1,740.4	1,740.4	104	122	5,027	1,015	3,115	16,405	6	1,050	710
2015	1,727.1	1,727.1	74	146	6,637	2,235	1,795	17,625	8	3,668	1,888
2016	1,361.9	1,361.9	245	449	4,707	1,489	1,799	15,046	19	4,170	1,023
2017	1,533.3	175	124	4,999	3,112	2,044	10,157	50	6,538	1,398	67

BFT = bluefin tuna; SWO = swordfish; PEL = pelagic sharks; LCS = large coastal sharks. Source: UDP.

Table 8.10 Number of bluefin tuna, swordfish, pelagic and large coastal sharks, billfish, and sea turtles reported kept and/or discarded in all areas other than the Mid-Atlantic Bight and Northeast Coastal in 2013–2017.

Year	Hooks set (x1000)	BFT kept	BFT discards	SWO kept	SWO discards	PEL shark kept	PEL shark discards	LCS kept	LCS discards	Billfish discards	Turtle interactions
2013	5,339.3	218	159	34,750	2,583	683	9,842	41	7,263	2,190	61
2014	5,384.8	275	258	27,881	3,640	689	22,101	41	4,855	2,339	77
2015	4,128.9	246	64	21,093	3,147	413	27,457	42	5,171	3,509	101
2016	3,855.7	166	133	19,749	2,938	373	12,854	31	5,379	3,780	130
2017	3,794.3	289	105	18,333	4,004	498	15,407	29	4,995	3,728	95

BFT = Bluefin tuna; SWO = Swordfish; PEL = Pelagic sharks; LCS = Large coastal sharks. Source: UDP.

8.6 Evaluation of Weak Hook Requirement in the Gulf of Mexico

A final rule to implement a requirement for the mandatory use of weak hooks in the Gulf of Mexico pelagic longline fishery published on April 5, 2011 (76 CFR 18653). A weak hook is a circle hook that meets NOAA Fisheries' current size and offset restrictions for the Gulf of Mexico pelagic longline fishery, but is constructed of round wire stock that is thinner gauge than the circle hooks currently used and is no larger than 3.65 mm in diameter. These hooks may allow incidentally hooked bluefin tuna to escape capture because the hooks are more likely to straighten when a large fish is hooked. The intent of this requirement is to reduce the bycatch of bluefin tuna; allow the long-term beneficial socioeconomic benefits of normal operation of directed fisheries in the Gulf of Mexico with minimal short-term negative socio-economic impacts; and have both short- and long-term beneficial impacts on the stock status of Atlantic bluefin tuna. NOAA Fisheries is currently developing a proposed rule to examine existing area-based and weak hook management measures to achieve the current management objectives and allow for sufficient flexibility to adapt to future fishing needs (83 FR 8969). The NOI was published March 2 (83 FR 8969), and the proposed rule is anticipated to be published in Spring 2019.

As a first step to evaluate the impacts of the weak hook requirement, reported landings of major target species from the Gulf of Mexico were examined to look for any initial trends (Table 8.11). Reported landings prior to the implementation of the requirement (2007–10) were compared with reported landings post-implementation (2012–17). Annual reported landings of swordfish and yellowfin tuna immediately following implementation of the weak hook requirement appeared to be on the rise but decreased in 2014–2015. Landings of swordfish increased in 2016 and 2017. Yellowfin tuna landings increased in 2016 but dropped off slightly in 2017. Bluefin tuna landings and discards have decreased since 2012. In order to remove interannual differences, the mean reported landings for each period were calculated and compared. The mean reported landings of albacore tuna were greater following implementation of the weak hook requirement. The mean reported landings of swordfish, bluefin and bigeye tuna were lower in the years following implementation of the weak hook requirement. Mean yellowfin tuna landings were about the same before and after implementation while albacore landings increased. Discards of swordfish and bluefin tuna were lower after implementation while blue marlin discards were slightly higher.

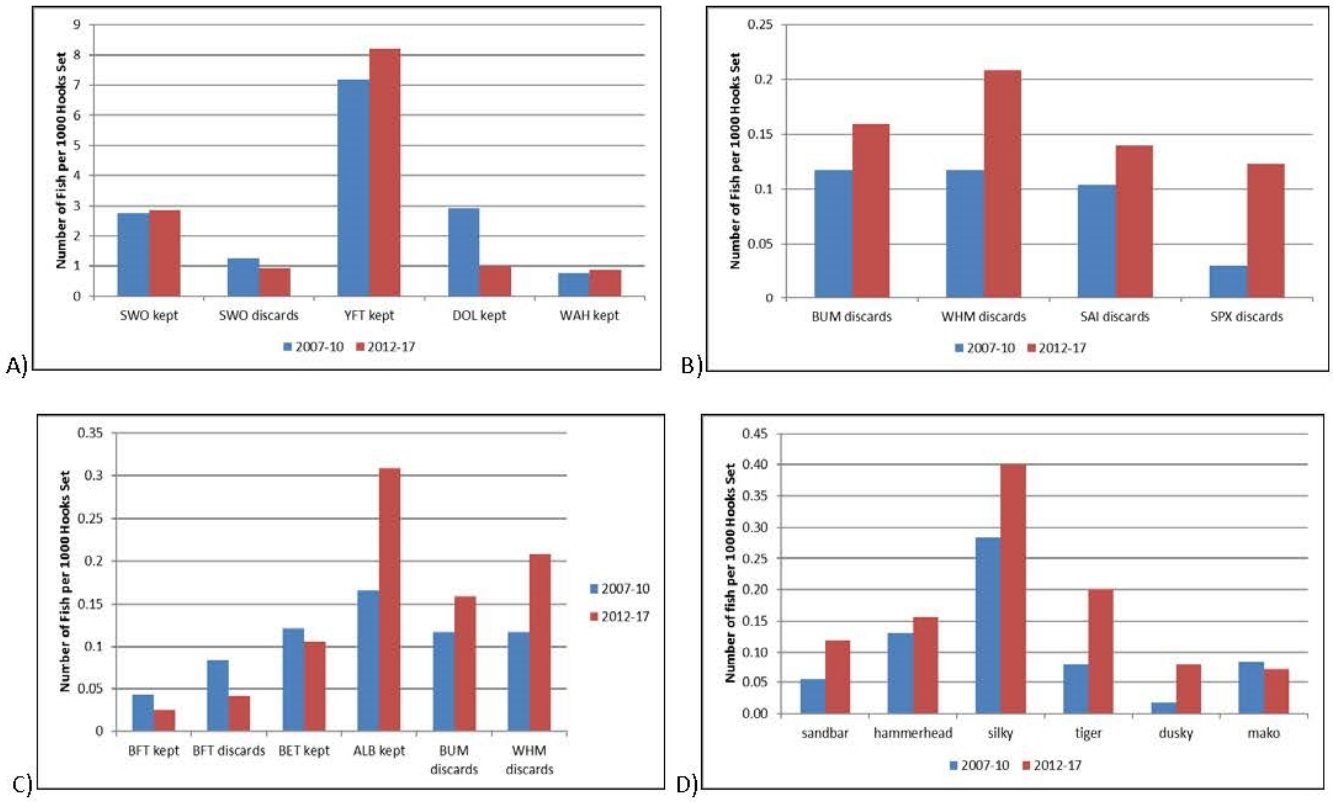
Table 8.11 Reported number of hooks fished, landings, means, and CPUE of major target species and blue marlin interactions from the Gulf of Mexico in 2012–2017

Year	Hooks (x1000)	Swordfish	Bluefin	Yellowfin	Bigeye	Albacore	Swordfish discards	Bluefin tuna discards	Blue marlin discards
2012	2,655.5	10,129	137	25,419	292	818	3,292	206	484
2013	2,312.2	9,143	44	17,593	180	627	2,022	67	279
2014	2,219.7	4,868	53	15,212	151	352	1,401	68	223
2015	1,465.5	2,304	17	9,877	189	459	1,036	31	229
2016	1,618.6	2,907	14	15,263	135	810	1,370	84	276
2017	1,533.4	4,227	23	13,495	308	578	1,805	29	391
2007–10 mean	2,331.5	6,419.3	99.3	16,775.0	282.3	387.0	2,954.0	198.0	273.8
2012–17 mean	1,967.5	5,596.3	48.0	16,143.2	209.2	607.3	1,821.0	80.8	273.7
2007–10 CPUE		2.7533	0.0426	7.1951	0.1211	0.166	1.267	0.0849	0.1174
2012–17 CPUE		2.8444	0.0244	8.205	0.1063	0.3087	0.9256	0.0411	0.1594

Note: Weak hooks implemented in 2011. Source: UDP.

The next step was to examine the nominal CPUE (as expressed as catch per 1000 hooks) between the two time periods (Table 8.12). The CPUE of swordfish, yellowfin, and albacore tuna kept was higher in 2012–2017 versus 2007–2010. The CPUE of bluefin tuna kept and discards were lower in 2012–2017 as were the CPUEs of swordfish discards and bigeye tuna kept. The CPUE of bluefin tuna kept was 39.4 percent lower following weak hook implementation and the CPUE of bluefin tuna discards were 38.9 percent lower. Blue marlin CPUE was greater after the weak hook requirement went into effect.

Table 8.12 CPUE comparisons of HMS prior to and following weak hook management implementation in 2007–10 vs 2012–17



Note: The number of fish (kept and discards) per 1,000 hooks set reported for HMS compared prior to weak hook management measures were implemented in 2011 (shown in blue; 2007–2010) and after implemented (shown in red; 2012–2017). Species include: A) swordfish (SWO), yellowfin tuna (YFT), dolphin (DOL), and wahoo (WAH); B) blue marlin (BUM), white marlin (WHM), sailfish (SAI), spearfish (SPX); C) bluefin tuna (BFT), bigeye tuna (BET), albacore (ALB), blue marlin (BUM), white marlin (WHM); and D) sandbar, hammerhead, silky, tiger, dusky, and mako sharks. Source: UDP.

8.7 Bycatch in the Prohibited Shark Complex

As described in Amendment 5b, the ACL for prohibited sharks is zero, and the fisheries for those stocks are closed, although a small amount of bycatch does occur. NOAA Fisheries monitors that bycatch and ensures that the ACL of zero remains appropriate. This section includes the annual analysis specified by Amendment 5b to monitor the recreational estimates and observed bycatch of prohibited sharks.

These updated annual data (Table 8.13) include prohibited sharks that were observed or reported as discarded dead or landed (most likely due to misidentification issues or a lack of awareness of shark fishing regulations) in both recreational and commercial fisheries. Data were compiled from the following sources: SEFSC BLLOP, SEFSC GNOP, SEFSC POP, NEFOP, HMS EFP Program, LPS, and the MRIP. The recreational data from LPS and MRIP include estimated landings whereas observer program data include observed dead discards. More information about these data used can be found in Chapter 1 of Amendment 5b. These are the best available data with which to evaluate observed bycatch mortality trends in the prohibited shark complex, and the annual numbers (Table 8.13) form the basis for the three-year moving average analysis below (Table 8.14).

Table 8.13 Observed and estimated shark mortality (dead discards and kept in numbers of sharks) in the prohibited shark complex from 2012–2017

Species	2012	2013	2014	2015	2016	2017
Basking	19	19	40	13	8	33
Bigeye thresher	31	33	27	39	28	21
Bignose	0	0	0	1	1	0
Caribbean reef	522	1	1	0	0	0
Dusky	707	53	649	141	29	22
Galapagos	0	0	0	0	0	0
Longfin mako	19	36	7	8	15	14
Night	107	68	56	14	8	31
Sand tiger	27	33	21	16	26	9
Whale	0	0	0	0	0	0
White	2	1	3	5	0	10
Atlantic angel	23	31	67	52	113	98
Sevengill	4	1	0	1	0	0
Sixgill	0	0	0	0	0	1
Narrowtooth	0	0	0	0	0	0
Caribbean sharpnose	0	0	0	0	0	0
Bigeye sand tiger	0	0	0	0	0	0
Bigeye sixgill	0	0	0	0	0	0
Total	1,461	276	871	290	228	239

Sources: BLLOP, GNOP, POP, NEFOP, EFP Program, LPS, MRIP.

Because of the limited amount of data available for the prohibited shark complex, and highly variable interannual observed catches, three-year rolling averages were used to smooth the interannual variability, as is commonly done in time series with high variance. Table 8.14 presents the three-year rolling averages from 2012 through 2017, and identifies whether observed bycatch mortality the most recent three-year average for each species has increased, decreased, or not changed since the previous three-year average. If there are significant increases in the observed three-year moving average mortality for a particular species or fishery, then NOAA Fisheries may consider additional management actions to address that mortality and

ensure that bycatch remains small. For species with long-term mean observations of less than ten individuals per year, NOAA Fisheries considers an order of magnitude (10x) to represent a significant increase. For species with long-term mean observations of ten or greater, NOAA Fisheries considers an increase of more than two standard deviations from the mean to represent a significant increase.

Table 8.14 Three-year moving average observed and estimated shark mortality (dead discards and kept in numbers of sharks) in the prohibited shark complex from 2012–2017, and the directional change between the two most recent three-year averages

Species	2012–2014	2013–2015	2014–2016	2015–2017	Increase (+)/Decrease (-)/No Change (0)
Basking	26	24	20	18	-
Bigeye thresher	30	33	31	29	-
Bignose	0	0	1	1	0
Caribbean reef	175	1	0	0	0
Dusky	470	281	273	64	-
Galapagos	0	0	0	0	0
Longfin mako	21	17	10	12	+
Night	77	64	26	18	-
Sand tiger	27	23	21	17	-
Whale	0	0	0	0	0
White	2	3	3	5	+
Atlantic angel	40	50	77	88	+
Sevengill	2	1	0	0	0
Sixgill	0	0	0	0	0
Narrowtooth	0	0	0	0	0
Caribbean Sharpnose	0	0	0	0	0
Bigeye sand tiger	0	0	0	0	0
Bigeye sixgill	0	0	0	0	0
Totals	869	479	463	252	-

Sources: BLLOP, GNOP, POP, NEFOP, EFP Program, LPS, MRIP.

These data are the best available for monitoring bycatch of prohibited sharks; however, they only provide initial insights into potential trends in the overall fishing mortality rates of these species. They are not direct indicators of fishing mortality on their own, but may signal species or fisheries that require closer evaluation. If significant increases in observed/estimated mortalities are noted in a particular species or fishery, these data would then be evaluated in more detail in conjunction with other related information, including observer coverage rates, fishing effort and CPUE trends, and fishery-independent indicators of relative abundance. For example, a significant increase in observed mortality could indicate increased fishing mortality, or it could simply reflect an increase in observer coverage rates, an increase in fishing effort, and/or in an increase in the abundance of a rebuilding stock. At this time, there are increases in bignose sharks and Atlantic angel sharks. However, the increase in bignose sharks is not greater than an order of magnitude of the long-term mean; nor is the increase in Atlantic angel sharks greater

than two standard deviations of the long-term mean. Thus, based on the available data, no significant increases in prohibited shark bycatch are apparent at this time.

8.8 Evaluation of Other Bycatch Reduction Measures

NOAA Fisheries continues to monitor and evaluate bycatch in HMS fisheries through direct enumeration (pelagic and bottom longline observer programs, shark gillnet observer program), evaluation of management measures (closed areas, trip limits, gear modifications, etc.), and VMS.

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