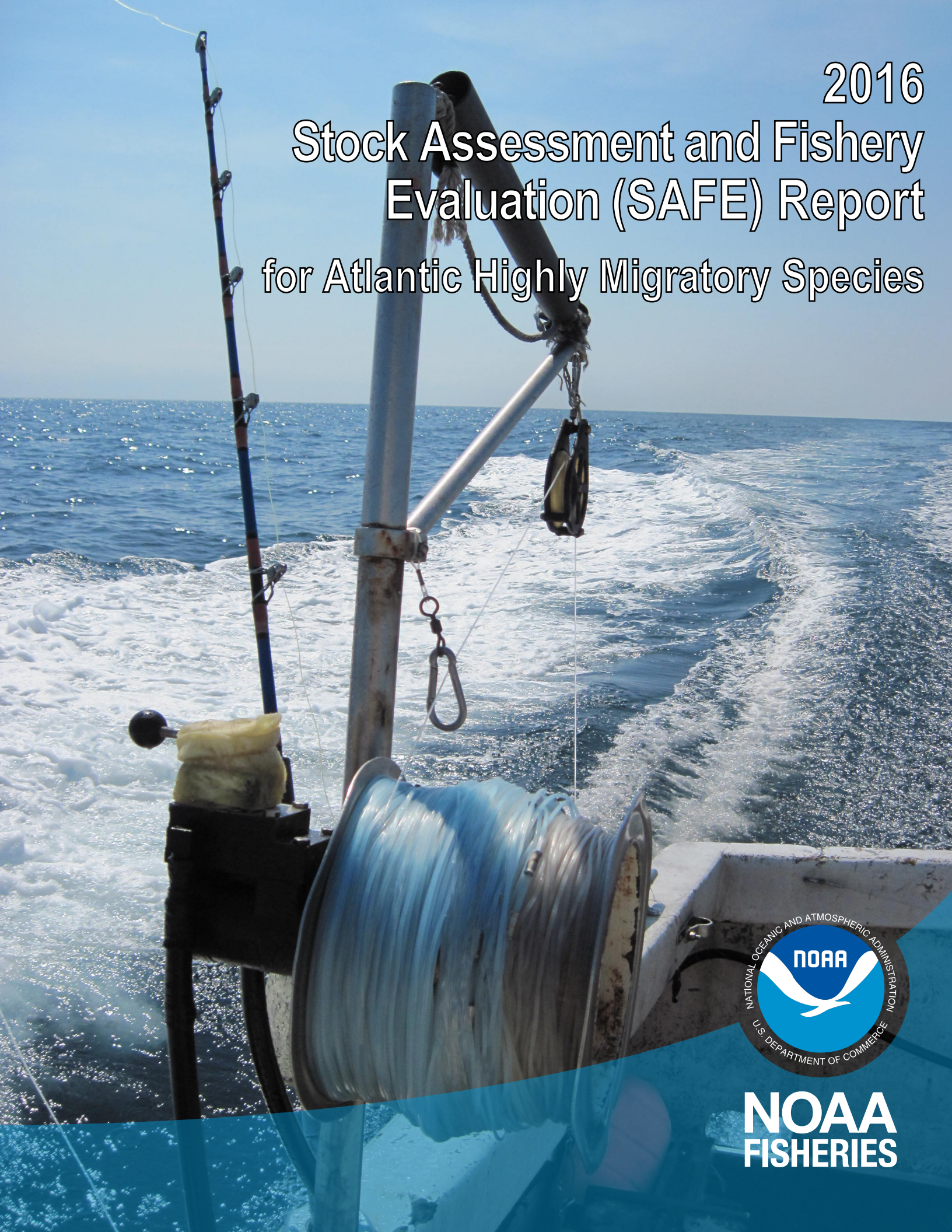

2016 Stock Assessment and Fishery Evaluation (SAFE) Report

for Atlantic Highly Migratory Species

NOAA FISHERIES

2016
Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic Highly Migratory Species

Atlantic Highly Migratory Species Management Division
March 2017

For HMS permitting information and regulations:
HMS Recreational, Commercial, and Dealer compliance guides
http://www.nmfs.noaa.gov/sfa/hms/compliance/guides/
Regulatory updates for tunas
https://hmspermits.noaa.gov/

To purchase or renew an HMS permit:
Open access permits: HMS Charter/headboat, Atlantic tunas (General, Harpoon, Purse Seine, and Trap categories), North Atlantic swordfish (General Commercial), and HMS Angling (recreational)
NOAA Fisheries, (888) 872-8862
https://hmspermits.noaa.gov/

Limited access permits: Atlantic sharks, Swordfish, and Tunas longline
Open access permit: HMS Commercial Caribbean Small Boat and Smoothhound shark
Dealer permits: Sharks and Swordfish
NOAA Fisheries Southeast Regional Office, (727) 824-5326
http://sero.nmfs.noaa.gov/operations_management_information_services/constituency_services_branch/permits/

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

For HMS SAFE Reports (2000 – current):
http://www.nmfs.noaa.gov/sfa/hms/documents/safe_reports.

For hard copies of this document and the referenced literature:
Highly Migratory Species Management Division, NOAA Fisheries, 1315 East-West Highway, Silver Spring, MD 20910, Phone (301) 427-8503, Fax (301) 713-1917

Cover image: Photo taken during NC greenstick study, 2009. Randy Blankinship and Dr. Nicolás Alvarado (NOAA)

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LIST OF COMMONLY USED ACRONYMS

AA	Assistant Administrator for Fisheries
ABC	Acceptable biological catch
ACCSP	Atlantic Coastal Cooperative Statistics Program
ACL	Annual catch limit
ACS	Angler consumer surplus
ACT	Annual catch target
ALWTRT/P	Atlantic Large Whale Take Reduction Team/Plan
AM	Accountability measure
ANPR	Advanced notice of proposed rulemaking
AOCTRP	Atlantic Offshore Cetacean Take Reduction Plan
AP	Advisory panel
APA	Administrative Procedure Act
ASMFC	Atlantic States Marine Fisheries Commission
ATCA	Atlantic Tunas Convention Act
B	Biomass
BAYS	Bigeye, albacore, yellowfin, and skipjack tunas
BFT	Bluefin tuna
BiOp	Biological opinion
BLL	Bottom longline
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
CBP	U.S. Bureau of Customs and Border Protection
CAR	Caribbean
CFMC	Caribbean Fishery Management Council
CFL	Curved fork length
CFR	Code of Federal Regulations
CHB	Charter/headboat
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
EA	Environmental assessment
eBCD	Electronic international bluefin tuna catch documentation system
EEZ	Exclusive economic zone
EFH	Essential fish habitat
EFP	Exempted fishing permit
EIS	Environmental impact statement
EO	Executive order
ESA	Endangered Species Act
F	Instantaneous fishing mortality
FAD	Fish aggregating device
FAO	Food and Agriculture Organization
FEC	Florida East coast
FEIS	Final environmental impact statement
FL	Fork length
FMP	Fishery management plan
F	Fishing mortality
F_{MSY}	Instantaneous fishing mortality rate expected to yield max sustainable yield
FMU	Fishery management unit
F_{OY}	Fishing mortality rate expected to yield optimum yield
FR	Federal Register
FRFA	Final regulatory flexibility analysis
GOM	Gulf of Mexico
GSAFF	Gulf and South Atlantic Fishery Foundation
GMFMC	Gulf of Mexico Fishery Management Council
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
HMS FMP	Consolidated Highly Migratory Species Fishery Management Plan
HTS	Harmonized tariff schedule
IBQ	Individual bluefin [tuna] quota
ICCAT	International Commission for the Conservation of Atlantic Tunas
IFTP	International Fisheries Trade Permit
IMO	International Maritime Organization
IPOA	International plan of action

IRFA	Initial regulatory flexibility analysis
ITP	International trade permit
ITQ	Individual transferable quota
ITS	Incidental take statement
IUU	Illegal, unreported, unregulated
LAP	Limited access permit
LCS	Large coastal sharks
LOA	Letter of acknowledgment
LPS	Large Pelagics Survey
LWTRT/P	Large Whale Take Reduction Team/Plan
MAB	Mid Atlantic Bight
MAFMC	Mid-Atlantic Fishery Management Council
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MFMT	Maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MPA	Marine protected area
MRIP	Marine Recreational Information Program
MSST	Minimum stock size threshold
MSY	Maximum sustainable yield
mt	Metric tons
NCA	North Central Atlantic
NEC	Northeast Coastal
NED	Northeast Distant Waters
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
GARFO	Greater Atlantic Regional Fisheries Office
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
NS	National Standards
NWGB	National Working Group on Bycatch
OSF	Office of Sustainable Fisheries
OY	Optimum yield
PLTRT/P	Pelagic Longline Take Reduction Team/Plan
PLL	Pelagic longline
POP	Pelagic Observer Program
OPR	Office of Protected Resources
PRA	Paperwork Reduction Act
RBS	Recreational Billfish Survey
Reg Flex Act	Regulatory Flexibility Act
RFMO	Regional Fishery Management Organization
RIR	Regulatory Impact Review
RPAs	Reasonable and Prudent Alternatives
RPMs	Reasonable and Prudent Measures
SAB	South Atlantic Bight
SAFE	Stock Assessment and Fishery Evaluation
SAFMC	South Atlantic Fishery Management Council
SAR	Sargasso Sea
SBRM	Standardized bycatch reporting methodology
SCRS	Standing Committee for Research and Statistics
SCS	Small coastal sharks
SDC	Status determination criteria
SEDAR	Southeast Data and Assessment Review
SEFSC	Southeast Fisheries Science Center
SEIS	Supplemental environmental impact statement
SERO	Southeast Regional Office
SEW	Stock evaluation workshop
SFA	Sustainable Fisheries Act
SFL	Straight fork length
SRP	Scientific research permit
SSB	Spawning stock biomass
SWO	Swordfish
TAC	Total allowable catch
TAL	Total allowable landings
TCs	Terms and Conditions
TL	Total length
TUN	Tuna North
TUS	Tuna South
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
UVI	Unique Vessel Identifier
VMS	Vessel monitoring system
VTR	Vessel trip report
WTP	Willingness to pay
ww	Whole weight
YOY	Young of the year

EXECUTIVE SUMMARY

This 2016 Stock Assessment and Fisheries Evaluation (SAFE) Report is produced by the National Marine Fisheries Service (NMFS) Atlantic Highly Migratory Species (HMS) Management Division. It contains a review of the current status of Atlantic HMS stocks (tunas, swordfish, billfish, and sharks) and describes the year's accomplishments in managing Atlantic HMS. 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 2015 HMS SAFE Report, the HMS Management Division: held three HMS Advisory Panel meetings; published several rules regarding HMS fisheries, including a final rule implementing the electronic international bluefin tuna catch documentation system (eBCD), a final rule changing the bluefin tuna dealer reporting methodology from paper-based to electronic submission, proposed and final rules adjusting the 2016 North and South Atlantic swordfish quotas, proposed and final rules modifying the requirement that require persons surgically implanting or externally affixing archival tags to Atlantic HMS obtain written authorization from NMFS and requiring fishermen to report their catches of Atlantic HMS with such tags to NMFS, proposed and final rules requiring the careful release of live porbeagle sharks in ICCAT fisheries, proposed and final rules adjusting the 2017 shark quotas, a final rule removing some vessel upgrade restrictions, proposed and final rules modifying commercial retention limits for blacknose sharks and non-blacknose small coastal sharks, proposed and final rules adjusting individual bluefin tuna quota program inseason quota transfers, and a proposed rule for dusky shark management measures to end overfishing and rebuild the stock, including clarifying the annual catch limit for prohibited sharks and establishing accountability measures; published a draft update of essential fish habitat for Atlantic HMS and Habitat Areas of Particular Concern for bluefin tuna and sandbar shark and considering the creation of new Habitat Areas of Particular Concern for lemon shark and sand tiger shark; contributed to a final rule replacing the International Trade Permit with the expanded International Fisheries Trade Permit; began the scoping process for a rulemaking that could modify the swordfish and shark retention limits for the Commercial Caribbean Small Boat permit, and enacted several inseason actions for the management of Atlantic HMS.

The 20th Special Meeting of the International Commission for the Conservation of Atlantic Tunas (ICCAT) was held in Vilamoura, Portugal, November 14 - 21, 2016. The United States helped develop recommendations aimed at promoting the conservation, management, and rebuilding of Atlantic HMS stocks (e.g., tunas, billfish, swordfish, sharks). At this meeting, ICCAT adopted recommendations regarding western Atlantic bluefin tuna, North and South Atlantic swordfish, North Atlantic albacore tuna, Atlantic sailfish, and North Atlantic blue sharks, as well as recommendations on monitoring, control and surveillance measures, compliance issues, and management strategy evaluation (MSE) and harvest control rules (HCR). ICCAT also evaluated the reporting and conservation and management measures of the 51 members.

Four stocks of HMS underwent assessments in 2016. The Standing Committee on Research and Statistics (SCRS) completed stock assessments for Atlantic yellowfin tuna, North Atlantic albacore tuna, and Atlantic sailfish. A stock assessment update was completed for dusky sharks

through the Southeast Data and Assessment Review (SEDAR) process. NMFS continued shark nursery grounds research and EFH studies through two programs (COASTSPAN and GULFSPAN) along the U.S. Atlantic, Gulf of Mexico, and Caribbean.

Much of the data in this report is based on final reports of 2015 data that were completed and/or published in 2016. Domestic fishery landings and bycatch data are obtained from the U.S. Annual Report to ICCAT, and directly from NMFS program databases, including 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), the online catch reporting system at https://hmspermits.noaa.gov/, and the Commercial Bluefin Tuna Landings Database; and recreational landings from the Marine Recreational Information Program, Large Pelagics Survey, the Recreational Billfish Survey, and the HMS Recreational Reporting Program.

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 Document and Swordfish Statistical Document Programs, the U.S. Census Bureau, and U.S. Customs and Border Protection.

NMFS permits data are collected from the Office of Science and Technology's International Trade Permit Database, the Northeast and Southeast Regional Permits Offices' Databases, the HMS Permits Database, the HMS Exempted Fishing Permits, Display Permits, and Scientific Research Permits Database, and the HMS Tournament Registration Database.

Feedback and comments on this SAFE Report are encouraged and should be sent to the HMS Management Division F/SF1, 1315 East West Highway, Silver Spring, MD 20910, phone: (301) 427-8503, fax: (301) 713-1917.

1 INTRODUCTION

The Magnuson-Stevens Act is the primary Federal legislation governing the management of marine fisheries of the United States. The guidelines for National Standard (NS) 2 of the Magnuson-Stevens Act (50 CFR 600.315) require NMFS to prepare a SAFE Report, or similar document, and summarize, on a periodic basis, the best scientific information available concerning condition of the stocks, EFH, marine ecosystems, and fisheries being managed under Federal regulation. SAFE reports are to be updated or supplemented as necessary when new information is available to inform management decisions. This document constitutes the 2016 SAFE Report for Atlantic HMS managed under the 2006 Consolidated Atlantic HMS FMP and its amendments (Table 1.1).

Table 1.1 Species Managed under the 2006 Consolidated Atlantic HMS Fishery Management Plan and its Amendments

Common Name	*Scientific Name*	Common Name	*Scientific Name*
Skipjack tuna	*Katsuwonus pelamis*	Sandbar shark	*Carcharhinus plumbeus*
Albacore tuna	*Thunnus alalunga*	Smalltail shark	*Carcharhinus porosus*
Yellowfin tuna	*Thunnus albacares*	Night shark	*Carcharhinus signatus*
Bigeye tuna	*Thunnus obesus*	Sand tiger	*Carcharias taurus*
Bluefin tuna	*Thunnus thynnus*	White shark	*Carcharodon carcharias*
		Basking shark	*Cetorhinus maximus*
Swordfish	*Xiphias gladius*	Tiger shark	*Galeocerdo cuvier*
		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*
		Porbeagle	*Lamna nasus*
Bigeye thresher shark	*Alopias superciliosus*	Smooth dogfish	*Mustelus canis*
Thresher shark	*Alopias vulpinus*	Florida smoothhound	*Mustelus norrisi*
Blacknose shark	*Carcharhinus acronotus*	Gulf smoothhound	*Mustelus sinusmexicanus*
Bignose shark	*Carcharhinus altimus*	Lemon shark	*Negaprion brevirostris*
Narrowtooth shark	*Carcharhinus brachyurus*	Bigeye sand tiger	*Odontaspis noronhai*
Spinner shark	*Carcharhinus brevipinna*	Blue shark	*Prionace glauca*
Silky shark	*Carcharhinus falciformis*	Whale shark	*Rhincodon typus*
Galapagos shark	*Carcharhinus galapagensis*	Caribbean sharpnose shark	*Rhizoprionodon porosus*
Finetooth shark	*Carcharhinus isodon*	Atlantic sharpnose shark	*Rhizoprionodon terraenovae*
Bull shark	*Carcharhinus leucas*	Scalloped hammerhead	*Sphyrna lewini*
Blacktip shark	*Carcharhinus limbatus*	Great hammerhead	*Sphyrna mokarran*
Oceanic whitetip shark	*Carcharhinus longimanus*	Bonnethead	*Sphyrna tiburo*
Dusky shark	*Carcharhinus obscurus*	Smooth hammerhead	*Sphyrna zygaena*
Caribbean reef shark	*Carcharhinus perezii*	Atlantic angel shark	*Squatina dumerili*

Consistent with the NS 2 guidelines, this SAFE Report provides a comprehensive summary of the most recent data on the condition of Atlantic HMS stocks, 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 2015 SAFE Report, NMFS proposed or implemented a number of actions with regard to Atlantic HMS. These actions were published in the Federal Register 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 http://www.nmfs.noaa.gov/sfa/hms/ or by calling the HMS Management Division at (301) 427-8503.

NMFS held three Atlantic HMS Advisory Panel meetings in 2016: March 29 - April 1 in Bethesda, MD; September 7 - 8 in Silver Spring, MD; and December 1 - 2 in Bethesda, MD. These meetings provided valuable opportunities for comments on a suite of management actions that NMFS pursued or considered in 2016. Meeting presentations and transcripts are posted on the HMS website.

On April 1, 2016, NMFS published a final rule implementing the ICCAT electronic bluefin tuna catch documentation system (eBCD system) (81 FR 18796). This final rule adopts regulations governing international trade documentation and tracking programs for Atlantic bluefin tuna to fulfill recommendations from recent meetings of ICCAT. The final rule transitioned from the ICCAT paper-based bluefin tuna catch documentation program, used in the United States by HMS International Trade Permit (now International Fisheries Trade Permit) holders, to the eBCD system, effective May 1, 2016.

On June 29, 2016, NMFS published a final rule (81 FR 42990) announcing a change in the dealer landings reporting methodology for Atlantic bluefin tuna from use of handwritten and faxed landings reports to an approved electronic reporting system via the Internet. Federal Atlantic bluefin tuna dealers now must submit electronically all bluefin tuna landings via Standard Atlantic Fisheries Information System (SAFIS). The online reporting process, which became effective July 28, 2016, is intended to simplify and improve reporting, and does not change the substance of the reports.

On July 26, 2016, NMFS published final North and South Atlantic swordfish specifications (81 FR 48719) that adjusted the 2016 fishing season quotas for North and South Atlantic swordfish based upon 2015 commercial quota underharvests and international quota transfers consistent with ICCAT Recommendations 13-02 and 13-03. This action also modified the regulations to specify that NMFS would not undertake notice and comment rulemaking when annual quota specifications simply follow a formula previously adopted through notice and comment rulemaking and where NMFS exercises no discretion in its application. NMFS would continue

to undertake notice and comment rulemaking when adopting new quotas or otherwise altering conservation and management measures. The proposed rule for this action published on June 7, 2016 (81 FR 36511) and the public comment period ended on July 7, 2016.

On August 3, 2016 (81 FR 514126) NMFS published a final rule that replaced the International Trade Permit with the International Fisheries Trade Permit (IFTP), and expanded its scope to include dolphin-safe tuna imports covered by the Tuna Tracking and Verification Program and the trade of Patagonia/Antarctic toothfish (also known as Chilean sea bass). This rulemaking also implemented mandatory electronic reporting of NMFS-required import and export documentation per the SAFE Port Act of 2006. All provisions of the final rule were effective September 20, 2016.

On August 19, 2016, NMFS published a final rule (81 FR 55376) that revised the regulations regarding the placement of archival tags on Atlantic HMS. Archival tags are tags that electronically record scientific information about the migratory behavior of fish. This includes tags that are surgically implanted within a fish and tags that are externally affixed, such as pop-up satellite (PSAT) and smart position and temperature tags (SPOT). This rule only affects persons placing archival tags. The rule does not impact the placement of other tags such as spaghetti or roto tags, acoustic tags, or passive integrated transponder (PIT) tags. Specifically, the final rule removed the requirement for researchers to obtain written authorization from NMFS to implant or affix an archival tag and allows for persons who catch a fish with a surgically implanted tag to retain the fish only if they return the tag to the person indicated on the tag or to NMFS. Additionally, the final action no longer requires persons retaining fish with surgically implanted tags to submit an archival tag landing report or make the fish available for inspection and tag recovery by a NMFS scientist, enforcement agent, or other person designated in writing by NMFS. Persons who land an Atlantic HMS with an externally-affixed archival tag are encouraged, but not required, to return the tag to the appropriate research entity or to NMFS. The proposed rule for this action published on April 14, 2016 (81 FR 22044) and the public comment period ended on May 16, 2016.

On August 24, 2016, NMFS published a final rule (81 FR 57803) to implement ICCAT Recommendation 15-06, which requires, among other things, fishing vessels to promptly release unharmed, to the extent practicable, porbeagle sharks caught in association with ICCAT fisheries when brought alive alongside for taking on board the vessel. This action affects fishermen fishing in the commercial HMS pelagic longline fishery and HMS recreational fishing vessels when tunas, billfish, or swordfish are on board the vessel. The proposed rule for this action published on June 15, 2016 (81 FR 39017) and the public comment period ended on July 15, 2016.

On September 1, 2016, NMFS adjusted the 2016 annual baseline quota for northern albacore tuna with available underharvest of the 2015 adjusted U.S. northern albacore quota, and augmented the 2016 Atlantic bluefin tuna Reserve category quota with available underharvest of the 2015 adjusted U.S. Atlantic bluefin tuna quota, consistent with the annual quota adjustment processes established in Amendment 7. These quota adjustments were consistent with ICCAT Recommendations 13-05 and 14-05, respectively, and were effective for 2016 only.

On September 8, 2016, NMFS published a Notice of Availability for Draft Amendment 10 (81 FR 62100). The purpose of this Draft Amendment was to update Atlantic HMS EFH with recent information using the same EFH delineation methodology used in Amendment 1 to the 2006 Consolidated Atlantic HMS FMP; update and consider new HAPCs for Atlantic HMS based on recent information, as warranted; minimize to the extent practicable the adverse effects of fishing and non-fishing activities on EFH; and identify other actions to encourage the conservation and enhancement of EFH. The public comment period closed December 22, 2016. Final Amendment 10 is expected to be released in fall 2017.

On October 18, 2016, NMFS published a proposed rule on Draft Amendment 5b to the 2006 Consolidated Atlantic HMS FMP (81 FR 71672). The proposed rule was designed to reduce dusky shark fishing mortality and rebuild the stock, consistent with the results of the 2016 stock assessment update to SEDAR 21. The proposed rule and Draft Amendment 5b also include clarification of the annual catch limit (ACL) and accountability measures for the prohibited shark complex, which includes dusky sharks, and established accountability measures (AMs) for dusky sharks. For the recreational fisheries, the proposed measures include a requirement for a shark endorsement for recreational permit holders, an online training requirement before obtaining the shark endorsement, additional outreach, and a requirement to use circle hooks while fishing for sharks. For the commercial fisheries, the proposed measures include requiring pelagic longline vessels to use a dehooker or cut the gangion less than three feet from the hook when releasing sharks, new shark identification and regulations training as part of the Protected Species Safe Handling, Release, and Identification workshops, additional outreach materials, a fleet communication and relocation protocol, and requiring bottom longline vessels to use circle hooks. The comment period for the proposed rule and Draft Amendment 5b closed on December 22, 2016. A final rule is expected in March 2017.

On November 23, 2016, NMFS published a final rule (81 FR 84491) that established quotas, opening dates, and retention limits for the 2017 Atlantic commercial shark fisheries. The quota adjustments are based on over- and/or underharvests experienced during 2016 and previous fishing seasons. NMFS opened all management groups on January 1, 2017, except the blacktip, aggregated large coastal shark (LCS) and hammerhead shark management groups in the western Gulf of Mexico sub-region, which opened February 1, 2017. The LCS retention limit for directed shark limited access permit holders will start 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 directed shark limited access permit holders may decrease or increase during the year to provide, to the extent practicable, fishing opportunities for commercial shark fishermen in all regions and areas.

On November 23, 2016, NMFS published a final rule that removed upgrade restrictions for vessels issued swordfish directed and Atlantic tunas Longline category limited access permits (LAPs). In consideration of effort controls implemented since 1999, reduced capacity in the pelagic longline fleet, and swordfish stock recovery, vessel upgrade restrictions were determined no longer necessary. The final rule eases a barrier to entry in the pelagic longline fishery, facilitates LAP transfers, provides increased business flexibility, and helps vessel owners address safety issues. The proposed rule published on July 26, 2016 (81 FR 48731) and the comment period closed on October 26, 2016.

On December 14, 2016, NMFS published a final rule (81 FR 90241) that established a commercial retention limit of eight blacknose sharks on all trips when the blacknose shark fishery is open for all Atlantic HMS limited access permit holders in the Atlantic region south of 34°00' N. latitude. The rule is effective January 13, 2017. The proposed rule published on August 3, 2016 (81 FR 51165) and the comment period closed on September 20, 2016.

On December 29, 2016, NMFS published a final rule (81 FR 95903) that provides additional flexibility regarding the distribution of inseason Atlantic bluefin tuna quota transfers to the Longline category. The rule provides NMFS the flexibility to distribute quota inseason either to all qualified Individual Bluefin Quota (IBQ) share recipients (i.e., share recipients who have associated their permit with a vessel) or only to permitted Atlantic Tunas Longline vessels with recent fishing activity (as determined by logbook, vessel monitoring system, or electronic monitoring data from the subject and previous year indicating fishing activity with pelagic longline gear). The proposed rule for this action published on September 26, 2016 (81 FR 65988) and the public comment period ended on October 26, 2016.

Based on public comments, the Atlantic HMS Management Division is considering a rulemaking that could potentially modify the swordfish and shark retention limits for HMS Caribbean Small Boat permit holders (Puerto Rico and the U.S. Virgin Islands). NMFS is currently gathering input from the Caribbean Fishery Management Council (CFMC), the HMS Advisory Panel (AP), local agencies, and fishermen in the Caribbean on local tuna, swordfish, and shark fishing practices. To date, Atlantic HMS Management has presented the issues and options of such a rulemaking to the CFMC, HMS AP, and local commercial fishermen in Fajardo, Puerto Rico, and is continuing to engage in outreach and consultation with interested parties.

Table 1.2 Atlantic HMS Federal Management Actions (Dec 16, 2015 to Dec 31, 2016)

Federal Register Cite	Date	Rule or Notice
		HMS Fisheries (General)
81 FR 8178	2/18/2016	Notice of Public Meeting for the Atlantic HMS Advisory Panel
81 FR 12078	3/8/2016	Notice for Atlantic Shark Identification Workshops, and Protected Species, Release, Disentanglement, and Identification Workshops
81 FR 22044	4/14/2016	Proposed Rule to Revise Atlantic HMS Archival Tag Management Measures
81 FR 37184	6/9/2016	Notice for Atlantic Shark Identification Workshops, and Protected Species, Release, Disentanglement, and Identification Workshops
81 FR 50687	8/2/2016	Notice of Public Meeting for the Atlantic HMS Advisory Panel
81 FR 55376	8/19/2016	Final Rule to Revise Atlantic HMS Archival Tag Management Measures
81 FR 57565	8/23/2016	Notice to Request Nominations for Advisory Panel for HMS SEDAR Workshops
81 FR 60677	9/2/2016	Notice for Atlantic Shark Identification Workshops, and Protected Species, Release, Disentanglement, and Identification Workshops
81 FR 62100	9/8/2016	Notice of Availability of Draft Amendment 10 to the 2006 Consolidated Atlantic HMS Fishery Management Plan: Essential Fish Habitat
81 FR 71076	10/14/2016	Notice of Public Hearings for Draft Amendment 10 to the 2006 Consolidated Atlantic HMS Fishery Management Plan: Essential Fish Habitat
81 FR 78568	11/8/2016	Notice to Request Nominations for the Atlantic HMS Advisory Panel
81 FR 80643	11/16/2016	Notice of Public Meeting for the Atlantic HMS Advisory Panel
81 FR 80646	11/16/2016	Notice of Intent to Issue Exempted Fishing Permits and Related Permits for Atlantic HMS During 2017
81 FR 88214	12/7/2016	Notice for Atlantic Shark Identification Workshops, and Protected Species, Release, Disentanglement, and Identification Workshops
		Bluefin and BAYS Tunas
81 FR 19	1/4/2016	Annual Adjustment of Atlantic Bluefin Tuna Purse Seine and Reserve Category Quotas; Inseason Quota Transfer from the Reserve Category to the Longline Category
81 FR 18796	4/1/2016	Final Rule to Implement ICCAT Electronic Bluefin Tuna Catch Documentation System
81 FR 21481	4/12/2016	Atlantic Bluefin Tuna Angling Category Fishery: Southern Area Trophy Fishery Closing April 10, 2016
81 FR 23438	4/21/2016	Atlantic Bluefin Tuna Angling Category Fishery: Recreational Daily Retention Limit Adjustment
81 FR 29501	5/12/2016	Atlantic Bluefin Tuna General Category Fishery: Adjusted Daily Retention Limit for June-August 2016
81 FR 42290	6/29/2016	Final Rule to Modify Dealer Landings Reporting Methodology for Atlantic Bluefin Tuna
81 FR 51810	8/5/2016	Atlantic Bluefin Tuna Angling Category Fishery: Northern Area Trophy Fishery (Recreational) Closing August 6, 2016
81 FR 59153	8/29/2016	Atlantic Bluefin Tuna: Five-fish General Category (Commercial) Daily Retention Limit for September – December 2016
81 FR 60286	9/1/2016	Adjusted 2016 Northern Albacore Quota and 2016 Atlantic Bluefin Tuna Reserve Category Quota
81 FR 65988	9/26/2016	Proposed Rule to Adjust Individual Bluefin Tuna Quota Program Regulations for Distribution of Inseason Quota Transfers
81 FR 70369	10/12/2016	Atlantic Bluefin Tuna General Category Fishery: Transfer of 125 mt from the Reserve Category and Adjusted Daily Retention Limit to Four Fish for the Remainder of 2016
81 FR 71639	10/18/2016	Atlantic Bluefin Tuna General Category Fishery: Transfer of 18 mt from the Harpoon Category and 67 mt from the Reserve Category and Adjusted Daily Retention Limit to Two Fish for the Remainder of 2016
81 FR 76874	11/04/2016	Closure of 2016 Atlantic Bluefin Tuna General Category Fishery

Federal Register Cite	Date	Rule or Notice
81 FR 91873	12/19/2016	Atlantic Bluefin Tuna General Category Fishery: Transfer of 16.3 mt from December 2017 Subquota to January 2017 Subquota; Daily Retention Limit for January 2017 Subquota of Three Fish
81 FR 95903	12/29/2016	Final Rule to Adjust Individual Bluefin Tuna Quota Program Regulations for Distribution of Inseason Quota Transfers
		Sharks
80 FR 78969	12/18/2015	Final Rule on Collection-of-Information Requirements for Smoothhound Shark Management Measures
81 FR 1941	1/14/2016	Notice of Public Meeting for Selected Participants of the 2016 Shark Research Fishery
81 FR 12602	3/10/2016	March 12 Closure of the Commercial Blacktip Shark, Aggregated Large Coastal Sharks, and Hammerhead Shark Groups in the Western Gulf of Mexico Sub-Region
81 FR 18541	3/31/2016	Retention Limit of Commercial Aggregated Large Coastal Shark and Hammerhead Shark Management Groups: Atlantic Region Reduced to 3 Sharks per Trip
81 FR 33604	5/27/2016	Closure of Commercial Fisheries for Blacknose Sharks and Non-Blacknose Small Coastal Sharks in the Atlantic Region South of 34° N. Latitude
81 FR 39017	6/15/2016	Proposed Rule to Implement ICCAT Recommendation Requiring Release of Live Porbeagle Sharks
81 FR 44798	7/11/2016	Retention Limit of Commercial Aggregated Large Coastal Shark and Hammerhead Shark Management Groups: Atlantic Region Increased to 45 Sharks per Trip
81 FR 51165	8/3/2016	Proposed Rule to Modify Commercial Retention Limit for Small Coastal Sharks in the Atlantic Region
81 FR 57803	8/24/2016	Final Rule to Implement ICCAT Recommendation Requiring Release of Live Porbeagle Sharks
81 FR 59167	8/29/2016	Proposed Rule to Establish Quotas, Opening Dates, and Retention Limits for the 2017 Atlantic Shark Commercial Fishing Season
81 FR 69043	10/5/2016	Notice of Determination that Atlantic Dusky Sharks are Overfished and Subject to Overfishing
81 FR 71672	10/18/2016	Proposed Rule to Implement Amendment 5b to the 2006 Consolidated Atlantic HMS FMP: Atlantic Shark Management Measures
81 FR 72007	10/19/2016	Retention Limit of Commercial Aggregated Large Coastal Shark and Hammerhead Shark Management Groups: Atlantic Region Reduced to 25 Sharks per Trip
81 FR 79409	11/14/2016	Notice of Change in Location of Public Hearing for Amendment 5b to the 2006 Consolidated Atlantic HMS FMP
81 FR 83206	11/21/2016	Request for Applications for Participation in the Atlantic HMS 2017 Shark Research Fishery
81 FR 84491	11/23/2016	Final Rule to Establish Quotas, Opening Dates, and Retention Limits for the 2017 Atlantic Shark Commercial Fishing Season
81 FR 90241	12/14/2016	Final Rule to Establish a Commercial Retention Limit for Blacknose Sharks in the Atlantic Region
		Swordfish and Billfishes
80 CFR 81770	12/31/2015	Swordfish General Commercial Permit Retention Limit Adjustment for January – June 2016
81 FR 36511	6/7/2016	Proposed Rule to Adjust 2016 North and South Atlantic Swordfish Quotas
81 FR 38966	6/15/2016	Swordfish General Commercial Permit Retention Limit Adjustment for July – December 2016
81 FR 48719	7/26/2016	Final Rule to Adjust 2016 North and South Atlantic Swordfish Quotas
81 FR 48731	7/26/2016	Proposed Rule to Remove Vessel Upgrade Restrictions for Swordfish Directed and Atlantic Tunas Longline Category Limited Access Permits
81 FR 84501	11/23/2016	Final Rule to Remove Vessel Upgrade Restrictions for Swordfish Directed and Atlantic Tunas Longline Category Limited Access Permits
81 FR 91876	12/19/2016	Swordfish General Commercial Permit Retention Limit Adjustment for January – June 2017

1.2 2016 Accomplishments of the International Commission for the Conservation of Atlantic Tunas

The International Commission for the Conservation of Atlantic Tunas (ICCAT) is a regional fishery management organization (RFMO) with 51 members, including the United States. The 20th Special Meeting of ICCAT was held in Vilamoura, Portugal November 14-21, 2016. The United States helped develop recommendations aimed at promoting the conservation, management, and rebuilding of Atlantic highly migratory fish stocks (e.g., tunas, billfish, swordfish, sharks), including those important to U.S. interests. ICCAT made progress on a number of issues, including temperate and tropical tunas, sharks, sailfish, monitoring, control and surveillance measures, compliance issues and MSE, and HCR.

Bluefin Tuna: For both western and eastern/Mediterranean bluefin tuna stocks, the next benchmark assessment is scheduled for 2017. To continue the current western Atlantic bluefin tuna management measures until the new assessment results can be considered next November, ICCAT adopted Recommendation 16-08, which extends the 2,000-mt total allowable catch (TAC) through 2017. For eastern Atlantic and Mediterranean bluefin tuna, Recommendation 14-04 (adopted in 2014) established the TAC and management measures through 2017. However, following consideration of a request by Algeria to address the reduction of its quota allocation starting in 2010, ICCAT adopted Recommendation 16-09, which allows Algeria to catch an additional 500 mt (i.e., in addition to its 2017 quota that was established in Recommendation 14-04) in 2017.

North Atlantic Albacore: ICCAT adopted Recommendation 16-06, taking into consideration the improved status of the stock following the 2016 stock assessment (i.e., not overfished with overfishing not occurring). The recommendation maintains the annual TAC of 28,000 mt for 2017 and 2018 and indicates an annual TAC of 30,000 mt may be established for 2019 and 2020, subject to a Commission decision in 2018 based on the latest scientific advice. However, if ICCAT adopts a harvest control rule for the stock during this period, as is expected, the TAC shall be re-established according to those rules. The recommendation authorizes transfers in 2017 from the United States (150 t) and two other members to Venezuela from the unused portion of their 2015 quotas. The recommendation also incorporates capacity management measures (from prior recommendations) and a new checkbox that will be added to the current 20-meter vessel list to indicate vessels authorized to fish for North Atlantic albacore.

Tropical tunas (Atlantic bigeye, yellowfin, and skipjack tunas): ICCAT adopted Recommendation 16-01 for tropical tunas, taking into consideration the recently updated status of the yellowfin tuna stock following the 2016 stock assessment (i.e., overfished with overfishing not occurring). The recommendation made minor changes to the Tropical Tunas Conservation and Management Program regarding Fish Aggregating Device limits, bycatch mitigation measures, and vessel listing requirements.

Sailfish: ICCAT adopted Recommendation 16-11, which established a TAC based on a biological reference point for the eastern and western stock at 67 percent of the maximum sustainable yield (MSY). The recommendation requires ICCAT Contracting Parties, Cooperating non-Contracting Parties, Entities or Fishing Entities (CPCs) to take or maintain appropriate measures to limit sailfish mortality. Such measures could include releasing live

sailfish, encouraging or requiring the use of circle hooks or other effective gear modifications, implementing a minimum size, and/or limiting days at sea.

Swordfish: ICCAT adopted Recommendation 16-03 to rollover the North Atlantic swordfish TAC and CPC-specific catch limits for one year until the new stock assessment in 2017. Recommendation 16-04 maintains the South Atlantic swordfish TAC of 15,000 mt and CPC-specific quotas for one year until the new stock assessment is conducted in 2017. Both recommendations direct the SCRS to consider an interim limit reference point of $0.4 \times B_{MSY}$ (biomass needed for MSY) or any more robust Limit Reference Point established through further analysis. A new checkbox will be added to the current 20-meter vessel list to indicate vessels authorized to fish for North or South Atlantic swordfish.

Recommendation 16-05 establishes a multi-annual recovery plan for Mediterranean swordfish to lower fishing mortality and juvenile landings via several measures. These include extending the time-area closure, further limiting the minimum size, limiting the use of hooks at a certain depth, designating a port landings scheme, requiring observers, monitoring the recreational fishery, and creating a working group to set CPC-specific quotas in the future.

Sharks: ICCAT adopted Recommendation 16-12 for North Atlantic blue sharks, establishing a total catch limit of the average level observed during the period 2011-2015 (i.e., 39,102 mt). If the average total catch of the North Atlantic blue shark in any consecutive two years from 2017 onward exceeds the total catch limit, the Commission shall consider additional measures.

Monitoring, Control and Surveillance Measures: ICCAT took action to address illegal, unreported, and unregulated (IUU) fishing, including amending transshipment controls, creating an expert group to design training programs on port inspection, and updating its IUU vessel list.

Compliance: ICCAT took action to improve compliance with recommended management measures including improvements to the way in which CPCs report their activities, improvements to the way in which ICCATs Compliance Committee reviews those reports and considers the actions of Parties, and the development of a schedule of possible responses to noncompliance with ICCAT management measures.

Management Strategy Evaluation (MSE) and Harvest Control Rules (HCRs): ICCAT agreed to a "roadmap" (i.e., a 5-year schedule that the Commission and the SCRS will follow) to develop harvest strategies for priority stocks (North Atlantic albacore, North Atlantic swordfish, eastern and western Atlantic bluefin tuna, and tropical tunas). The process is iterative, with the Commission and SCRS each taking action at the appropriate time. For instance, steps for the Commission (through its Standing Working Group for Enhancing the Dialogue between Fisheries Scientists and Managers) include providing specific input for each stock on: management objectives, performance indicators, acceptable levels of probability (e.g., of achieving targets or avoiding limits), and timeframes for ending overfishing and/or rebuilding; and ultimately adopting an HCR. Steps for the SCRS include: conducting stock assessments, evaluating a range of candidate HCRs through MSE, and evaluating the performance of candidate and adopted HCRs through MSE.

1.3 State Regulations

Table 1.3 outlines the state regulations regarding Atlantic HMS as of November 1, 2016. While the HMS Management Division updates this table annually, persons interested in the current regulations for any state should contact that state directly.

Atlantic tunas (bluefin, bigeye, albacore, yellowfin, and skipjack tunas) are under federal jurisdiction from the outer boundary of the exclusive economic zone (EEZ) to the shoreline. Federal regulations for Atlantic tunas apply in state waters of the U.S. Atlantic, Gulf of Mexico, and Caribbean, with the exceptions of state waters of Maine, Connecticut, and Mississippi (50 CFR 635.1(b)). NMFS periodically reviews state tuna regulations for federal consistency as required under the ATCA. Table 1.3 describes the state regulations as stated in available source material and makes no statement about the consistency of the specific, 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 ASMFC 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 ASMFC Interstate 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 consistent with federal regulations. Most recently, in August 2016, Addendum IV was finalized which amended the smooth dogfish at-sea processing requirements consistent with federal regulations. Under Addendum IV, which states were required to implement by January 1, 2017, 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. 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 (Maine, Massachusetts, and New Hampshire) or have equivalent conservation measures 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.

Some Atlantic states have also adopted legislative bans on the possession and trade of shark fins, including Delaware, Maryland, Massachusetts, and New York, although some allow limited exemptions for certain species such as smoothhound sharks. Some states on the west coast of the United States, several U.S. territories, and Illinois have similar restrictions.

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. X = Regulations in Effect; n = Regulation Repealed; FL = Fork Length; CL = Carcass Length; TL = Total Length; LJFL = Lower Jaw Fork Length; CFL = Curved Fork Length; DW = Dressed Weight; and SCS = Small Coastal Sharks; LCS = Large Coastal Sharks.

State	Species				Cite Reference	Regulatory Details	Contact Information
	Tunas	Swordfish	Billfishes	Sharks			
ME	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 - 1 tuna/year – 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 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
NH			X	X	Billfish - N.H. Code Admin. R. Fis 603.13 Sharks - N.H. Code Admin. R. Fis 603.20	Billfish - Possession limit - 1 billfish/trip; minimum size (LJFL) - blue marlin – 99”; white marlin - 66”; sailfish – 57”; 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 list (Fis 603.20) for prohibited sharks at http://gencourt.state.nh.us/rules/state_agencies/fis600.html – no take, landings, or possession of prohibited shark species; NH Wholesale Marine Species License and a Federal Dealer permit 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.	NH Fish and Game Douglas Grout Phone: (603) 868-1095 Fax: (603) 868-3305

State	Species				Cite Reference	Regulatory Details	Contact Information
	Tunas	Swordfish	Billfishes	Sharks			
MA	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 or NOAA Fisheries. All MA 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
RI				X	Sharks - RIMFC Regulations part VII 7.24	Sharks – ASMFC Coastal Shark Plan; Commercial fishing license or landing permit required to harvest or land HMS; No person fishing recreationally shall possess a shark with a fork length less than 54 inches, with the exception of Atlantic sharpnose, bonnethead, and smoothhound, which have no minimum size limit; No person shall possess a sandbar shark. All RI commercial and recreational marine fisheries regulations are at: http://www.dem.ri.gov/pubs/regs/regs/fishwild/rimftoc.htm RIMFC Regulations part VII 7.24 are at: http://www.dem.ri.gov/pubs/regs/regs/fishwild/rimf7.pdf	RI Dept of Environment Management, Div of Fish and Wildlife Eric Schneider Phone: (401) 423-1933
CT				X	Sharks – Regulations of Connecticut State Agencies § 26-159a-1; Connecticut General Statutes §26-102, Declaration 15-04	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 Dept of Energy and Environmental Protection David Simpson Phone: (860) 434-6043 Fax: (860) 434-6150

State	Species				Cite Reference	Regulatory Details	Contact Information
	Tunas	Swordfish	Billfishes	Sharks			
NY			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.	NY Department of Environmental Conservation Stephen W. Heins Phone: (631) 444-0435 Fax: (631) 444-0449
NJ				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 Fish and Wildlife Russ Babb Phone: (609)748-2020 Fax: (609) 748-2032
DE			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			
MD	X	X	X	X	Code of Maryland Regulations: Bluefin tuna – Md. Code. Regs 08.02.05.23 Swordfish – Md. Code. Regs. 08.02.05.27 Billfish – Md. Code Regs. 08.02.05.26 Sharks - Md. Code Regs. 08.02.22.03	Bluefin tuna - Federal regulations used to control size and seasons, and recreational catch required to be tagged. Swordfish - Federal regulations used to control size and seasons, and recreational catch required to be tagged. Billfish (blue/white marlin and sailfish) - Federal regulations control size and seasons, and recreational catch required to be tagged. Sharks – Recreational catch required to be tagged; ASMFC Coastal Shark Plan; all recreationally harvested sharks must have heads, tails, and fins attached naturally to the carcass through landing; all commercially harvested sharks other than smoothhounds must have tails and fins attached naturally to carcass through landing; smoothhound sharks harvested commercially may have dorsal, pectoral and caudal fins removed (caudal fins may not exceed 4% of total dressed weight of smoothhound shark carcasses on board; dorsal and pectoral fins may not exceed 8% of total dressed weight of smoothhound shark carcasses on board). Commercial - During the period of May 15-July 15 an individual may not harvest the species listed in §A(6) and (7) of this regulation from State waters or transport the species listed in §A(6) and (7) of this regulation in State waters, unless the shark was harvested from federal waters provided: (i) The vessel does not engage in fishing within the closed area while possessing the species listed in §A(6) and (7) of this regulation; (ii) The sharks possessed were not caught in the closed area; and (iii) All fishing gear is stowed as described in §D(4) of this regulation and not available for immediate use.	MD Department of Natural Resources Gina Hunt Phone: (410) 260-8326
VA			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			
NC	X		X	X	NC Admin Code: 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: yellowfin tuna – 27” CFL, bigeye tuna - 27” CFL, bluefin tuna – 73” CFL; Recreational bag limit: 3 yellowfin tuna/day. Billfish - Recreational possession limit - 1 blue or white marlin/vessel/trip; 1 sailfish/person/day; Minimum size - blue marlin - 99", white marlin - 66", sailfish - 63"; 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; additionally: 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
SC	X	X	X	X	SC Code Ann: Tuna/Swordfish - 50-5-2725 and 2730 Billfish - 50-5-1700, 1705, 2725 and 2730; 50-1-30 (7) Sharks - 50-5-2725, 2730	Tuna - Bigeye 27” CFL, Yellowfin 27 CFL, Bluefin 27”- 73” CFL. Billfish – Blue Marlin 99”, White Marlin 66”, Sailfish 63”,Swordfish 47”, 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
GA			X	X	GA Code Ann: Gear Restrictions/Prohib - 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 is prohibited in state waters. Billfish - Possession prohibited in state waters, except for catch and release. Sharks – Commercial/Recreational: 1/person for sharks from the Small Shark Composite (bonnethead, Atlantic sharpnose, and spiny dogfish), min size 30” FL. All other sharks - 1 shark/person or boat, whichever is less, min size 54” FL. Hammerheads (great, scalloped and smooth)-1/person or boat, whichever is less, minimum size – 78” FL. Prohibited Species: same as federal, plus silky sharks; All species must be landed head and fins intact; Sharks may not be landed in Georgia if harvested using 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

State	Species				Cite Reference	Regulatory Details	Contact Information
	Tunas	Swordfish	Billfishes	Sharks			
FL		X	X	X	Sharks - FL Administrative Code 68B-44 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); Minimum size limit (blue marlin – 99” LJFL; white marlin – 66” LJFL; roundscale spearfish – 66” LJFL; sailfish – 63” LJFL); All recreational landings must be reported NOAA within 24 hours; Must land in whole condition (gutting allowed). Swordfish - Min size – 47” LJFL/25” CK; Authorized fishing gear for swordfish is hook and line in state waters, Recreational possession limit 1 fish/person/day or 4 fish/vessel/day (with 4 or more persons onboard) on private boats, limit of 1 fish/paying customer/day up to 15 fish/vessel/day on for-hire vessels; Captain and crew on for-hire vessels have zero bag limit. Commercial harvest and sale allowed only with FL saltwater products license, restricted species endorsement, and a federal commercial permit for swordfish, so federal regulations apply in state waters unless state regulations are more restrictive. Wholesale dealers purchasing swordfish must possess a federal Swordfish Dealer permit; All recreational landings must be reported to NMFS within 24 hr. Sharks – Commercial/recreational: min size – 54” except no min size on blacknose, blacktip, bonnethead, smooth dogfish, finetooth, Atlantic sharpnose; Commercial/recreational possession limit – 1 shark/person/day, max; 2 sharks/vessel on any vessel with 2 or more persons on board; Allowable gear – hook and line only; 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; Finning, removing heads and tails, and filleting prohibited (gutting allowed); 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, 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. Under Fla. Admin. Code Ann.r. 68B-4400. it is 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)	FL Fish and Wildlife Conservation Commission Martha Bademan Phone: (850) 487-0554 Fax: (850) 487-4847

State	Species				Cite Reference	Regulatory Details	Contact Information
	Tunas	Swordfish	Billfishes	Sharks			
AL	X	X	X	X	Tunas/Swordfish/Billfish/Sharks – AL Administrative Code r.220-3-.30 Sharks - AL Administrative Code r.220-3-.30, r.220-3-.37, and r.220-2-.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; Yellowfin and bigeye – 27" CFL min size. Sharks – Recreational: bag limit – 1 sharpnose/person/day and 1 bonnethead/person/day; no min size; great hammerhead, smooth hammerhead, scalloped hammerhead 1/person/day - 78" FL; all other sharks – 1/person/day; min size – 54" FL or 30" dressed; Commercial - no size limit and no possession limit on any non-prohibited species. Restrictions of chumming and shore-based angling if creating unsafe bathing conditions; Prohibited species: Atlantic angel, basking, bigeye sand tiger, bigeye sixgill, bigeye thresher, bignose, Caribbean reef, Caribbean sharpnose, dusky, Galapagos, largetooth sawfish, longfin mako, narrowtooth, night, sandtiger, 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 fisheries permit). Commercial-state waters close, by species, 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 a dressed weight not exceeding 10 percent of total catch.	AL Department of Conservation and Natural Resources, Marine Resources Division Major Scott Bannon Phone: (251) 861-2882 www.outdooralabama.com

State	Species				Cite Reference	Regulatory Details	Contact Information
	Tunas	Swordfish	Billfishes	Sharks			
LA	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 for yellowfin and bigeye is 27" CFL; Recreational bag limits – 3 yellowfin/person. Recreational minimum size for bluefin tuna is 73" CFL 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 Fishery Conservation Act and published in the Code of Federal Regulations 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 Fishery Conservation Act and published in the Code of Federal Regulations as amended Title 50 and 15 law." Billfish/Swordfish - Minimum size: blue marlin (99" LJFL), white marlin (66" LJFL), sailfish (63" LJFL), swordfish (29" carcass length or 33 lb dw, 47" LJFL if not dressed); Recreational creel limit - 5 swordfish/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. Sharks - Recreational: min size – 54" FL, except Atlantic sharpnose and bonnethead which have no size limit; bag limit - 1 sharpnose or bonnethead/person/day, all other sharks, except sandbar, silky and all prohibited sharks – 1 shark/ vessel/ trip in aggregate; Commercial: 45/permit holder/day limit; no min size; Com & rec prohibited: Apr 1 - Jun 30; Prohibited species: same as federal regulations; Fins must remain naturally attached to carcass though off-loading. Commercial shark fishing 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 without Louisiana waters, except Atlantic sharpnose and bonnethead which are allowed at one/person/day.	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			
MS	X		X	X	Tunas MS ADC 43 000 040 Billfish Sharks - MS Code Title-22 part 7	Tunas – No directed bluefin tuna fishing; only recreational anglers can retain incidentally-caught bluefin tuna up to 1/boat/week; Recreational and commercial min size for yellowfin and bigeye is 27" CFL; Recreational retention limit for yellowfin is 3/person (possession limit). Billfish – Unlawful to sell blue and white marlin and sailfish without proper federal documentation; Recreational min size: blue marlin 99" LJFL; white marlin 66" LJFL; sailfish 63" LJFL; No possession for longbill spearfish; No limit for recreational take. Sharks – Recreational min size: LCS/Pelagics 37" TL; SCS 25" TL; possession limit: LCS/Pelagics 1/person up to 3/vessel; SCS 4/person; it is unlawful for commercial fishermen to possess sandbar sharks. Prohibition on finning.	MS Department of Marine Resources Kerwin Cuevas Phone: (228) 374-5000
TX		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; min size (TL): blue marlin 131"; white marlin 86"; sailfish 84". Sharks - Commercial/recreational: bag limit - 1 shark/person/day; possession limit is twice the daily bag limit (i.e., 2 sharks/person/day); min size 24" TL for Atlantic sharpnose, blacktip, and bonnethead sharks and 64" TL for all other lawful sharks. Prohib species: all federally prohibited species and sandbar sharks.	TX Parks & Wildlife Department Mark Lingo Phone: (512) 389-4668 Fax: (512) 389-8762
Puerto Rico	X	X	X	X	Regulation #7949 Article 13 – Commercial Fishing Limits Article 18 – Recreational Fishing Limits	Illegal to sell, offer for sale, or traffic in any billfish or marlin, either whole or processed, captured in jurisdictional waters of Puerto Rico. Swordfish or billfish, tuna, and shark are covered under the federal Atlantic HMS regulations (50 CFR, Part 635), which also apply in territorial waters; Fishers who capture these species are 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; in the case of tuna and swordfish, fishers shall obtain a permit according to the requirements of the federal government; Year-round closed season on nurse sharks.	Puerto Rico Department of Natural and Environmental Resources Craig Lilyestrom Phone: (787) 772-2022

State	Species				Cite Reference	Regulatory Details	Contact Information
	Tunas	Swordfish	Billfishes	Sharks			
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 thresholds used to determine the status of Atlantic HMS are presented in Figure 2.1. These thresholds are fully described in Chapter 3 of the 1999 Atlantic Tunas, Swordfish, and Sharks FMP (1999 FMP) and in Amendment 1 to the Billfish FMP, and were carried over in full in the 2006 Consolidated HMS FMP. These thresholds are based upon those described in a paper providing the initial technical guidance for implementing NS 1 of the Magnuson-Stevens Act (Restrepo et al. 1998). These types of figures 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, the 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, the stock may have a status of "overfished," "overfishing is occurring," or both.

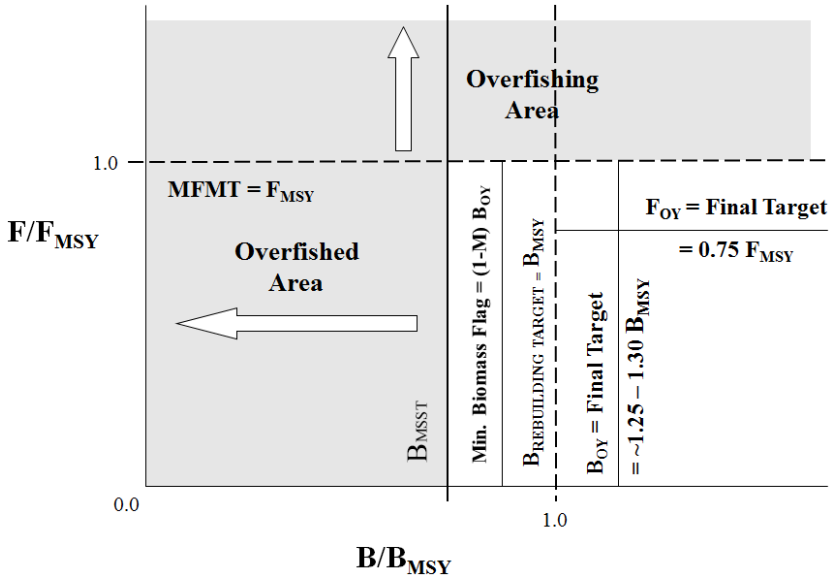

Figure 2.1 Illustration of the Status Determination Criteria and Rebuilding Terms

In summary, a species is considered "overfished" when the current biomass (B) is less than 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 be lower than B_{MSY}, and the stock not be declared overfished as long as the biomass is above B_{MSST}. If a species is declared overfished, action to rebuild the stock is required by law. A species is considered rebuilt when B is greater than B_{MSY}. It is important to note that other bodies, such as ICCAT, use different thresholds for stock status determination. For instance, the ICCAT Convention 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}.

"Overfishing may be occurring" on a species 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.

A species 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 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 $M < 0.5$; MSST = $0.5B_{MSY}$ when $M \geq 0.5$ (MSST values for specific billfishes: blue marlin = $0.9B_{MSY}$; white marlin = $0.85B_{MSY}$; west Atlantic sailfish = $0.75B_{MSY}$); M = natural mortality. 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 = $(1\text{-}M)B_{OY}$; and
- 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 2016 under the domestic and, when appropriate, international thresholds. In some cases, these statuses are preliminary as NMFS is still reviewing the most recent stock assessment results. NMFS updates all U.S. fisheries' stock statuses each quarter and provides an annual Status of U.S. Fisheries Report to Congress (http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries).

With the exception of many Atlantic shark stocks, stock assessments for Atlantic HMS are conducted by ICCAT's SCRS (http://www.iccat.int/en/assess.htm). In 2016, the SCRS completed stock assessments for Atlantic yellowfin tuna, North Atlantic albacore tuna, and West Atlantic sailfish.

Atlantic shark stock assessments for large coastal, small coastal, and smoothhound sharks are generally completed by the Southeast Data, Assessment, and Review (SEDAR) process. In 2016, a stock assessment update was completed for dusky sharks following the SEDAR process. In some cases, NMFS looks to available resources, including peer reviewed literature, for external assessments that, if deemed appropriate, could be used for domestic management purposes. NMFS followed this process in determining the stock status of scalloped hammerhead sharks based on an assessment for this species that was completed by Hayes et al. (2009).

Table 2.1 Atlantic HMS Stock Status Summaries (Domestic and International): Overfished (and Years to Rebuild) and Not Overfished

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)	Most Recent Assessment
West Atlantic bluefin tuna	SSB_{2013}/SSB_{MSY}* = 2.25 (1.92 - 2.68) (low recruitment) SSB_{2013}/SSB_{MSY}* = 0.48 (0.35 - 0.72) (high recruitment)	SSB_{MSY} = 13,226 mt (low recruitment; 12,969-13,645 mt) SSB_{MSY} = 63,102 mt (high recruitment; 50,096-72,921 mt)	B_{MSY}	0.86 SSB_{MSY} (11,374 mt; low recruitment) (54,268 mt; high recruitment)	Low recruitment scenario: Not overfished High recruitment scenario: Overfished	Low recruitment scenario: Not overfished* High recruitment scenario: Overfished*	20	5/1/1999 (2019)	2014
Atlantic bigeye tuna	B_{2014}/B_{MSY} = 0.67 (0.48 - 1.20)	*Unspecified*†	B_{MSY}	0.6 B_{MSY}	Overfished	Not overfished (Rebuilding)	Not available†††	1/1/1999	2015
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			2016
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)			2016
West Atlantic skipjack tuna	B_{2013}/B_{MSY}: Probably close to 1.3	30,755 mt	B_{MSY}	*Unknown*	Not overfished	Not overfished			2014
North Atlantic swordfish	B_{2011}/B_{MSY} = 1.14 (1.05 - 1.24)	65,060 mt	B_{MSY}	0.8 B_{MSY}; (52,048 mt)	Not overfished	Not overfished			2013
South Atlantic swordfish	B_{2011}/B_{MSY} = *Unknown but likely above 1*	*Unknown*	B_{MSY}	0.8 B_{MSY} *(Unknown)*	Not overfished	Not overfished			2013
Blue marlin	B_{2009}/B_{MSY} = 0.67 (0.53 - 0.81)	25,411 mt (SSB_{MSY})	B_{MSY}	0.9 B_{MSY} (22,870 mt; based on SSB_{MSY})	Overfished	Overfished	Not available†††	6/1/2001	2011

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)	Most Recent Assessment
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	2012
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 t ‡,‡‡	B_{MSY}	0.75 B_{MSY}	Not Likely	Not overfished - rebuilding			2016
Longbill spearfish	*Unknown*	*Unknown*	B_{MSY}	*Unknown*	*Unknown*	*Unknown*			1997
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)	2009
North Atlantic blue sharks	B_{2013}/B_{MSY} = 1.35-3.45	*Unspecified* †	B_{MSY}	(1-M)B_{MSY}	Not likely overfished	Not overfished			2015
North Atlantic shortfin mako sharks	B_{2010}/B_{MSY} = 1.15 - 2.04	183,612 mt - 863,655 mt ††	B_{MSY}	(1-M)B_{MSY}**	Not overfished	Not overfished			2012
Sandbar sharks	SSF_{2009}/SSF_{MSY} = 0.51 – 0.72	SSF_{MSY} = 349,330 - 1,377,800 (numbers of sharks)	*NA*	301,821 – 1,190,419 (based on SSF_{MSY})	*NA*	Overfished	66	1/1/2005 (2070)	2010
Gulf of Mexico blacktip sharks	SSF_{2010}/SSF_{MSY} = 2.00-2.66	SSF_{MSY} = 1,570,000 - 6,440,000 (numbers of sharks)	*NA*	1,327,697 - 5,446,093 (1-M)SSF_{MSY}	*NA*	Not overfished			2012
Atlantic blacktip sharks	*Unknown*	*Unknown*	*NA*	(1-M)B_{MSY}	*NA*	*Unknown*			2005/2006
Dusky sharks	SSF_{2015}/SSF_{MSY} = 0.41 - 0.64	*Unknown*†	*NA*	(1-M)SSB_{MSY}	*NA*	Overfished	100	7/24/2008 (2108)	2016
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)	2009
Atlantic Bonnethead sharks	*Unknown*	*Unknown*	*NA*	*Unknown*	*NA*	*Unknown*			2013

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)	Most Recent Assessment
Gulf of Mexico Bonnethead sharks	*Unknown*	*Unknown*	*NA*	*Unknown*	*NA*	*Unknown*			2013
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			2013
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			2013
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)	2010
Atlantic blacknose sharks – Gulf of Mexico stock	*Unknown*	*Unknown*	*NA*	(1-M)B_{MSY}	*NA*	*Unknown*			2010
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			2007
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			2015
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			2015

*Future stock productivity is based upon two hypotheses about future recruitment: a "high recruitment scenario" in which future recruitment has the potential to achieve levels that occurred in the early 1970s and a "low recruitment scenario" in which future recruitment is expected to remain near present levels. The SCRS, as stated in the stock assessment, has insufficient evidence to favor either scenario over the other and notes that both are plausible (but not extreme) lower and upper bounds on rebuilding potential. **M is unknown. †A value for B_{MSY} (or its proxy) was not provided in the stock assessment. ††Only the BSP model provided B_{MSY} values. The B_{MSY} range encompasses the16 scenarios run of the BSP model. †††There is insufficient information to estimate how many years it will take this stock to rebuild. ‡Stock Synthesis estimate based on increasing CPUE trends, with approximate 95% confidence intervals. ‡‡ Stock Synthesis estimate based on decreasing CPUE trends, with approximate 95% confidence intervals.

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

Table 2.2 Atlantic HMS Stock Status Summaries (Domestic and International): Overfishing Is Occurring and Overfishing Is Not Occurring

Species	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Threshold	International Stock Status	Domestic Stock Status	Most Recent Assessment
West Atlantic bluefin tuna	$F_{2010\text{-}2012}/F_{MSY}$*= 0.36 (0.28 - 0.43) (low recruitment) $F_{2010\text{-}2012}/F_{MSY}$*= 0.88 (0.64 - 1.08) (high recruitment)	F_{MSY} = 0.20 (0.17-0.24) (low recruitment) F_{MSY} = 0.08 (0.07-0.10) (high recruitment)	Low recruitment scenario: Overfishing is not occurring* High recruitment scenario: Overfishing is not occurring*	Low recruitment scenario: Overfishing is not occurring* High recruitment scenario: Overfishing is not occurring*	2014
Atlantic bigeye tuna	F_{2014}/F_{MSY} = 1.28 (0.62 - 1.85)	F_{MSY} = †	Overfishing is occurring	Overfishing is occurring	2015
Atlantic yellowfin tuna	F_{2014}/F_{MSY}= 0.77 (0.53 - 1.05)	F_{MSY} †	Overfishing is not occurring	Overfishing is not occurring	2016
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	2016
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	2014
North Atlantic swordfish	F_{2011}/F_{MSY} = 0.82 (0.73 - 0.91)	F_{MSY} = 0.21 (0.17 - 0.26)	Overfishing is not occurring	Overfishing is not occurring	
South Atlantic swordfish	F_{2011}/F_{MSY} = *Unknown but likely above 1*	*Unknown*	Overfishing is not occurring	Overfishing is not occurring	
Blue marlin	F_{2009}/F_{MSY} = 1.63 (1.11-2.16)	F_{MSY} = 0.07	Overfishing is occurring	Overfishing is occurring	2011
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	2012
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	2016
Longbill spearfish	*Unknown*	*Unknown*	*Unknown*	*Unknown*	1997

Species	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Threshold	International Stock Status	Domestic Stock Status	Most Recent Assessment
Northwest Atlantic porbeagle shark	F_{2008}/F_{MSY} = 0.03 – 0.36	0.025 - 0.075	Overfishing is not occurring	Overfishing is not occurring	2009
North Atlantic blue shark	F_{2013}/F_{MSY} = 0.04-0.75	0.19-0.20	Overfishing is not likely occurring	Overfishing is not occurring	2015
North Atlantic shortfin mako shark	F_{2010}/F_{MSY} = 0.16 - 0.92	0.029 - 0.104††	Overfishing is not occurring	Overfishing is not occurring	2012
Sandbar	F_{2009}/F_{MSY} = 0.29 - 2.62	0.004 - 0.06	Not assessed internationally	Overfishing is not occurring	2010
Gulf of Mexico blacktip	F_{2010}/F_{MSY} = 0.05 – 0.27	0.021 - 0.163	Not assessed internationally	Overfishing is not occurring	2012
Atlantic blacktip	*Unknown*	*Unknown*	Not assessed internationally	*Unknown*	2005/2006
Dusky shark	F_{2015}/F_{MSY} = 1.08 - 2.92	0.015 - 0.046	Not assessed internationally	Overfishing is occurring	2016
Scalloped hammerhead shark	F_{2005}/F_{MSY} =1.29	0.11	Not assessed internationally	Overfishing is occurring	2009
Bonnethead shark – Atlantic stock	*Unknown*	*Unknown*	Not assessed internationally	*Unknown*	2013
Bonnethead shark – Gulf of Mexico stock	*Unknown*	*Unknown*	Not assessed internationally	*Unknown*	2013
Atlantic sharpnose shark – Atlantic stock	F_{2011}/F_{MSY} = 0.23	0.184	Not assessed internationally	Overfishing is not occurring	2013
Atlantic sharpnose shark - Gulf of Mexico stock	F_{2011}/F_{MSY} = 0.57	0.331	Not assessed internationally	Overfishing is not occurring	2013
Atlantic blacknose shark – Atlantic stock	F_{2009}/F_{MSY} = 3.26 – 22.53	0.01 - 0.15	Not assessed internationally	Overfishing is occurring	2010
Atlantic blacknose shark – Gulf of Mexico stock	*Unknown*	*Unknown*	Not assessed internationally	*Unknown*	2010
Finetooth shark	F_{2005}/F_{MSY} = 0.17	0.03	Not assessed internationally	Overfishing is not occurring	2007
Atlantic smooth dogfish	F_{2012}/F_{MSY} = 0.61-0.99	0.129	Not assessed internationally	Overfishing is not occurring	2015

Species	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Threshold	International Stock Status	Domestic Stock Status	Most Recent Assessment
Gulf of Mexico smoothhound shark complex	F_{2012}/F_{MSY} = 0.07-0.35	0.106	Not assessed internationally	Overfishing is not occurring	2015

*Where F year refers to the geometric mean of the estimates for 2010-2012 (a proxy for recent F levels). †A value for F_{MSY} was not provided in the stock assessment. ††Both the BSP and catch-free model estimated F_{MSY}. The F_{MSY} range encompasses the lowest estimate of the 16 scenarios run of the BSP model and the highest estimate of the 10 scenarios run for the catch-free model. ‡Stock Synthesis estimate based on increasing CPUE trends, with approximate 95% confidence intervals. ‡‡ Stock Synthesis estimate based on decreasing CPUE trends, with approximate 95% confidence intervals.

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

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://www.sefsc.noaa.gov/sedar/. 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

Assessed by ICCAT's SCRS in 2014:
http://www.iccat.int/Documents/Meetings/Docs/2014_BFT_ASSESS-ENG.pdf

Atlantic Bigeye Tuna

Assessed by ICCAT's SCRS in 2015:
http://www.iccat.int/Documents/Meetings/Docs/2015_BET%20ASSESS_REPORT_ENG.pdf

Atlantic Yellowfin Tuna

Assessed by ICCAT's SCRS in 2016:
https://www.iccat.int/Documents/Meetings/Docs/2016_YFT_ASSESSMENT_ENG.pdf

North Atlantic Albacore Tuna

Assessed by ICCAT's SCRS in 2016:
http://www.iccat.int/Documents/Meetings/Docs/2016_ALB_REPORT_ENG.pdf

West Atlantic Skipjack Tuna

Assessed by ICCAT's SCRS in 2014:
http://iccat.int/Documents/Meetings/Docs/2014_SKJ_ASSESS_ENG.pdf

North Atlantic Swordfish

Assessed by ICCAT's SCRS in 2013:
http://www.iccat.int/Documents/Meetings/Docs/2013_SWO_ASSESS_REP_ENG.pdf

South Atlantic Swordfish

Assessed by ICCAT's SCRS in 2013:
http://www.iccat.int/Documents/Meetings/Docs/2013_SWO_ASSESS_REP_ENG.pdf

Blue Marlin

Assessed by ICCAT's SCRS in 2011:
http://www.iccat.int/Documents/Meetings/Docs/2011_BUM_ASSESS_ENG.pdf

White Marlin and Roundscale Spearfish

Assessed by ICCAT's SCRS in 2012:
http://www.iccat.int/Documents/Meetings/Docs/2012_WHM_ASSESS_ENG.pdf

West Atlantic Sailfish

Assessed by ICCAT's SCRS in 2016:
http://www.iccat.org/Documents/Meetings/Docs/2016_SAI_REPORT_ENG.pdf

Longbill Spearfish

Longbill spearfish have not been assessed by ICCAT's SCRS due to the lack of data. Some information can be found in the 2009 sailfish stock assessment:
https://www.iccat.int/Documents/SCRS/DetRep/DET-SAI.pdf

Sandbar Sharks

Assessed in 2010/2011 through the SEDAR process: http://sedarweb.org/sedar-21

Gulf of Mexico Blacktip Sharks

Assessed in 2012 through the SEDAR process: http://sedarweb.org/sedar-29

Atlantic Blacktip Sharks

Assessed in 2006 through the SEDAR process: http://sedarweb.org/sedar-11

Dusky Sharks

Assessed in 2010/2011 and update completed in 2016 through the SEDAR process:
http://sedarweb.org/sedar-21u

Bonnethead Sharks (Atlantic and Gulf of Mexico)

Assessed in 2013 through the SEDAR process: http://sedarweb.org/sedar-34

Atlantic Sharpnose Sharks (Atlantic and Gulf of Mexico)

Assessed in 2013 through the SEDAR process: http://sedarweb.org/sedar-34

Blacknose Sharks (Atlantic and Gulf of Mexico)

Assessed in 2010/2011 through the SEDAR process: http://sedarweb.org/sedar-21

Finetooth Sharks

Assessed in 2007 through the SEDAR process: http://sedarweb.org/sedar-13

Northwest Atlantic Porbeagle Sharks

Assessed by ICCAT's SCRS in 2009:
http://www.iccat.int/Documents/Meetings/Docs/2009_POR_ASSESS_ENG.pdf

North Atlantic Blue Sharks

Assessed by ICCAT's SCRS in 2015:
http://www.iccat.int/Documents/Meetings/Docs/2015_BSH%20ASSESS_REPORT_ENG.pdf

North Atlantic Shortfin Mako Sharks

Assessed by ICCAT's SCRS in 2012: http://www.iccat.int/Documents/Meetings/Docs/2012_SHK_ASS_ENG.pdf

Scalloped Hammerhead Sharks

Assessed in Hayes et al. (2009).

Smoothhound Sharks (Atlantic and Gulf of Mexico)

Assessed in 2015 through the SEDAR process: http://sedarweb.org/sedar-39

Chapter 2 References

Gibson AJA, Campana SE. 2005. Status and recovery potential of porbeagle shark in the Northwest Atlantic. Canadian Science Advisory Secretariat, Research Document 2005/053. http://www.dfo-mpo.gc.ca/csas/

Hayes CG, Jiao Y, Cortés E. 2009. Stock assessment of scalloped hammerheads in the Western North Atlantic Ocean and Gulf of Mexico. North American Journal of Fisheries Management 29:1406-1417.

NMFS. 2006. SEDAR 11 Stock assessment report: large coastal shark complex, blacktip and sandbar shark. Silver Spring (MD): HMS Management Division.

NMFS. 2007. SEDAR 13 Stock assessment report: small coastal sharks, Atlantic sharpnose, blacknose, bonnethead, and finetooth shark. Silver Spring (MD): HMS Management Division.

Restrepo VR, Thompson GG, Mace PM, Gabriel WL, Low LL, MacCall AD, Methot D, Powers JE, Taylor BL, Wade PR, Witzig JF. 1998. Technical guidance on the use of precautionary approaches to implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Tech Memo NMFS-F/SPO-31.

SCRS. 2007. ICCAT Report for Biennial Period, 2006-07, Part II;2:47-262.

SCRS. 2008. ICCAT Report for Biennial Period, 2007-08, Part I; 2:31-271.

SCRS. 2009a. ICCAT Report for Biennial Period, 2008-09, Part II; 2:45-344.

SCRS. 2009b. Report of the 2009 porbeagle stock assessments meeting (Copenhagen, Denmark, June 22 to 27, 2009). ICCAT Collect Vol Sci Pap. 2010; 65(6):1909-2005.

SCRS. 2010. ICCAT Report for Biennial Period, 2010-11, Part I; 2:1-265.

SCRS. 2011. ICCAT Report for Biennial Period, 2010-11, Part II; 2:1-268.

SCRS. 2012a. ICCAT Report for Biennial Period, 2012-13, Part I; 2:1-296.

SCRS. 2012b. 2012 Shorfin mako stock assessment and ecological risk assessment meeting (Olhão, Portugal - June 11 to 18, 2012). ICCAT Collect Vol Sci Pap. 2013; 69(4):1427-1570.

SCRS. 2013. ICCAT Report for Biennial Period, 2012-13, Part II; 2:1-343.

SCRS. 2014. ICCAT Rep for Bienn Per, 2014-15, Part I; 2:1-348.

SCRS. 2015. Report of the standing committee on research and statistics. ICCAT September 28 – October 2, 2015; Madrid, Spain.

SCRS. 2016. Report of the standing committee on research and statistics. ICCAT October 3-7, 2016; Madrid, Spain.

SEDAR. 2011a. SEDAR 21 stock assessment report: HMS Atlantic blacknose shark. North Charleston (SC): SEDAR.

SEDAR. 2011b. SEDAR 21 stock assessment report: HMS dusky sharks. North Charleston (SC): SEDAR.

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.

SEDAR. 2012. SEDAR 29 stock assessment report: HMS Gulf of Mexico blacknose sharks. North Charleston (SC): SEDAR.

SEDAR. 2013a. SEDAR 34 stock assessment report: HMS Atlantic sharpnose shark. North Charleston (SC): SEDAR.

SEDAR. 2013b. SEDAR 34 stock assessment report: HMS bonnethead shark. North Charleston (SC): SEDAR.

SEDAR. 2015a. SEDAR 39 Stock Assessment Report: HMS Atlantic smooth dogfish. North Charleston (SC): SEDAR.

SEDAR. 2015b. SEDAR 39 Stock Assessment Report: HMS Gulf of Mexico smoothhound sharks. North Charleston (SC): SEDAR.

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

3 ESSENTIAL FISH HABITAT

3.1 Designations in the 2006 Consolidated Atlantic HMS FMP and its Amendments

The Magnuson-Stevens Act requires NMFS 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 EFH. In 2009, NMFS completed the five-year review and update of EFH for Atlantic HMS with Amendment 1 to the 2006 Consolidated HMS FMP (June 12, 2009, 74 FR 288018) (Amendment 1). In Amendment 1, NMFS updated and revised existing identifications and descriptions of EFH for Atlantic HMS, designated a Habitat Area of Particular Concern (HAPC) for bluefin tuna in the Gulf of Mexico, and analyzed fishing and non-fishing impacts on EFH pursuant to Section 305(b) of the Magnuson-Stevens Act.

In 2010, NMFS added the smoothhound management group to the species under Secretarial management in Amendment 3 to the 2006 Consolidated HMS FMP (June 1, 2010, 75 FR 30484). The smoothhound management group consists of smooth dogfish, Florida smoothhound, and Gulf smoothhound. As a Magnuson-Stevens Act condition of adding a species to federal management, NMFS designated EFH for smoothhound using the same methodology employed in Amendment 1. Details, including a map of the final EFH, are available in Chapter 11 of the Amendment 3 FEIS (http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/am3/am3_feis/chapter_11.pdf).

NMFS also published an interpretive rule and final action in 2010 (75 FR 57698) which, among other things, added roundscale spearfish to the definition of terms in the implementing regulations of the Magnuson-Stevens Act and the Atlantic HMS regulations, and defined EFH for roundscale spearfish. Roundscale spearfish and white marlin were managed conjointly before this final action because roundscale spearfish was only recently recognized as a distinct species. NMFS determined that the designation of roundscale spearfish EFH is the same as the designation of EFH for white marlin in Amendment 1 to the Consolidated HMS FMP.

On July 1, 2015, NMFS published the final EFH 5-Year Review and announced the Agency's intent to initiate an amendment to the 2006 Consolidated Atlantic HMS FMP to revise certain Atlantic HMS EFH descriptions and designations (80 FR 37598), using new observer, survey, and tag/recapture data collected as well as published literature and public requests for information since 2009 to revise EFH geographic boundaries for all species. Several areas were also identified that met the initial criteria for HAPCs for lemon sharks, sand tiger sharks, larval billfish, and white sharks and warranted further consideration. Based on this information, NMFS concluded a new Amendment (Amendment 10) would address the identified EFH issues.

On September 1, 2016, NMFS published Draft Amendment 10 (81 FR 62100), which would update Atlantic HMS EFH based on the recommendations of the 5-Year Review, using delineation methodologies established in Amendment 1 (i.e., using 95 percent volume contours to develop EFH boundaries). If accepted, the preferred alternatives in this amendment would expand the current bluefin tuna HAPC into the eastern Gulf of Mexico; adjust the current sandbar HAPC to reflect the boundaries of proposed updated EFH and recently collected data; create a new HAPC for lemon sharks extending between Cape Canaveral and Jupiter Inlet, Florida; and create new HAPCs for sand tiger sharks in Delaware Bay and in the Plymouth,

Duxbury, Kingston (PDK) bay system in coastal Massachusetts. Draft Amendment 10 also evaluated other components of the EFH provisions, such as the identification and evaluation of Fishing and Non-Fishing Impacts on EFH, Cumulative Impacts, Conservation Recommendations, Prey Species, and Research Needs. The public comment period for Draft Amendment 10 ended on December 22, 2016. NMFS anticipates publishing Final Amendment 10 by fall 2017.

Maps of EFH and HAPCs delineated in draft Amendment 10 are available as shapefiles and PDF documents at http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/am10/index.html. Maps of the existing EFH for Atlantic HMS are available in Amendments 1 and 3 and as PDF documents on the HMS website. The electronic maps and downloadable spatial files for EFH of HMS and all federally managed species are available on the NMFS EFH Mapper at: http://www.habitat.noaa.gov/protection/efh/habitatmapper.html. A summary of the management history of HMS EFH is given in Table 3.1. Provided that NMFS implements the preferred alternative that would update EFH under Amendment 10, new maps will be posted in association with Final Amendment 10 updating the maps and shapefiles depicting EFH from Amendment 1, Amendment 3, and the Roundscale Spearfish Interpretive Rule.

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 Billfish FMP	EFH first identified and described for Atlantic billfishes
2003 Amendment 1 to the FMP for Atlantic Tunas, Swordfish and Sharks	EFH updated for five shark species (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.
2016 Draft Amendment 10 to the 2006 Consolidated Atlantic HMS FMP	Presents alternatives that would update EFH for all federally managed Atlantic HMS. Existing HAPCs for sandbar shark and bluefin tuna would be adjusted, and new HAPCS for sand tiger shark and lemon shark would be created, to reflect recommendations in the 5-Year Review.

3.2 Shark Nursery Grounds and Essential Fish Habitat Studies

NMFS continues to study EFH for HMS to refine understanding of their important habitat areas. The Magnuson-Stevens Act defines EFH as habitat necessary for spawning, breeding, feeding, and growth to maturity. The Magnuson-Stevens Act requires the identification of EFH in FMPs, and towards that end NMFS 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 areas where (1) juvenile sharks are more commonly encountered; (2) juvenile sharks remain or return to over an extended period of time; and (3) the area is repeatedly utilized across years compared to other areas (Springer 1967; Bass 1978; Heupel et al. 2007). Where possible, distinctions between primary and secondary nursery habitats are made based on the definition by Bass (1978): primary nursery habitats are those areas important for pupping and young-of-year sharks, whereas secondary nursery habitats are those areas important for juvenile sharks.

3.2.1 COASTSPAN Survey Results

The COASTSPAN program, administered by the NMFS Northeast Fisheries Science Center's Narragansett, RI laboratory, has been collecting information on shark nursery areas along the U.S. Atlantic coast since 1998. It involves NMFS scientists along with state and university researchers in New Jersey, Delaware, Virginia, South Carolina, Georgia, Florida and the U.S. Virgin Islands. Following is a summary of the results from the 2015 COASTSPAN and survey (McCandless unpubl. data):

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. Sandbar shark was the most abundant shark species caught in 2015, followed by smooth dogfish and sand tigers. Additionally, five adult male Atlantic sharpnose sharks were also caught in Delaware Bay near Brandywine Shoal and one adult male blacktip shark was caught in the Bay Shore Channel. As in previous years, the majority (81 percent) of sandbar sharks caught were immature, with 11 percent as young-of the-year; the remaining sandbar sharks caught were considered mature females based on length and girth measurements. Smooth dogfish were represented primarily by juveniles (77 percent) in 2015, with young-of-the-year dominating the catch. The sand tigers caught in 2015 were primarily immature sharks, 32 percent were 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 and smooth dogfish continues to highlight the seasonal importance of this essential shark habitat.

Virginia

COASTSPAN sampling conducted by the Virginia Institute of Marine Science encompassed the mainstem 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. Additional sampling was also conducted at historical fixed stations in the coastal waters of Virginia. Juvenile sandbar sharks dominated the catch in the bay, lagoon, and inlet habitats, and were second only to Atlantic sharpnose sharks in the coastal ocean sampling. Within the bay, inlets, and lagoons, the majority of

sandbar sharks caught were young-of-the-year. Sandbar sharks were the only species caught along the Eastern Shore of Virginia in 2015. Within the Chesapeake Bay, two adult male Atlantic sharpnose sharks and 13 juvenile spinner sharks were also collected. Other species caught in the coastal ocean, in decreasing order of abundance, were: tiger, blacktip, spinner, blacknose, dusky, scalloped hammerhead, bull, and sand tiger sharks. The majority of each species caught in the coastal ocean were mature, with the exception of dusky, spinner, and tiger sharks. All species caught in the coastal waters included juveniles except sand tiger. These findings highlight the importance of Virginia's coastal waters in providing nursery habitat for many coastal shark species. 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 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 in 2015. Fourteen species of sharks were captured, the most abundant of which was Atlantic sharpnose. Other sharks captured, in order of abundance, were finetooth, blacktip, sandbar, bonnethead, blacknose, scalloped hammerhead, spinner, tiger, bull, lemon, and nurse sharks, and one of each great hammerhead and sand tiger. The majority of each shark species captured were immature, with the exception of these species: Atlantic sharpnose, bonnethead, and blacknose, nurse, and sand tiger sharks. 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 Georgia Department of Natural Resources took place in the estuarine waters of the St. Simon and St. Andrew sound systems. Of the eight species of shark captured, Atlantic sharpnose was the most abundant. Other sharks in order of abundance were bonnethead, sandbar, blacknose, blacktip, and lemon sharks, and one of each finetooth and spinner sharks. Three species captured were also present as young-of-the-year in estuarine waters: sandbar, Atlantic sharpnose, and blacktip sharks. The majority of sharks captured were immature, highlighting the importance of these areas as potential nursery habitat for both small and large coastal shark species. In addition, the majority of bonnetheads and all blacknose were mature, indicating these waters 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 north Atlantic coast in and around the following locations: Cumberland Sound, Nassau Sound, Tolomato River, and the St. Johns River. Species represented in the 2015 catch included, in order of abundance: Atlantic sharpnose, blacktip, scalloped hammerhead, sandbar, finetooth, blacknose, bonnethead, nurse, and lemon sharks. Nassau and Cumberland Sounds continue to provide nursery habitat for juvenile Atlantic sharpnose, blacktip, sandbar, and finetooth sharks. Northern Florida's nearshore waters continue to provide habitat for adult female bonnetheads and mature blacknose sharks. The multi-year seasonal use of the Tolomato River by neonate

scalloped hammerheads continues to provide supporting evidence of estuarine nursery area for this species.

U.S. Virgin Islands

Sampling for sharks took place in the waters surrounding the Buck Island Reef National Monument off of St. Croix in May 2015. This is part of an ongoing multi-species, multi-age study of community structure and habitat use within the national monument. Three shark species were captured, tagged, and released in May 2015: tiger, Caribbean reef and nurse sharks. Additionally, in September 2015, the National Park Service tagged and released one lemon shark. All tagged sharks were immature, but none were young-of-the-year.

3.2.2 GULFSPAN Survey Results

NMFS initiated the GULFSPAN program in 2003 to expand upon the COASTSPAN Survey. This cooperative program, which is administered by the NMFS Southeast Science Center's Panama City, Florida laboratory, includes in addition to NMFS scientists the states of Florida, Alabama, and Mississippi. GULFSPAN sampling in 2015 covered 6 areas along the Florida coast: Mississippi Sound, Florida-Alabama border (Pensacola Bay and Santa Rose Sound), St. Andrew Bay to St. Vincent Island, Big Bend of Florida (St. George Sound to Anclote Keys, FL), lower Tampa Bay, and Pine Island Sound, FL (Figure 3.1). The following is a summary of the 2015 GULFSPAN catch and noted habitat associations (Bethea et al. 2016).

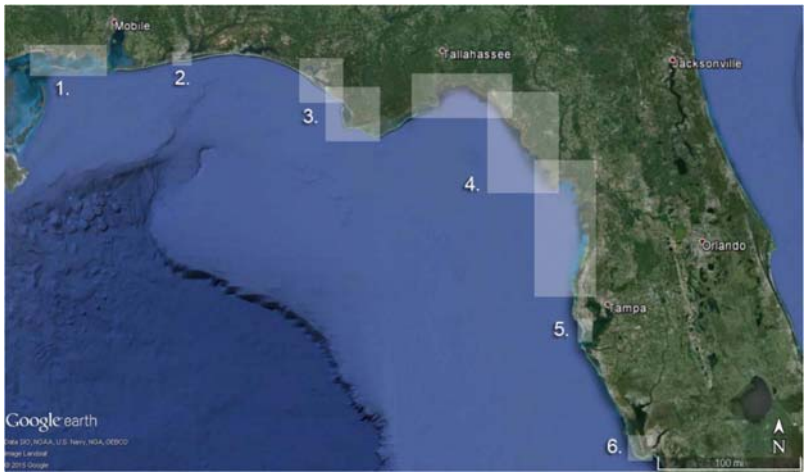

Figure 3.1 Regions Sampled During the 2015 GULFSPAN Survey

Big Bend of Florida

2015 GULFSPAN sampling by the Florida State University Coastal and Marine Laboratory covered more than 300 km of Florida's coastline from St. George Sound to Anclote Keys. Longlines and gillnets were used to collect data. A total of 1,188 elasmobranchs were captured, consisting of 14 species. Approximately 98.3 percent of the catch was comprised of three species: Atlantic sharpnose, bonnethead, and blacktip sharks. Other species captured include blacknose, spinner, sandbar, bull, lemon, tiger, great hammerhead, nurse, and Florida smoothound sharks. Two species of batoid (cownose ray and southern stingray) were also captured.

Sampling indicates that this region provides important primary and secondary nursery habitat for several species of large and small coastal sharks. Atlantic sharpnose were noted to be habitat generalists (few were captured over hard bottom), however most sampling occurred in shallow seagrass habitats. Blacktip shark tended to be captured on the edges of muddy channels and sandy ledges adjacent to seagrass habitat. Young of year blacknose were usually captured in sandy seagrass habitat. No environmental associations were noted between the species dominating catch (Atlantic sharpnose, bonnethead and blacktip shark) and abiotic variables measured (i.e., temperature, salinity, water clarity, depth, dissolved oxygen).

Florida-Alabama Border

GULFSPAN sampling by the University of West Florida took place in four areas of the west Florida panhandle, including Perdido Bay, Big Lagoon, Pensacola Bay, and Santa Rosa Sound. Sampling in Big Lagoon did not yield elasmobranchs. In 2015, five species of elasmobranchs were caught (blacktip shark, finetooth shark, Atlantic sharpnose shark, Atlantic stingray, and cownose ray) for a total of 13 individuals. Cownose ray was the most abundant elasmobranch captured in the survey (46 percent of catch, or 6 individuals). Blacktip shark was the most abundant shark species captured (23 percent of catch, or 3 individuals). Most of the sharks captured were mature, with the exception of an immature male blacktip shark.

Low catch rates make it difficult to assess EFH for elasmobranchs in this sampling region. Salinity was higher than in recent years; CPUE increases for sharks may be attributable to the recovery of the system following flooding in 2014. Since the majority of catch at the Alabama-Florida border consisted of mature individuals, it is suspected that this area may not support significant nursery habitat. However, there are extensive seagrass beds in adjacent areas that have not been sampled and might prove to be important nursery habitat in future surveys.

Mississippi Sound

In 2015, GULFSPAN sampling by the University of Southern Mississippi Gulf Coast Research Laboratory covered six regions of the Mississippi Sound in Mississippi state waters: west, central, east, inshore west, inshore central, and inshore east. A total of 21 gillnet sets were conducted between April and October 2015. Six species of shark (Atlantic sharpnose, finetooth, blacktip (most abundant), spinner, bull, and bonnethead), for a total of 152 animals, were encountered. Three ray species (cownose ray, Brazilian cownose ray, and Atlantic stingray) and three unknown *Rhinopterids* were encountered during this sampling year. The majority of the animals captured (92 percent) were immature. The prevalence of young-of-year animals sampled (69 percent of all animals captured) suggested that Mississippi Sound continues to be a potential nursery area for several elasmobranch species.

Young-of-year blacktip and finetooth shark were consistently caught in lower salinity waters than juvenile and adult conspecifics. Atlantic sharpnose were the consistently captured in 3- to 10-m depth ranges (no other species were caught in these areas).

St. Andrew Bay to St. Vincent Island, FL

In 2015, GULFSPAN sampling by the 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. Ten species of shark

(Atlantic sharpnose (most abundant), bonnethead, blacktip, scalloped hammerhead, finetooth, blacknose, spinner, Florida smoothhound, bull, sandbar) were encountered. Two batoid species (cownose ray, smooth butterfly ray) were also encountered during this sampling year. The majority of the sharks captured (74 percent) were immature animals. Of the total number of immature animals, 32 percent were Age 1+ and 42 percent were young-of-the-year, indicating the region continues to be used as nursery habitat. Seventeen neonates were collected (blacknose, spinner, and Atlantic sharpnose sharks).

Important habitats included seagrass (*Thallassia testudinum* and *Halodule wrighti)*, sand, mud, and a mix of the three. Atlantic sharpnose and bonnethead were considered to be habitat generalists, although bonnethead adults were most often associated with sandy seagrass habitats. Immature scalloped hammerhead were generally caught in deeper waters with higher temperature, salinity, and water clarity. Finetooth shark were captured in a specific location (St. Vincent Island) in conditions of high salinity and low water clarity. Young of year blacknose shark were captured over sandy bottoms in Crooked Island Sound; immature Florida smoothhound were also caught in this location. The only sandbar shark was captured at St. Vincent Island.

Southern Tampa Bay, FL

Limited sampling was completed in 2015 by New College of Florida near the confluence of Boca Ciega Bay and southwestern Tampa Bay. Catch consisted of a total of 13 individuals of three species: bonnethead, Atlantic sharpnose, and blacktip shark. 23 percent of the total catch was immature. The sampling program will be expanded in 2016 to additional areas in Tampa Bay and adjacent Sarasota Bay.

Pine Island Sound, FL

In 2015, GULFSPAN sampling by Mote Marine Laboratory covered two areas near Charlotte Harbor on the southwest Florida coast, within Pine Island Sound. Five species of shark were encountered for a total of 134 sharks sampled: bonnethead, (most abundant, 56 percent of catch), blacktip (29 percent of catch), Atlantic sharpnose (13 percent of catch), blacknose (n = 1), and great hammerhead (n = 1) shark. One ray species, smooth butterfly ray, was encountered during this sampling year. The southern sampling grid (in which all species but blacknose were captured) borders Ding Darling National Wildlife Refuge and the Caloosahatchee River, and habitats can receive significant outflow from the latter. The northern sampling grid, in the middle of Pine Island Sound, is more tidally influenced.

The majority of the sharks captured were immature, indicating that Pine Island Sound is nursery habitat for coastal sharks. Young of year blacktip and bonnethead, and juveniles of all species sampled, were captured in mud and seagrass habitats and in a broad range of temperature (24 to 33 ºC) and salinity (20 to 34 ppt).

3.3 Conclusion

The COASTSPAN and GULFSPAN 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 EFH for shark nurseries and pupping. Time series for both

surveys continue to be used in the stock assessments for large and small coastal shark species and are essential for monitoring these populations and their habitat use.

Chapter 3 References

Bass AJ. 1978. Problems in the studies of sharks in the southwest Indian Ocean. *Pages 545-594 in* Hodgson ES, Matthews RF (eds.) Sensory biology of sharks, skates, and rays. Department of Navy, Office of Naval Research, Arlington, Virginia.

Bethea DM, Casselberry G, Carlson J, Hendon J, Peterson C, Grubbs R, Daly-Engel TS, Pfleger MO, Hueter R, Morris J, Gardiner J. 2016. Shark Nursery Grounds and Essential Fish Habitat Studies (GULFSPAN survey - 2015). Report to NOAA Fisheries, Highly Migratory Species Management Division. Panama City Laboratory Contribution 16-02.

Heupel MR, Carlson JK, Simpfendorfer CA. 2007. Shark nursery areas: concepts, definition, characterization, and assumptions. Mar Ecol Prog Ser 337:287-297.

McCandless CT, Frazier B, Belcher C, Gelsleichter J, Gartland J, Bonzek C, Latour R, DeAngelis B. 2017. 2015 Report for the Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Program. NOAA Fisheries Apex Predators Program, NEFSC Narragansett Lab, Narragansett, RI.

Springer S. 1967. Social organization of shark populations. *Pages 149-174 in* Gilbert PW, Mathewson RF, Rall DP (eds.). Sharks, Skates, and Rays. John Hopkins Press, Baltimore, Maryland.

4 HMS PERMITS AND TOURNAMENTS

This section provides updates the number of permits for Atlantic HMS fisheries and the number of dealer permits for sharks, swordfish, and tunas in Table 4.1 - Table 4.10. 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 (LAP) program includes six vessel permits: Swordfish Directed, Swordfish Incidental, Swordfish Handgear, Shark Directed, Shark Incidental, and Atlantic Tunas Longline. The Swordfish Directed and Incidental permits are valid only if the permit holder also holds an Atlantic Tunas Longline and a shark permit. Similarly, the Atlantic Tunas Longline permit is valid only if the permit holder also holds a swordfish (Directed or Incidental, not Handgear) and a shark permit. No additional LAPs are required to make a Swordfish Handgear or the shark permits valid.

Table 4.1 Number of Limited Access Shark, Swordfish, and Atlantic Tunas Longline Vessel Permits and Permit Holders by State (2011-2016)

State	Swordfish Permits			Shark Permits		Tunas Longline Permit	Permit Holders / Permits
	Directed	Incidental	Handgear	Directed	Incidental		
ME	4	1	2	2	6	5	10 / 20
MA	4	1	7	2	8	7	19 / 29
RI	1	-	11	1	3	2	11 / 18
CT	1	1	1	-	2	2	3 / 7
NY	15	3	5	10	12	19	27 / 64
PA	3	-	-	1	3	2	4 / 9
NJ	27	10	2	23	26	40	49 / 128
DE	2	-	1	2	2	2	5 / 9
MD	4	-	-	2	3	4	4 / 13
VA	1	1	-	1	2	4	5 / 9
NC	10	6	1	17	9	16	26 / 59
SC	5	2	-	7	11	7	15 / 32
GA	-	-	-	3	2	-	4 / 5
FL	79	35	53	121	132	120	276 / 540
AL	-	-	-	4	2	-	5 / 6
MS	-	-	-	-	1	-	1 / 1
LA	28	5	-	23	33	37	60 / 126
TX	1	7	-	3	13	10	13 / 34
OR	-	-	-	-	1	-	1 / 1
Canada	-	-	-	-	-	1	1 / 1
Trinidad/ Tobago	1	-	-	1	-	1	1 / 3
Annual Totals							
2016*	186	72	83	223	271	280	540 / 1,115
2015	188	72	83	224	275	280	540 / 1,122
2014	183	66	77	206	258	246	536 / 1,036
2013	185	71	81	220	265	252	556 / 1,074
2012	184	73	77	215	271	253	555 / 1,073
2011	178	67	78	217	262	242	555 / 1,044

* As of October 2016. 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 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 2016)

State	Incidental HMS Squid Trawl Permits
ME	2
NH	1
MA	7
RI	10
CT	3
NY	4
NJ	24
VA	4
NC	7
2016 Total	**63**
2015 Total	66

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 and the retention limit for North Atlantic swordfish is 2. 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 Commercial Caribbean Small Boat permits among the U.S. states and territories is presented in Table 4.3.

Table 4.3 Number of Commercial Caribbean Small Boat Permits by State (as of October 2016)

State	Commercial Caribbean Small Boat Permits
CT	1
NC	1
SC	2
GA	2
FL	26
LA	1
TX	1
PR	3
VI	2
2016 Total	**39**
2015 Total	20

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 0-6 fish per vessel per trip. The default retention limits for North Atlantic swordfish are three (NW Atlantic and Gulf of Mexico), two (US Caribbean), and zero (FL Swordfish Management Area). From July 1 to December 31, 2016, the swordfish retention limits were increased to six fish in all regions except the Florida

Swordfish Management Area (81 FR 38966). The distribution of General Commercial Swordfish permits is presented in Table 4.4.

Table 4.4 Number of General Commercial Swordfish Permits by State (as of October 2016)

State	General Commercial Swordfish Permits	State	General Commercial Swordfish Permits
AL	9	NC	49
CA	1	NH	30
CT	14	NJ	30
DE	6	NY	51
FL	72	OH	1
HI	1	PA	1
KY	1	PR	8
LA	6	RI	47
MA	156	SC	6
MD	5	TX	8
ME	97	VA	9
MS	2	VI	3
2016 Total		**613**	
2015 Total		623	

Atlantic Tunas Permits

Commercial Atlantic tunas permits are categorized by gear type (longline, harpoon, trap, purse seine, and General category) (Table 4.5). 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 4.6. HMS Charter/Headboat permit holders (Table 4.7) may also sell tunas to permitted tuna dealers.

Table 4.5 Number of Commercial Atlantic Tunas Permits by Category (2010-2016)

Category	2010	2011	2012	2013	2014	2015	2016*
Longline	248	242	253	252	246	280	280
Harpoon	29	24	13	14	14	23	9
Trap	6	6	8	7	3	4	-
General	3,849	3,764	4,084	3,783	3,396	3,230	2,910
Purse seine	3	3	3	3	5	5	5
Total	4,135	4,039	4,361	4,059	3,664	3,542	3,204

* As of October 2016. The actual number of 2016 permit holders in each category is subject to change as individuals renew their permits or allow them to expire. 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.

The homeport states for the nine Atlantic Tunas Harpoon category permits issued in 2016 (Table 4.5) were Maine (four vessels) and Massachusetts (five vessels).

Table 4.6 Number of Tunas General Category Permits by State/Territory (as of October 2016)

State	Tunas General Category Permits	State	Tunas General Category Permits
AL	34	NC	326
AZ	1	NH	196
CA	2	NJ	117
CO	1	NY	131
CT	53	OH	1
DE	20	OR	2
FL	150	PA	2
GA	3	PR	78
HI	1	RI	138
KY	1	SC	19
LA	28	TX	16
MA	888	VA	58
MD	29	VI	9
ME	576	VT	6
MI	1	WA	2
MS	20		
2016 Total		**2,910**	
2015 Total		3,129	

HMS Charter/Headboat Permit

The Atlantic HMS Charter/Headboat (CHB) permit is open access and authorizes recreational fishing for all Atlantic HMS, commercial fishing for Atlantic tunas under certain conditions, and commercial fishing for North Atlantic swordfish only on non for-hire trips. The distribution of 2016 Atlantic HMS Charter/Headboat permits is presented in Table 4.7.

Table 4.7 Number of Atlantic HMS Charter/Headboat Permits by State (as of October 2016)

State/Territory	HMS CHB Permits	State/Territory	HMS CHB Permits
AL	65	NC	322
CT	67	NH	95
DE	97	NJ	447
FL	614	NY	296
GA	34	OH	2
ID	1	OK	1
IL	2	PA	16
KY	1	PR	27
LA	92	RI	122
MA	686	SC	127
MD	116	TX	102
ME	124	VA	91
MI	1	VI	16
MS	25	WV	2
2016 Total		**3,594**	
2015 Total		3,663	

HMS Angling Permit

The HMS Angling Permit is open access and required to recreationally fish for, retain, or possess (including catch-and-release fishing) any federally-regulated HMS, including sharks, swordfish, white and blue marlin, sailfish, spearfish, bluefin tuna, and BAYS tunas. It does not authorize the sale or transfer of HMS to any person for a commercial purpose. Atlantic HMS Angling permit distribution is reported in Table 4.8.

Table 4.8 Number of Atlantic HMS Angling Permits by State or Country (as of October 2016)

State/Country	Permits by Home Port*	Permits by Residence**	State/Country	Permits by Home Port*	Permits by Residence**
AK	1	-	NC	1,225	1,131
AL	456	410	ND	1	1
AR	4	10	NE	1	2
AZ	1	3	NH	218	254
BV	-	-	NJ	2,781	2,375
CA	2	13			
CO	2	4	NV	10	8
CT	598	703	NY	1,851	1,904
DC	1	6	OH	13	26
DE	835	551	OK	9	17
FL	3,880	2,882	OR	1	-
GA	115	196	PA	177	1,053
HI	1	1	PR	397	404
IA	-	3	RI	536	375
ID	1	-	SC	513	506
IL	13	28	SD	1	4
IN	8	17	TN	19	37
KS	1	4	TX	700	745
KY	6	11	UT	2	2
LA	652	641	VA	900	975
MA	2,317	2,317	VI	39	19
MD	1,098	1,033	VT	14	25
ME	357	300	WA	3	6
MI	24	31	WI	9	11
MN	3	8	WV	3	5
MO	8	16	WY	-	3
MS	208	248	Canada	9	11
MT	1	1	Not Reported	-	9
2016 Total				**20,020**	**20,020**
2015 Total				20,566	20,566

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

Atlantic Tunas, Swordfish, and Shark Dealer Permits

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

part of the fish, as the fish are offloaded from a fishing vessel. Atlantic tunas, swordfish and sharks dealer permits (by state) are reported in Table 4.9.

Table 4.9 Number of Domestic Atlantic Tunas, Swordfish, and Sharks Dealer Permits (2016 by State; 2011-2016 Totals by Permit)

State/Territory	Bluefin Only	BAYS Only	Bluefin and BAYS	Atlantic Swordfish	Atlantic Sharks	Total
AL	-	1	2	6	1	11
CA	2	-	-	2	-	4
CT	-	1	3	1	-	6
DE	-	-	2	-	-	3
FL	1	9	17	81	33	145
GA	-	-	1	-	1	2
HI	-	-	2	-	-	2
LA	-	1	6	8	7	24
MA	5	10	76	16	6	120
MD	-	-	7	3	3	12
ME	12	-	13	2	1	30
NC	4	3	22	18	20	69
NH	1	-	5	1	-	7
NJ	-	10	41	12	9	68
NY	4	20	46	8	9	80
PA	-	-	3	1	-	3
PR	-	3	1	1	-	5
RI	-	5	26	9	5	42
SC	-	1	4	9	10	23
TX	-	3	-	2	1	6
VA	-	5	12	1	5	19
VI	-	2	1	1	-	3
VT	-	-	1	-	-	1
Annual Totals						
2016*	29	74	291	182	111	687
2015	33	79	289	184	102	687
2014	32	79	308	195	96	710
2013	35	72	318	183	97	705
2012	30	67	313	179	92	681
2011	33	67	316	191	117	724

* As of October 2016. The actual number of permits per state may change as permit holders move or sell their businesses.

Exempted Fishing Permits (EFPs), Display Permits, Letters of Acknowledgement (LOAs), Chartering Permits, Scientific Research Permits (SRPs), and the Shark Research Fishery

EFPs, 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. Similar to SRPs, LOAs are issued to individuals conducting research from "bona fide" research vessels on species that are only regulated by the Magnuson-Stevens Act and not ATCA. Display permits are issued to individuals who are fishing for, catching, and then transporting HMS to certified aquariums for public display. Chartering permits are issued to HMS-permitted vessel owners that wish to fish under a chartering arrangement outside U.S. waters. The number of EFPs, display permits, and SRPs issued from 2012 to 2016 by category and species are listed in Table 4.10. In 2016, NMFS received 16 applications for the Shark Research Fishery permit. Based on the qualification criteria and random selection process, five permits were issued.

Table 4.10 Number of Atlantic HMS Exempted Fishing Permits (EFPs), Display Permits, and Scientific Research Permits (SRPs) (2012-2016)

Permit Type		2012	2013	2014	2015	2016*
Exempted Fishing Permit	Sharks for display	4	4	3	3	3
	HMS** for display	2	2	3	1	0
	Tunas for display	0	0	0	0	0
	Shark research on a non-scientific vessel	10	10	10	11	12
	Tuna research on a non-scientific vessel	5	4	2	2	4
	HMS** research on a non-scientific vessel	3	3	3	4	4
	Billfish research on a non-scientific vessel	1	1	0	0	0
	Shark fishing	0	0	0	0	0
	HMS** chartering	0	0	0	0	0
	Tuna fishing	0	0	1	1	0
	Total	25	24	22	22	23
Scientific Research Permit	Shark research	4	3	2	4	5
	Tuna research	3	2	2	1	1
	Billfish research	0	0	0	0	0
	HMS** research	4	3	3	1	1
	Total	11	8	7	6	7
Letters of Acknowledgement	Shark research	7	6	8	8	9
	Total	7	6	8	8	9

*As of October 31, 2016. **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 http://www.nmfs.noaa.gov/sfa/hms/compliance/guides/index.html.

4.2 Atlantic HMS Tournaments

An Atlantic HMS tournament is any fishing competition involving Atlantic HMS in which participants must register or otherwise enter or in which a prize or award is offered for catching or landing such fish. Atlantic HMS tournaments are conducted from ports along the U.S. Atlantic coast, Gulf of Mexico, and U.S. Caribbean. Atlantic HMS tournaments vary in size. They may range from relatively small "members-only" club events with as few as ten participating boats (40 – 60 anglers) to larger, statewide tournaments with 250 or more participating vessels (1,000 – 1,500 anglers). 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 NMFS at least four weeks prior to the commencement of tournament fishing activities. Some foreign tournaments (e.g., those held in the Bahamas, Bermuda, and the Turks and Caicos) may voluntarily register because their participants are mostly U.S. citizens. Tournament registration and reporting forms are available at http://www.nmfs.noaa.gov/sfa/hms/compliance/tournaments/. Tournament operators may be selected by NMFS for reporting, in which case a record of tournament catch and effort must be submitted to NMFS within seven days of the conclusion of the tournament. Tournament landings of billfishes and swordfish are presented in Section 5.4.2.

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 2016, more than 137 tournaments requested and received nearly 10,000 copies of these materials from the HMS Management Division. The number of HMS tournaments that registered from 2006 to 2016 is reported in Figure 4.1. Since 2006, an average of 262 HMS tournaments have registered each year. The highest number of HMS tournament registrations was received in 2007. The number of registered tournaments in 2014 was the highest since 2007, possibly due to increased outreach and compliance monitoring, and may have been influenced by an improving U.S. economy and lower fuel prices. The following tables and figures are summary data from the HMS Atlantic Tournament Registration database.

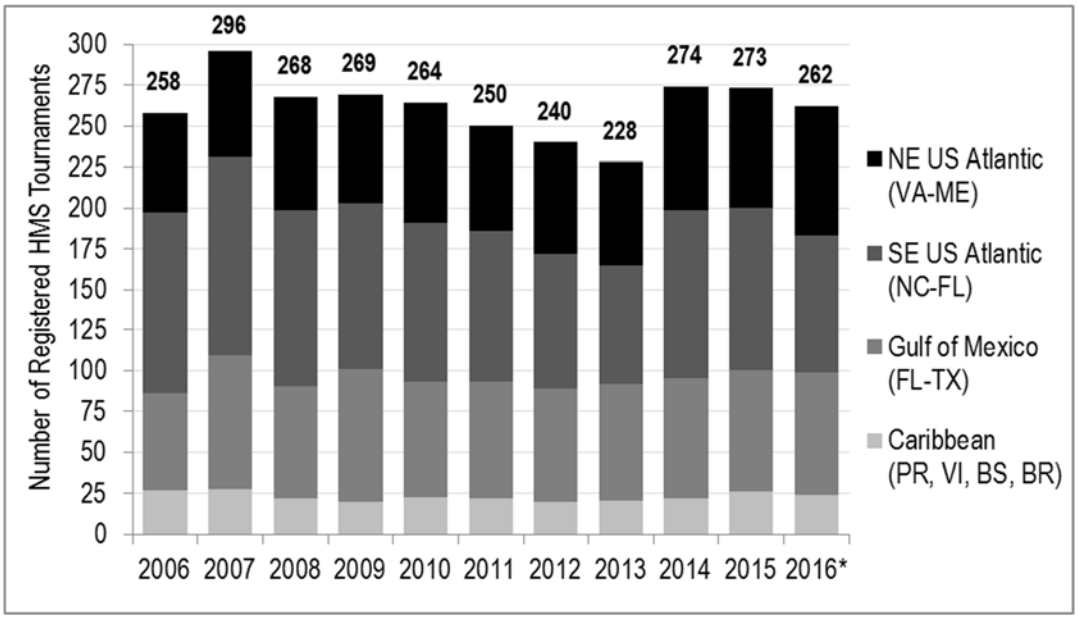

Figure 4.1 Annual Number of Registered Atlantic HMS Tournaments by Region (2006-2016)

*As of November 2016

The average distribution of HMS fishing tournaments along the Atlantic and Gulf of Mexico coastal states and the U.S. Caribbean is represented in Figure 4.2.

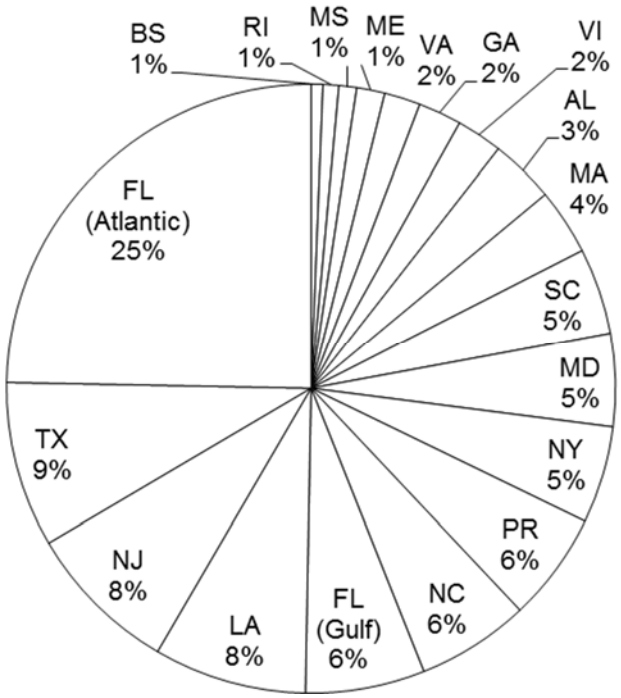

Figure 4.2 Percent of Atlantic HMS Tournaments Held in each State from 2006 to 2016

Number of tournaments: 2,882; Areas excluded (< 1%) are Bermuda (0.03%), Connecticut (0.07%), and Delaware (0.28%)

Participants may target one or more HMS in a tournament. Most tournaments register to catch multiple HMS; however, in 2015, 42 percent registered for only one species group, of which the majority were billfish, followed by sharks, tunas, and swordfish. There were 28 tournaments that targeted only sailfish in 2015. Often, there is a primary species targeted in the tournament, and other species are caught for entry in separate categories. Overall, there is a regional trend toward species that are present during the local fishing season. Figure 4.3 gives a breakdown of the number of tournaments in each state that registered for billfish, sharks, swordfish, or tuna species in 2015.

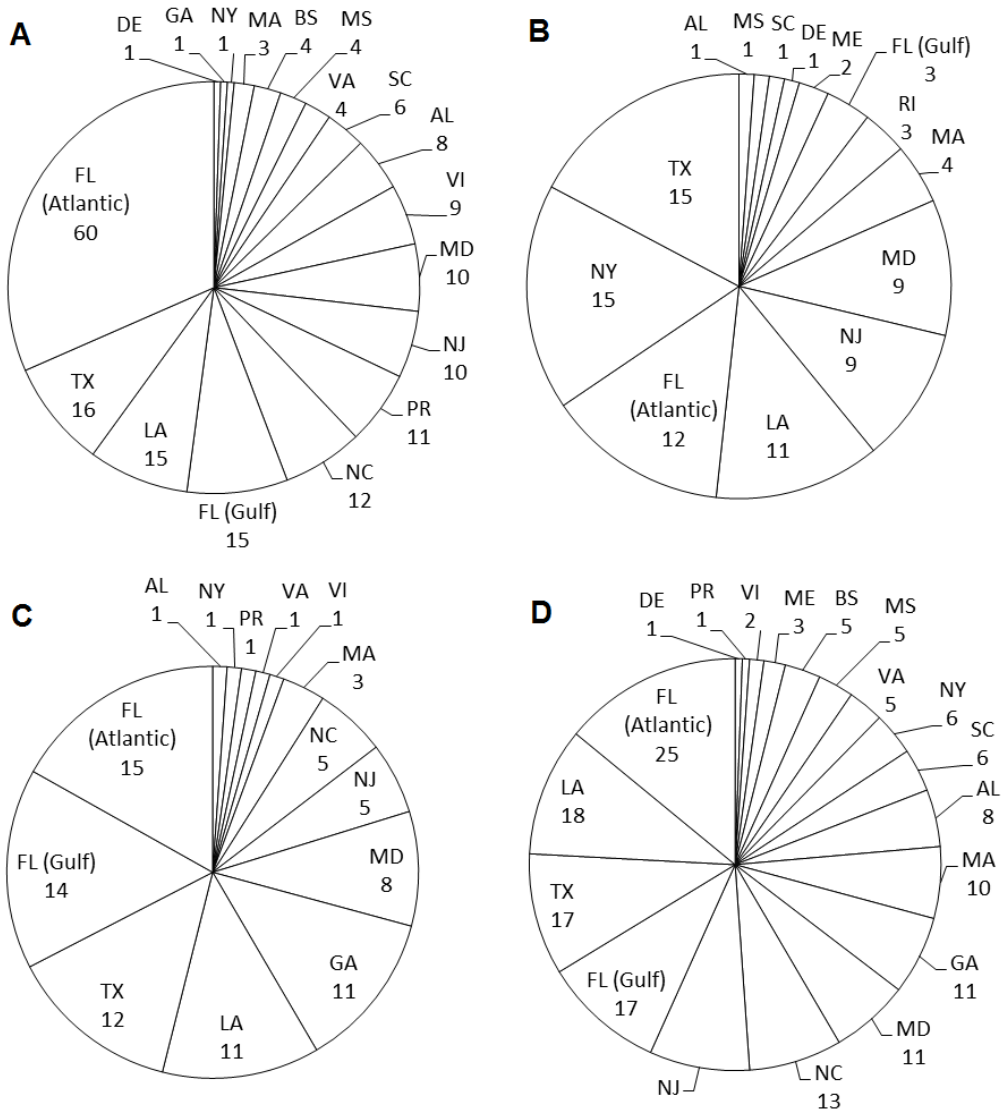

Figure 4.3 Number of Tournaments in each State that Registered for (A) Billfish, (B) Shark, (C) Swordfish, or (D) Tuna Species (2015)

Total numbers of tournaments divided by state were 190 (A), 87 (B), 89 (C), and 178 (D).

Table 4.11 provides the total numbers of HMS tournaments in 2014 and 2015 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 4.11 Number of Atlantic HMS Tournaments per Species (2014 & 2015)

Species		2014	2015
Billfishes	Blue marlin	153	161
	White marlin	138	146
	Longbill spearfish	52	67
	Roundscale spearfish	44	61
	Sailfish	158	161
Swordfish		74	89
Tunas	Bluefin tuna	96	96
	Bigeye tuna	81	75
	Albacore tuna	49	48
	Yellowfin tuna	164	166
	Skipjack tuna	33	38
Sharks	Pelagic sharks	72	79
	Small coastal sharks	19	16
	Non-ridgeback sharks	17	19
	Ridgeback sharks	12	13

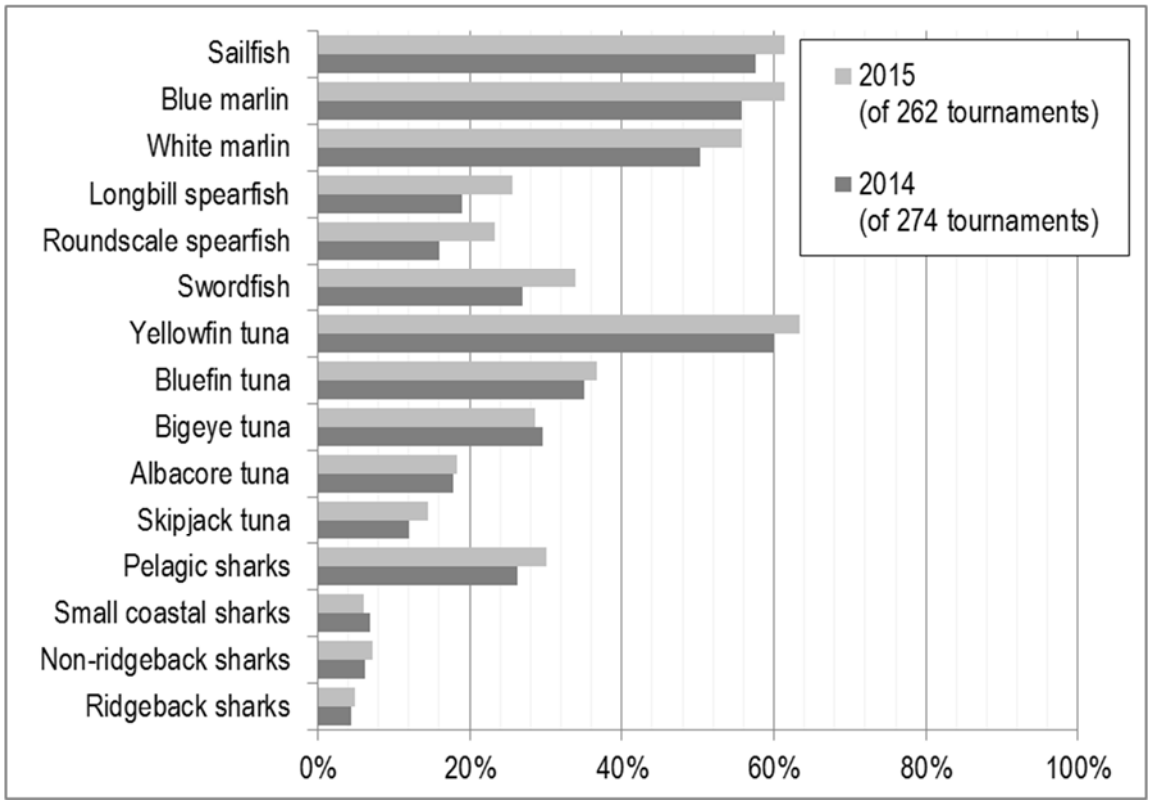

Figure 4.4 Percent of HMS Tournaments Registered for each Species or Group (2014 & 2015)

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 are selected for reporting to the Recreational Billfish Survey (RBS), including numbers of released fish.

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.

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 2015, all of the billfish tournaments occurring in January targeted sailfish along the Atlantic coast of Florida.

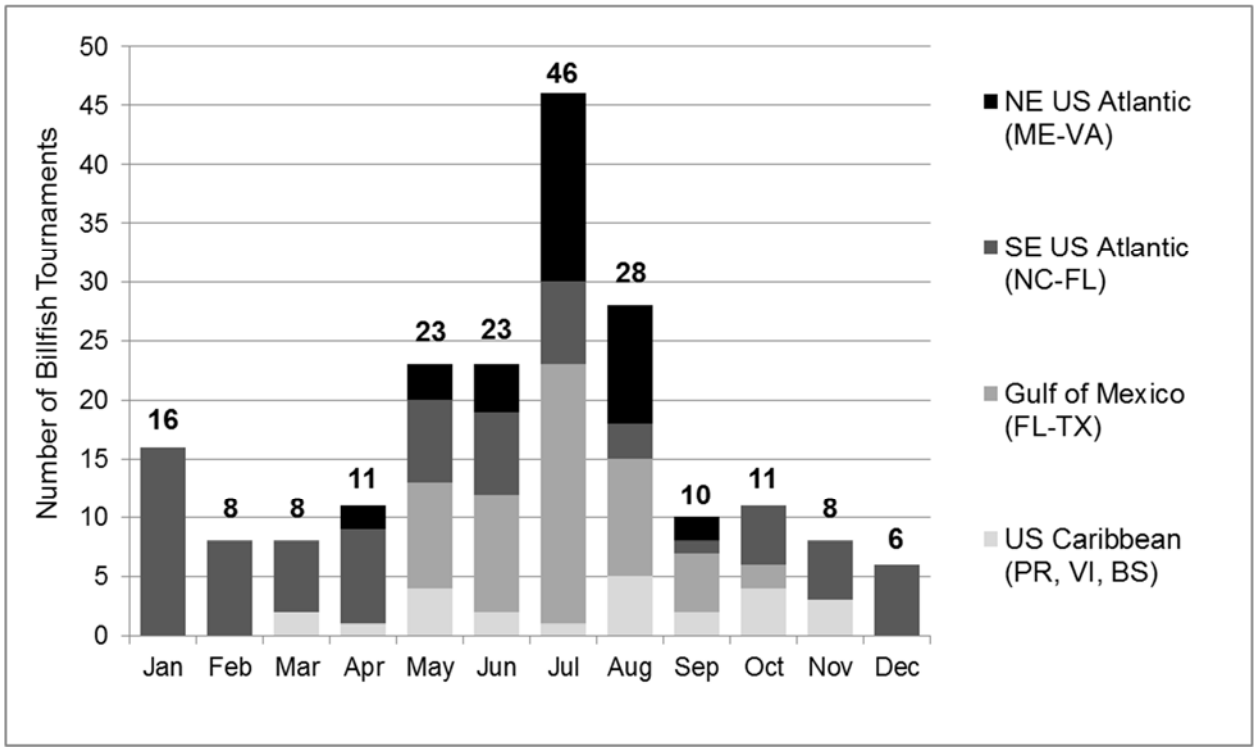

Figure 4.5 Number of Billfish Tournaments by Region and Month (2015)

5 FISHERY DATA

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

"The use of any gear or participation in a fishery not on the following list of authorized fisheries and gear is prohibited... however, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic [HMS], of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (e.g., through emergency or interim regulations)." This regulation and the list of fisheries (LOF) and authorized gear types are at 50 CFR 600.725(v). The list applies to all U.S. marine fisheries, including the Atlantic HMS fisheries (LOF section IX) presented in Table 5.1.

Table 5.1 List of HMS Fisheries and Authorized Gear Types

HMS Fishery	Authorized Gear Types
Swordfish handgear	Rod and reel, harpoon, handline, bandit gear, buoy gear, green-stick
Swordfish recreational	Rod and reel, handline
Pelagic longline	Longline, green-stick
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 tunas other than bluefin), 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 (landings and dead discards) of HMS is presented to provide a basis for comparison of the U.S. catch relative to other nations/entities (Table 5.2; catch broken down to landings and discards when available). International catch levels and U.S. reported catches for HMS (other than sharks) are taken from the 2016 ICCAT Report of the SCRS (SCRS 2016). SCRS data 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 of HMS Reported to ICCAT (Calendar Year 2015)

Species	Region		Catch (mt ww)*			U.S. Percentage of Total Catch
			Landed	Discarded Dead	Total	
Atlantic swordfish	N Atlantic	*U.S.*	*1,583*	*139*	*1,722*	
			10,959	149	11,108	15.5
	S Atlantic		-	-	10,937	0.0
	Total		21,896	149	22,045	7.8
Atlantic bluefin tuna	W Atlantic	*U.S.*	*877*	*20*	*897*	
			1,816	23	1,839	48.7
	E Atlantic + Med		16,190	11	16,201	0.0
	Total		18,006	34	18,040	5.0
Atlantic bigeye tuna	Atlantic + Med	*U.S.*	*838*	-	*838*	
			79,539	38	79,577	1.1
	Total		78,539	38	79,577	1.1
Atlantic yellowfin tuna	W Atlantic	*U.S.*	*2,076*	-	*2,076*	
			14,701	3	14,704	14.1
	E Atlantic		94,069	137	94,206	0.0
	Total		108,770	140	108,910	1.9
Atlantic albacore tuna	N Atlantic	*U.S.*	*248*	-	*248*	
			25,241	209	25,450	1.0
	S Atlantic + Med		17,852	10	17,862	0.0
	Total		43,093	219	43,312	0.6
Atlantic skipjack tuna	W Atlantic	*U.S.*	*78*	-	*78*	
			19,929	-	19,929	0.4
	E Atlantic + Med		208,652	631	209,283	0.0
	Total		228,581	631	229,212	> 0.1
Atlantic blue marlin	Atlantic + Med	*U.S.*	*9*	*80*	*89*	
			1,783	81	1,864	4.8
	Total		1,783	81	1,864	4.8
Atlantic white marlin	Atlantic + Med	*U.S.*	*2*	*8*	*10*	
			457	8	465	2.2
	Total		457	8	465	2.2
Atlantic sailfish	W Atlantic	*U.S.*	*2*	*6*	*8*	
			886	6	892	0.9
	E Atlantic		1,271	-	1,271	0.0
	Total		2,157	6	2,163	0.4
Blue shark	N Atlantic	*U.S.*	*31*	*83*	*114*	
			43,583	125	43,708	0.3
	S Atlantic + Med		24,191	128	24,319	0.0
	Total		67,774	253	68,027	0.2
Porbeagle shark	N Atlantic	*U.S.*	*9*	*35*	*44*	
			21	37	57	77.2

Species	Region	Catch (mt ww)*			U.S. Percentage of Total Catch
		Landed	Discarded Dead	Total	
	S Atlantic + Med	7	-	7	0.0
	Total	28	37	65	67.7
Shortfin mako shark	N Atlantic	*U.S.* *519*	*8*	*527*	
		3,258	10	3,269	16.1
	S Atlantic + Med	2,582	2	2,585	0.0
	Total	5,840	12	5,854	9.0

Totals subject to rounding error. U.S. catch reported in italics is included in the region's catch reported below it. – Unreported data. *As reported by ICCAT member nations. Source: SCRS 2016

5.1 Pelagic Longline

5.1.1 Current Management

The pelagic longline (PLL) 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 this gear can be modified (e.g., depth of set, hook type, hook size, bait, etc.) to target swordfish, tunas, or sharks, it is generally a multi-species fishery. PLL vessel operators are opportunistic, switching gear style and making subtle changes to target the best available economic opportunity on each individual trip. PLL 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. PLL 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 (MMPA). Any species that cannot be landed due to fishery regulations (or undersized catch of permitted species) is required to be released, regardless of whether the catch is dead or alive.

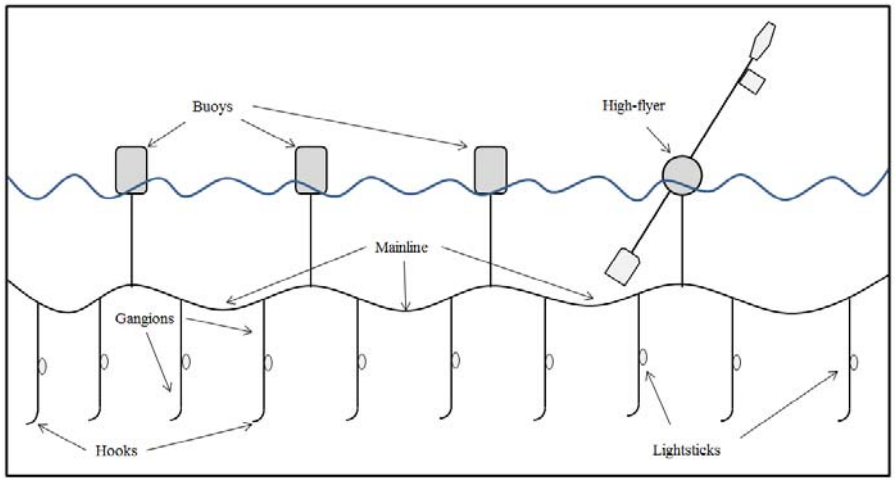

Figure 5.1 Typical U.S. Pelagic Longline Gear

Source: Redesign from original in Arocha (1997)

PLL gear is composed of several parts (Figure 5.1). The primary fishing line, or mainline of the longline system, can vary from five to 40 miles in length, with approximately 20 to 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).

When targeting swordfish, PLL gear is generally deployed at sunset and hauled at sunrise to take advantage of swordfish 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 (2011-2015)

Target Species	2011	2012	2013	2014	2015
Swordfish	728	683	735	780	729
Bigeye tuna	802	865	620	811	641
Yellowfin tuna	645	628	638	608	571
Mix of tuna species	786	728	694	670	653
Shark	348	525	NA	293	298
Dolphin	1,082	1,129	933	1,093	1,140
Other species	400	300	NA	NA	150
Mix of species	749	758	717	722	737

Source: Fisheries Logbook System

Figure 5.2 illustrates basic differences between swordfish (shallow) and tuna (deep) 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.

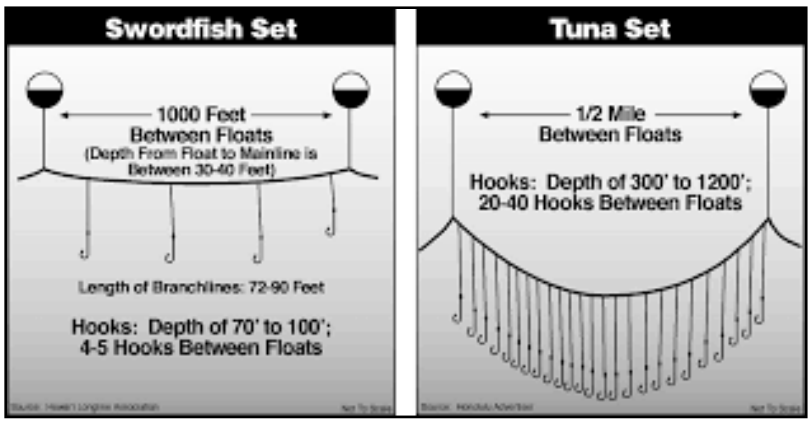

Figure 5.2 Pelagic Longline Gear Deployment Techniques

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 FMP established six different limited access permit (LAP) types: (1) directed swordfish, (2) incidental swordfish, (3) swordfish handgear, (4) directed shark, (5) incidental shark, and (6) Atlantic tunas longline. To reduce bycatch in the PLL fishery, these permits were designed so that the swordfish directed and incidental permits are valid only if the permit holder also holds both a tuna longline and a shark permit. Similarly, the tunas longline permit is valid only if the permit holder also holds both a swordfish (directed or incidental, not handgear) and a shark permit. This allows limited retention of species that might otherwise have been discarded.

As of October 2016, approximately 280 tunas longline LAPs had been issued. In addition, approximately 186 directed swordfish LAPs, 72 incidental swordfish LAPs, 233 directed shark LAPs, and 271 incidental shark LAPs had been issued (see Table 4.1 for more detailed data on LAPs). Not all vessels with limited access swordfish and shark permits use PLL gear, but these are the only permits that allow for the use of PLL 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. PLL fishery: (1) Two new or modified PLL Gear Restricted Areas (GRAs); (2) an Individual Bluefin Quota (IBQ) program; (3) mandatory electronic monitoring of PLL gear at haulback; and (4) catch reporting of each PLL set using vessel monitoring systems (VMS). The conservation and management measures in Amendment 7 became effective January 1, 2015, with two exceptions: electronic monitoring requirements in the PLL 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 (landings and dead discards) by individual vessels; provide strong incentives to reduce interactions with bluefin and to increase flexibility for vessels to continue to operate profitably; accommodate different fishing practices within the pelagic longline fleet; and create new potential for revenue (from 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 ("quota share"), and are eligible to receive annual associated quota allocations. Shareholders as well as other permit holders that 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.

Amendment 7 also implemented mandatory electronic monitoring of PLL gear at haulback. To effect this requirement, NMFS paid for the installation and equipment costs for electronic monitoring 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 PLL gear to report through VMS the following information within 12 hours of completion of each PLL set: date the set was made; area in which the set was made; the number of hooks in the set; and the 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 Northeast Distant Area (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 3 hours, but no more than 12 hours, prior to any landing.Additional information regarding requirements for PLL vessels is in the HMS Commercial Fishing Compliance Guide (http://www.nmfs.noaa.gov/sfa/hms/compliance/guides), and in the Amendment 7 Compliance Guide and IBQ Program FAQ documents (http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/am7/index.html).

PLL Observer Program

In 2015, NMFS observers recorded 1,144 PLL sets, an overall fishery coverage of 14.0 percent. Table 5.4 details the amount of observer coverage in past years for this fleet.

The Pelagic Longline Take Reduction Plan (PLTRP) (74 FR 23349; May 19, 2009) recommended that NMFS increase observer coverage to 12 to 15 percent throughout all Atlantic PLL 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 (PLTRT) recommended NMFS allocate observer coverage to fisheries, regions, and seasons with the highest observed or reported bycatch rates of pilot whales. The PLTRT recommended that additional coverage be achieved either by increasing the number of NMFS 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 Atlantic Pelagic Longline Fishery (2011-2015)

Year	Number of Sets Observed			Percentage of Total Number of Sets		
	Total	Non-EXP	EXP	Total	Non-EXP	EXP
2011[1]	879	864	15	10.9	10.1	100
2012[2]	1,060	945	115	9.5	8.6	100
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	-	-	14.0	-	-

EXP=Experimental fishing operations. [1]100 percent observer coverage was required in experimental fishing in the FEC, Charleston Bump, and GOM, but these sets are not included in extrapolated bycatch estimates because they are not representative of normal fishing. [2]100 percent observer coverage was required in a cooperative research program in the GOM to test the effectiveness of "weak hooks" on target species and bycatch rates, but these sets are not included in extrapolated bycatch estimates because they are not representative of normal fishing. Garrison and Stokes 2011, 2012, 2013, 2014; Garrison unpubl. data (2015).

Increased Observer Coverage in the Mid-Atlantic Bight 2015 to 2016

NMFS increased the mandatory observer coverage for pelagic longline vessels in the Mid-Atlantic bight (MAB), including the Cape Hatteras GRA from December 1, 2015 through April 30, 2016. The purpose of the increased coverage was to supplement scientific research on bycatch in the pelagic longline fishery, as well as provide data on the effectiveness of management measures. One of the research questions was whether there was a difference in catch rate of bluefin tuna by pelagic longline vessels between the area inside the GRA, and the areas outside of the GRA (within the MAB). Analysis of the data indicated that there was insufficient data to answer this question. Specifically, there was not enough data from outside of the GRA, and most of the fishing that did take place outside of the GRA took place during the month of December, when there were low catches of bluefin tuna.

Increased Observer Coverage in the Gulf of Mexico (GOM) during 2016

NMFS continued an increased rate of mandatory observer coverage in the GOM during 2016 (February through June 15, 2016), in order to obtain additional data on bluefin tuna during the bluefin tuna spawning season in the GOM, as well as contribute to the evaluation of management measures such as the GOM Spring GRAs.

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

U.S. Atlantic PLL 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 PLL landings, as reported to ICCAT.

Table 5.5 Reported Numbers of Catch in the U.S. Atlantic Pelagic Longline Fishery (2011-2015)

Species	2011	2012	2013	2014	2015
Swordfish kept	38,721	51,544	44,556	32,908	27,730
Swordfish discarded	8,736	7,996	4,756	4,655	5,382
Blue marlin discarded	544	896	844	718	990
White marlin discarded	943	1,432	1,239	1,580	2,885
Sailfish discarded	581	795	456	445	715
Spearfish discarded	281	270	342	306	837
Bluefin tuna kept	347	392	273	379	320
Bluefin tuna discarded	765	563	266	390	210
Bigeye, albacore, yellowfin, and skipjack tunas kept	69,504	84,707	67,083	73,339	54,734
Pelagic sharks kept	3,732	2,794	3,384	3,804	2,208
Pelagic sharks discarded	43,806	23,038	28,151	38,496	45,082
Large coastal sharks kept	131	86	49	47	50
Large coastal sharks discarded	6,351	7,716	7,997	5,905	8,839
Dolphin kept	30,054	42,445	34,250	63,217	53,526
Wahoo kept	1,922	3,121	2,721	3,325	1,563
Sea turtle interactions	66	61	92	93	357
Number of Hooks (× 1000)	6,035	7,679	7,306	7,125	5,856

Source: Fisheries Logbook System

Table 5.6 Reported Landings (mt ww) in the U.S. Atlantic Pelagic Longline Fishery (2011-2015)

Species	2011	2012	2013	2014	2015
Yellowfin tuna	1,458.3	2,269.6	1,544.4	1,446.5	1,046.7
Skipjack tuna	0.6	0.4	0.5	0.31	0.2
Bigeye tuna	600.2	581.4	508.9	584.3	581.6
Bluefin tuna*	241.4	295.4	190.4	221.9	86.0
Albacore tuna	240.0	261.2	255.3	308.7	229.8
Swordfish N.*	2,570.9	3,346.6	2,812.1	1,815.7	1,596.2
Swordfish S.*	0.0	0.0	0.06	0.0	0.0

* Includes landings and estimated discards from scientific observer and logbook sampling programs. Source: NMFS 2016

Individual Bluefin Quota (IBQ) 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 were described above in the section called "Bluefin Tuna - Amendment 7 to the 2006 Consolidated HMS FMP." The following section provides data from the program for 2015 and a portion of 2016 as well as a summary narrative of the program operation.

On January 1, 2015, NMFS distributed 137.3 mt of Longline category bluefin tuna quota to IBQ shareholders whose permit was associated with a vessel. For shareholders whose permit was not associated with a vessel, IBQ was not distributed to the permit holder until the permit was associated with a vessel. The total amounts of quota distributed to the shareholder accounts were based on the eligible permit's share percentage as determined by the Amendment 7 criteria (either high (1.2 %), medium (0.6 %), or low (0.37 %) tier permits).

NMFS made several inseason adjustments to the Longline category quota during 2015. On July 28, 2015, using the "inseason adjustments" regulatory authority under 50 CFR § 635.27(a)(9), NMFS transferred 34 mt of bluefin tuna quota from the Reserve category to the Longline category and divided the amount equally among the IBQ shareholders. The purpose of that quota transfer and distribution was to enhance the ability of vessel owners to account for bluefin tuna catch, reduce quota debt, facilitate quota leasing, and reduce uncertainty in the fishery. On September 28, 2015, a final rule which increased the baseline U.S. annual bluefin tuna quota, including the Longline category quota, became effective (August 28, 2015; 80 FR 52198), and, NMFS distributed an additional 11 mt of quota among the vessel accounts of IBQ shareholders based on the eligible permit's share percentage. The amounts of IBQ distributed to IBQ vessel accounts, as well as the total amounts of quota allocated to the Longline category, are summarized in Table 5.7.

On January 1, 2016, NMFS distributed the annual base of 148.3 mt of Longline category bluefin tuna quota to IBQ shareholders whose permit was associated with a vessel. For shareholders whose permit was not associated with a vessel, IBQ was not distributed to the permit holder until the permit was associated with a vessel. The total amounts of quota distributed to the shareholder accounts on January 1, 2016 were based on the eligible permit's share percentage as determined by the Amendment 7 criteria. On January 4, 2016, NMFS distributed an additional 34 mt, which had been transferred from the Reserve category inseason. The January 4, 2016 quota was distributed equally to each IBQ shareholder associated with a vessel.

Table 5.7 IBQ Allocations (mt) to the Pelagic Longline Category by Share Tier (lb, 2015 & 2016)

			IBQ (lb) to each Eligible Shareholder*		
Quota Distribution	IBQ (mt)	Date	High Tier (~1.2 %)	Medium Tier (~0.6 %)	Low Tier (~0.37 %)
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
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

* Only allocated to eligible shareholders, for which the valid permit was associated with a vessel.

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

Table 5.8 Bluefin Catch under the IBQ Program (January – December 2015)

Bluefin Catch by Pelagic Longline Vessels (Including Northeast Distant Area (NED))			
Bluefin Tuna landings (mt and # of fish)	Atlantic	33.5 mt	178 fish
	Gulf of Mexico	3.7 mt	15 fish
	NED	34.1 mt	130 fish
	Total	71.3 mt	323 fish
Bluefin Tuna dead discards[1] (mt)	Atlantic		11.5
	Gulf of Mexico		5.6
	NED		0.0
	Total		17.1
Fishing Effort, Bluefin Tuna Catch Details, and IBQ Leasing Between Shareholders[1]			
Permits eligible for IBQ shares (#)			136
Vessels that fished with PLL gear (#)			104
Vessels associated with IBQ shares			100
Vessels not associated with IBQ shares (leased IBQ allocation from share recipients to fish)			4
Share Recipients that did not fish with PLL gear (#)			36
Share recipients did not fish with PLL gear, but leased out IBQ			5
Vessels that landed bluefin tuna (#)			59
Trips with longline gear[3] (#)			1124
IBQ leases (#)			49
Participants leasing (#)	Longline		40
	Purse Seine		4
Amount leased (mt)			57
Average amount leased (lb)(not including 3 very large PS leases)			1,598
Average price ($ per lb) leased (weighted average)	Longline		3.61
	Purse Seine		3.34
Real Time Electronic Reporting[4]			
Trips based on VMS data; Pre-landing reports (a.k.a. 'hail-ins') (#)			1,087
Vessel Monitoring System (VMS) Reports (one per longline set) (#)			5,472
Hooks fished (#)			4,209,589
Reports indicating interactions with bluefin tuna (%)			5
Bluefin tuna discarded dead (#)			37
Bluefin tuna released alive (#)			173
Bluefin retained (#)			224
Electronic Monitoring (EM; Video Cameras and Associated Equipment)			
Vessels with installed EM systems[5] (#)			111
Hard drives received (June through December, #)[6]			785
Vessels submitting hard drives[6] (June through December, #)			91

Sources: [1] Pelagic Observer Program and Fisheries Logbook System; [2]80 FR 52198, August 28, 2015; [3]Fisheries Logbook System; [4]VMS; [5]Saltwater, Inc. (NMFS contractor for installation and maintenance of electronic monitoring systems); [6]ERT Corp. (NMFS contractor for review and storage of electronic monitoring data).

Compliance with the Amendment 7 Regulations

The data indicate that, in general, compliance with the Amendment 7 regulations was strong. 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 (reporting system for all commercially landed bluefin tuna regardless of gear type or geographic area).

The correspondence between the number of vessels that dealers reported landing bluefin tuna and the number of vessels reporting bluefin tuna retention through VMS increased over time in 2015 (Figure 5.3).

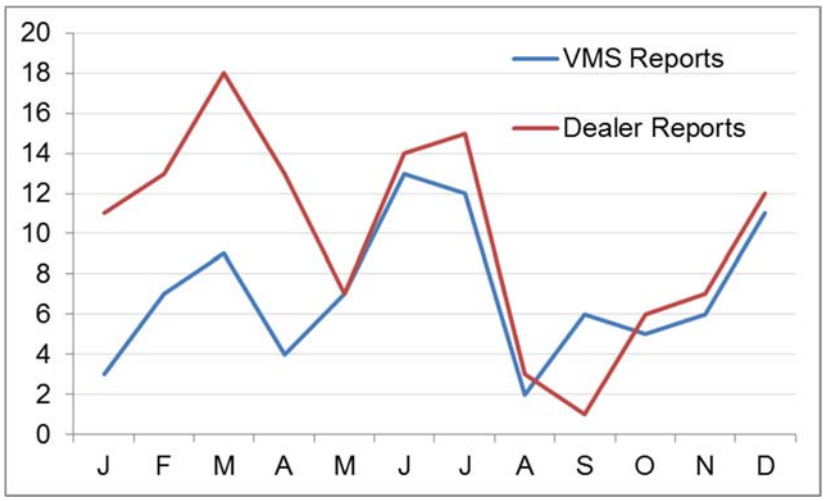

Figure 5.3 Number of Vessels using VMS to Report Retention of Bluefin Tuna and Number of Vessels that Dealers Reported to Have Landed Bluefin Tuna (Jan – Dec, 2015)

Other Pelagic Longline Bycatch

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 oceanic whitetip and hammerhead shark prohibitions, the United States also prohibited the storing, selling, or purchasing of silky sharks caught in association with ICCAT fisheries. The number of releases (and status) of ICCAT-prohibited species from pelagic longline vessels in 2015 is presented in Table 5.9.

Table 5.9 ICCAT-Designated Prohibited Shark Interactions and Dispositions in the Pelagic Longline Fishery (2015)

Species	Kept	Released Dead	Released Alive	Released Unknown	Lost at Surface
Bigeye thresher	0	39	36	0	0
Silky	3	198	203	0	0
Great hammerhead	0	13	12	0	0
Oceanic whitetip	0	13	41	0	0
Smooth hammerhead	0	0	0	0	0
Scalloped hammerhead	0	51	48	1	0
Unidentified hammerhead	0	37	89	1	0

Source: NMFS Pelagic Observer Program

Bycatch mortality of marlins, sailfish, swordfish, and bluefin tuna from all fishing nations may significantly 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 PLL fishery, NMFS implemented regulations to close certain areas to this gear type (Figure 5.4) and has banned the use of live bait and required the use of weak hooks by PLL vessels in the Gulf of Mexico.

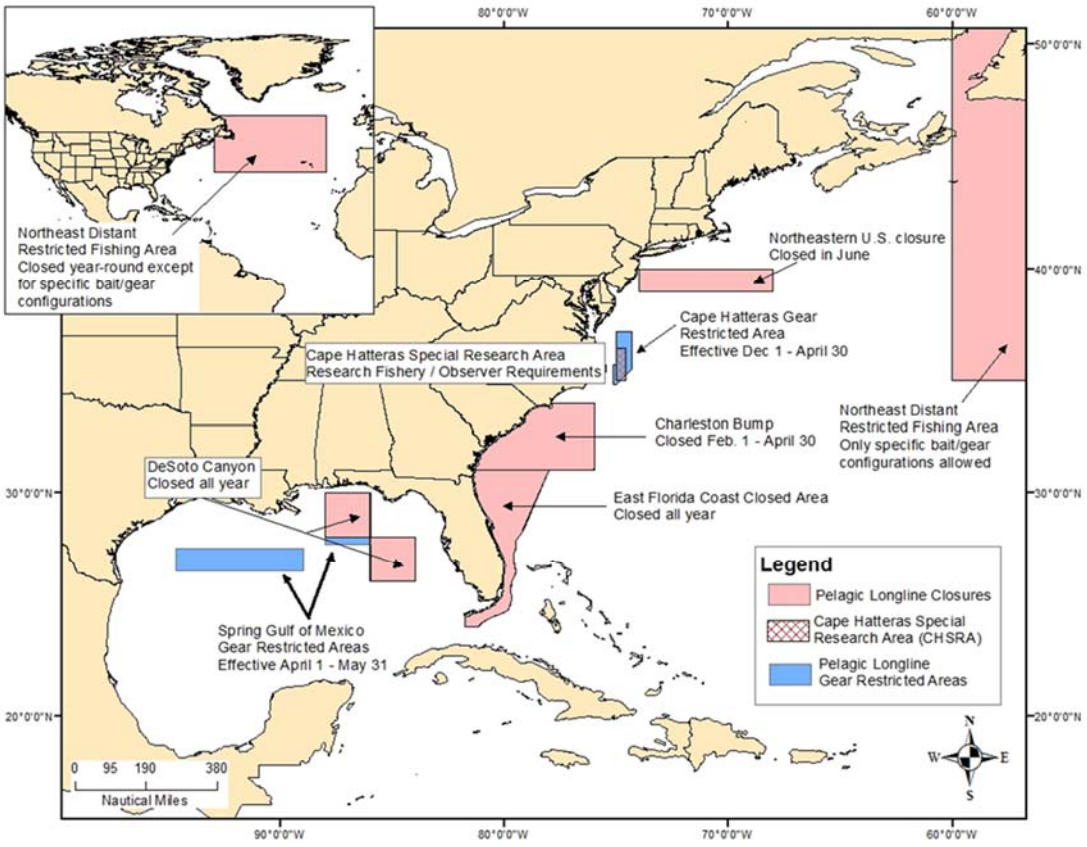

Figure 5.4 Areas Closed/Restricted to Pelagic Longline Fishing by U.S. Flagged Vessels

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 above. The GRAs encompass regions with elevated bluefin interaction rates for PLL 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 PLL 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 limited access longline permit (and other associated permits as required) may be granted conditional access to fish with PLL gear in the Cape Hatteras GRA provided the permit holder/ eligible vessel have demonstrated an ability to avoid bluefin and comply with reporting and monitoring requirements. The use of other gear types authorized for the pelagic longline permit, 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: (1) ratio of bluefin interactions to designated species landings; (2) compliance with the Pelagic Observer Program requirements; and (3) compliance with HMS logbook reporting requirements.

In 2015, the first year of implementation, a total of 34 vessels were not qualified for access to the area. In 2016, a total of 16 vessels are not qualified for access to the area (a 47 percent reduction in vessels not qualified). In 2016, 10 vessels were not qualified due to either an inability to avoid bluefin tuna interactions (n = 4) or lack of compliance with observer requirements (n = 6), and six vessels are not qualified because there are insufficient data to assess performance due to permit transfers (there should be sufficient data after one year of fishing). Overall, there have been incremental improvements in bluefin tuna avoidance (10 percent reduction in the poorest performance), observer compliance (50 percent reduction in non-compliance), and logbook reporting compliance (10 percent reduction in late reporting). The initial assessment of performance metrics (i.e., effective date of the final rule through the end of 2015) was based on data from 2006 through 2012. Subsequent assessments (i.e., the 2016 fishing year) will be based on the most recent complete three-consecutive-year-period. Permit holders will be 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 GRA.

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 2-month period from April through May of a given year. Other gear types authorized for use by PLL 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 that are hooked by U.S. PLL fishermen are released alive, although some animals suffer serious injuries and may die after being released. The observed and estimated marine mammal interactions for 2011 - 2015 are summarized in Table 5.10. Marine mammals are caught primarily during the third and fourth quarters in the Mid Atlantic Bight (MAB), and the South Atlantic Bight (SAB) in quarter 2. In 2015, the majority of observed interactions were with pilot whales (Garrison, unpublished data). NMFS monitors observed interactions with sea turtles and marine mammals on a quarterly basis and reviewed data for appropriate action, if any, as necessary.

Table 5.10 Marine Mammal Interactions in the Atlantic Pelagic Longline Fishery (2011–2015)

Year	Species	Total		Mortality		Serious Injury		Alive	
		Obs.	Est.	Obs.	Est.	Obs.	Est.	Obs.	Est.
2011	Bottlenose dolphin	3	40.5	-	-	1	12.2	2	28.3
	False killer whale	1	11.0	-	-	-	-	1	11.0
	Atlantic spotted dolphin	1	0.8	-	-	-	-	1	0.8
	Pilot whale	16	291.7	1	18.7	12	233.8	3	39.5
	Short-finned pilot whale	4	58.3	-	-	3	46.5	1	11.8
	Pygmy/Dwarf sperm whale	1	17.0	-	-	1	17.0	-	-
	Risso's dolphin	7	31.3	-	-	3	13.3	4	18.0
	Unidentified dolphin	1	1.1	-	-	1	1.1	-	-
2012	Bottlenose dolphin	6	101.0	-	-	4	77.5	2	23.5
	Pilot whale	19	242.6	-	-	14	170.1	5	72.4
	Short-finned pilot whale	1	10.0	-	-	-	-	1	10.0
	Pantropical spotted dolphin*	1	1.0	1	1	-	-	-	-
	Risso's dolphin	3	58.2	-	-	2	45.0	1	13.2
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	-	-
	Unidentified dolphin	3	10.8	-	-	2	3.1	1	7.7
	Unidentified marine mammal	1	12.5	-	-	1	12.5	-	-
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

Obs. – observed; Est. – estimated. * Pantropical spotted dolphin was observed dead in an experimental set.
Sources: Garrison and Stokes, 2012, 2013, 2014. Garrison 2015, 2016, unpublished data.

Protected Species - Sea Turtles

As a result of increased sea turtle interactions in 2001 and 2002, NMFS reinitiated consultation for the PLL fishery and completed a new biological opinion on June 1, 2004. The June 2004 biological opinion concluded that long-term continued operation of the Atlantic PLL 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 (RPA) which was adopted and implemented within the PLL fishery, and an Incidental Take Statement (ITS) for 2004 – 2006, and for each subsequent three-year period (NMFS 2004). The estimated sea turtle takes for regular fishing and experimental fishing effort for 2011 - 2015 are summarized in Table 5.12 and Table 5.13. Loggerhead interactions are more widely distributed; however, the NED and the NEC appear to be areas with high interaction levels each year.

Sea turtle bycatch in the U.S. Atlantic PLL fishery has decreased significantly in the last decade. From 1999 to 2003, the PLL 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 (Garrison, 2006). These numbers have been reduced and in 2015, the U.S Atlantic PLL fishery was estimated to have interacted with 243 loggerhead sea turtles and 299 leatherback sea turtles (Garrison, unpublished data) (Table 5.13). In 2015, the majority of loggerhead sea turtle interactions occurred in the FEC, MAB, and NEC areas (Table 5.11). Interactions with leatherback sea turtles were highest in the GOM, MAB, and NEC areas (Table 5.12). The total interactions for the most recent 3-year ITS period (2013-15) were below the level established by the ITS in the 2004 biological opinion for both loggerheads and leatherbacks. NMFS monitors observed interactions with sea turtles and marine mammals on a quarterly basis and reviews data for additional appropriate action, if any, as necessary.

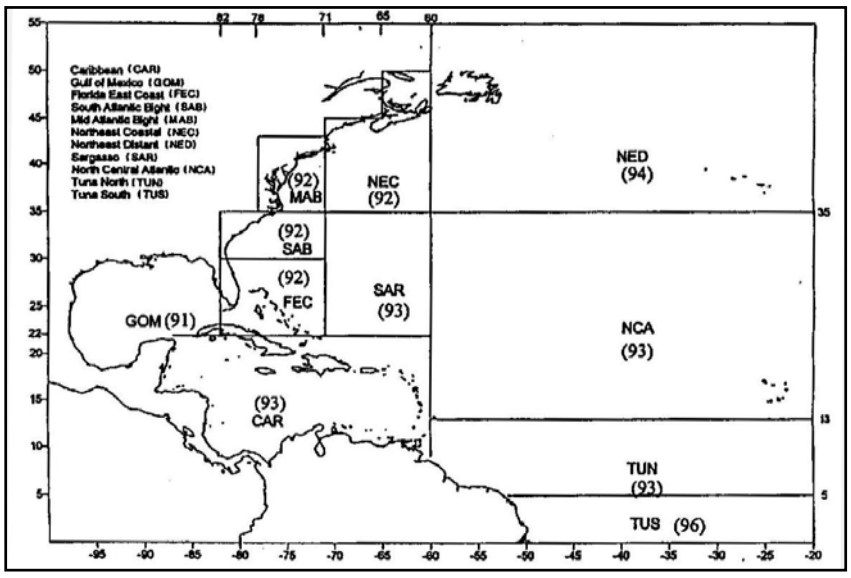

Figure 5.5 Geographic Areas Used in Summaries of Pelagic Logbook Data

Source: Cramer and Adams 2000

Table 5.11 Estimated Number of Loggerhead Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery, by Statistical Area (2010-2015)

Area	2010	2011	2012	2013	2014	2015
CAR	12	4	0	4	3	1
GOM	2	0	56	20	23	1
FEC	26	92	157	50	83	90
SAB	39	9	37	14	19	18
MAB	55	81	71	91	56	70
NEC	101	103	199	139	10	52
NED	97	105	161	49	27	7
SAR	13	44	0	11	28	4
NCA	0	0	0	0	0	0
TUN	0	0	0	0	0	0
TUS	0	0	0	0	0	0
Total	344	438	681	376	259	243
Experimental fishery (2008-14)	0	0	0	1	2	-
Total	344	438	681	377	261	243

Sources: Garrison and Stokes 2011, 2012, 2013, 2014. Garrison 2015, 2016 unpublished data.

Table 5.12 Estimated Number of Leatherback Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery, by Statistical Area (2011-2015)

Area	2010	2011	2012	2013	2014	2015
CAR	10	3	0	3	2	0
GOM	26	33	250	144	235	99
FEC	20	17	75	41	9	30
SAB	13	12	119	11	11	8
MAB	0	140	46	52	0	61
NEC	40	26	60	93	9	60
NED	55	8	41	11	0	24
SAR	2	0	3	6	2	12
NCA	0	0	0	0	0	0
TUN	0	1	2	2	0	5
TUS	0	0	0	0	0	0
Total	166	239	596	363	268	299
Experimental fishery (2005; 2008-14)	2	1	2	3	2	-
Total	168	240	598	366	270	299

Sources: Garrison and Stokes, 2012, 2013, 2014. Garrison 2015, 2016 unpublished data.

Table 5.13 Estimated Sea Turtle and Marine Mammal Interactions and Sea Turtle Incidental Take Levels in the US Atlantic Pelagic Longline Fishery (by Species, 2010 -2015)

Species	2010	2011	2012	Total (2010 – 2012)	2013	2014	2015	Total (2013 – 2015)	Total 3-year ITS (2010-12*)
Leatherback	168	240	598	1,006	366	270	299	935	1,764
Loggerhead	344	438	681	1,463	377	261	243	881	1,905
Other/unidentified sea turtles	3	4	15	22	0	6	18	24	105
Marine mammals	237	452	413	N/A	289	338	285	N/A	N/A

* Applies to all subsequent 3-year ITS periods (e.g.; 2010-2012, 2013-2015)

Protected Species - Seabirds

Observer data indicate that seabird bycatch is low in the U.S. Atlantic PLL fishery (Table 5.14 and Table 5.15). In 2015, there were 102 active U.S. PLL vessels fishing for swordfish in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea that reportedly set approximately 5.9 million hooks. Two seabirds were observed taken, a greater shearwater and an unidentified shearwater. These seabirds were released dead.

Table 5.14 Status of Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery (1992-2015)

	Release Status			
Species	Dead	Alive	Total	Percent Dead
Greater shearwater	30	3	33	90.9
Cory's shearwater	2	-	2	100.0
Unidentified shearwater	3	1	4	75.0
Herring gull	12	-	12	100.0
Great black-backed gull	9	1	10	90.0
Laughing gull	3	1	4	75.0
Unidentified gull	15	8	23	65.2
Northern gannet	3	9	12	25.0
Storm petrel	1	-	1	100.0
Unidentified seabird	41	19	60	68.3
Brown pelican	3	0	3	100.0
Parasitic jaeger	1	0	1	100.0
Total	123	42	165	74.5

Source: NMFS Pelagic Observer Program

Table 5.15 Observed Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery (2011-2015)

Year	Quarter	Area	Type of Bird	Number Observed	Status
2011	3	NED	Northern gannet	1	dead
	3	NED	Unidentified	1	dead
	4	MAB	Herring gull	3	dead
	4	MAB	Unidentified gull	1	dead
	4	MAB	Greater shearwater	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

Source: NMFS Pelagic Observer Program

In 2014, NMFS released a report titled "Implementation of the United States National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries." 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 on, 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 (SEFSC). 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 5.6 provides extrapolated estimates of incidental seabird catch in U.S. Atlantic longline fisheries, which includes the Gulf of Mexico and Western North Atlantic fisheries. The highest estimate of seabird bycatch occurred in the middle Atlantic bight (MAB), followed by the northeast coast (NEC). Estimated pelagic longline seabird bycatch, by season, 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.

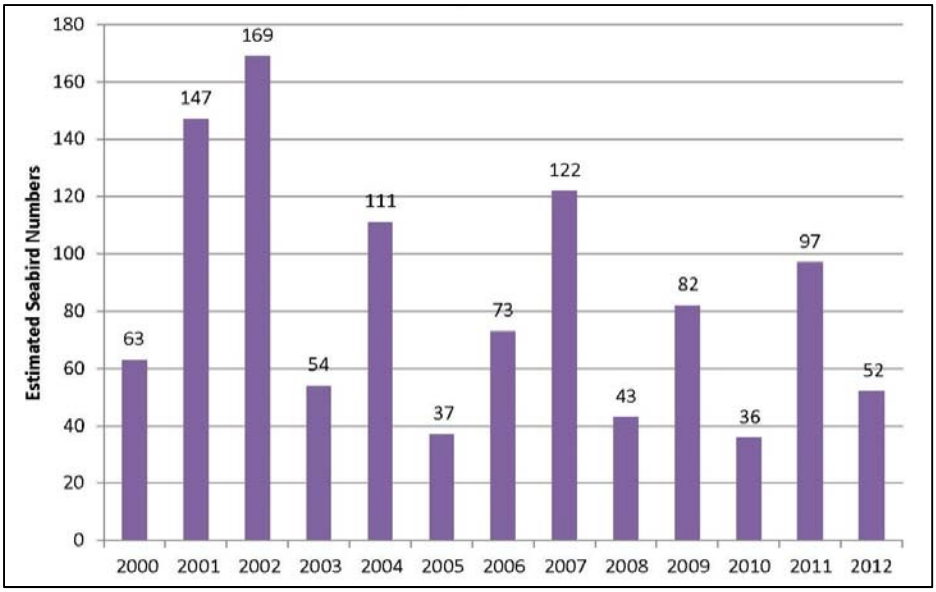

Figure 5.6 Incidental Seabird Catch in Atlantic Longline Fisheries

Source: Li and Jiao 2014

5.1.3 International Issues and Catch

Highly Migratory Species

The U.S. PLL fleet represents a small fraction of the international PLL fleet that competes on the high seas for catches of tunas and swordfish. In recent years, the proportion of U.S. PLL landings of HMS, for the fisheries in which the United States participates, has remained relatively stable in proportion to international landings. Historically, the U.S. 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. In recent years (2011 – 2015), U.S. longline landings have averaged 5.6 percent of total Atlantic longline landings, ranging from a high of 7.0 percent in 2012 to a low of 4.1 percent in 2015. Table 5.16 contains aggregate longline landings of HMS, other than sharks, for all countries in the Atlantic for the period 2006 – 2015.

Table 5.16 Estimated International Longline Landings (mt ww) of HMS (Excluding Sharks) for All Countries in the Atlantic (2011-2015)

Species (Region)	2011	2012	2013	2014	2015
Swordfish (N. Atl + S. Atl)	22,443	23,156	19,167	21,261	21,213
Yellowfin tuna (W. Atl)[2]	10,677	12,558	12,308	8,345	6,744
Bigeye tuna	38,204	35,005	32,037	37,008	40,079
Bluefin tuna (W. Atl.)[2]	743	478	470	497	553
Albacore tuna (N. Atl + S. Atl)	20,111	21,605	20,377	11,977	14,447
Skipjack tuna (W. Atl)[2]	41	107	1,194	462	36
Blue marlin (Atl. + Med.)[3]	1,635	1,536	934	1,528	1,664
White marlin (Atl. + Med.)[3]	449	391	262	320	361
Sailfish (W. Atl.)[4]	1,250	1,153	868	748	867
Total International longline landings[6]	95,553	95,989	87,617	82,146	85,964
Total U.S. longline landings[5]	5,111	6,755	5,312	4,377	3,541
U.S. landings as a percent of total International landings	5.3%	7.0%	6.1%	5.3%	4.1%

[1] Landings include those classified by the SCRS as longline landings. [2] Note that the United States has not reported participation in the E. Atl yellowfin tuna fishery since 1983 and has not participated in the E. Atl bluefin or the E. Atl skipjack tuna fishery since 1982. [3] Includes U.S. and foreign discards. [4] Includes U.S. dead discards. [5] From U.S. National Reports to ICCAT, 2006-2016. Includes swordfish, blue marlin, white marlin, and sailfish longline discards. [6] From SCRS, 2016. Sources: U.S. ICCAT National Reports 2012 – 2016; SCRS, 2016.

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, and 15-6). 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 5.17 provides the most recent catch totals for blue, shortfin mako, and porbeagle sharks.

Table 5.17 Estimated International Longline Landings (mt ww)[1] of Pelagic Sharks for All Countries in the Atlantic (2011 - 2015)

Species (Region)	2011	2012	2013	2014	2015
Blue shark (N. Atl + S. Atl + Med)	72,557	62,719	56,566	67,324	66,478
Shortfin mako (N. Atl + S. Atl + Med)	6,749	7,037	5,247	6,021	5,496
Porbeagle (N. Atl + S. Atl + Med)	90	149	185	80	65
Total International longline catches	79,396	69,905	61,998	73,425	72,039
U.S. blue shark catches[1]	271	162	131	161	114
U.S. shortfin mako catches[1]	392	430	411	409	527
U.S. porbeagle catches[1]	12	4	29	14	44
Total U.S. catches[1]	675	596	571	584	685
U.S. catches[1] as a percent of total International catch	0.9	0.9	0.9	0.8	1.0

[1]Includes catches and discards. Source: SCRS, 2016.

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. Once a school is spotted, the vessel, with the aid of a smaller skiff, intercepts and uses the large net to encircle it. Once encircled, the purseline is pulled, closing the bottom of the net and preventing escape. The net is hauled back onboard using a powerblock, and the tunas are removed and placed onboard the larger vessel. Economic and social aspects of the fisheries are described in Chapter 5 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.

Starting January 1, 2015, purse seine vessel owners were required 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 the approximate length of all bluefin tuna retained, discarded dead, or released alive (by standardized size ranges), including reporting of zero bluefin on a set. Purse seine vessel owners may be eligible to receive reimbursement funds (up to $3,100/unit) for procuring the Enhanced Mobile Transmitting Unit (E-MTU) VMS units. The reimbursement does not cover installation or communication costs.

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. Equal baseline quota allocations of bluefin tuna are assigned to individual fishery participants by regulation and those allocations are adjusted based on the individuals fishing activity in the previous year. According to criteria established in Amendment 7, NMFS annually will make allocations of quota to Purse Seine category participants through a two-step process: (1) NMFS will calculate equal amounts of quota for the participants (20 percent of the total quota for each participant) and (2) NMFS will make adjustments to the individual participant quotas based on the bluefin catch by such participants in the previous year. Thus, Purse Seine category participants will be allocated 100 %, 75 %, 50 %, or 25 % of their individual base allocation. Portions of the baseline Purse Seine quota not allocated to Purse Seine fishery participants will be reallocated to the Reserve category and may be made available for use by other fishing categories.

Regulations currently provide that the quotas are transferable among the five purse seine fishery participants or, as authorized under Amendment 7, limited access pelagic longline permitted vessels through the IBQ program.

Vessels participating in the Atlantic tunas purse seine fishery may only target the larger size class bluefin tuna; more specifically, the giant size class (≥ 81 inches), and are granted a tolerance limit for large medium size class bluefin tuna (73 to < 81 inches) (i.e., large medium catch may not exceed 15 percent by weight of the total amount of giant bluefin tuna landed during a season). During the 2014 and 2015 fishing years, NMFS issued an Exempted Fishing Permit (EFP) to one of the Purse seine vessels to investigate and gather data regarding reducing

discards of large medium bluefin tuna during permitted operations in this fishery. The EFP granted an exemption to the 15 percent tolerance. Under 50 CFR § 635.32, and consistent with § 600.745, NMFS may authorize activities otherwise prohibited by the regulations for "the investigation of bycatch, economic discards and regulatory discards" and the acquisition of information and data. The EFP was only valid if a NMFS-approved observer was onboard the vessel. Therefore, in order to depart on a trip under this EFP, the owner/operator or another crew member had to notify the Northeast Fisheries Observer Program at least 48 hours before departing the dock. If an observer was not available, the vessel could have fished under current regulations (i.e., without any exemptions). Also, under this EFP, all bluefin tuna dead at haulback were required to be brought on board and/or made available to the observer for enumeration and sampling, when feasible.

Consistent with Amendment 7, NMFS will annually make 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. Based on these considerations, NMFS determined that the 2015 Purse Seine bluefin tuna fishery would start on July 6, 2015 and continue through December 31, provided the vessel has not fully attained its IVQ.

NMFS did not open (i.e., announce a start date for) the Atlantic tunas Purse Seine fishery in 2016 because there were no active vessels permitted to fish for BFT with purse seine gear and therefore there was no catch of BFT in 2016. Although NMFS received an Exempted Fishing Permit (EFP) application for purse seine fishing (similar to those submitted for 2014 and 2015), the EFP was not issued for 2016 due to changes in ownership of the vessel listed on the application.

5.2.2 Recent Catch and Landings

Table 5.18 shows purse seine catch (landings + dead discards) of Atlantic tunas from 2007 through 2015. Purse seine landings historically made up approximately 20 percent of the total annual U.S. landings of bluefin tuna (about 25 percent of total commercial landings), but over the past 20 years only account for a small percentage. In the 1980s and early 1990s, purse seine landings of yellowfin tuna were often over several hundred metric tons. Over 4,000 mt ww of yellowfin were recorded landed in 1985. Over the past 30 years, via informal agreements with other sectors of the tuna industry, the purse seine fleet has opted not to direct any effort on HMS other than bluefin tuna; therefore, Table 5.18 only includes bluefin tuna.

Table 5.18 Domestic Atlantic Tuna Landings (mt ww) for the Purse Seine Fishery in the Northwest Atlantic Fishing Area (2007-2015)

Species	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bluefin tuna	27.9	0.0	11.4	0.0	0.0	1.7	42.7	41.8	38.8

Source: NMFS, 2015.

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 5.19 shows that since 2007, the U.S. purse seine fishery has contributed to less than 0.10 percent of the total purse seine landings reported to ICCAT. In Recommendation 10-10, ICCAT established a minimum standard for scientific fishing vessel observer programs and adopted a minimum of 5 percent observer coverage of fishing effort in the purse seine fishery, as measured in number of sets or trips.

Table 5.19 Estimated International Atlantic Tuna Landings (mt ww) for the Purse Seine Fishery in the Atlantic and Mediterranean (2006-2014)

Tuna Species	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bluefin	22,980	12,641	11,406	5,058	4,306	6,186	8,028	8,237	10,034
Yellowfin	51,121	73,152	78,210	76,597	70,243	74,198	68,093	71,780	84,431
Skipjack	89,068	88,501	100,052	127,749	148,552	170,257	184,102	176,200	183,856
Bigeye	16,557	18,676	22,730	27,630	29,506	27,589	28,628	29,101	27,548
Albacore	1,302	175	270	429	242	672	184	90	248
Total	181,028	193,145	212,668	237,463	252,849	278,905	289,035	285,408	306,117
U.S. total	27.9	0.0	11.4	0.0	0.0	1.7	42.7	41.8	38.8
U.S. percentage	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Source: SCRS, 2016.

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 (trolling). In general, trolling consists of dragging baits or lures through, on top of, or even above the water's surface. While trolling, vessels often use outriggers to assist in spreading out or elevating baits or lures and to prevent fishing lines from tangling. A commercial swordfish fishery utilizing handgear (especially buoy gear) exists primarily off the east coast of Florida, but also occurs in other locations of the Atlantic, Gulf of Mexico, and U.S. Caribbean.

Buoy gear means a fishing gear consisting of one or more floatation devices supporting a single mainline to which no more than two hooks or gangions are attached. The buoy gear fishery is usually performed at night. 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 including, but not limited to, 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.

Handgear Trip Estimates

Table 5.20 displays the estimated number of rod and reel and handline trips targeting large pelagic species (e.g., tunas, billfishes, swordfish, sharks, wahoo, dolphin, and amberjack) from Maine through Virginia from 2011 to 2015. The trips include commercial and recreational trips, and are not specific to any particular species. It should be noted that the 2015 estimates are preliminary and subject to change.

Table 5.20 Estimated Number of Rod and Reel and Handline Trips Targeting Atlantic Large Pelagic Species, by State (ME-VA, 2011-2015)

	AREA							
Year	NH/ME	MA	CT/RI	NY	NJ (North)	NJ (South) and MD/DE	VA	Total
Private Vessels								
2011	6,931	20,227	2,175	5,480	4,549	12,109	2,630	54,101
2012	8,408	19,096	6,189	6,425	5,447	13,682	2,445	61,692
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
Charter Vessels								
2011	1,318	4,339	322	2,019	1,279	3,685	774	13,736
2012	1,570	4,248	465	1,211	1,437	2,910	619	12,462
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

Source: Large Pelagics Survey (LPS)

Buoy gear effort, as reported by the fishery, is presented from 2010 to 2015 in Table 5.21.

Table 5.21 Reported Buoy Gear Effort (2010-2015)

Specifications	2010	2011	2012	2013	2014	2015
Number of vessels	57	50	55	46	39	37
Number of trips	632	603	688	629	467	353
Average buoy gears deployed per trip	11.9	12.2	14.1	17.95	20.9	21.1
Total number of set hooks	8,855	8,858	11,639	12,557	10,740	8,267
Average number hooks per gear	1.2	1.2	1.2	1.1	1.1	1.1

Source: Fisheries Logbook System

The handgear fisheries for all HMS are typically most active during the summer and fall, although in the South Atlantic and Gulf of Mexico, fishing occurs during the winter months. Fishing usually takes place between eight and two hundred km from shore and for those vessels using bait, the baitfish typically includes 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 5.7 shows bluefin tuna commercial landings, which are predominately handgear landings, in metric tons by geographic region (Gulf of Mexico, South Atlantic, Mid-Atlantic, and Northeast). The South Atlantic region ends at Cape Hatteras, 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 2001, takes place in the northwest Atlantic. 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.

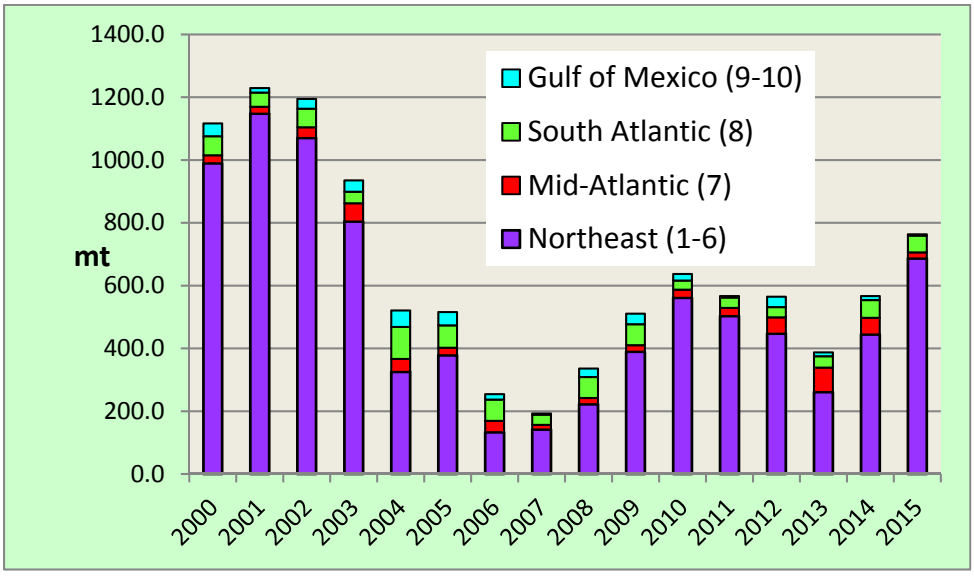

Figure 5.7 Commercial Landings of North Atlantic Bluefin Tuna by U.S. Geographic Region (2000 – 2015)

Source: NMFS Commercial BFT Landings Database.

The U.S. Atlantic tuna commercial handgear fisheries are currently managed through an open access vessel permit program. Vessels that wish to sell their 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). 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 Greater Atlantic Region Permit Office, and vessel owner/operators may obtain a list of permitted dealers in their area at http://www.nero.noaa.gov/ro/doc/vesdata1.htm or by calling the Permit Office at (978) 281-9370.

Vessels that are permitted in the General and Charter/Headboat categories fish commercially under the General 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 one to five 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 category is divided into multiple subquotas associated with specific periods of the year. NMFS has the authority to transfer quota from one subquota period to another, including earlier in the calendar year. The General category bluefin tuna fishery opens on January 1 of each year and remains open until either the General 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 until the quota is filled. Vessel owners/operators should check with the agency online (https://hmspermits.noaa.gov/) or via telephone information line (978-281-9260) to verify the bluefin tuna retention limit on any given day. In accordance with the fishery management plan, the General category receives approximately 47 percent of the U.S. bluefin tuna quota. A brief history of the General category fishery in the United States is available in Amendment 7 to the 2006 Consolidated HMS FMP.

Vessels that are permitted in the 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 ("large medium") per vessel trip per day while the fishery is open. The default retention limit is two bluefin tuna, and NMFS has the authority to set the limit in the range of two to four fish. There is no limit on the number of bluefin tuna that can be retained measuring longer than 81 inches CFL ("giant"), as long as the Harpoon category season is open. The Harpoon category season also opens on June 1 of each year until November 15, or until the quota is 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 dead discards through an online catch reporting system (either through a website designated by NMFS or calling a phone number) within 24 hours of the landings or end of each trip. Specifically, vessels must report the number of bluefin tuna retained, and the number of bluefin tuna discarded dead, according to "Instructions for reporting bluefin tuna," available at: https://hmspermits.noaa.gov/library. The address of the website for reporting is: https://hmspermits.noaa.gov/catchReports.

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, and regional swordfish retention limits exist for these permits, along with gear authorizations and reporting requirements.

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 2015, bluefin tuna commercial handgear landings accounted for approximately 70 percent of the total U.S. bluefin

tuna landings and 80 percent of commercial bluefin tuna landings. Figure 5.8 shows the U.S. Atlantic bluefin tuna landings in metric tons by category since 1998. Note that the commercial handgear landings are comprised of bluefin tuna landed by both general and harpoon categories.

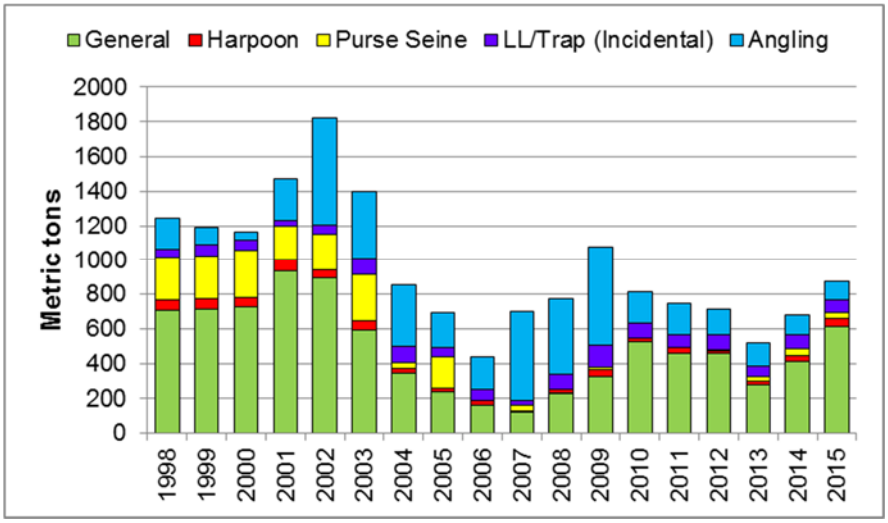

Figure 5.8 Landings of Bluefin Tuna by Fishing Category (1998 – 2015)

Source: NMFS Commercial BFT Landings Database.

Also in 2015, four percent of the total yellowfin catch, or seven percent of the commercial yellowfin catch, was attributable to commercial handgear. Commercial handgear landings of skipjack tuna accounted for approximately two percent of total skipjack landings, or about 60 percent of commercial skipjack landings. For albacore, commercial handgear landings accounted for approximately one percent of total albacore landings, and one percent of commercial albacore landings. Commercial handgear landings of bigeye tuna accounted for approximately seven percent of total bigeye landings and nine percent of total commercial bigeye landings.

Table 5.22 Reported Buoy Gear Landings (lb dw, 2010-2015)

Species	2011	2012	2013	2014	2015
Swordfish	138,041	178,088	140,038	114,153	85,304
Dolphin	1,269	1,324	486	996	216
Oilfish	338	719	693	362	490
Shortfin mako shark	812	2,295	1,194	1,117	932
Wahoo	198	163	70	35	45
Bigeye tuna	350	0	0	0	0
Blacktip shark	0	38	0	13	0
King mackerel	142	56	134	143	29
Yellowfin tuna	400	0	0	0	0
Hammerhead shark	575	400	0	0	0
Silky shark	0	120	0	0	0
Greater amberjack	0	0	0	0	0
Bonito	0	54	0	0	0
Blackfin tuna	70	97	32	84	189

Source: Fisheries Logbook System

Commercial handgear landings of all Atlantic HMS (other than sharks) in the United States by gear and area are shown in Table 5.23 and Table 5.24. Numbers of caught and discarded fish by buoy gear are presented in Table 5.25.

Table 5.23 U.S. Atlantic Commercial Handgear Landings of Tunas and Swordfish (mt ww) by Gear Type (2011-2015)

Species	Gear	2011	2012	2013	2014	2015
Bluefin tuna	Rod and Reel	419.5	419.5	249.5	378.9	581.4
	Handline	0.9	1.3	0.5	0.0	0.0
	Harpoon	70.1	52.3	45.0	67.5	77.1
	Total	490.5	473.1	295.0	446.4	658.5
Bigeye tuna	Troll	.09	0.2	5.0	4.5	5.4
	Handline	3.4	7.9	15.9	13.4	49.2
	Total	3.49	8.0	20.9	17.9	54.6
Albacore tuna	Troll	0.0	0.0	0.2	0.2	0.0
	Handline	1.8	1.1	2.32	2.27	2.6
	Total	1.8	1.1	2.32	2.47	2.6
Yellowfin tuna	Troll	0.5	0.3	30.1	28.7	21.0
	Handline	42.7	83.5	66.4	57.1	59.7
	Total	43.7	83.8	96.5	85.8	80.7
Skipjack tuna	Troll	0.0	0.0	0.0	1.1	0.8
	Handline	0.02	.06	.02	.01	0.2
	Total	0.02	.06	.02	1.11	1.0
Swordfish	Handline	120.9	154.6	105.3	87.6	76.1
	Harpoon	0.6	0.3	0.5	0.0	0.0
	Total	121.5	154.9	105.8	87.6	76.1

Source: NMFS 2015

Table 5.24 U.S. Atlantic Commercial Handgear Landings of Tunas and Swordfish (mt ww) by Region (2011-2015)

Species	Region	2011	2012	2013	2014	2015
Bluefin tuna	NW Atl	490.5	473.1	295.0	446.4	658.5
Bigeye tuna	NW Atl	3.4	7.9	15.9	13.4	49.2
	GOM	0.0	0.0	0.0	0.0	0.0
	Caribbean	0.05	0.0	0.6	0.0	0.0
Albacore tuna	NW Atl	1.7	0.6	2.3	2.2	2.6
	GOM	0.0	0.0	0.0	0.00	0.0
	Caribbean	0.1	0.5	.02	.07	0.0
Yellowfin tuna	NW Atl	34.0	66.0	66.4	47.4	57.8
	GOM	8.7	17.5	0.0	9.7	1.9
	Caribbean	1.5	3.2	0.6	0.6	0.6
Skipjack tuna	NW Atl	1.5	2.0	0.8	.05	0.2
	GOM	0.2	0.06	0.02	0.01	0.0
	Caribbean	6.6	4.0	0.4	0.7	0.5
Swordfish	NW Atl	121.0	151.6	105.3	80.9	70.7
	GOM	0.5	3.3	0.5	6.7	5.4
	Caribbean	0	0	0	0.3	0.2

Table 5.25 Reported Buoy Gear Catches and Discards, in Numbers of Fish (2010-2015)

Species	2010	2011	2012	2013	2014	2015
Swordfish	1,950	1,893	2,699	2,155	1,856	1,561
Dolphinfish	29	121	196	51	182	18
Oilfish	10	76	13	18	8	12
Bigeye tuna	0	4	0	0	0	0
Blackfin tuna	7	3	10	3	10	16
Wahoo	2	40	12	2	1	1
Bonito	6	0	1	0	0	0
King mackerel	7	130	2	14	5	4
Shortfin mako	4	7	14	13	9	6
Hammerhead shark	6	3	3	0	0	0
Blacktip shark	0	0	1	0	1	0
Silky shark	1	0	4	0	0	0
Yellowfin tuna	0	8	0	0	0	0
Greater amberjack	7	0	0	0	0	0
Thresher shark	0	0	1	0	0	0
Released Alive						
Swordfish	1,031	1,659	1,221	478	447	311
Dolphinfish	0	11	14	4	15	0
Blue marlin	1	2	2	1	0	0
White marlin	0	0	0	0	0	0
Sailfish	1	1	0	0	0	0
Hammerhead shark	52	81	93	68	32	23
Blue shark	0	30	5	0	0	0
Thresher shark	2	7	6	1	0	0
Dusky shark	12	2	9	97	1	2
Night shark	39	87	238	129	79	83
Oceanic whitetip shark	0	0	0	1	3	7
Bigeye thresher shark	0	2	2	1	0	1
Tiger shark	1	2	2	3	3	0
Sandbar shark	2	0	0	0	0	0
Longfin mako shark	7	5	6	4	2	0
Shortfin mako shark	6	4	5	6	6	1
Blacktip shark	4	19	39	11	4	0
Silky shark	12	14	12	33	8	18
Oilfish	0	1	0	0	0	0
Greater amberjack	0	0	0	0	0	0
Blackfin Tuna	0	3	0	0	0	0
Bignose shark	0	0	0	0	0	1
Skipjack Tuna	0	1	0	0	0	0
Released Dead						
Swordfish	87	155	139	75	76	45
Silky shark	0	0	0	0	0	0
Hammerhead shark	1	1	0	0	0	1
Blackfin tuna	0	1	0	0	0	0
Blue marlin	0	0	0	0	0	0
Night shark	1	0	1	2	1	14
Longfin mako shark	0	0	1	0	0	0
Shortfin Mako	0	1	0	0	0	0

Source: Fisheries Logbook System.

5.4 Recreational Handgear

The following section describes the recreational portion of the handgear fishery with a primary focus on rod and reel fishing.

5.4.1 Current Management

Domestic recreational fishermen target various HMS using a variety of handgear including rod and reel gear. Recreational fishing for any federally-managed Atlantic HMS requires an HMS Angling permit or, for for-hire vessels taking passengers recreational fishing, an HMS Charter/Headboat permit (note that 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). Two otherwise commercial permits, the General Commercial Swordfish permit and the Atlantic Tunas General permit, also authorize vessel occupants to fish recreationally for all HMS, but only in registered Atlantic HMS tournaments. All HMS fishing tournaments are required to register with NMFS at least four weeks prior to the commencement of tournament fishing activities. If selected, tournament operators are required to report the results of their tournament to the Recreational Billfish Survey (RBS). All billfish and swordfish tournaments are selected for reporting, and must submit a summary of their catch and landings within a week after the tournament has occurred. All non-tournament recreational landings of Atlantic marlins, roundscale spearfish, sailfish, bluefin tuna (including dead discards), and swordfish must also be reported to NMFS through the Automated Landings Reporting System (ALRS) within 24 hours of landing. Detailed "Instructions for reporting bluefin tuna" are available at https://hmspermits.noaa.gov/library. Public access to report fish in the ALRS is at https://hmspermits.noaa.gov/catchReports. 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.

5.4.2 Recent Catch, Landings, and Bycatch

The recreational landings presented here for Atlantic HMS consist of information obtained through the Marine Recreational Information Program (MRIP), the Large Pelagics Survey (LPS), the Southeast Headboat Survey (HBS), Texas Headboat Survey, RBS, and the ALRS. MRIP funds and conducts various surveys and studies of recreational fishing activities and the LPS is an MRIP survey that is specific to Atlantic HMS. The 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.

Tuna and swordfish landings for HMS recreational rod and reel fisheries are presented below in Table 5.26 from 2011 through 2015.

Table 5.26 Domestic Landings (mt ww)* for the Atlantic Tunas and Swordfish Recreational Rod and Reel Fishery (2011-2015)

Species	Region	2011	2012	2013	2014	2015
Bluefin tuna*	NW Atlantic	148.6	148.7	131.4	99.6	112.9
	GOM	0.0	0.0	0.0	0	0
	Total	148.6	148.7	131.4	99.6	112.9
Bigeye tuna**	NW Atlantic	72.4	269.6	337.5	251.0	198
	GOM	34.9	0.1	7.0	0.0	0.02
	Caribbean	2.3	0.0	0.0	1.4	0.5
	Total	109.6	269.7	344.5	252.4	198.52
Albacore**	NW Atlantic	170.6	144.3	340.3	136.7	12.9
	GOM and Caribbean	0.0	0.7	0.0	0	0.2
	Total	170.6	145.0	340.3	136.7	13.1
Yellowfin tuna**	NW Atlantic	1,133.8	1,433	495.4	997.8	795.6
	GOM	362.8	294.1	191.8	73.2	134.0
	Caribbean	0.9	0.0	0.0	16.2	6.7
	Total	1,497.5	1,721.1	687.2	1,087.2	936.3
Skipjack tuna**	NW Atlantic	50.3	98.0	37.7	46.0	32.7
	GOM	23.7	2.5	77.1	9.8	35.7
	Caribbean	3.0	3.0	0.0	9.4	7.2
	Total	77.0	103.5	114.8	65.2	75.6
Swordfish	Total	53.6	70.8	22.0	35.4	46.0

* Rod and reel catch and landings estimates of bluefin tuna < 73 in curved fork length (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). ** 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, 2012; NMFS, 2013; NMFS, 2014; NMFS, 2015; NMFS, 2016.

Atlantic Billfish Recreational Fishery

Table 5.27 provides a summary of reported billfish and swordfish landings from 2011 through 2015. 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, the RBS provides a preliminary source for analyzing recreational billfish tournament landings ("Tournament" columns). Recreational report totals are developed from analysis of multiple datasets, including the ALRS, the LPS, Maryland and North Carolina Catch Cards, the RBS, and MRIP. In 2012, NMFS established a new accounting protocol that analyzes tournament and non-tournament landings reports of billfishes using all available programs (see sources in Table 5.27). The number of registered tournaments and reported tournament landings by state are shown in Table 5.28.

"Total landings of marlin and RSP" by year and "Balance Remaining (from 250 Marlin 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 Atlantic blue and white marlin landings, combined, 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 5.27 Atlantic HMS Recreational Billfish and Swordfish Landings, in Numbers (2011-2015)

Species	Recreational Reporting	2011	2012	2013	2014	2015
Blue Marlin	Tournament*	27	45	44	49	40
	Non-Tournament**	3	18	11	5	23
	Total***	43	63	55	54	63
White Marlin	Tournament*	31	23	34	36	46
	Non-Tournament**	6	7	15	6	20
	Total***	56	30	49	42	66
Roundscale Spearfish (RSP)	Tournament*	3	4	1	2	10
	Non-Tournament**	0	0	0	0	0
	Total***	7	4	1	2	10
Total Landings of Marlin and RSP		106	97	100	98	139
Balance Remaining (from 250 Marlin Limit)		144	153	150	152	111
Sailfish	Tournament*	7	21	2	5	1
	Non-Tournament**	166	163	171	113	113
	Total***	173	184	173	118	114
Swordfish	Tournament*	29	29	16	23	17
	Non-Tournament**	318	386	263	281	315
	Total	347	415	279	304	332

Sources: 2011 for all billfishes (2009-2013 for swordfish): * RBS; ** ALRS; *** RBS, ALRS, MD and NC HMS Catch Cards, LPS, and MRIP. 2012-2015 for all billfishes and 2014-2015 for swordfish (excludes swordfish 2012-2013): * RBS, MD and NC HMS Catch Cards, LPS, and MRIP; ** ALRS, MD and NC HMS Catch Cards, LPS, and MRIP. *** Sum total of tournament and non-tournament reports.

Table 5.28 Tournament Landings of Billfishes and Swordfish by State or Area (2015)

State(s)	Tournaments	White Marlin	Blue Marlin	Sailfish	Roundscale Spearfish	Swordfish
MA	3	-	-	-	-	
NY/NJ	13	2		-	-	2
DE/MD	11	43	6	-	10	1
VA	4	-	-	-	-	-
NC	12	-	14	-	-	-
SC	6	-	1	-	-	-
GA	11	-	-	-	-	-
FL	78	1	8	1	-	13
AL/MS	4	-	3	-	-	-
LA	16	-	7	-	-	1
TX	16	-	-	-		
PR/USVI	11	-	1	-	-	-

Some states are aggregated to protect tournament reporting privacy if at least three tournaments were not held in one or more state(s). States without tournaments are not shown. Sources: RBS, HMS Recreational Reporting Program, NC and MD HMS Catch Cards, LPS, and MRIP.

Shark Recreational Fishery

Unlike billfish or bluefin tuna, recreational shark landings are not required to be reported to NMFS unless an angler is required to participate in the LPS or MRIP. However, as of 2013 for vessel owners in Maryland, and 2014 for vessel owners in North Carolina, shark landings must be reported on catch cards at state-operated landings stations. Two shortfin mako sharks were landed and reported via North Carolina catch cards in both 2014 and in 2015 (four sharks total).

Table 5.29 Recreational Shark Landings Reported from the Maryland Catch Card Program (2013-2015)

Species	2013	2014	2015
Atlantic sharpnose	13	13	13
Blue	0	7	2
Common thresher	8	12	10
Scalloped hammerhead	0	1	0
Shortfin mako	47	53	55
Spinner	1	0	0
Smoothhound	0	1	0
Total	69	87	80

Source: MD DNR

The following tables provide estimated recreational landings for each of the three shark species groups by region: large coastal sharks (Table 5.30, Table 5.31, and Table 5.32), pelagic sharks (Table 5.33), and small coastal sharks (Table 5.34 and Table 5.35); as well as for smoothhound (Smooth Dogfish) sharks (Table 5.36).

Table 5.30 Estimated Recreational Harvest of Large Coastal Sharks in the Atlantic Region, in Number of Fish per Species (2011-2015)

Species	2011	2012	2013	2014	2015
Basking[2]	0	0	0	0	0
Bignose[1]	0	0	0	0	0
Bigeye sand tiger[2]	0	0	0	0	0
Blacktip	754	1,164	962	1,730	1,718
Bull	698	68	77	3	2
Caribbean reef[1]	0	0	0	0	0
Dusky[1]	23	15	16	2	0
Galapagos[1]	0	0	0	0	0
Hammerhead, great	0	37	0	0	1
Hammerhead, scalloped	178	4	248	900	0
Hammerhead, smooth	0	0	352	0	0
Hammerhead, unclassified	0	0	0	0	0
Lemon	14	0	0	0	144
Night[1]	0	0	0	0	0
Nurse	301	706	13	418	298
Sandbar[3]	1,125	857	399	1,873	1,252
Sand tiger[2]	0	0	0	0	0
Silky[3]	0	232	0	176	38
Spinner	679	1,145	390	847	82
Tiger	1	2	8	324	417
Whale[2]	0	0	0	0	0
White[2]	0	0	0	0	0
Requiem shark, unclassified	4,949	6,070	97	4,513	153
Total	8,723	10,299	2,562	10,785	4,105

[1]Prohibited in the recreational fishery as of July 1, 1999. [2]Prohibited as of April 1997. [3]Prohibited as of July 2008.
Source: TX PWD, SE Headboat Survey, MRIP

Table 5.31 Estimated Recreational Harvest of Large Coastal Sharks in the Gulf of Mexico Region, in Number of Fish per Species (2011-2015)

Species	2011	2012	2013	2014	2015
Basking[2]	0	0	0	0	0
Bignose[1]	0	0	0	0	0
Bigeye sand tiger[2]	0	0	0	0	0
Blacktip	16,084	22,530	105,315	10,338	8,071
Bull	581	2,415	2,786	3,498	400
Caribbean reef[1]	0	0	0	0	0
Dusky[1]	125	42	20	598	1
Galapagos[1]	0	0	0	0	0
Hammerhead, great	126	5	7	2	0
Hammerhead, scalloped	22	24	516	14	5
Hammerhead, smooth	0	0	0	0	0
Hammerhead, unclassified	0	0	0	0	0
Lemon	1,274	0	0	0	0
Night[1]	0	0	55	0	0
Nurse	1,098	2	2	0	1
Sandbar[3]	200	46	1,405	62	4
Sand tiger[2]	0	0	0	0	0
Silky[3]	74	0	615	0	1
Spinner	1,695	4,975	6,021	569	653
Tiger	52	0	3	4	2
Whale[2]	0	0	0	0	0
White[2]	0	0	0	0	0
Requiem shark, unclassified	38,876	16,453	17,606	2,440	3,445
Total	60,207	46,492	134,351	17,525	12,583

[1]Prohibited in the recreational fishery as of July 1, 1999. [2]Prohibited as of April 1997. [3]Prohibited as of July 2008.
Source: TX PWD, MRIP, Southeast Headboat Survey.

Table 5.32 Estimated Recreational Harvest of Large Coastal Sharks in Puerto Rico, in Numbers of Fish (2010-2015)

Species	2011	2012	2013	2014	2015
Dusky	0	384	0	0	0
Lemon	0	0	0	12	0
Hammerhead, scalloped	77	98	0	0	0
Silky	317	263	215	85	334
Caribbean reef	0	521	0	0	0
Total	394	745	215	97	334

[1]Prohibited in the recreational fishery as of July 1, 1999. [2]Prohibited as of April 1997. [3]Prohibited as of July 2008.
Source: TX PWD, MRIP, Southeast Headboat Survey

Table 5.33 Estimated Recreational Harvest of Pelagic Sharks in the Atlantic, Gulf of Mexico, and U.S. Caribbean in Number of Fish per Species (2011-2015)

Species	2011	2012	2013	2014	2015
Bigeye thresher*	0	0	0	0	0
Bigeye sixgill*	0	0	0	0	0
Blue Shark	0	0	4,165	3,449	9,421
Mako, longfin*	0	0	0	0	0
Mako, shortfin	301	1,314	6,856	16,531	12,835
Mako, unclassified	396	14	12	5	34
Lamnidae (mackerel sharks)	3,091	5,706	24	19,898	3,906
Oceanic whitetip	0	0	0	0	132^
Porbeagle	19	0	0	0	0
Sevengill*	0	0	0	0	0
Sixgill*	0	0	0	0	0
Thresher	0	0	0	3,164	12,274
Total	3,807	7,034	11,057	43,047	38,602

*Prohibited in the recreational fishery as of July 1, 1999. ^Includes 132 individuals caught in Puerto Rico. Source: TX PWD, Southeast Headboat Survey, MRIP

Table 5.34 Estimated Recreational Harvest of Small Coastal Sharks in the Atlantic Region, in Number of Fish per Species (2011-2015)

Species	2011	2012	2013	2014	2015
Atlantic angel*	0		0	0	0
Blacknose	573	0	70	4,146	1,211
Bonnethead	8,599	9,798	14,376	28,532	2,870
Finetooth	0	0	0	2,896	326^
Atlantic sharpnose	28,252	23,207	44,832	56,052	28,869
Caribbean sharpnose*	0	0	0	0	0
Smalltail*	0	0	0	0	0
Total	37,424	33,005	59,278	91,626	33,276

*Prohibited in the recreational fishery as of July 1, 1999. ^Includes 48 individuals caught in Puerto Rico. Source: TX PWD, MRIP, Southeast Headboat Survey

Table 5.35 Estimated Recreational Harvest of Small Coastal Sharks in the Gulf of Mexico Region, in Number of Fish per Species (2011-2015)

Species	2011	2012	2013	2014	2015
Atlantic angel*	0	0	0	0	0
Blacknose	1,533	2,637	232	4,381	741
Bonnethead	51,715	6,763	7,755	19,072	6,659
Finetooth	47	248	239	80	112
Atlantic sharpnose	19,072	40,301	45,617	25,410	29,167
Caribbean sharpnose*	0	0	0	0	0
Smalltail*	0	0	0	0	0
Total	72,367	49,949	53,843	48,943	36,679

*Prohibited in the recreational fishery as of July 1, 1999. Source: TX PWD, MRIP, Southeast Headboat Survey.

Table 5.36 Estimated Recreational Harvest of Smoothhound (Smooth Dogfish) in the Gulf of Mexico and Atlantic Regions, in Number of Fish per Species (2011-2015)

Region	2011	2012	2013	2014	2015
Atlantic	21,041	31,669	17,308	49,835	43,721
Gulf of Mexico	0	1,258	214	7	3
Total	21,041	32,927	17,522	49,842	43,724

Bycatch Issues

Bycatch in the recreational rod and reel fishery is difficult to quantify because many fishermen simply value the experience of fishing and may not be targeting a particular species. The 1999 Billfish Amendment established a catch-and-release fishery management program for the recreational Atlantic billfish fishery. As a result of this program, all Atlantic billfish that are released alive, regardless of size, are not considered bycatch. The recreational white shark fishery is by regulation a catch-and-release fishery only, and white sharks are not considered bycatch.

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. The number of kept and released fish reported or observed through the LPS dockside intercepts for 2011 – 2015 are presented in Table 5.37 and Table 5.38.

Most evidence suggests that circle hooks reduce at-vessel and post-release mortality rates for many HMS without reducing catchability compared to J-hooks, although it varies by species, gear configuration, bait, and other factors. Willey et al. (2016) found that sharks caught recreationally with circle hooks were deep hooked 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 (N=624). Campana et al. (2009) observed that 96 percent of sharks that were deep hooked were severely injured or dead while 97 percent of sharks that were hooked superficially (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%).

An outreach program to address bycatch and to educate anglers on the benefits of circle hooks has been implemented by NMFS. In January 2011, NMFS developed and released a brochure that provides guidelines on how to increase the survival of hook-and-line caught large pelagic species. This brochure is available at: http://www.nmfs.noaa.gov/sfa/hms/compliance/guides/careful_release_brochure.pdf.

Table 5.37 HMS Retained by the Rod and Reel Fishery as Reported in the Large Pelagics Survey (ME-VA, May-October, 2011-2015)

Species	2011	2012	2013	2014	2015
White marlin	17	5	14	8	13
Blue marlin	1	3	6	1	4
Sailfish	0	0	0	0	0
Swordfish	27	28	15	16	43
Giant bluefin tuna	51	65	37	56	119
Large medium bluefin tuna	28	23	14	7	29
Small medium bluefin tuna	14	21	29	26	33
Large school bluefin tuna	77	73	97	60	40
School bluefin	180	146	104	147	141
Young school bluefin	0	2	1	4	0
Bigeye tuna	66	97	250	215	240
Yellowfin tuna	3,474	3,296	2,719	2,072	1,942
Skipjack tuna	278	200	109	109	125
Albacore	550	358	1,040	444	310
Thresher shark	41	39	31	55	68
Mako shark	172	151	179	180	152
Sandbar shark	1	0	0	0	1
Dusky shark	0	0	0	0	0
Tiger shark	0	2	0	2	3
Porbeagle	2	2	6	3	3
Blacktip shark	0	0	0	0	0
Atlantic sharpnose shark	5	3	22	6	13
Blue shark	30	28	12	10	25
Hammerhead shark	0	0	0	0	0
Smooth hammerhead	0	0	0	0	0
Scalloped hammerhead	0	0	0	0	0
Unidentified hammerhead	0	0	0	0	0
Wahoo	63	206	92	59	135
Dolphin	4,935	3,055	3,902	5,904	9,814
King mackerel	3	3	7	2	0
Atlantic bonito	41	79	77	454	46
Little tunny	151	172	84	157	108
Amberjack	25	40	37	25	46
Spanish mackerel	24	146	66	44	165

Source: LPS.

Table 5.38 HMS Released Alive and Dead by the Rod and Reel Fishery as Reported in the Large Pelagics Survey (ME-VA, May-October, 2011-2015)

Species	2011	2012	2013	2014	2015
White marlin	1,355	1,996	1,200	1,281	1,528
Blue marlin	106	137	109	99	170
Sailfish	11	61	15	16	25
Swordfish	27	12	18	15	14
Giant bluefin tuna	0	0	2	0	0
Large medium bluefin tuna	2	9	1	0	3
Small medium bluefin tuna	32	45	70	35	51
Large school bluefin tuna	53	64	87	40	14
School bluefin tuna	345	184	135	84	277
Young school bluefin tuna	44	21	14	6	29
Bigeye tuna	2	3	5	102	14
Yellowfin tuna	1,479	195	999	480	920
Skipjack tuna	479	325	464	137	217
Albacore tuna	84	25	112	29	11
Thresher shark	9	16	10	23	42
Mako shark	224	238	206	237	385
Sandbar shark	45	14	44	62	50
Dusky shark	84	76	90	57	102
Tiger shark	25	26	19	32	18
Porbeagle	31	18	22	21	42
Blacktip shark	10	346	89	33	13
Atlantic sharpnose shark	3	4	22	3	36
Blue shark	3,752	2,705	2,240	1,894	2,164
Hammerhead shark	1	2	0	1	7
Smooth hammerhead shark	3	3	0	6	2
Scalloped hammerhead shark	0	4	0	2	2
Unidentified hammerhead shark	10	30	20	23	28
Wahoo	2	5	2	0	2
Dolphin	380	192	209	213	508
King mackerel	0	0	0	0	0
Atlantic bonito	55	120	46	138	55
Little tunny	640	993	133	614	339
Amberjack	17	48	56	35	10
Spanish mackerel	0	0	0	0	2

Source: LPS.

5.5 Bottom Longline

Bottom longline is the primary commercial gear employed for targeting large coastal sharks (LCS) in all regions. Small coastal sharks (SCS) are also caught on bottom longline gear. Gear characteristics vary by region and target species. In 2015, hauls targeting LCS used bottom longline between 0.9 to 14.0 km (0.6 – 8.7 miles) long with 45 to 500 hooks attached and the average soak duration was 7.5 hours. Both circle and J hooks are used; the type(s) and size of hook depends on which shark species is being targeted. Fishermen targeting LCS with bottom longline gear most commonly used 16.0 circle hooks (75.0 percent of the time). Hauls targeting

sandbar sharks used bottom longline an average of 8.3 km (5.2 miles) long with 99 to 300 hooks attached and the average soak duration was 5.6 hours. Fishermen targeting sandbar sharks with BLL gear most commonly used 18.0 circle hooks (42.4 percent of the time) (Enzenauer et al. 2016).

The reported bottom longline effort for fishermen targeting sharks by region from 20 through 2015 is provided in Table 5.39. The Atlantic region has more vessels and trips targeting sharks, but the number of trips targeting sharks in the Gulf of Mexico region has surpassed the Atlantic region in 2012-2014. The number of trips is defined as targeting sharks if 75 percent of the landings, by weight, were sharks.

Table 5.39 Reported Bottom Longline Effort Targeting Sharks (2010-2015)

Specifications	Region	2010	2011	2012	2013	2014	2015
Number of Vessels	Gulf of Mexico	7	11	20	16	20	18
	Atlantic	32	26	21	24	19	14
Number of Trips	Gulf of Mexico	54	194	379	457	604	527
	Atlantic	486	434	281	329	369	330
Average Sets per Trip	Gulf of Mexico	1.2	1.4	1.2	1.1	1.1	1.1
	Atlantic	1.4	1.3	1.5	1.5	1.7	1.8
Total Number of Set Hooks	Gulf of Mexico	15,380	48,112	99,675	105,559	139,709	139,956
	Atlantic	239,952	183,465	98,094	136,475	193,561	170,032
Average Number of Hooks per Set	Gulf of Mexico	215.6	213.8	229.0	212.1	206.1	236.1
	Atlantic	327.3	330.3	237.1	253.5	276.7	294.9
Total Soak Time (Hours)	Gulf of Mexico	396.0	1,361.0	2,912.0	2,589.5	3,011.0	2,917
	Atlantic	3,490.5	3,331.0	2,289.5	2,438.0	2,649.5	2,293
Average Mainline Length (Miles)	Gulf of Mexico	2.6	3.0	2.8	2.1	1.9	2.1
	Atlantic	4.7	5.1	3.9	3.4	3.4	3.8

Source: Fisheries Logbook System

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. 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.

A rulemaking to prevent quota exceedances went into effect January 13, 2017, impacting fishermen using bottom longline gear. The final rule establishes a commercial retention of eight blacknose sharks on all trips when the blacknose shark fishery is open for all Atlantic HMS limited access permit holders in the Atlantic region south of 34°00' N. latitude. NMFS is currently working on a second shark rulemaking that could impact fishermen using BLL gear. Amendment 5b to the 2006 Consolidated HMS FMP could change certain shark regulations

based on the latest stock assessment for dusky sharks. The preferred alternatives specific to BLL fishermen include the completion of a shark identification and fishing regulation training at existing safe handling workshops, moving 1 nmi after interacting with a dusky shark and notifying other vessels in the area of the dusky shark catch, and using only circle hooks with BLL gear.

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 BLL observer program. Since 2002, shark BLL 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 directed shark permit, and reported fishing with longline gear in the previous year were randomly selected for coverage with a target coverage level of 5-10% for shark directed (Enzenauer et al., 2016).

In 2015, the BLL observer program selected 8 vessels for the entire fishing season. These vessels were observed for a total of 83 BLL hauls (defined as setting gear, soaking gear for some duration of time, and retrieving gear) and a total of 116 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 LCS or sandbar shark) (Enzenauer et al., 2016). In the non-research shark fishery, the BLL observer program observed trips from the southern U.S. Atlantic (the coastline from North Carolina to Florida) region. The observed non-research shark fishery hauls targeted coastal shark species in the southern U.S. Atlantic. Approximately 73 trips with 99 hauls were observed. These trips caught mostly blacktip sharks with Atlantic sharpnose, blacknose, and bull sharks being the next most caught species (Table 5.40).

Table 5.40 Shark Species Caught on Observed Bottom Longline Trips Targeting Sharks from North Carolina through the East Coast of Florida (2015)

Species	Total Caught (#)	Kept (%)	Discarded Dead (%)	Discarded Alive (%)	Disposition Unknown (%)
Blacktip shark	280	91.8	6.8	1.1	0.4
Atlantic sharpnose shark	142	7.0	83.1	9.9	0.0
Blacknose shark	53	0.0	88.7	11.3	0.0
Bull shark	37	86.5	0.0	10.8	2.7
Scalloped hammerhead shark	34	61.8	38.2	0.0	0.0
Spinner Shark	16	62.5	31.3	6.3	0.0
Sandbar Shark	15	0.0	6.7	93.3	0.0
Sand tiger shark	14	0.0	0.0	100.0	0.0
Lemon shark	7	100.0	0.0	0.0	0.0
Tiger shark	4	75.0	0.0	25.0	0.0
Great hammerhead shark	4	100.0	0.0	0.0	0.0
Bonnethead shark	1	0.0	100.0	0.0	0.0
Total	607				

Source: Enzenauer et al. 2016

In 2015, 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. NMFS changed the regulations for vessels participating in the shark research fishery in 2015 by modifying the regional dusky shark bycatch caps and allowing observers to retain and land up to three whole sharks per trip (Table 5.41).

Table 5.41 Summary of Shark Research Fishery Management Measures (2012-2015)

Management Measure	2012	2013	2014	2015
Number of Vessels	5	6	5	7
Number of Trips per Month	1	1	1	1
Captain's Meeting Held	Yes	Yes	Yes	Yes
Retention Limits	None. All sharks, except for prohibited species, brought to vessel dead must be landed.	None. All sharks, except for prohibited species, brought to vessel dead must be landed.	None. All sharks, except for prohibited species, brought to vessel dead must be landed.	None. All sharks, except for prohibited species, brought to vessel dead must be landed.
Gear Restrictions	Set limit: one longline set per trip Hook restriction: 150 or fewer hooks on board *Amendment 1* Set limit: two non-concurrent longline sets per trip: 1st set ≤ 75 hooks; soak time no more than 2 hours; 2nd set ≤ 150 hooks; no soak time limit Hook restriction: ≤ 250 hooks on board *Amendment 2* Set limit: two non-concurrent longline sets per trip: 1st set ≤ 150 hooks; soak time no more than 2 hours; 2nd set ≤ 300 hooks; no soak time limit Hook restriction: ≤ 500 hooks on board	Set limit: two non-concurrent longline sets per trip: 1st set ≤ 150 hooks; soak time no more than 2 hours; 2nd set ≤ 300 hooks; no soak time limit Hook restriction: ≤ 500 hooks on board	Set limit: two non-concurrent longline sets per trip: 1st set ≤ 150 hooks; soak time no more than 2 hours; 2nd set ≤ 300 hooks; no soak time limit Hook restriction: ≤ 500 hooks on board	Set limit: two non-concurrent longline sets per trip: 1st set ≤ 150 hooks; soak time no more than 2 hours; 2nd set ≤ 300 hooks; no soak time limit Hook restriction: ≤ 500 hooks on board

Management Measure	2012	2013	2014	2015
Individual Vessel Quota	Sandbar quota and LCS research quota split equally among selected vessels Sandbar: 14.06 mt dw Non-sandbar LCS: 6.0 mt dw	Sandbar quota and LCS research quota split equally among selected vessels Sandbar: 15.5 mt dw Non-sandbar LCS: 6.7 mt dw	Sandbar quota and LCS research quota split equally among selected vessels Sandbar: 18.6 mt dw Non-sandbar LCS: 8.0 mt dw	Sandbar quota and LCS research quota split equally among selected vessels Sandbar: 13.3 mt dw Non-sandbar LCS: 5.7 mt dw
Mid-Atlantic Closed Area	Vessels could fish in the closed area	Vessels could not fish in the closed area	Vessels could fish in the closed area only when the observer program intends to place a satellite archival tag(s) on a dusky shark(s)	Vessels could fish in the closed area only when the observer program intends to place a satellite archival tag(s) on a dusky shark(s)
Dusky Bycatch Cap	None	No more than five dusky shark interactions were allowed in any of the designated regions (North Carolina, Georgia/ South Carolina, east coast of Florida, the Florida Keys, west coast of Florida, and rest of the Gulf of Mexico) through the entire year	Once three dead dusky shark are observed, a three hour soak time restriction is implemented and no more than three dusky shark interactions were allowed in any of the designated regions (North Atlantic, North Carolina, South Atlantic, the Florida Keys, west coast of Florida, 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 were 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 were allowed in South Atlantic region through the entire year (Figure 5.9).

Figure 5.9 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 2015, a total of 73 trips with 99 hauls were observed. These trips caught mostly sandbar sharks with tiger, Atlantic sharpnose, and dusky sharks being the next most caught species (Table 5.41). Dusky sharks were only observed on trips targeting sandbar sharks, not on any trips targeting other shark species.

Table 5.42 Shark Species Caught on Observed Bottom Longline Trips in the Sandbar Shark Research Fishery in the Gulf of Mexico and Southern Atlantic (2014)

Species	Total Caught (#)	Kept (%)	Discarded Dead (%)	Discarded Alive (%)	Disposition Unknown (%)
Sandbar shark	3,771	98.4	0.1	0.2	1.3
Tiger shark	325	52.0	0.9	45.8	1.2
Atlantic sharpnose shark	268	17.5	71.6	10.8	0.0
Dusky shark	248	0.0	8.9	91.1	0.0
Blacktip shark	243	96.3	2.9	0.0	0.8
Scalloped hammerhead shark	138	89.1	2.9	7.2	0.7
Great hammerhead shark	117	88.0	0.9	8.5	2.6
Nurse shark	86	0.0	0.0	100.0	0.0
Bull shark	84	94.0	0.0	0.0	6.0
Spinner shark	74	98.6	1.4	0.0	0.0
Blacknose shark	69	33.3	49.3	417.4	0.0
Lemon shark	65	95.4	0.0	1.5	3.1
Sand tiger shark	30	0.0	0.0	93.3	6.7
Silky shark	19	78.9	10.5	10.5	0.0
Hammerhead sharks	5	0.0	20.0	40.0	40.0
Requiem shark family	4	0.0	0.0	75.0	25.0
Finetooth shark	2	100.0	0.0	0.0	0.0
White shark	1	0.0	100.0	0.0	0.0
Total	5,549				

Source: Gulak et al. 2016

5.5.3 Bottom Longline Bycatch

For more detailed information on the fishery classification and requirements under the MMPA and the ESA, please see the Final Environmental Assessment prepared for Amendment 6 to the 2006 Consolidated HMS FMP. On July 3, 2014, NMFS issued the final determination to list the Central and Southwest Atlantic Distinct Population Segment (DPS) of scalloped hammerhead shark as a threatened species pursuant to the Endangered Species Act (ESA) (79 FR 38214). The Central and Southwest Atlantic DPS of scalloped hammerhead sharks occur within the management area of Atlantic HMS commercial and recreational fisheries which are managed by NMFS's Office of Sustainable Fisheries, HMS Management Division. On August 27, 2014, NMFS published a final rule to list seven 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 currently listed as threatened (*Acropora cervicornis* and *A. palmata*) remain listed as threatened.

Table 5.43 provides information on observed interactions with protected resources for BLL vessels targeting sharks in the Gulf of Mexico and Atlantic regions. In 2015, two smalltooth sawfish and four loggerhead sea turtles were observed in the Shark Research Fishery. All were released alive. No sea bird or marine mammal interactions were observed. No interactions with protected resources (sea bird, sea turtle, sawfish, or marine mammal) were observed for bottom

longline vessels fishing in the Gulf of Mexico and South Atlantic regions outside of the Shark Research Fishery (Enzenauer et al., 2016). Per the ITS in the 2012 biological opinion, the incidental take of listed sea turtles, smalltooth sawfish, or Atlantic sturgeon has not been exceeded over any 3-yr period.

Table 5.43 Protected Species Interactions Observed Bottom Longline Trips Targeting Sharks in the Gulf of Mexico and Atlantic Ocean (2007-2015)

Year	Sea Turtles	Sea Birds	Marine Mammals	Smalltooth Sawfish	Total
2007	4 (2A, 2D)	-	-	3 (2A, 1D)	7
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
Total	28 (U)	0	0	32 (U)	60

Letters in parentheses indicate whether the animal was released alive (A), dead (D), or unknown (U).

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 data also includes a summary of observations of the state gillnet fisheries that occur in coastal Louisiana, Mississippi, and Alabama from 2012 to 2015. These data are from the Gillnet Observer Program, which received additional funding to characterize fishing effort, catch and bycatch, and interactions with protected resources of gillnet vessels specifically in coastal Louisiana, Mississippi, and Alabama.

The overall gillnet effort targeting sharks by region is available from 2008 through 2015 (Table 5.44). 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. Also due to confidentiality concerns, the overall gillnet effort targeting sharks in state waters in Louisiana, Mississippi, and Alabama from 2012 through 2015 is not presented. Instead, a three-year summary of the effort is provided in section 5.6.2.

Table 5.44 Gillnet Gear Effort in the U.S. South Atlantic and Gulf of Mexico Regions Targeting Sharks (2008-2015)

Specifications	Region	2008	2009	2010	2011	2012	2013	2014	2015
Number of Vessels	Gulf of Mexico	C	C	C	3	3	C	C	C
	Atlantic	38	37	37	35	33	22	23	19
Number of Trips	Gulf of Mexico	C	C	C	43	46	C	C	C
	Atlantic	342	357	241	291	366	305	348	160
Average Sets per Trip	Gulf of Mexico	C	C	C	2.9	2.0	C	C	C
	Atlantic	1.9	1.9	1.6	1.6	1.5	1.1	1.0	2.1
Total Soak Time (Hours)	Gulf of Mexico	C	C	C	743.0	945.0	C	C	C
	Atlantic	1,264.4	1,093.9	827.5	763.5	1,074.5	849.0	1,148.5	537.8
Average Gillnet Length (Yards)	Gulf of Mexico	C	C	C	1,830.2	1,443.5	C	C	C
	Atlantic	782.7	879.9	871.1	757.7	844.4	761.0	771.6	725.6
Average Mesh Size (Inches, Stretched Mesh)	Gulf of Mexico	C	C	C	7.3	7.9	C	C	C
	Atlantic	5.6	5.3	5.8	4.7	4.8	5.0	5.2	5.2

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

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 fish 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.

Federal management of smoothhound sharks was implemented through Amendment 9 to the 2006 Consolidated HMS FMP (November 24, 2015; 80 FR 46217). Amendment 9 included a variety of smoothhound shark-specific measures, such as permit and observer requirements, but also included measures that affect the larger shark gillnet fishery. Specifically, Amendment 9 requires Atlantic shark and smoothhound shark permit holders using gillnet gear to limit soak times to 24 hours when using sink gillnet gear and conduct a net check at least every 2 hours when using drift gillnet gear. Additionally, fishermen with a federal directed Atlantic shark limited access permit and gillnet gear on board are required to use a vessel monitoring system only in the vicinity of the Southeast U.S. Monitoring Area (area from 27°51'N. lat. south to 26°46.5'N. lat., extending from the shoreline or exemption line out to 80°00' W. long). The measures in Amendment 9 became effective on March 15, 2016. Thus, the data presented in this chapter, which goes through 2015, does not yet include smoothhound gillnet fisheries in the northeast or mid-Atlantic regions.

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)) while 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 2015, a total of 225 sets comprised of various southeast gillnet fisheries were observed by the Southeast Gillnet Observer Program. A total of three strike gillnet fishery vessels were observed making five strike sets on eight trips in 2015. A total of 21 sink gillnet fishery vessels were observed making 220 sink net sets on 66 trips in 2015. Table 5.45 through Table 5.47 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 2015 (Mathers et al., 2015).

Table 5.45 Shark Species Caught on Observed Southeast Sink Gillnet Trips Targeting Spanish Mackerel (2015)

Species	Total Caught (#)	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose shark	102	1.0	76.5	22.6
Bonnethead shark	43	0.0	51.2	48.8
Blacktip shark	11	54.6	18.2	27.3
Smooth dogfish	9	0.0	100.0	66.7
Sandbar shark	6	0.0	100.0	0.0
Blacknose shark	1	0.0	100.0	11.1
Finetooth shark	1	0.0	100.0	0.0
Dusky shark	1	0.0	100.0	0.0
Requiem shark family	1	0.0	100.0	0.0
Spinner shark	2	50.0	50.0	0.0
Total	176			

Source: Mathers et al. 2015

Table 5.46 Shark Species Caught on Observed Southeast Sink Gillnet Trips Targeting Mixed Teleosts (2015)

Species	Total Caught (#)	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose shark	192	1.6	58.3	40.1
Bonnethead shark	6	0.0	50.0	50.0
Blacktip shark	4	100.0	0.0	0.0
Sand tiger shark	2	0.0	100.0	0.0
Blacknose shark	1	0.0	100.0	0.0
Finetooth shark	1	0.0	100.0	0.0
Total	206			

Source: Mathers et al. 2015

Table 5.47 Shark Species Caught on Observed Southeast Sink Gillnet Trips Targeting Mixed Sharks (2015)

Species	Total Caught (#)	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose shark	665	98.7	1.1	0.3
Blacknose shark	286	100.0	0.0	0.0
Smooth dogfish	62	100.0	0.0	0.0
Spinner shark	53	0.0	92.5	7.6
Bonnethead shark	14	100.0	0.0	0.0
Blacktip shark	8	0.0	100.0	0.0
Scalloped hammerhead shark	7	0.0	28.6	71.4
Requiem shark family	4	0.0	100.0	0.0
Finetooth shark	3	100.0	0.0	0.0
Sand tiger shark	3	0.0	100.0	0.0
Sandbar shark	2	0.0	100.0	0.0
Atlantic angel shark	2	0.0	100.0	0.0
Tiger shark	1	0.0	100.0	0.0
Bull shark	1	0.0	0.0	100.0
Total	1,111			

Source: Mathers et al. 2015

Table 5.48 Shark Species Caught on Observed Southeast Sink and Strike Gillnet Trips by Target Species (2015)

	Trip Type: Target Species			
Shark Species Caught	King Mackerel	Spanish Mackerel	Mixed Teleosts and Sharks	Total
Blacktip shark	1	11	12	24
Requiem shark family	-	-	4	4
Atlantic sharpnose shark	-	102	857	959
Bonnethead shark	-	43	20	63
Blacknose shark	-	1	287	288
Sand tiger shark	-	-	5	5
Spinner shark	-	2	53	55
Smooth dogfish	-	9	62	71
Scalloped hammerhead shark	-	-	7	7
Sandbar shark	-	6	2	8
Spiny dogfish	-	-	-	0
Finetooth shark	-	1	4	5
Dusky shark	-	1	-	1
Atlantic angel shark	-	-	2	2
Tiger shark	-	-	1	1
Bull shark	-	-	1	1
Total	1	176	1,317	1,494

Source: Mathers et al. 2015

Summary of Catch, Landings, and Discards of the Gillnet Fisheries in Louisiana, Mississippi and Alabama State Waters from 2012 to 2015

A total of 63 trips comprised of 160 strike gillnet sets on 28 vessels were observed between November 2012 and December 2015. Trips were made in state waters and targeted one or more of the following: Florida pompano, *Trachinotus carolinus*; in Alabama, Spanish mackerel, *Scomberomorus maculates*, striped mullet, *Mugil cephalus*, and mixed teleosts (including ladyfish, *Elops saurus*, silver mullet, *Mugil curema*, little tunny, *Euthynnus alletteratus*, Gulf menhaden, *Brevoortia patronus*, and Florida pompano). A total of 12 strike gillnet fishery vessels were observed making 75 strike sets on 27 trips targeting Spanish mackerel. A total of 19 trips totaling 56 sets on 9 vessels were observed targeting striped mullet using strike gillnets. A total of 17 trips totaling 29 sets on 7 vessels were observed targeting mixed teleosts using strike gillnets.

A total of 30 trips totaling 76 sink net sets on 13 vessels were observed between November 2012 and December 2015. Trips were made in state waters and targeted one or more of the following, all in Alabama: Spanish mackerel, *Scomberomorus maculates*, striped mullet, *Mugil cephalus*, and mixed teleosts (including flounders *Paralichthys sp.* and sheepshead *Archosargus probatocephalus*). A total of 21 trips totaling 40 sets on 8 vessels were observed targeting Spanish mackerel using sink gillnets. Three gillnet fishery vessels were observed making 30 sets on five trips targeting striped mullet using sink gillnets. Table 5.49 through Table 5.52 of this section outline shark species composition, disposition, and summary information for sharks caught during observed sink, strike and trammel gillnet trips with observers onboard in Louisiana, Mississippi and Alabama from 2012 to 2015 (Mathers et al. 2015a).

Table 5.49 Shark Species Caught on Observed Strike Gillnet Trips Targeting Spanish Mackerel in Louisiana, Mississippi and Alabama State waters (2012-2015)

Species	Total Caught (#)	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose shark	116	49.1	47.4	3.5
Finetooth shark	24	62.5	37.5	0.0
Spinner shark	24	33.3	62.5	4.2
Blacktip shark	16	62.5	37.5	0.0
Requiem shark family	13	0.0	100.0	0.0
Blacknose shark	5	100.0	0.0	0.0
Smooth dogfish	2	0.0	100.0	0.0
Bonnethead shark	1	100.0	0.0	0.0
Total	201			

Source: Mathers et al. 2015a

Table 5.50 Shark Species Caught on Observed Strike Gillnet Trips Targeting Mixed Teleosts in Louisiana, Mississippi and Alabama State waters (2012-2015)

Species	Total Caught (#)	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose shark	45	2.2	75.6	22.2
Finetooth shark	25	4.0	96.0	0.0
Blacktip shark	19	5.3	89.5	5.3
Spinner shark	4	25.0	75.0	0.0
Bull shark	2	50.0	50.0	0.0
Total	95			

Source: Mathers et al. 2015a

Table 5.51 Shark Species Caught on Observed Sink Gillnet Trips Targeting Spanish Mackerel in Louisiana, Mississippi and Alabama State waters (2012-2015)

Species	Total Caught (#)	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose shark	79	60.8	36.7	2.5
Blacktip shark	15	86.7	13.3	0.0
Blacknose shark	3	100.0	0.0	0.0
Finetooth shark	2	100.0	0.0	0.0
Spinner shark	1	10.00	0.0	0.0
Total	100			

Source: Mathers et al. 2015a

Table 5.52 Shark Species Caught on Observed Trammel Gillnet Trips Targeting Florida Pompano in Louisiana, Mississippi and Alabama State Waters (2012-2015)

Species	Total Caught (#)	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Blacktip shark	12	0.0	58.3	41.7
Bonnethead shark	8	0.0	0.0	100.0
Atlantic sharpnose shark	2	0.0	0.0	100.0
Lemon shark	2	0.0	100.0	0.0
Sand tiger shark	1	0.0	100.0	0.0
Sharks	1	0.0	100.0	0.0
Total	25			

Source: Mathers et al. 2015a

5.6.3 Gillnet Bycatch

This section describes the non-shark bycatch observed in the southeast sink gillnet fishery during trips targeting mixed sharks (Mathers et al., 2015).

There was a wider range of fish species caught in the sink gillnet fisheries due to the number of sets observed, gear deployment methods, and targeted species. Predominant species caught in sink gillnets included Atlantic menhaden, Spanish mackerel, Southern kingfish, and Atlantic

butterfish. All of the observed interactions with protected species between 2000 and 2015 in the observed gillnet fisheries are on Table 5.53.

Sea Turtles and Sea Birds

There were no sea turtles or sea birds observed caught in sink gillnet gear in 2015 (Mathers et al. 2015).

One Kemp's ridley sea turtle was caught with sink gillnet gear in state waters between 2012 and 2015. The turtle was caught and released alive (Mathers et al. 2015a).

Marine Mammals

The MMPA Category II classification refers to occasional serious injuries and mortalities. In 2015, there were no observed interactions with marine mammals in gillnet gear (Mathers et al. 2015).

Smalltooth Sawfish and Atlantic Sturgeon

In 2015, 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 the high rate of observer coverage in these gillnet fisheries consistent with Atlantic Large Whale Take Reduction Plan (ALWTRP); NMFS believes that smalltooth sawfish and Atlantic sturgeon interactions in this fishery are rare.

Table 5.53 Protected Species Interactions in the Shark Gillnet Fishery Targeting Mixed Sharks Other than Smoothhounds (2007-2015)

Year	Sea Turtles	Sea Birds	Marine Mammals	Smalltooth Sawfish	Atlantic Sturgeon	Total
2007	4 (3A, 1D)	-	-	-	-	4
2008	-	-	-	-	-	0
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
Total	9	2	1	0	0	13

Letters in parentheses indicate whether the animal was released alive (A) or dead (D).

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 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 PLL gear and no J-hooks may be possessed onboard a PLL vessel unless green-stick gear is also onboard. J-hooks possessed and used onboard PLL 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. An unknown portion of these landings were made with green-stick gear as the gear has been used in the Atlantic tuna fisheries since the mid-1990s. Reporting mechanisms that are in place do not enable the number of vessels using green-stick gear to be quantified; although, limited data allow the catch to be characterized and were presented in the 2008 SAFE Report (NMFS 2008). Data on landings specific to green-stick gear are expected to improve because a green-stick gear code was designated for use in dealer reporting systems such as trip tickets in the southeast and electronic reporting programs in the northeast. NMFS has, with some success, also encouraged states to utilize the green-stick gear code in their trip ticket programs. Beginning in 2013, the HMS e-Dealer electronic reporting system was required to be used by Atlantic HMS dealers and Table 5.54 presents greenstick landings data from this system.

Table 5.54 Select Landings with Greenstick Gear (lb ww, 2013-2015)

Species	Region	2013	2014	2015
Yellowfin tuna	Atlantic	43,175	57,064	44,673
	Gulf of Mexico	19,212	1,082	0

Additional landings of other species have occurred, but cannot be displayed due to confidentiality requirements.
Source: Atlantic HMS Electronic Dealer Reporting System

NMFS and the Louisiana Department of Wildlife and Fisheries investigated the catch and bycatch of green-stick gear during 2012-2015 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 NMFS Atlantic HMS Management Division.

5.8 Safety Issues

The following section highlights safety issues in fisheries. The USCG maintains websites for each of its regions (http://www.uscg.mil/top/units/), many of which provide regulatory and safety information, and region-specific statistics. A summary of previous findings was published in Section 4.9 of the 2011 HMS SAFE Report.

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 notes that the fishing industry has one of the highest

mortality rates (104.4)[1] and indices of relative risk (21.3)[2] of the country professions (http://www.bls.gov/iif/oshwc/cfar0020.pdf). Bureau of Labor Statistics data indicates that there were 24 fatalities in the fishing industry in 2014 (inclusive of finfish and shellfish fishing) (http://www.bls.gov/iif/oshcfoi1.htm#2014). Statistical data on vessel safety may also be obtained from the U.S. Coast Guard (USCG), including (1) "Analysis of Fishing Vessel Casualties – A Review of Lost Fishing Vessels and Crew Fatalities 1992-2010" (Dickey 2011) and (2) USCG Safety Program (http://www.uscgboating.org).

The National Institute for Occupational Safety and Health (NIOSH) Western States Division office in Alaska has completed studies of fishing safety to reduce the incidence of injury and fatality among U.S. fishermen. The NIOSH website presents research, evaluations and recommendations regarding the greatest dangers to fishermen: vessel disasters, falls overboard, and deck machinery (http://www.cdc.gov/niosh/topics/fishing/).

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, NMFS finalized a Technical Memorandum titled "Guidance on Fishing Vessel Risk Assessments and Accounting for Safety at Sea in Fishery Management Design" which provides two tools, a safety checklist, and a risk assessment, which can be used by fishery managers to evaluate safety within fisheries, determine whether proposed management measures create a safety concern, and develop solutions for reducing risk and improving safety. NMFS will include these factors in future actions to ensure safety at sea is appropriately considered.

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 Coast Guard and Maritime Transportation Act of 2012 included several new regulations that were implemented between 2013 and 2016. A summary of new requirements is at https://www.uscg.mil/d13/cfvs/PDFs/MSIB_CFVSReq.pdf.

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 has more than 16 individuals on board;
- **Vessels that are 79 feet or longer** must be assigned a load line if operated outside the Boundary line.

[1] Fatality rate = ((Fatal work injuries/employment) x 100,000 workers) Employment based on 1995 CPS.

[2] Index of Relative Risk = Fatality Rate for a given group / Fatality rate for all workers.

Beginning October 15, 2015, the USCG required that all commercial fishing vessels that operate or transit more than 3 nautical miles off shore be fully compliant with existing fishing vessel safety regulations (46 CFR 41 - 47, Subchapter E, "Load Lines"). To meet this requirement, all commercial fishing vessels are required to complete biennial dockside safety examinations. More information on the this requirement can be found at the USCG Commercial Fishing Safety website: http://www.uscg.mil/d13/cfvs/.

The Coast Guard Authorization Act of 2015 was signed into law on February 8, 2016, amending language in Section 301 of the 2015 Coast Guard Authorization Act (CGAA). These amendments removed the language in 46 U.S.C. §3104 that prevented the Coast Guard from approving in-water survival craft (e.g., life floats and rigid buoyant apparatus) for all vessels that fall under Title 46 U.S.C. Part B, which includes uninspected commercial fishing vessels. Therefore, in-water survival craft approvals may resume and commercial fishing vessels may continue to use their existing in-water survival craft as specified in 46 Code of Federal Regulations (CFR) Part 28. However, the Coast Guard highly recommends that owners and operators transition to out-of-water survival craft for the safety of their personnel. For more information, go to https://www.uscg.mil/msib/docs/004_16_2-18-2016.pdf.

An additional notice of proposed rulemaking was published on June 21, 2016 to further align commercial fishing vessel regulations with The Coast Guard Authorization Act of 2010 and the Coast Guard and Maritime Transportation Act of 2012. The alignments would change the applicability of current regulations, and add new requirements for safety equipment, vessel examinations, vessel safety standards, the documentation of maintenance, and the termination of unsafe operations. The Coast Guard extended the public comment period through December 18, 2016 (81 FR 53986).

The U.S. Coast Guard maintains a blog, the Coast Guard Maritime Commons, which provides safety alerts, news bulletins, and regulatory information: http://mariners.coastguard.dodlive.mil/

5.8.2 Recreational Fisheries

Safety at Sea is not just an issue for commercial fisheries. Recreational boating statistics are published annually by the United States Coast Guard Office of Auxiliary and Boating Safety (USCG 2016). The following summarizes recreational boating statistics, inclusive of recreational fishing activities:

- The Coast Guard reported 4,158 accidents involving 626 deaths, approximately 42 million dollars in damages, and 2,613 injuries as a result of recreational boating accidents.
- The fatality rate for 2015 was 5.3 deaths per 100,000 registered recreational vessels. Most fatalities are associated with drowning, and 85 percent of drowning victims were not wearing a life jacket at the time of fatality.
- Alcohol use is the leading contributing factor in fatal boating accidents where the primary cause is known. Other primary contributing factors in accidents included operator inattention, operator inexperience, improper lookout, machinery failure, and excessive speed.

- From a summary of accident reports, approximately 614 vessels were engaged in fishing activities at the time of accidents which resulting in 191 deaths and 226 injuries.

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.

5.9 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 5.55 - Table 5.60) of Atlantic HMS landings are taken from the 2016 National Report of the United States to ICCAT (NMFS 2016). Landings for sharks (Table 5.61- Table 5.67) were updated based on 2015 landings from eDealer.

Table 5.55 U.S. Landings (mt) of Atlantic Bluefin Tuna, by Area and Gear (2011-2015)

Area	Gear	2011	2012	2013	2014	2015
NW Atlantic	Longline**	216.3	189.4	153.0	171.7	70.8
	Handline	0.9	1.3	0.5	0.0	0.0
	Purse seine	0.0	1.7	42.5	41.8	38.8
	Harpoon	70.1	52.3	45.0	67.5	77.1
	Commercial rod and reel	419.5	419.5	249.5	378.9	581.4
	Recreational rod and reel	148.6	148.7	131.4	99.6	112.9
	Trawl	0.4	0.0	0.0	0.0	0.0
Gulf of Mexico	Longline	13.2	101.2	33.5	41.3	6.9
NC Area 94a	Longline	11.3	3.9	3.5	8.9	8.3
Caribbean	Longline	0.6	0.9	0.4	0.0	0.0
All areas	All gears	904.7	919.0	658.9	810.0	896.2

Source: NMFS, 2016.

Table 5.56 U.S. Landings (mt) of Atlantic Yellowfin Tuna, by Area and Gear (2011-2015)

Area	Gear	2011	2012	2013	2014	2015
NW Atlantic	Longline	684.1	873.7	539.9	664.9	551.3
	Rod and reel*	1,133.8	1,433.0	495.4	997.8	795.6
	Troll	0.5	0.3	30.1	28.7	21.0
	Gillnet	0.06	1.5	0.8	1.3	0.7
	Trawl	1.3	0.2	0.0	0.3	0.0
	Handline	34	66.0	66.4	47.4	57.8
	Trap	0.0	0.0	0.0	0.0	0.0
	Unclassified	4.2	4.5	2.1	28.5	12.6
Gulf of Mexico	Longline	642.1	1,251.0	834.9	701.2	491.0
	Rod and reel*	362.8	294.1	191.8	53.2	134.0
	Handline	8.7	175	0.0	9.7	1.9
	Unclassified	0.1	8.7	0.0	0.0	0.0
Caribbean	Longline	132.1	141.9	169.6	78.7	2.6
	Handline	1.5	3.2	0.6	0.6	0.6
	Gillnet	0.0	0.0	0.0	0.0	0.0
	Rod and reel*	0.9	0.0	0.0	15.8	6.7
NC Area 94a	Longline	0.0	3	0.0	1.7	1.8
SW Atlantic	Longline	-	-	-	-	-
All areas	All gears	3,010.4	4,099.5	2,331.6	2,629.8	2,076.3

* Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. ** ≤ 0.05 mt. Source: NMFS 2016

Table 5.57 U.S. Landings (mt) of Atlantic Skipjack Tuna, by Area and Gear (2011-2015)

Area	Gear	2011	2012	2013	2014	2015
NW Atlantic	Longline	0.4	0.3	0.5	0.3	0.2
	Rod and reel*	50.3	98.0	37.7	46.0	32.7
	Gillnet	0.04	1.6	0.27	6.7	0.2
	Trawl	0.0	0.006	0.0	0.0	0.07
	Handline	1.5	2.0	0.8	0.05	0.2
	Troll	0.0	0.0	0.0	1.1	0.8
	Unclassified	0.8	0.6	0.7	2.3	0.2
Gulf of Mexico	Longline	0.2	0.0	0.0	0.01	0.0
	Rod and reel*	23.7	0.06	77.1	9.8	35.7
	Handline	0.2	2.5	0.02	0.01	0.0
Caribbean	Longline	0.0	0.1	0.0	0.0	0.0
	Gillnet	0.0	-	0.0	0.0	0.0
	Rod and reel*	3.0	3.0	0.0	9.4	7.2
	Handline	4.5	4.0	0.0	0.7	0.5
	Trap	-	1.0	-	-	-
All areas	All gears	86.7	112.2	117.5	76.4	77.8

* 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 2016.

Table 5.58 U.S. Landings (mt) of Atlantic Bigeye Tuna, by Area and Gear (2011-2015)

Area	Gear	2011	2012	2013	2014	2015
NW Atlantic	Longline	397.2	564.9	490.9	573.3	571.6
	Gillnet	0.0	0.2	0.06	0.08	0.5
	Rod and reel*	72.4	269.6	337.5	251.0	198.0
	Troll	0.9	0.2	5.0	4.5	5.4
	Handline	3.4	7.9	15.9	13.4	49.2
	Trawl	1.2	0.2	0.0	0.0	0.09
	Unclassified	4.7	7.3	6.2	4.7	3.2
Gulf of Mexico	Longline	2.2	13.5	9.2	7.1	9.1
	Rod and reel*	34.9	0.1	7.0	0.0	0.02
	Handline	0.0	0.0	0.0	0.0	0.0
	Unclassified	0.0	0.4	0.0	0.0	0.0
Caribbean	Longline	0.0	0.002	8.6	3.9	0.9
	Rod and reel*	2.3	0.0	0.0	1.4	0.5
	Handline	0.05	0.0	0.0	0.0	0.0
NC Area 94a	Longline	-	-	-	-	-
SW Atlantic	Longline	200.8	3.1	0.2	0.0	0.0
All areas	All gears	718.7	867.4	880.6	859.4	838.5

* 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 2016.

Table 5.59 U.S. Landings (mt) of Atlantic Albacore Tuna, by Area and Gear (2011-2015)

Area	Gear	2011	2012	2013	2014	2015
NW Atlantic	Longline	138.2	157.7	139.9	150.5	84.5
	Gillnet	0.2	5.7	0.02	3.6	0.5
	Handline	1.7	0.6	2.3	2.2	2.6
	Trawl	2.0	0.3	0.0	0.0	1.7
	Trap	0.0	0.0	0.0	0.0	0.0
	Troll	0.0	0.0	0.2	0.2	0.0
	Rod and reel*	170.6	144.3	340.3	136.6	12.9
	Unclassified	7.8	4.4	0.6	6.8	0.03
Gulf of Mexico and Caribbean	Longline	101.8	103.5	115.4	158.3	145.3
	Rod and reel*	0.0	0.7	0.0	0.0	0.2
	Handline	0.1	0.5	0.02	0.07	0.0
NC Area 94a	Longline	-	-	-	-	-
SW Atlantic	Longline	-	-	-	-	-
All areas	All gears	422.4	417.7	598.7	458.1	247.8

* 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 2016.

Table 5.60 U.S. Catches and Landings (mt ww) of Atlantic Swordfish, by Area and Gear (2011-2015)

Area	Gear	2011	2012	2013	2014	2015
NW Atlantic	Longline*	1,741.8	1,987.0	1,720.5	1,205.6	1,091.0
	Gillnet	0.0	0.0	0.0	0.0	0.0
	Handline	120.4	151.3	104.8	80.9	70.7
	Trawl	17.9	26.8	2.9	5.7	2.9
	Harpoon	0.6	0.3	0.5	0.0	0.0
	Rod and reel**	48.7	64.3	21.7	34.4	45.0
	Unclassified	0.0	0.5	1.6	0.09	0.09
	Unclassified discards	5.8	3.6	0.0	0.0	0.0
Gulf of Mexico	Longline*	363.6	673.3	531.6	300.9	127.4
	Handline	0.5	3.3	0.5	6.7	5.4
	Rod and reel**	4.9	6.3	0.3	1.0	1.0
	Unclassified discards	2.5	6.8	0.0	0.0	-
Caribbean	Longline*	14.2	3.7	20.8	0.2	8.8
	Rod and reel**	0.0	0.2	0.0	0.0	0.0
	Handline	0.0	0.0	0.0	0.3	0.2
	Unclassified discards	0.9	0.0	0.0	0.0	0.0
NC Atlantic	Longline*	451.3	682.6	539.1	309.0	369.0
	Handline	0.0	0.0	.0.0	0.0	0.2
SW Atlantic	Longline*	0.0	0.0	0.06	0.0	0.0
All areas	All gears	2,773.7	3,609.6	2,944.4	1,945.2	1,721.9

* 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 2016.

Table 5.61 Commercial Landings of Large Coastal Sharks in the Atlantic Region (lb dw, 2010-2015)

Large Coastal Sharks	2010	2011	2012	2013	2014	2015
Aggregated Large Coastal Sharks						
Blacktip	246,617	176,136	215,403	256,277	282,009	229,823
Bull	56,901	49,927	24,504	33,980	32,372	33,737
Lemon	25,316	45,448	21,563	16,791	13,047	18,158
Nurse	71	0	81	0	0	24
Silky	1,049	992	29	186	289	1,246
Spinner	13,544	4,113	10,643	26,892	25,716	33,002
Tiger	43,145	36,425	23,245	16,561	29,062	28,460
Total Aggregated LCS carcass weight	386,643 (175 mt dw)	313,041 (142 mt dw)	295,468 (134 mt dw)	350,687 (159 mt dw)	464,803 (211 mt dw)	334,450 (156 mt dw)
Hammerhead Sharks						
Hammerhead, great	0	0	371	7,406	13,538	36,892
Hammerhead, scalloped	0	0	15,800	27,229	24,652	13,197
Hammerhead, smooth	7,802	110	3,967	1,521	601	304
Hammerhead, unclassified	43,345	35,618	9,617	0	0	0
Total Hammerhead carcass weight	51,147 (23 mt dw)	35,728 (16 mt dw)	29,755 (13 mt dw)	36,156 (16 mt dw)	38,791 (18 mt dw)	50,393 (23 mt dw)
Shark Research Fishery						
Sandbar*	84,339 (38 mt dw)	94,295 (43 mt dw)	46,446 (21 mt dw)	46,868 (21 mt dw)	82,308 (37 mt dw)	112,610 (51 mt dw)
Unclassified Sharks						
Unclassified, assigned to LCS	2,229 (1 mt dw)	50,711 (23 mt dw)	53,705 (24 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total LCS carcass weight	524,358 (238 mt dw)	493,775 (224 mt dw)	425,374(193 mt dw)	433,711 (197 mt dw)	585,887 (266 mt dw)	620,028 (281 mt dw)

*Some unauthorized non-shark research fishery sandbar shark landings exist. Sources: 2009-2012 PDC (Pelagic Dealer Compliance) and ALS (Accumulated Landings System); 2013-2015 eDealer

Table 5.62 Commercial Landings of Large Coastal Sharks in the Gulf of Mexico Region (lb dw, 2010-2015)

Large Coastal Sharks	2010	2011	2012	2013	2014	2015
Blacktip sharks						
Blacktip	654,942 (297 mt dw)	384,662 (174 mt dw)	405,015 (184 mt dw)	531,440 (241 mt dw)	444,812 (202 mt dw)	644,058 (292 mt dw)
Aggregated Large Costal Sharks						
Bull	165,894	178,595	255,892	279,379	259,825	274,195
Lemon	21,081	38,132	29,362	12,869	5,259	13,023
Nurse	0	27	11	0	0	62
Silky	270	643	0	1,714	7	612
Spinner	78,951	66,996	49,647	68,576	61,607	43,185
Tiger	8,825	21,594	26,209	14,062	16,796	18,536
Total Aggregated LCS carcass weight	275,021 (125 mt dw)	305,987 (139 mt dw)	361,121 (164 mt dw)	376,600 (171 mt dw)	343,494 (156 mt dw)	349,613 (159 mt dw)
Hammerhead Sharks						
Hammerhead, great	6,339	49	99	28,591	29,783	33,439
Hammerhead, scalloped	0	0	33,216	1,101	5,299	6,290
Hammerhead, smooth	0	0	0	0	0	0
Hammerhead, unclassified	51,149	68,709	8,005	0	0	0
Total Hammerhead carcass weight	57,488 (26 mt dw)	68,758 (31 mt dw)	41,320 (19 mt dw)	29,692 (13 mt dw)	35,082 (16 mt dw)	39,729 (18 mt dw)
Shark Research Fishery						
Sandbar*	54,914 (25 mt dw)	46,040 (21 mt dw)	23,854 (19 mt dw)	37,582 (13 mt dw)	38,036 (17 mt dw)	53,250 (24 mt dw)
Unclassified Shark						
Unclassified, assigned to LCS	0 (0 mt dw)	169,651	188,566	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total LCS carcass weight	1,042,365 (473 mt dw)	975,098 (442 mt dw)	1,019,876 (463 mt dw)	975,314 (442 mt dw)	661,424 (300 mt dw)	1,086,650 (493 mt dw)

*Unauthorized non-shark research fishery sandbar shark landings are included. Sources: 2009-2012 PDC and ALS; 2013-2015 eDealer

Table 5.63 Commercial Landings of Small Coastal Sharks in the Atlantic Region (lb dw, 2010-2015)

	2010	2011	2012	2013	2014	2015
Blacknose Sharks						
Blacknose	30,287 (14 mt dw)	28,373 (13 mt dw)	37,873 (17 mt dw)	33,382 (15 mt dw)	38,437 (17 mt dw)	45,405 (21 mt dw)
Non-Blacknose Small Coastal Sharks						
Bonnethead	9,069	28,284	19,907	22,845	13,221	5,885
Finetooth	76,438	52,318	15,922	19,452	19,026	8,712
Sharpnose, Atlantic	211,190	214,382	345,625	183,524	198,568	293,128
Total Non-Blacknose SCS carcass weight	296,697 (135 mt dw)	294,984 (134 mt dw)	381,454 (173 mt dw)	225,821 (102 mt dw)	230,815 (105 mt dw)	307,725 (140 mt dw)
Unclassified Shark						
Unclassified, assigned to small coastal	851 (1 mt dw)	36,639 (17 mt dw)	492 (1 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total SCS carcass weight	327,835 (149 mt dw)	359,996 (163 mt dw)	419,819 (190 mt dw)	259,203 (118 mt dw)	269,252 (122 mt dw)	353,130 (160 mt dw)

Sources: 2010-2012 PDC and ALS; 2013-2015 eDealer.

Table 5.64 Commercial Landings of Small Coastal Sharks in the Gulf of Mexico Region (lb dw, 2010-2015)

	2010	2011	2012	2013	2014	2015
Blacknose Sharks						
Blacknose	4,204 (2 mt dw)	3,900 (2 mt dw)	14,379 (7 mt dw)	2,009 (1 mt dw)	3,160 (1 mt dw)	2,096 (1 mt dw)
Non-Blacknose Small Coastal Sharks						
Bonnethead	2,672	12,986	2,601	4,436	8,391	968
Finetooth	45,001	159,558	130,278	60,118	64,023	60,169
Sharpnose, Atlantic	17,958	53,723	100,253	116,133	89,674	137,121
Total Non-Blacknose SCS carcass weight	65,631 (30 mt dw)	226,267 (103 mt dw)	233,132 (106 mt dw)	180,687 (82 mt dw)	162,088 (74 mt dw)	198,258 (90 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)	0 (0 mt dw)	0 (0 mt dw)
Total SCS carcass weight	69,835 (32 mt dw)	230,167 (104 mt dw)	247,511 (112 mt dw)	182,695 (83 mt dw)	165,248 (75 mt dw)	200,354 (91 mt dw)

Sources: 2010-2012 PDC and ALS; 2013-2015 eDealer.

Table 5.65 Commercial Landings of Atlantic Pelagic Sharks (lb dw, 2010-2015)

Pelagic Sharks	2010	2011	2012	2013	2014	2015
Blue Sharks						
Blue	9,135 (4.1 mt dw)	13,370 (6.1 mt dw)	17,200 (7.8 mt dw)	9,767 (4.4 mt dw)	17,806 (8 mt dw)	1,114 (1 mt dw)
Porbeagle Sharks						
Porbeagle	4,097 (1.9 mt dw)	5,933 (2.7 mt dw)	4,250 (1.9 mt dw)	54 (1 mt dw)	6,414 (3 mt dw)	0 (0 mt dw)
Pelagic Sharks Other Than Blue or Porbeagle						
Mako, shortfin	220,400	207,630	198,841	199,177	218,295	141,720
Mako, unclassified	0	0	0	0	0	0
Oceanic whitetip	796	2,435	258	62	22	0
Thresher	61,290	47,462	63,965	48,768	116,012	72,463
Total Other Pelagic carcass weight	282,486 (128 mt dw)	257,527 (117 mt dw)	263,064 (119 mt dw)	248,007 (112 mt dw)	334,329 (152 mt dw)	214,183 (97 mt dw)
Unclassified Shark						
Unclassified, assigned to pelagic	16,160 (7 mt dw)	33,884 (15 mt dw)	28,932 (13 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total Pelagic carcass weight	311,878 (141 mt dw)	310,714 (141 mt dw)	313,446 (142 mt dw)	257,828 (117 mt dw)	358,549 (163 mt dw)	215,297 (98 mt dw)

Sources: 2010-2012 PDC and ALS; 2013-2015 eDealer.

Table 5.66 Commercial Landings of Shark Fins (lb dw, 2010-2015)

Fins	2010	2011	2012	2013	2014	2015
Atlantic Large Costal Shark and Small Coastal Shark Fins						
Blacktip	0	0	0	2,047	288	177
Bull	0	0	0	23	120	14
Hammerhead, great	0	0	0	82	518	272
Hammerhead, scalloped	0	0	0	7	0	6
Hammerhead, smooth	0	0	0	0	0	11
Lemon	0	0	0	1,457	0	0
Spinner	0	0	0	3	0	0
Tiger	0	0	0	134	5	3
Unclassified LCS	20,545	21,535	15,370	0	0	0
Blacknose	0	0	0	3	4	15
Bonnethead	0	0	0	315	1	14
Finetooth	0	0	0	91	0	0
Sharpnose, Atlantic	0	0	0	202	2	6
Unclassified SCS	0	0	0	0	0	0
Unclassified	0	0	0	16,609	19,868	20,824
Total Atlantic Fin weight	20,545 (9 mt dw)	21,535 (10 mt dw)	15,370 (7 mt dw)	20,973 (10 mt dw)	20,806 (9 mt dw)	21,342 (10 mt dw)
Gulf of Mexico Large Costal Shark and Small Coastal Shark Fins						
Blacktip	0	0	0	20,939	16,141	23,819
Bull	0	0	0	12,019	10,132	12,996
Hammerhead, great	0	0	0	220	351	729
Hammerhead, scalloped	0	0	0	3	44	45
Lemon	0	0	0	61	23	110
Silky	0	0	0	58	0	0
Spinner	0	0	0	2,463	1,833	1,015
Tiger	0	0	0	76	150	40
Unclassified LCS	45,425	40,768	40,693	0	0	0
Bonnethead	0	0	0	14	196	28
Finetooth	0	0	0	2,866	2,092	1,593
Sharpnose, Atlantic	0	0	0	277	10	249
Unclassified SCS	0	0	0	0	0	0
Unclassified	0	0	0	6,103	6,209	8,955
Total Gulf of Mexico Fin weight	45,425 (21 mt dw)	40,768 (18 mt dw)	40,693 (18 mt dw)	45,099 (20 mt dw)	37,256 (17 mt dw)	49,579 (22 mt dw)
Pelagic Shark Fins						
Mako, shortfin	0	0	0	1,303*	451	1,119
Porbeagle	0	0	0	2*	0	0
Thresher	0	0	0	1,638	512	405
Unclassified Pelagic	0	0	0	0	0	0
Total Pelagic Fin weight	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	3,151 (1 mt dw)	963 (1 mt dw)	1,524 (1 mt dw)
Total Fin weight	65,970 (30 mt dw)	62,303 (28 mt dw)	56,063 (25 mt dw)	69,187 (30 mt dw)	59,025 (27 mt dw)	72,445 (33 mt dw)

* NMFS determined that the porbeagle shark fins should have been reported as shortfin mako fins after the 2014 SAFE Report was published. Sources: 2010-2012 PDC and ALS; 2013-2015 eDealer.

Table 5.67 Commercial Landings of Prohibited Shark Species (lb dw, 2010-2015)

Prohibited Sharks	2010	2011	2012	2013	2014	2015
Previously Large Coastal and Small Coastal Sharks Landed in Atlantic						
Basking[2]	0	0	0	0	0	0
Bignose[1]	0	0	0	0	0	0
Bigeye sand tiger[2]	0	0	0	0	0	0
Caribbean reef[1]	0	0	0	0	0	0
Dusky[1]	0	14	172	0	0	0
Galapagos[1]	0	0	0	0	0	0
Narrowtooth[1]	0	0	0	0	0	0
Night[1]	0	0	0	0	0	0
Sand tiger[2]	18	20	66	0	0	0
Whale[2]	0	0	0	0	0	0
White[2]	0	0	0	0	0	0
Atlantic angel[1]	96	11	171	0	0	0
Sharpnose, Caribbean[1]	0	0	0	38	0	0
Total Atlantic carcass weight	114 (1 mt dw)	45 (1 mt dw)	409 (1 mt dw)	38 (1 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Previously Large Coastal and Small Coastal Sharks Landed in Gulf of Mexico						
Basking[2]	0	0	0	0	0	0
Bignose[1]	0	0	109	0	0	0
Bigeye sand tiger[2]	0	0	0	0	0	0
Caribbean reef[1]	0	0	0	0	0	0
Dusky[1]	0	0	0	0	0	0
Galapagos[1]	0	0	0	0	0	0
Narrowtooth[1]	0	0	0	0	0	0
Night[1]	0	208	0	0	0	0
Sand tiger[2]	0	0	0	0	0	0
Whale[2]	0	0	0	0	0	0
White[2]	0	27	0	0	0	0
Atlantic angel[1]	0	0	0	0	0	0
Sharpnose, Caribbean[1]	0	0	0	0	0	0
Total Gulf of Mexico carcass weight	0 (0 mt dw)	235 (1 mt dw)	109 (1 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Previously Pelagic Sharks						
Bigeye thresher[1]	28	135	276	0	0	0
Bigeye sixgill[1]	0	0	0	0	0	0
Mako, longfin[1]	289	3,465	362	112	147	0
Sevengill[1]	0	0	0	0	0	0
Sixgill[1]	0	0	0	0	0	0
Total Pelagic carcass weight	317 (<1 mt dw)	3,600 (2 mt dw)	638 (<1 mt dw)	112 (<1 mt dw)	147 (<1 mt dw)	0 (0 mt dw)
Total Prohibited carcass weight	431 (<1 mt dw)	3,880 (2 mt dw)	1,156 (<1 mt dw)	150 (<1 mt dw)	147 (<1 mt dw)	0 (0 mt dw)

[1] Prohibited in the commercial fishery as of June 21, 2000. [2] Prohibited since April 1997. Sources: 2010-2012 PDC and ALS; 2013-2015 eDealer reports

Chapter 5 References

Arocha, F. 1997. The reproductive dynamics of swordfish Xiphias gladius L. and management implications in the northwestern Atlantic. University of Miami, Ph.D. Dissertation. Coral Gables, FL. 383 p.

Cramer, J. and H. Adams. 2000. Large pelagic logbook newsletter:1998. NOAA Technical Memorandum. NMFS-SEFSC-433. 25 p.

Dickey DH. 2011. Analysis of Fishing Vessel Casualties: A Review of Lost Fishing Vessels and Crew Fatalities, 1992-2010. United States Coast Guard, Office of Investigations and Analysis. https://www.uscg.mil/history/docs/marinesafety/FVStudy1992-2010.pdf

FAO. 2015. Fisheries operations. Best practices to improve safety at sea in the fisheries sector. FAO Technical Guidelines for Responsible Fisheries No 1, Suppl. 3. Rome. 196 p.

Garrison, L.P and L. Stokes. 2014. Estimated bycatch of marine mammals and sea turtles in the U.S. Atlantic pelagic longline fleet during 2013. NOAA Technical Memorandum NMFS-SEFSC-667: 61 p.

Garrison, L.P and Stokes, L. 2013. Estimated bycatch of marine mammals and sea turtles in the U.S. Atlantic pelagic longline fleet during 2012. NOAA Technical Memorandum NOAA NMFS-SEFSC-655: 62 p.

Garrison, L.P. and L. Stokes. 2012. Estimated bycatch of marine mammals and sea turtles in the U.S. Atlantic pelagic longline fleet during 2011. NOAA Technical Memorandum NMFS-SEFSC-632, 61 p.

Gulak, S.J.B., M.P. Enzenauer, and J.K. Carlson. 2014. Characterization of the shark bottom longline fishery, 2013. NOAA Technical Memorandum NMFS-SEFSC-658, 22 p.

Gulak, S.J.B, M.S. Passerotti, and J.K. Carlson. 2012. Catch and bycatch in U.S. southeast gillnet fisheries, 2011. NOAA Technical Memorandum NMFS-SEFSC-629, 28 p.

Hale, L.F., S.J.B. Gulak, and J.K. Carlson. 2010. Characterization of the shark bottom longline fishery, 2009. NOAA Technical Memorandum NMFS-SEFSC-596, 25 p.

Hale, L.F., S.J.B. Gulak, A.M. Napier, and J.K. Carlson. 2011. Characterization of the shark bottom longline fishery, 2010. NOAA Technical Memorandum NMFS-SEFSC-611, 32 p.

Hale, L.F., S.J.B. Gulak, A.N. Mathers, and J.K. Carlson. 2012. Characterization of the shark and reeffish bottom longline fishery: 2011. NOAA Technical Memorandum NMFS-SEFSC-634, 24 p.

Lambert, D.M., E.M. Thunberg, R.G. Felthoven, J.M. Lincoln, and W.S. Patrick. 2016. Guidance on Fishing Vessel Risk Assessments and Accounting for Safety at Sea in Fishery Management Design. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OSF-2, 56 p.

Lewison, R.L. and L.B. Crowder. 2007. Putting longline bycatch of sea turtles into perspective. Conservation Biology Volume 21, No. 1, 79-86. 2007 Society for Conservation Biology.

Li, Y. and Y. Jiao. 2014. Term 2 Progress Report on the Project: Spatial and Temporal Analysis and Prediction of Seabird Bycatch of US Atlantic Pelagic Longline Fleet. Report submitted by Virginia Polytechnic Institute and State University, Blacksburg, Virginia, to

the Southeast Fisheries Science Center, NOAA National Marine Fisheries Service, Miami, Florida.

Mathers, A.N., M.S. Passerotti, and J.K. Carlson. 2013. Catch and bycatch in U.S. Southeast gillnet fisheries, 2012. NOAA Technical Memorandum NMFS-SEFSC-648

MD DNR. 2014. Survey of Atlantic bluefin tuna (ABT), billfish (while marlin, roundscale spearfish, blue marlin, swordfish, and sailfish), and shark recreational landings in Maryland. Final Report to the National Marine Fisheries Service, Contract DG133F07CN0229

NMFS. 2016. Annual Report of the United States to ICCAT (2015). US Department of Commerce, NOAA Fisheries.

NMFS. 2015. Annual report of the United States to ICCAT. USDOC, NMFS. ANN-038/2015.

NMFS. 2014. Annual report of the United States to ICCAT. USDOC, NMFS. ANN-048/2014.

NMFS. 2013. Annual report of the United States to ICCAT. USDOC, NMFS. ANN/045/2013.

NMFS. 2012. Annual report of the United States to ICCAT. USDOC, NMFS. ANN/045/2012.

NMFS. 2011. Stock assessment and fishery evaluation (SAFE) report for Atlantic highly migratory species. Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD 20910. 294 p.

NMFS. 2008. U.S national report to ICCAT, 2008. NMFS Office of Sustainable Fisheries, Silver Spring, MD. ANN/045/2008.

NMFS. 2008. Stock assessment and fishery evaluation (SAFE) report for Atlantic highly migratory species. Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD 20910. 446 p.

NMFS. 2004. Reintiation of Consutlation on the Atlantic Pelagic Longline Fishery for Highly Migratory Species. Biological opinion, June 1, 2004. 153 p.

Passerotti, M.S., J.K. Carlson, and S.J.B. Gulak. 2011. Catch and bycatch in U.S. southeast gillnet fisheries, 2010. NOAA Technical Memorandum NMFS-SEFSC-612. 16 p.

Richards WJ. 1999. Problems with unofficial and inaccurate geographical names in the fisheries literature. Mar Fish Rev 61(3): 56-57.

SCRS. 2014. ICCAT Rep for Bienn Per, 2014-15, Part I; 2:1-348.

SCRS. 2015. Report of the standing committee on research and statistics. ICCAT September 28 – October 2, 2015; Madrid, Spain.

SCRS. 2016. Report of the standing committee on research and statistics. ICCAT October 3-7, 2016; Madrid, Spain.

USCG [United States Coast Guard]. 2016. Recreational Boating Statistics – 2015. United States Coast Guard Office of Auxiliary and Boating Safety, United States Department of Homeland Security. COMDTPUB P16754.29

Willey AL, Barker LS, Sampson M. 2016. A comparison of circle hook and J hook performance in the recreational shark fishery off Maryland. Fish Bull.

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, NMFS 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 2008 to 2015 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 (2008-2015)

Year	CPI-U	GDP Deflator	PPI Unprocessed Finfish
2008	215.3	99.2	301.6
2009	214.5	100.0	306.9
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

Note: 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 (2009=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 2016). In 2015, 9.7 billion pounds valued at $5.2 billion were landed for all fish species by U.S. fisherman at U.S. ports. In 2014, 9.4 billion pounds valued at $5.4 billion were landed for all fish species by U.S. fisherman at U.S. ports. The overall value of landings between 2014 and 2015 decreased by 4.5 percent. The total value of commercial HMS landings in 2015 was $35.9 million. Revenues of HMS fisheries are further discussed in section 6.1.2.

The estimated value of the 2015 domestic production of all fishery products was $10.2 billion, down $1.1 billion (9.5 percent) from 2014. The total import value of fishery products was $34.3 billion in 2015. This is a decrease of $1.6 billion from 2014. The total export value of fishery products was $28.4 billion in 2015. This is a decrease of $1.6 billion from 2014.

6.1.1 Ex-Vessel Prices

The average ex-vessel prices per pound dressed weight for 2008 to 2015 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 (2008-2015)

Species	Area	2008	2009	2010	2011	2012	2013	2014	2015
Bigeye tuna	Gulf of Mexico	$6.12	$5.80	$5.79	$5.64	$6.19	$3.18	$3.54	$5.57
	S. Atlantic	4.34	4.11	4.03	4.73	4.75	5.14	5.25	5.01
	Mid-Atlantic	5.70	5.42	5.86	6.38	6.90	6.35	6.66	5.89
	N. Atlantic	5.60	5.18	4.79	5.39	5.67	5.49	5.25	4.78
Bluefin tuna	Gulf of Mexico	4.51	4.65	5.42	6.38	7.16	6.72	6.49	5.75
	S. Atlantic	13.29	14.43	8.75	7.34	8.20	7.52	8.06	7.27
	Mid-Atlantic	7.94	10.10	8.94	10.64	10.95	9.02	7.66	7.20
	N. Atlantic	8.31	7.06	8.38	10.21	11.57	8.60	7.87	6.37
Yellowfin tuna	Gulf of Mexico	3.51	3.04	3.72	3.65	3.51	3.65	3.86	4.04
	S. Atlantic	2.99	2.90	3.53	3.93	4.63	3.64	3.69	3.43
	Mid-Atlantic	3.30	2.50	3.43	3.45	4.46	4.72	4.53	4.09
	N. Atlantic	3.82	2.86	2.80	3.39	4.22	3.89	3.52	3.18
Albacore tuna	Gulf of Mexico	0.49	0.55	1.40	1.09	0.68	0.77	0.77	0.78
	S. Atlantic	1.21	1.29	1.36	1.42	1.64	2.06	1.86	1.70
	Mid-Atlantic	0.97	1.10	1.30	1.19	1.25	1.41	1.27	1.36
	N. Atlantic	2.00	1.26	1.56	1.55	1.34	1.80	1.20	1.34
Skipjack tuna	Gulf of Mexico	-	0.50	-	0.90	0.75	-	-	-
	S. Atlantic	0.95	0.95	1.13	1.25	1.10	0.80	0.75	0.68
	Mid-Atlantic	4.50	-	-	0.60	1.06	0.88	1.12	0.72
	N. Atlantic	-	-	-	-	-	0.93	-	-
Swordfish	Gulf of Mexico	2.93	2.69	3.53	4.15	3.42	3.46	3.42	2.97
	S. Atlantic	4.11	4.12	4.63	4.84	4.97	4.99	4.85	4.31
	Mid-Atlantic	3.50	3.40	4.43	4.44	4.51	4.45	4.66	3.87
	N. Atlantic	4.20	3.49	4.61	4.22	4.49	4.61	4.43	3.25
Large coastal sharks	Gulf of Mexico	0.67	0.52	0.48	0.38	0.40	0.46	0.52	0.53
	S. Atlantic	0.72	0.55	0.65	0.61	0.75	0.77	0.72	0.77
	Mid-Atlantic	0.71	0.57	0.64	0.54	0.67	0.65	0.78	0.74
	N. Atlantic	-	-	-	-	-	-	-	-
Pelagic sharks	Gulf of Mexico	1.18	1.25	1.47	1.54	1.33	1.45	1.31	1.58
	S. Atlantic	1.29	1.25	1.27	1.46	1.74	1.66	1.47	1.55
	Mid-Atlantic	1.20	1.16	1.19	1.30	1.39	1.69	1.37	1.16
	N. Atlantic	0.96	1.23	1.28	1.48	1.68	2.03	2.00	1.68
Small coastal sharks	Gulf of Mexico	0.62	0.69	0.55	0.58	0.66	0.33	0.37	0.36
	S. Atlantic	0.78	0.71	0.79	0.81	0.99	0.71	0.74	0.76
	Mid-Atlantic	0.48	0.57	0.57	0.59	0.68	0.83	0.80	0.81
	N. Atlantic	-	-	-	-	-	-	-	-
Shark fins	Gulf of Mexico	14.94	15.09	16.48	15.11	14.97	11.05	9.75	10.10
	S. Atlantic	12.73	13.15	15.35	14.91	11.00	6.04	9.57	10.04
	Mid-Atlantic	3.74	3.62	6.83	3.50	2.79	1.45	1.77	1.95
	N. Atlantic	3.00	3.67	2.40	1.60	1.86	1.90	-	0.80

Sources: HMS eDealer, Dealer weighout slips from the Southeast Fisheries Science Center (SEFSC), Northeast Fisheries Science Center (NEFSC), and bluefin tuna dealer reports from the Greater Atlantic Regional Office. Gulf of Mexico includes: TX, LA, MS, AL, and the west coast of FL. S. Atlantic includes: east coast of FL, GA, SC, and NC dealers reporting to SEFSC. Mid-Atlantic includes: NC dealers reporting to NEFSC, VA, MD, DE, NJ, NY, and CT. N. Atlantic includes: RI, MA, NH, and ME. For bluefin tuna, all NC landings are included in Mid-Atlantic.

Average ex-vessel prices for bluefin tuna have declined 17.7 percent since 2014. 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 2015.

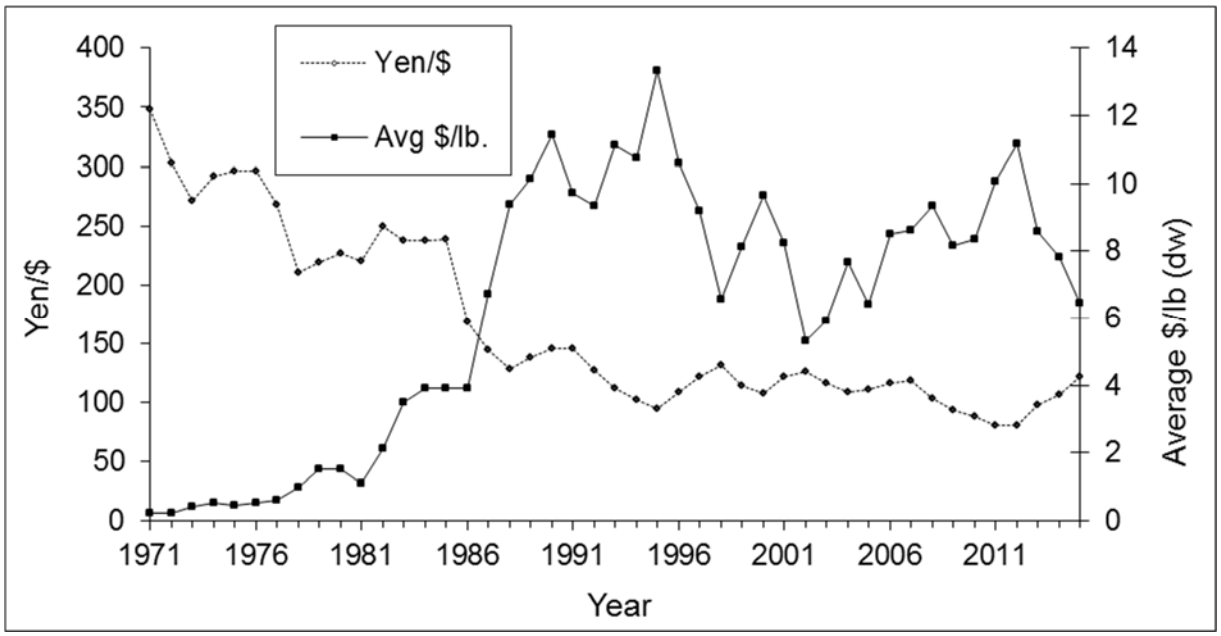

Figure 6.1 Average Annual Yen/$ Exchange Rate and Average U.S. Bluefin Tuna Ex-vessel $/lb (dw) for All Gears (1971-2015)

Source: Federal Reserve Bank (research.stlouisfed.org) and NMFS 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 to 2015, the U.S. National Report (NMFS 2016a), the information used in the shark stock assessments, information given to ICCAT (Cortés pers. comm., 2015), as well as price and weight reported to the NMFS Northeast Regional Office by Atlantic bluefin tuna dealers. These values indicate that the estimated total annual revenue of Atlantic HMS fisheries has decreased in 2015 to $35.9 million from $42.3 million in 2014. From 2014 to 2015, the Atlantic tuna fishery's total revenue decreased by $2.9 million. From 2014 to 2015, the annual revenues for the shark fisheries increased by $174 thousand. Finally, the annual revenues for swordfish declined by $3.7 million from 2014 to 2015 due to a decrease in landings and ex-vessel price.

Table 6.3 Estimates of the Total Ex-vessel Annual Revenues of Atlantic HMS Fisheries (2008-2015)

Species		2008	2009	2010	2011	2012	2013	2014	2015
Bigeye tuna	Ex-vessel $/lb dw	$5.26	$5.09	$5.22	$5.77	$6.42	$5.72	$5.79	$5.35
	Weight (lb dw)	736,520	774,087	799,934	1,122,619	1,039,585	851,669	1,063,914	1,129,017
	Fishery revenue	$3,874,095	$3,940,103	$4,175,655	$6,477,512	$6,674,136	$4,673,419	$5,716,850	$5,454,461
Bluefin tuna	Ex-vessel $/lb dw	$9.35	$8.18	$8.35	$10.08	$11.15	$8.58	$7.84	$6.45
	Weight (lb dw)	720,823	899,477	1,119,937	996,661	995,583	682,533	1,002,549	1,347,920
	Fishery revenue	$6,739,695	$7,357,722	$9,351,474	$10,046,343	$11,100,750	$5,826,566	$7,810,287	$8,716,613
Yellowfin tuna	Ex-vessel $/lb dw	$3.22	$2.87	$3.52	$3.60	$4.16	$3.91	$3.96	$3.71
	Weight (lb dw)	2,423,498	3,159,665	2,154,728	2,676,682	4,349,482	2,580,759	2,779,487	1,965,050
	Fishery revenue	$7,803,664	$9,068,239	$7,584,643	$9,636,055	$18,093,845	$11,214,871	$11,833,261	$8,494,781
Skipjack tuna	Ex-vessel $/lb dw	$1.01	$0.91	$1.13	$1.17	$1.06	$0.85	$0.98	$0.72
	Weight (lb dw)	32,628	30,688	16,269	12,931	17,804	3,857	17,919	3,421
	Fishery revenue	$32,950	$28,057	$18,451	$15,164	$18,949	$3,204	$14,478	$2,269
Albacore tuna	Ex-vessel $/lb dw	$1.15	$1.11	$1.36	$1.29	$1.31	$1.70	$1.49	$1.46
	Weight (lb dw)	216,759	291,187	290,827	491,133	489,800	402,400	554,428	409,210
	Fishery revenue	$248,400	$324,439	$394,754	$632,450	$639,370	$583,230	$800,870	$593,911
Total tuna	Fishery revenue	$18,698,804	$20,718,559	$21,524,977	$26,807,524	$36,527,050	$22,301,290	$26,175,746	$23,262,035
Swordfish	Ex-vessel $/lb dw	$3.68	$3.46	$4.40	$4.50	$4.41	$4.66	$4.65	$4.07
	Weight (lb dw)	3,414,513	3,762,280	3,676,324	4,473,140	5,561,605	4,099,851	2,952,835	2,576,537
Total Swordfish	Fishery revenue	$12,577,768	$13,031,079	$16,186,878	$20,130,595	$24,534,334	$19,178,743	$13,887,650	$10,175,662
Large coastal sharks	Ex-vessel $/lb dw	$0.70	$0.54	$0.60	$0.53	$0.59	$0.64	$0.65	$0.66
	Weight (lb dw)	1,451,423	1,532,969	1,566,741	1,469,142	1,445,597	1,392,440	1,368,178	1,593,989
	Fishery revenue	$1,009,138	$828,003	$938,044	$779,993	$854,916	$683,359	$764,162	$885,305
Pelagic sharks	Ex-vessel $/lb dw	$1.21	$1.18	$1.23	$1.35	$1.43	$1.67	$1.48	$1.40
	Weight (lb dw)	234,546	225,575	312,195	314,314	314,084	247,833	353,623	215,298
	Fishery revenue	$284,113	$266,548	$382,527	$425,831	$449,759	$384,419	$504,860	$323,129
Small coastal sharks	Ex-vessel $/lb dw	$0.69	$0.69	$0.69	$0.75	$0.87	$0.54	$0.56	$0.57
	Weight (lb dw)	639,842	708,279	397,766	590,174	667,501	439,704	434,377	553,419
	Fishery revenue	$440,108	$488,374	$272,590	$441,269	$578,126	$275,346	$342,887	$410,305
Shark fins*	Ex-vessel $/lb dw	$12.43	$12.45	$14.02	$11.90	$8.96	$6.08	$7.71	$8.46
	Weight (lb dw)	116,291	123,341	113,835	118,682	121,359	150,853	110,560	105,189
	Fishery revenue	$1,444,918	$1,535,469	$1,596,472	$1,412,129	$1,086,979	$738,189	$672,200	$839,642
Total sharks	Fishery revenue	$3,178,277	$3,118,394	$3,189,633	$3,059,222	$2,969,779	$2,081,313	$2,284,109	$2,458,381
Total HMS	Fishery revenue	$34,454,849	$36,868,033	$40,901,488	$49,997,341	$64,031,163	$43,561,346	$42,347,505	$35,896,078

* Shark fin total weight for 2008 through 2012 was estimated using 5% of all sharks landed. In 2013, 2014, and 2015, it was based on reported shark fin landings reported to eDealer. Sources: HMS eDealer Program, NMFS Northeast Commercial Fisheries Database Service; Pelagic Dealer Compliance Program; and NMFS 2013.

A variety of fishing gears are used to harvest Atlantic HMS. Figure 6.2 displays the percent composition of the $35.9 million ex-vessel annual revenues landed in 2015 by fishing gear category. Based on eDealer and Atlantic bluefin tuna bi-weekly dealer report data, approximately 66 percent of 2015 total revenues in the fishery were landed by pelagic longline gear. In addition, 23 percent of landings by value were from vessels using commercial rod and reel gear, 3 percent from bottom longline gear, 2 percent from harpoon, and 6 percent from other gear categories. These other gear categories include gill net, purse seine, buoy gear, green-stick, hand line, and other miscellaneous gears.

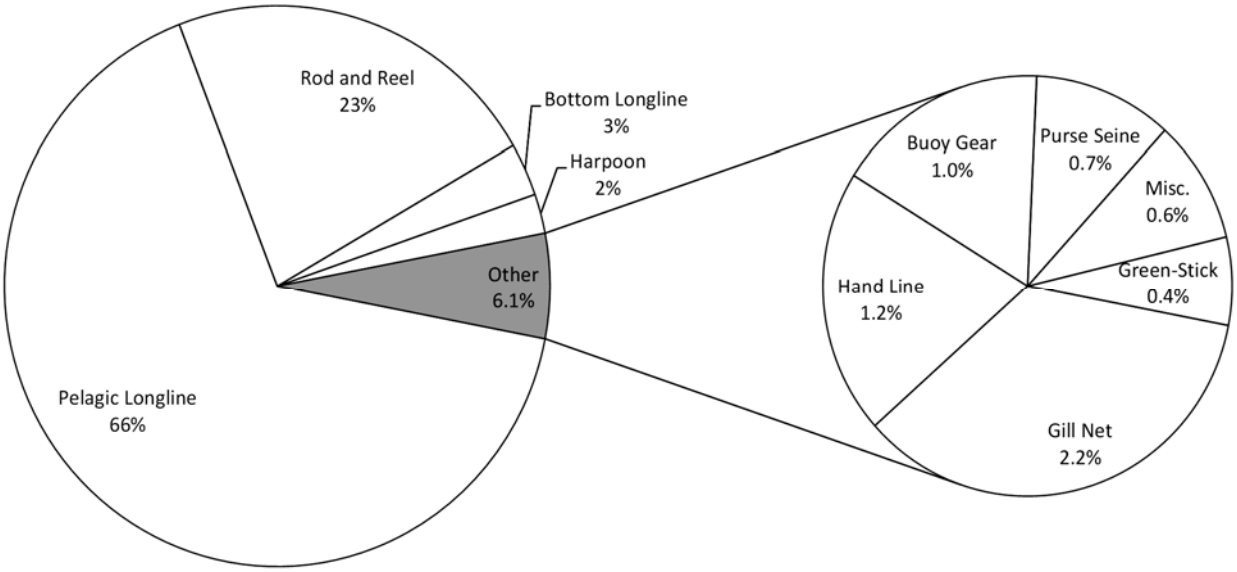

Figure 6.2 Percent of 2015 Total Ex-vessel Revenues of Atlantic HMS Fisheries By Gear

Sources: HMS eDealer and Atlantic bluefin tuna dealer reports from the Northeast Regional Office.

6.1.3 Operating Costs

NMFS 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, NMFS 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 PLL 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 decreased 31.1 percent from 2014 to 2015 while the cost per pound for bait decreased 13.5 percent from 2014 to 2015. The unit cost per light sticks has remained the same from 2014 to 2015.

Table 6.4 Pelagic Longline Vessel Median Unit Costs for Fuel, Bait, and Light Sticks (2008–2015)

Input Unit Costs ($)	2008	2009	2010	2011	2012	2013	2014	2015
Fuel (per gallon)	3.50	2.00	2.50	3.40	3.50	3.35	3.25	2.24
Bait (per lb)	0.81	0.81	0.90	1.31	1.50	1.59	1.33	1.15
Light sticks (per stick)	0.37	0.37	0.25	0.25	0.30	0.30	0.30	0.30

Source: Fisheries Logbook System

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 decreased 26.6 percent from 2014 to 2015.

Table 6.5 Median Input Costs for Pelagic Longline Vessel Trips (2008–2015)

Input Costs ($)	2008	2009	2010	2011	2012	2013	2014	2015
Fuel	3,213	2,862	2,386	2,814	2,784	2,860	2,554	1,875
Bait	1,488	1,785	1,895	3,150	3,000	3,000	2,565	2,250
Light sticks	600	592	500	633	750	750	750	700
Ice costs	476	514	430	600	675	584	660	750
Grocery expenses	765	895	780	900	900	900	900	900
Other trip costs	1,762	1,671	1,500	1,622	1,289	1,200	500	610

Source: Fisheries Logbook System

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 2008 to 2015. 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 2015 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 have ranged from $6,008 to $9,949 from 2008 to 2015.

Table 6.6 Median Labor Inputs for Pelagic Longline Vessel Trips (2008–2015)

Labor	2008	2009	2010	2011	2012	2013	2014	2015
Number of crew	3	3	3	3	3	3	3	3
Owner share (%)	45	47	50	50	50	50	50	50
Captain share (%)	20	20	23	23	25	23	25	25
Crew share (%)	20	25	25	25	28	25	25	25
Total shared costs ($)	6,608	6,500	7,295	9,949	8,266	8,032	6,699	6,629

Source: Fisheries Logbook System

In 2015, median reported total trip sales were $17,883. In 2014, median reported total trip sales were $17,898. After adjusting for operating costs, median net earnings per trip were $9,920 in 2014. Median net earnings per trip increased to $10,069 in 2015.

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 2008 to 2015.

Table 6.7 Median Input Costs for Bottom Longline Vessel Trips (2008–2015)

Input Costs	2008	2009	2010	2011	2012	2013	2014	2015
Fuel	$146	$106	$130	$184	$175	$124	$162	$156
Bait	$50	$20	$50	$50	$100	$75	$85	$50
Ice costs	$50	$20	$50	$50	$36	$40	$48	$36
Grocery expenses	$25	$20	$50	$50	$50	$25	$50	$40
Misc. trip costs	$20	$15	$15	$34	$26	$30	$24	$54
Number of crew	2	2	2	2	2	2	2	2
Days at sea	1	1	1	2	1	1	1	1

Source: Fisheries Logbook System

In 2015, median reported total trip sales were $1,438 for vessels using BLL gear. In 2014, median reported total trip sales were $918. After adjusting for operating costs, median net earnings per bottom longline trip were $597 in 2014. Median net earnings per trip increased to $1,091 in 2015.

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 $96.0 billion for fish products in 2015, including $64.8 billion at food service establishments, $31.0 billion in retail sales for home consumption, and $199 million for industrial fish products. The commercial marine fishing industry contributed $48.7 billion (in value added) to the U.S. Gross National Product in 2014 (NMFS 2015).

6.2.1 Dealers

NMFS 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 NMFS 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 2016). Table 6.8 provides a summary of available information.

Table 6.8 Processors and Wholesalers: Plants and Employment (2015)

Area and State	Processing[1]		Wholesale[2]		Total	
	Plants	Employment	Plants	Employment	Plants	Employment
New England						
Maine	37	844	169	1,261	206	2,105
New Hampshire	9	216	9	91	18	307
Massachusetts	52	2,292	149	2,262	201	4,554
Rhode Island	9	*	35	*	44	*
Connecticut	3	74	18	195	21	269
Total	110	3,426	380	3,809	490	7,235
Mid-Atlantic						
New York	19	442	269	2,096	288	2,538
New Jersey	16	618	80	854	96	1,472
Pennsylvania	4	87	32	659	36	746
Delaware	3	*	5	17	8	17
District of Columbia	-	-	2	*	2	*
Maryland	16	338	46	543	62	881
Virginia	35	1,450	63	491	98	1,941
Total	93	2,935	497	4,660	590	7,595
South U.S. Atlantic						
North Carolina	30	665	64	581	94	1,246
South Carolina	3	*	22	162	25	162
Georgia	6	702	34	706	40	1,408
Florida	43	1,572	317	2,709	360	4,281
Total	82	2,939	437	4,158	519	7,097
Gulf of Mexico						
Alabama	33	1,347	14	264	47	1,640
Mississippi	23	2,331	19	96	42	2,427
Louisiana	60	1,600	98	626	158	2,226
Texas	46	1,647	129	1,266	175	2,913
Total	162	6,954	260	2,252	422	9,206
Inland States or Other						
Areas**, Total	62	1,651	245	2,962	307	4,613

[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, 2015.

6.2.2 Processing Sector

NMFS does not currently collect wholesale price information from dealers.

NMFS 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 on average received a 98 percent margin on sales in 2015, which is higher than margins in 2014.

Table 6.9 Summary of the Mark-Up and Consumer Expenditures for the Primary Wholesale and Processing of Domestic Commercial Marine Fishery Products (2013-2015)

	2013	2014	2015
Purchase of fishery inputs ($)	9,690,909,000	10,924,641,000	9,935,752
Percent mark-up of fishery inputs (%)	77	62	98
Total mark-up ($)	7,510,336,000	6,791,794	9,694,696
Value added as percent of total mark-up (%)	60	60	60
Value added within sector ($)	4,534,951,000	4,101,187,000	5,853,822
Total value of sales within sector ($)	17,201,245,000	17,716,435,000	19,630,448,000

Source: NMFS 2016

6.3 International Trade

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

6.3.1 International HMS Trade Programs

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

HMS Trade Documentation Programs

NMFS implemented the HMS International Trade Program (ITP) in 2005 (69 FR 67268, November 17, 2004) to identify importers and exporters of HMS products that require trade monitoring documentation (i.e., bluefin tuna, swordfish, and frozen bigeye tuna). Under the ITP, traders in these species and shark fins were required to obtain the International Trade Permit. On August 3, 2016 (81 FR 514126) NMFS replaced the International Trade Permit with the International Fisheries Trade Permit (IFTP), and expanded its scope to include dolphin-safe tuna imports covered by the Tuna Tracking and Verification Program (http://www.nmfs.noaa.gov/pr/dolphinsafe/ttvp.htm) and the trade of Patagonia/Antarctic toothfish, also known as Chilean sea bass (http://www.nmfs.noaa.gov/ia/permits/amlr.html). This rulemaking also implemented mandatory electronic reporting of import and export documentation per the SAFE Port Act of 2006. Another recent rulemaking (81 FR 18796, April 1, 2016) implemented the electronic version of the trade monitoring program for Atlantic bluefin

tuna (i.e., the ICCAT bluefin tuna catch documentation or eBCD program). Trade monitoring programs established by NMFS for HMS are described in greater detail in the 2011 HMS SAFE Report. Further information on the IFTP and associated reporting requirements is available on the HMS website.

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

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

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

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

On June 27, 2012, the CITES Secretariat sent a notification to the parties regarding the inclusion of two shark species, scalloped hammerhead and porbeagle, in CITES Appendix III, requiring member parties to issue CITES permits or certificates for the import, export, and re-export of these species (or any of their parts or products). It also means that any U.S. import, export, or re-export of these species requires a declaration to and clearance from the U.S. Fish and Wildlife Service. In accordance with provisions of Article XVI paragraph 2 of the CITES Convention, the inclusion of these species in Appendix III took effect 90 days after the notification (i.e., effective as of September 25, 2012).

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 which have been altered in the United States from the form in which they were imported, or which have been enhanced in value by further manufacture in the United States. The value of an export is the FAS (free alongside ship) value defined as the value at the port of export based on a transaction price including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier. It excludes the cost of loading the merchandise, freight, insurance, and other charges or transportation costs beyond the port of export.

Atlantic and Pacific Bluefin Tuna Exports

Table 6.10 gives bluefin tuna export data for exports from the United States since 2005 and includes data from the NMFS BCD program and Census Bureau data. The Census Bureau usually reports a greater amount of bluefin tuna exported when compared to the amount reported by NMFS. Additional quality control measures are taken by NMFS 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. Bluefin tuna re-export data are listed separately later in section 6.3.3 (Table 6.18).

Table 6.10 United States Exports of Atlantic and Pacific Bluefin Tuna (2005-2015)

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] ($ million)
2005	419.4	245.7	125.1	370.8	454	5.30
2006	204.6	93.1	0.0	93.1	281	3.60
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

Note: most exports of Pacific bluefin tuna (BFT) were in round (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] Northeast Regional Office, [2] NMFS Bluefin Tuna Catch Document Program, 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, while domestic consumption of U.S. landings remained fairly constant (i.e., between 100 and 200 mt) from year to year. Overall domestic consumption increased to almost 800 mt in 2015. Most U.S. bluefin

tuna exports are destined for the sushi markets in Japan. As shown in Figure 6.3 and Figure 6.4, the percentage of the commercial U.S. bluefin tuna catch that was exported has declined from a peak in 2012, and was relatively low when landings declined to their lowest point in 2006-2007.

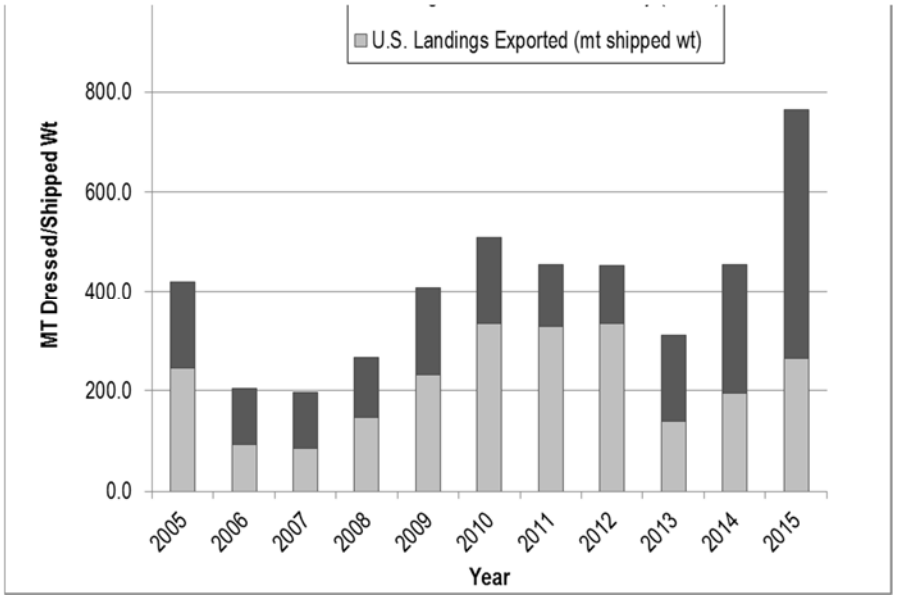

Figure 6.3 **Annual U.S. Domestic Landings of Atlantic Bluefin Tuna, Divided into U.S. Export (mt shipped weight) and U.S. Domestic Consumption (mt dw) (1996-2014)**

Figure 6.4 **Annual Percentage (by weight) of Commercially-Landed U.S. Atlantic Bluefin Tuna that was Exported (1996-2014)**

Other Tuna Exports

Export data for other tunas is gathered by the 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 mt and 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 7,951 mt in 2005. Both Atlantic landings and exports from all ocean areas were lower in 2015 than in the previous five years.

Table 6.11 U.S. Atlantic Landings and Total U.S. Exports of Albacore Tuna (2005–2015)

Year	Atlantic Landings (mt ww)[1]	U.S. Exports (from all ocean areas)[2]					
		Fresh		Frozen		Total for all Exports	
		Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)
2005	486	549	1.61	7,402	16.99	7,951	18.60
2006	400	378	1.04	8,810	19.56	9,187	20.60
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

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, 2016, [2]U.S. Census Bureau.

Table 6.12 and Table 6.13 show U.S. Atlantic landings and U.S. exports from all ocean areas for yellowfin and skipjack tuna, respectively. Annual yellowfin exports were greater and more valuable than exports for skipjack or bigeye tuna (Table 6.14) and were unusually high in 2008. Amounts of frozen yellowfin tuna were the lowest of the time series in 2011, but were much higher for the last four years, making total exports over the last four years, four out of the five highest values in the time series. Although the total amount has been consistent over the last 4 years, total value has been decreasing annually.

Table 6.12 U.S. Atlantic Landings and Total U.S. Exports of Yellowfin Tuna (2005-2015)

Year	Atlantic Landings (mt ww)[1]	U.S. Exports (from all ocean areas)[2]					
		Fresh		Frozen		Total for all Exports	
		Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)
2005	5,562	158	1.70	291	0.97	449	2.67
2006	7,090	183	1.96	108	0.37	291	2.32
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

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, 2016, [2]U.S. Census Bureau.

Table 6.13 shows that the amount and value of exported fresh and frozen skipjack tuna has varied over the eleven year time series without any perceptible pattern, while landings have ranged between 30-120 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 (2005-2015)

Year	Atlantic Landings (mt ww)[1]	U.S. Exports (from all ocean areas)[2]					
		Fresh		Frozen		Total for all Exports	
		Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)
2005	30	35	0.14	-	-	35	0.14
2006	61	6	0.02	23	0.04	30	0.06
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

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, 2016, [2] U.S. Census Bureau.

Bigeye tuna exports and Atlantic landings are given in Table 6.14. Atlantic landings have been fairly consistent over the last 4 years. Annually, bigeye tuna exports include more fresh than frozen product, except in 2008 and 2012 when exports of frozen product were greater. Total amount and value of exports have dropped substantially over the last three years.

Table 6.14 U.S. Atlantic Landings and Total U.S. Exports of Bigeye Tuna (2005-2015)

Year	Atlantic Landings (mt ww)[1]	U.S. Exports (from all ocean areas)[2]					
		Fresh		Frozen		Total for all Exports	
		Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)
2005	484	431	1.95	50	0.12	481	2.07
2006	991	223	1.69	76	0.20	299	1.89
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

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 2016; [2]U.S. Census Bureau.

Shark Exports

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

Table 6.15 indicates the magnitude and value of shark exports by the United States from 2005 – 2015. The amount and value of exports has been relatively high for the last three years of the time series, due mostly to large amounts of frozen product. The price per kg for frozen product consistently rose from 2010 to 2014, and reached a high for the time series in 2014. Exports of shark fins were highest in 2009 (56 mt) but have been much lower since then, ranging between 11 and 19 mt for 2011-2015. The price of shark fins was greatest in 2011 ($100.67/kg).

Table 6.15 Amount and Value of U.S. Shark Products Exported (2005-2015)

Year	Dried Shark Fins			Non-specified Fresh Shark			Non-specified Frozen Shark			Total for All Exports	
	Amount (mt)	Value ($ MM)	Value ($/kg)	Amount (mt)	Value ($ MM)	Value ($/kg)	Amount (mt)	Value ($ MM)	Value ($/kg)	Amount (mt)	Value ($ MM)
2005	31	2.37	76.93	377	1.03	2.73	494	1.06	2.15	902	4.46
2006	34	3.17	94.66	816	1.62	1.99	747	1.38	1.85	1,597	6.17
2007	19	1.78	93.68	502	1.05	2.09	695	1.35	1.94	1,216	4.18
2008	11	0.69	63.00	559	1.21	2.16	4,122	7.21	1.75	4,692	9.11
2009	56	2.82	50.36	254	0.72	2.83	320	1.33	4.16	630	4.87
2010	36	2.89	80.28	222	0.67	3.02	244	0.52	2.11	502	4.08
2011	15	1.51	100.67	333	0.89	2.66	59	0.22	3.77	407	2.62
2012	11	0.99	91.75	436	1.08	2.47	1,054	4.52	4.28	1,501	6.58
2013	12	0.79	65.63	196	0.57	2.90	1,043	5.21	5.00	1,250	6.57
2014	19	0.98	52.74	218	0.57	2.64	828	5.31	6.41	1,064	6.86
2015	18	1.02	57.97	273	0.66	2.43	930	4.92	5.28	1,221	6.60

$ MM – millions of dollars. Note: Exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change. Source: U.S. Census Bureau

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. product has been available since 2007, but total exports have generally decreased over the course of the time series (Table 6.16).

Table 6.16 Amount and Value of U.S. Swordfish Product Exported (2007-2015)

Year	Swordfish Fillet				Swordfish				Swordfish Meat				Total	
	Fresh		Frozen		Fresh		Frozen		Fresh		Frozen			
	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	12.1	0.04	-	-	24.0	0.13	231	1.6
2010	98	0.71	16	0.15	134	0.78	0.6	0.01	-	-	3.0	0.02	252	1.7
2011	32	0.26	31	0.28	134	0.80	72.4	0.45	-	-	0.5	0.01	269	1.8
2012	0	0.01	4	0.05	141	0.82	10.8	0.09	7.0	0.09	4.5	0.03	168	1.1
2013	0	0	18	0.09	160	0.87	13.0	0.13	2.6	0.04	2.4	0.02	196	1.2
2014	1	0.01	14	0.14	115	0.63	22.2	0.06	3.1	0.04	1.4	0.01	156	0.9
2015	1	0.01	24		94	.56	19.9	0.12	1.2	0.01	8.8	0.04	148	1.0

$ 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 6.17.

Table 6.17 Re-exports of HMS (Excluding Bluefin Tuna) in Excess of 1000 mt and/or One Million U.S. Dollars (2005–2015)

Year	Product	Amount (mt)	Value ($ million)
2004	Shark fins, dried	29	1.84
2005	Yellowfin tuna, fresh	123	2.30
	Shark fins, dried	34	1.53
2006	Yellowfin tuna, fresh	208	2.62
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	-	-

* In 2012, the product classification "shark fin, dried" in the HTS was renamed "shark fins." Source: U.S. Census Bureau.

In previous editions of SAFE reports, bluefin tuna re-exports for 2003-2005 reflected a great deal of transshipment from Mexico through the United States to Japan. Implementation of the HMS ITP regulations in 2005 (69 FR 67268, November 17, 2004) changed the way re-exports and transshipments were distinguished. Table 6.18 shows the re-exports of bluefin tuna since 2005, and is updated to reflect these changes for previous years. Re-exports of bluefin tuna in 2013 were particularly high, and have gradually decreased for the last two years.

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 2015, fresh and frozen tuna products accounted for

12,037 mt dw or 0.9 percent of the 1,301,671 mt dw of principal fresh and frozen seafood products exported from the United States, as indicated in *Fisheries of the United States, 2015.* The value of these HMS tuna products accounted for $41.9 million, out of a national total of $4.8 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 2015 were reported in the 2016 U.S. National Report to ICCAT as 248 mt (Table 6.11). National trade data show that over 8,855 mt of albacore were exported in 2015, 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 NMFS for use in implementing consignment document programs. U.S. Census Bureau import data are used by NMFS as well.

Atlantic and Pacific Bluefin Tuna Imports

United States imports and re-exports of bluefin tuna for 2005 through 2015, as reported through both CBP and BCD program data, are shown in Table 6.18.

Table 6.18 U.S. Imports and Re-exports of Atlantic and Pacific Bluefin Tuna (2005–2015)

	NMFS BFT Catch Document Program		U.S. Customs and Border Protection	
Year	Imports (mt)	Re-exports (mt)	Imports (mt)	Value ($ million)
2005	966.1	10.4	1,064.0	19.96
2006	791.5	18.5	865.2	17.05
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

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. Southern BFT trade was included in figures for Atlantic and Pacific BFT trade prior to 2002. Sources: NMFS Bluefin Tuna Catch Document Program and U.S. Customs and Border Protection.

The rise in popularity of sashimi in the United States has created a market for imports of Atlantic and Pacific bluefin tuna (Table 6.18). U.S. consumption of Atlantic bluefin tuna (landings + imports – exports – re-exports) has increased over the last three years to an all-time high for the time series in 2015 (Figure 6.5). Consumption of domestic landings had been fairly consistent, ranging between about 100 to 200 mt per year until 2015 when domestic landings consumption climbed to almost 500 mt. Consumption of imported bluefin tuna has been more variable.

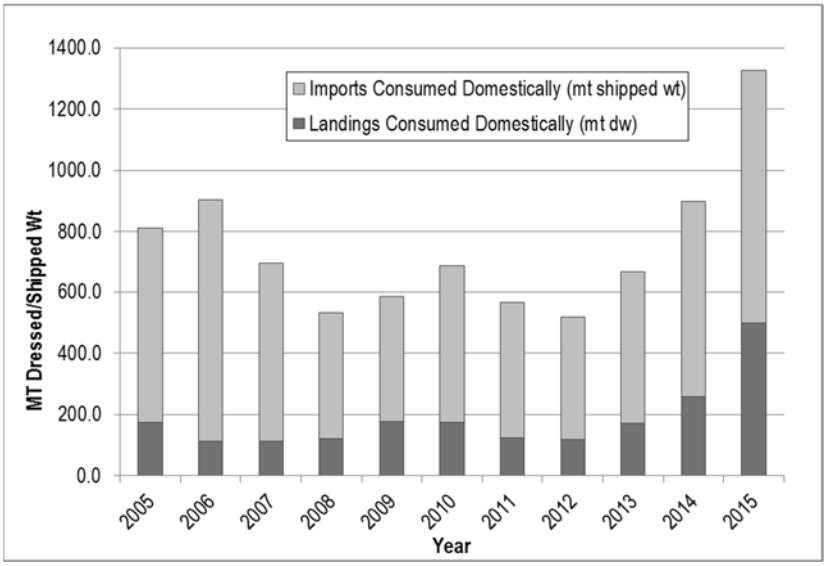

Figure 6.5 U.S. Annual Consumption of Atlantic and Pacific Bluefin Tuna, by Imports and U.S. Landings (2005-2015)

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 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 was greatest between 2006 and 2007.

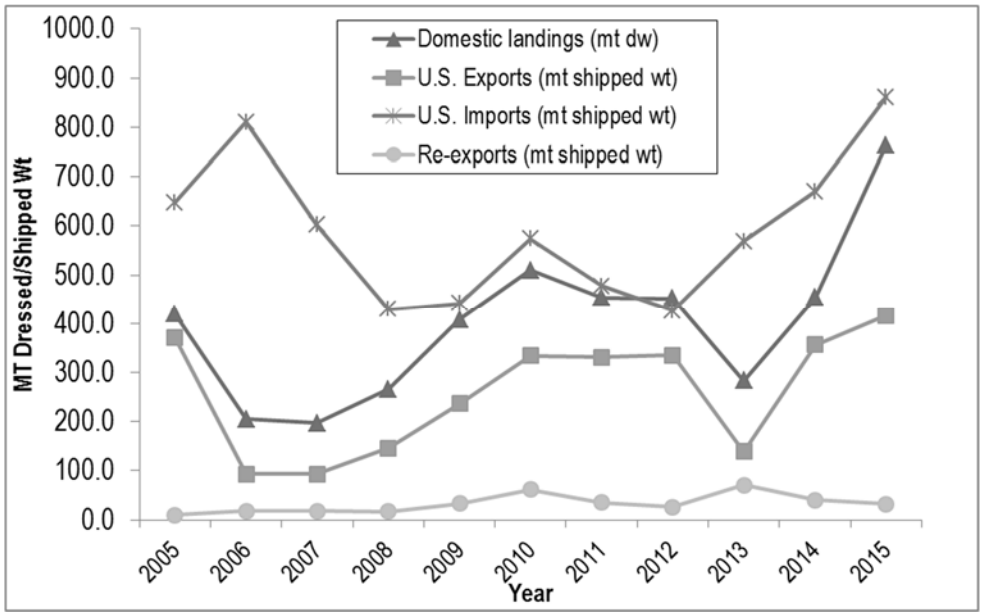

Figure 6.6 U.S. Domestic Landings (mt dw) of Atlantic Bluefin Tuna, and Exports, Imports and Re-exports of Atlantic and Pacific Bluefin Tuna (mt shipped weight) (2005-2015)

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 ranged between 3,498 (2011) and 8,059 mt (2008) over the time series, as shown in Table 6.19. Total imports of fresh bigeye have been gradually increasing since 2011 while imports of frozen bigeye have been gradually decreasing since 2012. Value of bigeye imports in 2015 was the greatest since 2008.

Table 6.19 U.S. Imports of Bigeye Tuna from All Ocean Areas Combined (2005-2015)

	Fresh		Frozen		Total for all Imports	
Year	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2005	5,040	38.18	1,539	3.33	6,579	41.51
2006	4,920	36.55	1,523	3.15	6,442	39.70
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

$ MM – in millions of dollars. Note: Imports may be whole weight (ww) or 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 given in Table 6.20. 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 2005 to 2007 (about 23,000 mt). Total amount has been consistent since 2010, but value has fluctuated, and decreased for the last two years. Most imported yellowfin products were fresh.

Table 6.20 U.S. Imports of Yellowfin Tuna from All Ocean Areas Combined (2005–2015)

	Fresh		Frozen		Total for all Imports	
Year	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)
2005	17,064	116.58	6,002	46.89	23,066	163.47
2006	17,792	126.47	5,442	42.78	23,234	169.25
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

Note: Imports may be whole weight (ww) or 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 was greatest in 2011 (4,462; Table 6.21), and has ranged between that amount and 1,543 (2006) without any perceptible pattern. The greatest value of albacore imports was also in 2011 ($10.22 million). Products in airtight containers (e.g., cans, foil pouches) are not included in these data.

Table 6.21 U.S. Imports of Albacore Tuna from All Ocean Areas Combined (2005-2015)

	Fresh		Frozen		Total for all Imports	
Year	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)
2005	706	2.38	1,016	2.96	1,722	5.34
2006	876	3.54	667	1.71	1,543	5.25
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

Note: Imports may be whole weight (ww) or 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 6.22). The amount of skipjack imports is variable over this time series, ranging from a low of 233 mt in 2015 to a high of 1,023 mt in 2006. Import value was the highest for 2012 ($1.21

million), which was the year with the second largest import amount (890 mt) for the time series. Products in airtight containers (e.g., cans, foil pouches) are not included in these data.

Table 6.22 U.S. Imports of Skipjack Tuna from All Ocean Areas Combined (2005–2015)

	Fresh		Frozen		Total for all Imports	
Year	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2005	0	0	652	0.67	652	0.67
2006	140	0.14	883	0.84	1,023	0.98
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

Note: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change.
Source: U.S. Census Bureau

Swordfish Imports

Table 6.23 indicates the amount and value of swordfish products imported into the United States from 2005 to 2015, as recorded by the U.S. Census Bureau, for all ocean areas combined. New import product categories were added in 2007. The annual totals for products and value are fairly consistent over the time series, with a gradual increase over the last three years to reach the greatest values in 2015.

Table 6.23 Imported Swordfish Products (2005-2015)

	Fresh (mt)				Frozen (mt)					Total for All Imports	
Year	Steaks			Other	Fillets		Steaks		Other	(mt)	($ million)
2005	172			6,388	2,957		367		304	10,187	77.17
2006	77			6,830	2,875		351		201	10,334	75.63
							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

* HTS classification changed as of 2007. NOTE: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change. Source: U.S. Census Bureau.

Table 6.24 summarizes swordfish import data collected by NMFS' Swordfish Statistical Document Program for the 2015 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 NMFS 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 6.24 U.S. Imports of Swordfish, by Flag of Harvesting Vessel and Area of Origin (2015)

	Ocean Area of Origin							
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	-	-	-	112.39	122.44	-	-	234.82
Brazil	1.55	0.41	298.51	2.29	-	-	-	302.77
Canada	-	604.09	-	-	-	-	-	604.09
Chile	-	-	-	179.87	-	-	-	179.87
China	-	-	-	2.03	-	-	-	2.03
Costa Rica	-	-	-	615.48	-	-	-	615.48
Ecuador	-	-	-	2,710.06	-	1.50	-	2,711.56
Fiji Islands	-	-	-	7.34	11.48	0.13	-	18.94
French Polynesia	-	-	-	8.49	-	-	-	8.49
Guatemala	-	-	-	0.30	-	-	-	0.30
Indonesia	-	-	-	-	-	63.38	-	63.38
Kingdom of Tonga	-	-	-	0.06	-	-	-	0.06
Malaysia	-	-	-	3.39	-	-	-	3.39
Mauritus	-	-	-	-	-	0.26	-	0.26
Marshall Islands	-	-	-	2.19	-	-	-	2.19
Mexico	-	-	-	291.47	-	-	-	291.47
New Zealand	-	-	-	-	397.10	-	-	397.10
Nicaragua	-	-	-	13.55	-	-	-	13.55
Not Provided	-	-	-	-	-	-	-	0.00
Panama	-	-	-	730.47	-	-	-	730.47
Republic of Maldives	-	-	-	-	-	9.59	-	9.59
Seychelles	-	-	-	-	-	0.54	-	0.54
South Africa	1.95	-	87.09	-	-	44.27	-	133.32
Sri Lanka	-	-	-	-	-	48.87	-	48.87
Trinidad & Tobago	-	5.40	-	-	-	-	-	5.40
Vanuatu	-	-	-	164.63	-	-	-	164.63
Vietnam	-	-	-	101.82	-	-	-	101.82
Total Imports Reported by SDs								6,644.37
Total Imports Reported by U.S. Customs & Border Protection								10,845.86

Source: NMFS Swordfish Statistical Document (SD) Program.

Shark Imports

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

Table 6.25 summarizes Census Bureau data on shark imports for 2005 through 2015. Imports of fresh and frozen shark have decreased significantly over the time series. Imports of shark fins have been variable between a range of 21 mt and 63 mt, and have been decreasing over the last three years. As of July 2, 2008, shark fin importers, exporters, and re-exporters are required to be permitted under NMFS' HMS ITP regulations (73 FR 31380). Permitting of shark fin traders was implemented to assist in enforcement and monitoring trade of this valuable commodity.

Table 6.25 U.S. Imports of Shark Products from All Ocean Areas Combined (2005-2015)

	Shark Fins Dried		Non-specified Fresh Shark		Non-specified Frozen Shark		Total for All Imports	
Year	(mt)	($ million)	(mt)	($ million)	(mt)	($ million)	(mt)	($ million)
2005	27	0.75	537	1.02	147	2.27	711	4.04
2006	28	1.38	338	0.68	93	1.35	459	3.41
2007	29	1.68	548	1.03	174	1.04	751	3.75
2008	29	1.74	348	0.72	189	1.88	566	4.34
2009	21	0.97	180	0.37	125	1.50	326	2.83
2010	34	1.18	114	0.33	34	1.16	182	2.66
2011	58	1.79	72	0.22	32	1.20	162	3.21
2012*	43	0.77	88	0.30	9	0.07	141	1.14
2013	63	0.74	153	0.46	3	0.05	219	1.25
2014	35	0.45	105	0.35	8	0.20	146	0.99
2015	24	0.29	88	0.32	21	0.26	133	0.87

Note: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change. * In 2012, the product classification "shark fin, dried" in the HTS was renamed "shark fins." Source: U.S. Census Bureau.

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 SCRS 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 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.

Table 6.26 Summary and Current Status of ICCAT-Recommended Trade Sanctions for Bluefin Tuna, Swordfish, and Bigeye Tuna Implemented by the United States

Country	Species	ICCAT-Recommended Sanction	U.S. Sanction Implemented	ICCAT Sanction Lifted	U.S. Sanction Lifted
Panama	Bluefin tuna	1996	1997	1999	2000
Honduras	Bluefin tuna	1996	1997	2001	2004
	Bigeye tuna	2000	2002	2002	2004
	Swordfish	1999	2000	2001	2004
Belize	Bluefin tuna	1996	1997	2002	2004
	Swordfish	1999	2000	2002	2004
	Bigeye tuna	2000	2002	2002	2004
Equatorial Guinea	Bluefin tuna	1999	2000	2004	2005
	Bigeye tuna	2000	2002	2004	2005
Cambodia	Bigeye tuna	2000	2002	2004	2005
St. Vincent & the Grenadines	Bigeye tuna	2000	2002	2002	2004
Bolivia	Bigeye tuna	2002	2004	2011	2012
Sierra Leone	Bluefin tuna	2002	2004	2004	2005
	Bigeye tuna	2002	2004	2004	2005
	Swordfish	2002	2004	2004	2005
Georgia	Bigeye tuna	2003	2004	2011	2012

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 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation was released in August 2012. This report, which is the 12th regarding a series of surveys that has been conducted about every 5 years since 1955, provides relevant information such as the number of anglers, expenditures by type of fishing activity, number of participants and days of participation by animal sought, and demographic characteristics of participants. The final national report and the data CD-ROM are available from the U.S. Fish and Wildlife Service (USFWS). More information on the 2011 national survey is available at http://www.fws.gov/pacific/news/news.cfm?id=2144375111.

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

This survey also included a separate survey of HMS Angling permit holders from the LPS region (Maine to Virginia) plus North Carolina (Hutt et al., 2014). Estimated trip-related expenditures

and the resulting economic impacts for HMS recreational fishing trips are presented in Table 6.27. For the HMS Angler Expenditure Survey, randomly selected HMS Angling permit holders were surveyed every two months, and asked to provide data on the most recent fishing trip in which they targeted HMS. Anglers were asked to identify the primary HMS they targeted, and their expenditures related to the trip. Of the 2,068 HMS anglers that returned a survey, 1,001 anglers indicated they targeted a species of tuna (i.e., bluefin, yellowfin, bigeye, or albacore tuna) on their most recent private boat trip, or simply indicated they fished for tuna in general without identifying a specific species. Of the rest of those surveyed, 88 reported on trips targeting billfish (i.e., blue marlin, white marlin, sailfish), 105 reported on trips targeting shark (i.e., shortfin mako, thresher shark, blacktip shark), and 874 either reported on trips that did not target HMS or failed to indicate what species they targeted. Average trip expenditures ranged from $534/trip for tuna trips to $900 for billfish trips. Boat fuel was the largest trip-related expenditure for all HMS trips, and made up about 73 percent of trip costs for billfish trips, which is not unexpected given the predominance of trolling as a fishing method for billfish species such as marlin. Total trip-related expenditures for 2011 were estimated by expanding average trip-related expenditures by estimates of total directed boat trips per species group from the LPS and MRIP. Total expenditures were then divided among the appropriate economic sectors, and entered into an input-output model to estimate total economic output and employment supported by the expenditures within the study region (coastal states from Maine to North Carolina). Overall, $23.2 million of HMS angling trip-related expenditures generated approximately $31.3 million in economic output, and supported 216 full time jobs from Maine to North Carolina in 2011. An updated trip expenditures survey of Atlantic HMS Angling Permit holders from Maine to Texas is currently being conducted for 2016, and results are expected to be presented in the 2017 SAFE Report.

Table 6.27 HMS Recreational Fishing Trip Related Expenditures and Economic Impacts for Directed HMS Private Boat Trips (ME - NC, 2011)

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

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

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

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

6.4.2 Atlantic HMS Tournaments

For detailed information about HMS tournaments, please see the 2006 Consolidated HMS FMP and sections 5.4.2 (landings) and 4.2 (HMS tournament registration) of this document. NMFS is currently conducting an Atlantic HMS Tournament Economic Study for 2016. This study is being conducted in two parts. The first part involves a survey of all Atlantic HMS tournaments on their costs and earnings associated with the operation of a tournament. The second part involves 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 will be selected to distribute surveys to their participants. Such a targeted survey should provide expenditure data on a unique group of saltwater angling trips that are largely under-represented in national surveys.

6.4.3 Atlantic HMS Charter and Party Boat Operations

At the end of 2004 and 2012, NMFS 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, NMFS 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 that 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 6.28). Overall, HMS most commonly targeted by charter boats were yellowfin tuna (45 %), sailfish (37 %), marlin (32 %), and coastal sharks (32 %). The reported percentages add to greater than 100 % as most HMS for-hire trips targeted multiple species. This was

especially true of 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 % or fewer reporting targeting other species.

Table 6.28 Percent of HMS Charter/Headboat Trips by Region and Target Species (2013)

	N. Atlantic		S. 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

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. * Percentages exceed 100 percent as most trips targeted multiple species.

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 %), bigeye tuna (45 %), swordfish (34 %), and coastal sharks (33 %). In the North Atlantic region, the two HMS most commonly targeted by both charter and head boats were yellowfin tuna (57 %, 100 %) and bigeye tuna (48 %, 100 %). The third HMS most commonly targeted in the North Atlantic by charter boats were bluefin tuna (35 %) which were not targeted on any reported headboat trips. HMS charters in the South Atlantic were most likely to report targeting sailfish (56 %), yellowfin tuna (44 %), and marlins (40 %). In the Gulf of Mexico, HMS charter and head boats were most likely to report targeting coastal sharks (64 %, 48 %), yellowfin tuna (35 %, 53 %), and marlins (23 %, 30 %).

In the Northeast, the average net return per HMS charter boat trip was $969 (Table 6.29). 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 over-night 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 costs ($70).

Table 6.29 Average Costs and Revenues for HMS Charter Boat Trips by Region (2013)

	Northeast Region (n = 95)	Southeast Region (n = 297)	Gulf of Mexico (n = 86)
	Maine to Virginia	North Carolina to east Florida	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

In the Northeast, the LPS estimated that there were 4,936 charter trips from July to November, 2013, that targeted HMS (Table 6.30). Extrapolating the average gross revenue per HMS trip in the Northeast resulted in an estimate of $12.1 million in gross revenue from July through November, 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 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 6.31).

In the Southeast, the MRIP estimated that there were 3,008 charter trips from July to November, 2013, that targeted HMS (Table 6.30). Extrapolating the average gross revenue per HMS trip in the Southeast resulted in an estimate of $3.7 million in gross revenue from July through 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 6.31).

In the Gulf of Mexico, excluding Texas, the MRIP estimated that there were 1,505 charter trips from July to November, 2013, that targeted HMS (Table 6.30). 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 through 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 6.31).

Table 6.30 Total Costs and Earnings for HMS Charter Boats by Region (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.

Table 6.31 Estimated Total Expenditures and Economic Impacts Generated by Atlantic HMS Charter Boat Trip Operations by Region (July-November 2013)

Region	Total Expenses ($1,000)	Economic Impacts		
		Employment	Labor Income ($1,000)	Total Output ($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

This study estimated 1,131 jobs were generated as a result of HMS charter vessel operations during the study period (Table 6.31). 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.

NMFS published the most recent plan for this required periodic review of regulations in the Federal Register in 2016 (81 FR 51426, August 4, 2016). This plan required review of rules issued during 2009. There were no Atlantic HMS rules published in 2009 that are subject to Section 610 review.

Chapter 6 References

American Sportfishing Association 2008. Sportfishing in America. http://asafishing.org/wp-content/uploads/Sportfishing_in_America_Jan_2008_Revised.pdf

Ditton, R.B., D.K. Anderson, J.F. Thigpen III, B.L. Bohnsack, and S.G. Sutton. 2000. 1999 Pirates cove big game tournaments: participants' characteristics, participation in fishing, attitudes, expenditures, and economic impacts. Human Dimensions of Fisheries Laboratory Report #HD-615, Texas A & M University, College Station, TX. 126 p.

Ditton, R.B. and D.J. Clark. 1994. Characteristics, attitudes, catch-and-release behavior, and expenditures of billfish tournament anglers in Puerto Rico. Report prepared for The Billfish Foundation, Ft. Lauderdale, FL. 27 p.

Ditton, R.B. and J.R. Stoll. 2003. Social and economic perspective on recreational billfish fisheries. Marine & Freshwater Research (54)4: 545-554.

Holland, S. M., A. J. Fedler, and J. W. Milon. 1999. The operations and economics of the charter and head boat fleets of the Eastern Gulf of Mexico and South Atlantic Coasts. Memo NOAA Fisheries - F/SPO-38.

Hutt, Clifford, Sabrina Lovell, and George Silva. 2014. The Economic Contributions of Atlantic Highly Migratory Species Anglers in New England and the Mid-Atlantic, 2011. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-F/SPO-147, 34 p.

Hutt, Clifford, and George Silva. 2015. The Economics of Atlantic Highly Migratory Species For-Hire Fishing Trips, July-November 2013. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-OSF-4, 31 p.

Lovell, Sabrina, Scott Steinback, and James Hilger. 2013. The economic contribution of marine angler expenditures in the United States, 2011. U.S. Department of Commerce, NOAA Technical Memo. NMFS-F/SPO-134, 188 p.

Lovell S, Hilger J, Steinback S, Hutt C. 2016. The economic contribution of marine angler expenditures on durable goods in the United States, 2014. U.S. Department of Commerce, NOAA Technical Memo. NMFS-F/SPO-165, 72 p.

Minnesota IMPLAN Group, Inc. 2010. IMPLAN professional: social accounting and impact analysis software. Minnesota IMPLAN Group, Inc., Minneapolis.

NMFS Office of Science and Technology foreign trade statistics website: http://www.st.nmfs.noaa.gov/st1/trade/cumulative_data/TradeDataProduct.html

NMFS. 2015a. Annual report of the United States to ICCAT. USDOC, National Marine Fisheries Service.

NMFS. 2015b. Fisheries of the United States: 2014. Alan Lowther and Michael Liddel, Editor. Office of Science and Technology, Fisheries Statistics and Economics Division, NOAA, U.S. Department of Commerce, Silver Spring, MD. http://www.st.nmfs.noaa.gov/st1/publications.html

Rose, D. 1996. An overview of world trade in sharks. TRAFFIC International. 105 p.

Sutton, S.G., R.B. Ditton, J.R. Stoll, and J.W. Milon. 1999. A cross-sectional study and longitudinal perspective on the social and economic characteristics of the charter and party boat fishing industry of Alabama, Mississippi, Louisiana, and Texas. Report prepared for the National Marine Fisheries Service with MARFIN funding support (Grant Number NA 77FF0551.) Human Dimensions of Fisheries Research Laboratory Report #HD-612. Texas A&M University, College Station. 198p.

Thailing, C.E., R.B. Ditton, D.K. Anderson, T.J. Murray, J.E. Kirkley, J. Lucy. 2001. The 2000 Virginia Beach red, white, and blue fishing tournament: participants' characteristics, attitudes, expenditures, and economic impacts. VIMS, College of William and Mary, Virginia Marine Resources Report No. 2001-9, VSG-01-88, Texas A & M University, College Station, TX. 110 p.

U.S. Fish and Wildlife Service and U.S. Department of Commerce U.S. Census Bureau. 2011 national survey of fishing, hunting, and wildlife-associated recreation. FHW/-6-NAT.

7 COMMUNITY PROFILES

National Standard 2 of the 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 FMP" (50 CFR 600.315(d)(3). This chapter updates information on the HMS fishing communities identified and described in the 2006 Consolidated HMS FMP 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, ten 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 2015. Please refer to prior SAFE reports for previous years' hurricane impact information.

The 2015 Atlantic hurricane season was somewhat below average (Stewart 2016) with a below average number of hurricanes (4). Only two hurricanes, Danny and Joaquin, intensified into major hurricanes, based on the Saffir-Simpson Hurricane Wind Scale, and there were eleven named storms, which is one storm less than the long-term averages. No hurricanes in 2015 made landfall on the continental United States. Hurricane Joaquin, however, deposited record-shattering rainfall while it passed offshore in the Atlantic exceeding 15 to 20 inches in parts of North and South Carolina. Areas in South Carolina saw rainfall totals in excess of those that would be expected in a 1-in-1,000 year event, with localities around Charleston and Columbia, SC being the hardest hit.

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, NMFS 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 (EEZ) to all fishing and analyzed the environmental impacts of these closures in an Environmental Assessment. Between May and November 2010, NMFS 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 EEZ. Significant portions of state territorial waters in Alabama (40 %), Florida (2 %), Louisiana (55 %), and Mississippi (95 %) 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 2011c).

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 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 between 11,000-18,000 jobs, and have an overall economic loss between $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.

One of the restoration projects is the Deepwater Horizon Oceanic Fish Restoration Project (previously referred to as that Pelagic Longline (PLL) Bycatch Reduction Project), which was released in September 2015 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 PLL fishing gear by compensating PLL fishermen who agree to voluntarily refrain from PLL 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 gear and/or buoy gear) to allow for the continued harvest of yellowfin tuna and swordfish during the repose period when PLL 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 PLL 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 PLL fishery would 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. For more information see: http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/Final-Phase-IV-ERP-EA.pdf, http://www.gulfspillrestoration.noaa.gov/, and http://sero.nmfs.noaa.gov/deepwater_horizon/index.html.

7.3 Community Impacts of Impediments to Navigation

Access to HMS may be hindered when ocean inlets become difficult to navigate. Severe shoaling has been observed in the Oregon Inlet and Hatteras Inlet, NC, causing fishermen and other mariners to either make difficult maneuvers through the shallow inlets or to reroute to Teaches Hole Channel at Ocracoke Inlet to the south or the Intracoastal Waterway via Chesapeake Bay to the north, resulting in higher fuel costs.

Dare County, NC, commissioned a study of the economic impacts of the Oregon Inlet navigability (Moffatt & Nichol 2014). The study examined the impacts of reduced navigability on five sectors: commercial fishing, seafood packing/processing, boat building and support services, and the recreational fishing (both charter and private sectors). The study found that with the Oregon Inlet in its current condition, the five sectors provide a total annual economic impact of 3,319 jobs and $403.5 million to Dare County and a total of 4,348 jobs and $548.4 million to North Carolina, including Dare County (Moffatt & Nichol, 2014). If the inlet were fully open, the five sectors studied could potentially provide a total annual economic impact of 5,120 jobs and $642.2 million to Dare County and a total of 5,397 jobs and $693 million to the rest of North Carolina (Moffatt & Nichol 2014).

Commercial fishermen were interviewed about the navigability of Oregon Inlet. If the inlet is not maintained, the interview responses indicated that most commercial fishing vessels would choose to remain in the fishing business but would relocate their fishing operations to other ports (Moffatt & Nichol 2014).

7.4 Social Indicators of Fishing Community Vulnerability and Resilience

The NMFS Office of Science and Technology presents community profiles by region (e.g., Northeast, mid-Atlantic, Southeast, Gulf of Mexico) on the following website: http://www.st.nmfs.noaa.gov/humandimensions/community-profiles/index. The NMFS Office of Science and Technology presents information on community vulnerability and resilience in a technical memo available on its webpage: http://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index.

Jepsen and Colburn (2013) developed a series of social indicators of vulnerability, resilience, and dependence on the fishing industry for coastal communities of the United States. This series of indices developed by NMFS 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 United States Census, permit sales, landings reports, and recreational fishing effort estimates from the MRIP survey (Jepsen and Colburn 2013). To date, their database includes index scores for over 3,800

coastal communities on the Atlantic, Gulf of Mexico, and West Coasts in addition to Alaska and Hawaii, which can be found on the community profiles website above.

In the 2014 SAFE Report, social indicators were presented for 25 communities selected by Jepson and Colburn (2013) for having a greater than average number of Atlantic HMS permits associated with them. Social indicator scores for these and other coastal communities were dependent on the fishing industry can be viewed via an online map tool on the NMFS Office of Science and Technology website for community profiles listed above. An update of the indices presented in the 2013 study (Jepsen and Colburn) is forthcoming and will contain updated and new data including a scope that encompasses communities from the entire United States. Once complete, updated social indicator scores for select Atlantic HMS communities will be included in a future SAFE report.

Chapter 7 References

Deepwater Horizon Oil Spill Natural Resource Damage Assessment: *Deepwater Horizon* Oil Spill Final Phase IV Early Restoration Plan and Environmental Assessments. 2015. Available at: http://www.gulfspillrestoration.noaa.gov/wp-content/uploads/Final-Phase-IV-ERP-EA.pdf

Impact Assessment, Inc. 2004. Identifying Communities Associated with the Fishing Industry in Louisiana. La Jolla, California. (NOAA-NMFS-Contract WC133F-02-SE-0297).

Jepson, Michael and Lisa L. Colburn. 2013. Development of Social Indicators of Fishing Community Vulnerability and Resilience in the U.S. Southeast and Northeast Regions. U.S. Dept. of Commerce., NOAA Technical Memorandum NMFS-F/SPO-129, 64 p.

Kirkley, J.E. 2005. The communities of the Atlantic highly migratory species (HMS) fishery: an overview of change associated with the HMS fishery management plan. Department of Coastal and Ocean Policy, School of Marine Science, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, Virginia. (NOAA-NMFS-HMS contract report).

Moffatt & Nichol. 2014. A Study of the Economic Impacts of Oregon Inlet Navigability to Dare County, the Surrounding Region, and the State of North Carolina. Final Report. Available at: http://www.darenc.com/home/showdocument?id=212

NOAA. 2011c. NOAA: All federal waters of the Gulf of Mexico once closed to fishing due to spill now open. Press Release. Available at: http://www.noaanews.noaa.gov/stories2011/20110419_gulfreopening.html

Stewart, S.R. 2016. National Hurricane Center Annual Summary: 2015 Atlantic Hurricane Season. Available at: http://www.nhc.noaa.gov/data/tcr/summary_atlc_2015.pdf

Sumaila, U.R., A.M. Cisneros-Montemayor, A. Dyck, L. Huang, W. Cheung, J. Jacquet, K. Kleisner, V. Lam, A. McCrea-Strub, W. Swartz, R. Watson, D. Zeller, D. and Pauly. 2012. Impact of the Deepwater Horizon Well Blowout on the Economics of US Gulf Fisheries. Canadian Journal of Fisheries and Aquatic Sciences. 69:499-510

Upton, H.F. 2011. The deepwater horizon oil spill and the Gulf of Mexico fishing industry. Congressional Research Service (R41640; February 17, 2011).

U.S. Census Bureau. "2010 Census Demographic Profiles." http://www2.census.gov/census_2010/03-Demographic_Profile.

Wilson, D., B.J. McCay, D. Estler, M. Perez-Lugo, J. LaMargue, S. Seminski, and A. Tomczuk. 1998. Social and cultural impact assessment of the highly migratory species fishery management plan and the amendment to the Atlantic billfish fisheries management plan. The Ecopolicy Center for Agriculture, Environmental, and Resource Issues, New Jersey Agricultural Experiment Station, Cook College, Rutgers, the State University of New Jersey (NOAA-NMFS-HMS contract report).

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 Act, the Endangered Species Act, the Marine Mammal Protection Act, and the Migratory Bird Treaty Act. In 1998, NOAA Fisheries developed a report, Managing the Nation's Bycatch: Priorities, Programs and Actions for the National Marine Fisheries Service, which 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 December 2016, NMFS issued a *National Bycatch Reduction Strategy* (http://www.nmfs.noaa.gov/sfa/fisheries_eco/bycatch/strategy.html) that aims to coordinate NMFS' efforts to address bycatch under the various mandates. NMFS (2016a) 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. NMFS 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 HMS fisheries as bycatch or incidental catch are marlin, undersized swordfish, and bluefin tuna caught 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 or considered to reduce bycatch in the Atlantic HMS fisheries. Final Amendment 5b to the 2006 Consolidated HMS FMP will expand the use of several of these methods in HMS fisheries.

Table 8.1 Bycatch Reduction Methods in the Atlantic HMS Fisheries – Historical and Currently Employed (*)

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*	Full Retention of Catch
Effort Reductions (i.e., Limited Access)*	Time/Area Closures
De-hooking Devices (mortality reduction only)*	
Prohibiting retention of fish*	
Full Retention of Catch	

* = These measures are currently employed in Atlantic HMS fisheries.

There are probably no fisheries in which there is zero bycatch because none of the currently legal fishing gears are perfectly selective for the target of each fishing operation (with the possible exception of the swordfish/tuna harpoon fishery and speargun fishery). Therefore, to eliminate completely bycatch of all non-target species in Atlantic HMS fisheries would be impractical. The goal of bycatch reduction is to minimize the amount of bycatch to the extent practicable and 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 (SBRM) 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 and subsequent amendments and their implementing regulations. NMFS provides an overview of bycatch in Atlantic HMS fisheries through 2010 in its 2011 SAFE Report (NMFS 2011a), and an updated overview of bycatch, including observer coverage rates, in Chapter 5 of this report. On January 19, 2017, NMFS published its final guidance on the requirements and implementation of SBRMs in all fisheries managed under the Magnuson-Stevens Act (82 FR 6317).

NMFS 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, and catch reporting via vessel monitoring systems. Post-release mortality of HMS is considered in stock assessments to the extent that the data allow.

In the following sub-sections, NMFS summarizes data collection, reporting, and recording requirements for PLL, purse seine, shark BLL, shark gillnet, commercial handgear, and recreational handgear vessels. 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). Post-release mortality of HMS is accounted for in stock assessments to the extent that the data will allow.

Pelagic Longline Fishery

NMFS utilizes both self-reported logbook data and observer data to monitor bycatch in the PLL fishery. The incidental catch of bluefin tuna in the pelagic longline fishery is also monitored via electronic monitoring (camera array) and vessel monitoring systems. Logbooks (Fisheries Logbook System or FLS, and the supplemental discard report form in the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook program) are mandatory, and reporting rates appear to be generally high (Garrison 2005). 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.

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 PLL 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 directed and indirect swordfish 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 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 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 BiOp for Atlantic PLL Fishery for HMS (NMFS 2004b). Observer coverage in 2005-2007 ranged from 7.5 – 10.8 percent. NMFS 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. NMFS increased mandatory observer coverage for pelagic longline vessels in the Mid-Atlantic Bight, including the Cape Hatteras GRA, from December 1, 2015 through April 30, 2016. Expanding observer coverage in this

area will help scientists better understand bluefin tuna stock structure, biology and behavior, and assist in the rebuilding of the stock.

Fishery observer effort is allocated among eleven large geographic areas and 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 reported to the FLS program 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 PLL gear to report through VMS the following information within 12 hours of completion of each PLL set: date the set was made; area in which the set was made; the number of hooks in the set; and the 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 Northeast Distant Area (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 3 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.

Purse Seine Fishery

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 the 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.

NMFS has limited observer data on the bluefin tuna purse seine fishery. The observer coverage requirement in this fishery is reported in section 5.2.

Bottom Longline Fishery

NMFS utilizes both self-reported logbook data and observer data to monitor bycatch in the shark BLL fishery. Logbooks (Fisheries Logbook System or FLS, and the supplemental discard report form in the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook program) are mandatory, and reporting rates appear to be generally high (Garrison 2005). The shark BLL fishery has relatively low observed bycatch rates. Historically, finfish bycatch has averaged approximately five percent in the BLL 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.

Gillnet Fishery

NMFS utilizes both self-reported logbook data and observer data to monitor bycatch in the shark gillnet fishery. Logbooks (Fisheries Logbook System or FLS, and the supplemental discard report form in the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook program) are mandatory, and reporting rates appear to be generally high (Garrison 2005). 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

Commercial Handgear Fishery

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.

Recreational Handgear Fishery

The recreational landings database for Atlantic HMS consists of information obtained through surveys including the MRIP, LPS, Southeast Headboat Survey (HBS), Texas Headboat Survey, RBS tournament data, and the HMS Recreational Reporting Program (non-tournament swordfish, billfishes, and bluefin tuna) via http://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 the MRIP, LPS, and RBS) 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, NMFS 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 web portal at http://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.

8.1.2 Bycatch Reduction in HMS Fisheries

The NMFS 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 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), in the 2006 Consolidated HMS FMP (NMFS 2006a), and in HMS SAFE Reports. In addition, an HMS Bycatch Reduction Implementation Plan was developed in late 2003and 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, and 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 is found in Table 8.2. For details of protected species as bycatch in PLL, shark BLL, and shark gillnet fisheries, please refer to Table 5.9 - Table 5.15, Table 5.43, and Table 5.53, 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. Adjustments to reporting methodologies are implemented as conditions or practices change in the fisheries or research identifies new methodologies or needs.

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 as described in 8.1.1. Adjustments to reporting methodologies are implemented as conditions or practices change in the fisheries or research identifies new methodologies or needs. 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 (Year Implemented) for the Atlantic HMS Fisheries

Fishery/Gear Type	Bycatch Species	MMPA Category	ESA Requirements	Bycatch Data Collection	Management Measures
Pelagic longline	Bluefin tuna Billfish Undersize target species Marine mammals Sea turtles Seabirds Non-target finfish Prohibited shark species Large coastal shark species after closure	Category I	Jeopardy findings in 2000 & 2004; Reasonable and Prudent Alternative implemented 2001-04; ITS, Terms & Conditions, RPMs; Consultation reinitiated in 2014	Permit requirement (1985); logbook requirement (SWO- 1985; SHK - 1993); observer requirement (1992), EFPs (2001-present); VMS reporting (2015)	Bluefin tuna 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 Atl PLL fishery (2009), weak hook requirement in GOM (2011); Individual Bluefin Quotas, GRAs, Electronic Monitoring, VMS reporting (2015)
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)
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)

Fishery/Gear Type	Bycatch Species	MMPA Category	ESA Requirements	Bycatch Data Collection	Management Measures
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)
Bluefin tuna purse seine	Undersize target species Non-target finfish	Category III	ITS, Terms & Conditions	Permit requirement (1982); observer requirement (1996, 2001 only); EFPs (2002-03); VMS reporting (2015)	Quotas (1975); limited access, individual vessel quotas (1982); minimum size (1982); VMS requirements and 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)

MMPA – Marine Mammal Protection Act; ESA – Endangered Species Act; ITS – Incidental take statement; MRFSS – Marine Recreational Fishing Statistics Survey; EFPs – Exempted fishing permits; BFT – Bluefin tuna; SWO – Swordfish; SHK – Shark; GOM – Gulf of Mexico; NED – North East Distant; MAB – Mid Atlantic Bight; PLL – Pelagic longline; VMS – Vessel monitoring system; LPS – Large Pelagic System

Domestic fishery landings and bycatch data are taken from the U.S. Annual Report to ICCAT, and directly from NMFS program databases including commercial landings from the HMS and Coastal Fisheries Logbook Programs, Pelagic Longline and Southeast Gillnet and Bottom Longline Observer Programs, Electronic Dealer Reporting Program (eDealer), Atlantic Catch and Landings Reports, and Commercial Bluefin Tuna Landings; and recreational landings from the LPS, the RBS, and the HMS Recreational Reporting Program. NMFS permits data are assembled from the Office of Science and Technology's International Trade Permits, Regional Permits Offices, HMS Permits, HMS Exempted Fishing, Display, and Scientific Research Permits, and HMS Tournament Registration.

NMFS 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.

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 NMFS-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 protected species that becomes entangled or hooked must be immediately released, and gear must be immediately retrieved and moved at least one nautical mile (1 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.

NMFS 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 of 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 5.13 for sea turtle and marine mammal interactions in the pelagic longline fishery.

Purse Seine Fishery

NMFS 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.

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 NMFS-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 protected species that becomes entangled or hooked must be immediately released, and gear must be immediately retrieved and moved at least one nautical mile from that location before fishing is resumed to avoid interacting with the species again. Marine mammal entanglements must be reported to NMFS 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 use 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. Observer coverage, bycatch and disposition, and protected species interactions in this fishery are reported in section 5.5.

NMFS 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 5.43.

Gillnet Fishery

Vessel owners and operators must attend a protected species safe handling, release, and identification workshop every three years. Fishermen using gillnet gear must limit soak times to 24 hours when using sink gillnet gear and conduct a net check at least every 2 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 NMFS consistent with the Marine Mammal Authorization Program. Smalltooth sawfish must not be removed from the water while being removed from the net.

NMFS 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.

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.

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). NMFS 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.

NMFS developed a Code of Angling Ethics as part of implementing Executive Order 12962 – Recreational Fisheries. NMFS 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 NMFS 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 2006a).

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 (Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), and Migratory Bird Treaty Act (MBTA)) affecting protected species, along with a description of the Pelagic Longline Take Reduction Team (PLTRT), Take Reduction Plan (PLTRP), and measures to address protected species concerns, is available on the NMFS Office of Protected Resources website (http://www.nmfs.noaa.gov/pr/) and discussed in the 2011 HMS SAFE Report (NMFS 2011a). The interaction of seabirds and longline fisheries is also considered under the United States "National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries" (NPOA – Seabirds). Bycatch of HMS in other fisheries is also discussed in the 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.

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

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 that Could be 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*
False killer whale	*Pseudorca crassidens*
Long-finned pilot whale	*Globicephela melas*
Pantropical spotted dolphin	*Stenella attenuata*
Pygmy sperm whale	*Kogia breviceps*
Risso's dolphin	*Grampus griseus*
Short-finned pilot whale	*Globicephela macrorhynchus*

Source: NMFS (http://www.nmfs.noaa.gov/pr/interactions/fisheries/lof.html).

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

1. Category I fisheries are those with frequent serious injury or 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 LOF for 2016 was effective May 9, 2016 (April 8, 2016; 81 FR 20550). The LOF also identifies species with which the Atlantic HMS fisheries interact. The Atlantic Ocean, Caribbean, and Gulf of Mexico large PLL 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 BLL; 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 reported in Table 8.2 (Section 8.2).

Owners of vessels or gear engaging in a Category I and/or II fishery(ies) are required to register with NMFS 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 NMFS' 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. Recreational vessels fisheries are not categorized listed on the LOF since they are not considered commercial fishing vessels.

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 Harbor Porpoise, Bottlenose Dolphin, Pelagic Longline (PLTRP), and Atlantic Large Whale Take Reduction (ALWTRP) Plans.

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

the MAB to 12-15 percent to ensure representative sampling of pilot whales and Risso's dolphins; (2) encourage vessel operators to maintain daily communication with other local vessel operators regarding protected species interactions throughout the PLL fishery with the goal of identifying and exchanging information relevant to avoiding protected species bycatch; (3) recommending that NMFS update the guidelines for handling and releasing marine mammals and NMFS and the industry to develop new technologies, equipment, and methods for safer and more effective handling and release of marine mammals; and (4) recommending NMFS pursue research and data collection goals in the PLTRT regarding pilot whales and Risso's dolphins. More information on the PLTRT can be found at http://www.nmfs.noaa.gov/pr/interactions/trt/pl-trt.html. The PLTRT last met in December 2015 in Virginia Beach, VA to discuss progress under the Plan.Interactions and the Endangered Species Act (ESA).

The ESA of 1973, as amended (16 U.S.C. §1531 et seq.), provides for the conservation and recovery of endangered and threatened species of fish, wildlife, and plants. The listing of a species is based on the status of the species throughout its range or in a specific portion of its range in some instances. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. §1532(20)] if no action is taken to stop the decline of the species. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. §1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NMFS, is authorized to list marine and anadromous fish species, marine mammals (except for walrus and sea otter), marine reptiles (such as sea turtles), and marine plants. The Secretary of the Interior, acting through the USFWS, is authorized to list walrus and sea otter, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species. A listing of species under the ESA that are encountered in Atlantic HMS Fisheries is included in Table 8.4.

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

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
Humpback whale *(Megaptera novaeangliae)*	Endangered
Northern right whale *(Eubalaena glacialis)*	Endangered
Sei whale *(Balaenoptera borealis)*	Endangered
Sperm whale *(Physeter macrocephalus)*	Endangered
Sea Turtles	
Green turtle *(Chelonia mydas)*	*Endangered/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 right whale	Endangered
Finfish	
Smalltooth sawfish *(Pristis pectinata)*	Endangered
Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)	**Endangered/Threatened

*Green sea turtles in U.S. waters are listed as threatened except for the Florida breeding population, which is listed as endangered. Due to the inability to distinguish between the populations away from the nesting beaches, green sea turtles are considered endangered wherever they occur in U.S. waters. ** Atlantic sturgeon have five distinct population segments. The population in the Gulf of Mexico is considered threatened. The other populations in the New York bight, Chesapeake Bay, Carolina, and South Atlantic are all considered endangered.

Sea Turtles

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

A BiOp completed on June 14, 2001, found that the actions of the PLL fishery as proposed would jeopardize the continued existence of loggerhead and leatherback sea turtles. This document reported that the PLL 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), NMFS published an emergency rule that closed the NED area to PLL fishing (effective July 15, 2001), modified how PLL 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), NMFS extended the emergency rule for 180 days through July 8, 2002. On July 9, 2002, NMFS

published a final rule (67 FR 45393) that closed the NED to PLL fishing. As part of the Reasonable and Prudent Alternative, the BiOp required NMFS 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 0.5 to 2 hours.

The experimental program required in the BiOp was initiated in the NED area in 2001 in cooperation with the U.S. PLL 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 PLL 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 PLL fishery may have exceeded the Incidental Take Statement in the June 14, 2001 BiOp, NMFS published a Notice of Intent to prepare an SEIS to assess the potential effects on the human environment of proposed alternatives and actions under a proposed rule to reduce sea turtle bycatch (68 FR 66783). A BiOp for the Atlantic PLL fishery was completed on June 1, 2004 (NMFS 2004b). The BiOp concluded that long-term continued operation of the Atlantic PLL fishery, authorized under the 1999 FMP, was not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or olive ridley sea turtles; and was likely to jeopardize the continued existence of leatherback sea turtles.

On July 6, 2004, NMFS implemented additional regulations for the Atlantic PLL 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 2004c). Post-release mortality rates were expected to decline due to a decrease in the number of turtles that swallow hooks which engage in the gut or throat, a decrease in the number of turtles that are foul-hooked and improved handling and gear removal protocols. NMFS is working to export this new technology to PLL 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, NMFS published a rule that required BLL vessels to carry the same dehooking equipment as the PLL vessels. To date, all bottom and PLL vessels with commercial shark permits are required to have NMFS-approved sea turtle dehooking equipment onboard (PLL: July 6, 2004, 69 FR 40734; BLL: February 7, 2007, 72 FR 5639).

A May 20, 2008 BiOp issued under Section 7 of the ESA for Amendment 2 concluded, based on the best available scientific information, that Amendment 2 was not likely to jeopardize the continued existence of endangered green, leatherback, and Kemp's ridley sea turtles; the endangered smalltooth sawfish; or the threatened loggerhead sea turtle.

On March 31, 2014, the Office of Sustainable Fisheries (OSF) requested reinitiation of consultation on the PLL BiOp due to new information on mortality rates and total mortality estimates for leatherback turtles that exceed those specified in the RPA; changes in information about leatherback and loggerhead populations; and new information on sea turtle mortality. On October 30, 2014, NMFS requested reinitiation of ESA Section 7 consultation on the continued operation and use of several HMS gear types (bandit gear, bottom longline, buoy gear, handline, and rod and reel) and associated fisheries management actions in the 2006 Consolidated Atlantic HMS FMP and its amendments, after Central and Southwest Atlantic DPS of scalloped hammerhead sharks and seven Caribbean species of corals were determined to occur within the management area of Atlantic HMS fisheries. See below in this section for more information on reinitiation of ESA Section 7 consultation in HMS fisheries.

Smalltooth Sawfish

NMFS 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, NMFS unpublished data). The animal was released in good condition and likely survived the interaction. No smalltooth sawfish captures in shark gillnet gear were observed from 2004-2011 (Carlson and Richards 2011, NMFS unpublished data). Based on this information, in the 2012 BiOp (NMFS 2012), NMFS estimated that one smalltooth sawfish may be taken annually, and that 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, NMFS estimated that that one smalltooth sawfish may be taken annually in the smoothhound portion of the gillnet fishery, and that that take would be either lethal or non-lethal (NMFS 2012).

Interactions with Seabirds

The NPOA-Seabirds (http://www.nmfs.noaa.gov/ia/species/seabirds/us_npoa.pdf) was released in February 2001, and calls for detailed assessments of longline fisheries, and, if a problem is found to exist within a longline fishery, for measures to reduce seabird bycatch within two years. Because interactions appear to be relatively low in Atlantic HMS fisheries, the adoption of immediate measures is unlikely. The 2014 Report on the Implementation of the United States National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries was

submitted to the UN FAO in June 2014 and can be found here http://www.nmfs.noaa.gov/ia/resources/publications/ccrf/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 Migratory Bird Treaty Act. The majority of longline interactions with seabirds occur as the gear is being set. The birds eat the bait and become hooked on the line. The line then sinks and the birds are subsequently drowned.

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.

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

On March 31, 2014, NMFS requested reinitiation of Section 7 consultation under the Endangered Species Act (ESA) on 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 biological opinion. Additionally, new information has become available about leatherback and loggerhead sea turtle populations and sea turtle mortality. While the mortality rate measure will be re-evaluated during consultation, the overall ability of the RPA to avoid jeopardy is not affected, and NMFS is continuing to comply with the terms and conditions of the RPA and RPMs pending completion of consultation. NMFS also has confirmed that there will be no irreversible or irretrievable commitment of resources that would foreclose the formulation or implementation of any reasonable and prudent alternative measures pending completion of consultation, consistent with section 7(d) of the Act.

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

The Central and Southwest Atlantic DPS of scalloped hammerhead sharks and seven Caribbean species of corals have been determined to occur within the management area of Atlantic HMS fisheries. Therefore, on October 30, 2014, NMFS requested reinitiation of ESA Section 7 consultation on the continued operation and use of several HMS gear types (bandit gear, bottom longline, buoy gear, handline, and rod and reel) and associated fisheries management actions in the 2006 Consolidated Atlantic HMS FMP and its amendments. These management actions were previously consulted in the 2001 Atlantic HMS biological opinion and the 2012 Shark and Smoothhound biological opinion, to assess potential adverse effects of these gear types on the

Central and Southwest DPS of scalloped hammerhead sharks and seven threatened coral species. NMFS has preliminarily determined that the ongoing operation of the fisheries is consistent with existing biological opinions and is not likely to jeopardize the continued existence or result in an irreversible or irretrievable commitment of resources which would foreclose formulation or implementation of any reasonable and prudent alternative measures on the threatened coral species.

With regard to the ongoing reinitiation of ESA Section 7 consultation on the Atlantic PLL fishery, the effects of HMS fishery interactions with the central and southwest Atlantic DPS of scalloped hammerhead shark and the seven threatened coral species (July 2014) will be considered in the ongoing PLL consultation. This will most effectively evaluate the effects of the PLL fishery on all listed species in the action area.

8.3.2 Additional Measures to Address Protected Species Concern

NMFS 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 PLL Fishery (69 FR 40734). NMFS 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). NMFS 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 BLL fisheries was effective October 23, 2008 (73 FR 54721). For a summary of bycatch management measures, please refer to Section 8.2.

Atlantic Large Whale Take Reduction Plan (ALWTRP) regulations

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 SC, within 35 nautical miles 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 US 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. For additional information please see the ALWTRP website 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 Atlantic Large Whale Take Reduction Plan requirements. The Amendment 9 measures will be effective on March 15, 2016.

Atlantic Bottlenose Dolphin Take Reduction Team

NMFS published a final rule on April 22, 2006, to implement the 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

8.4 Bycatch of HMS in Other Fisheries

The following section summarizes the bycatch of HMS in any federal or state-managed fishery which captures them. NMFS 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 5.6 mt ww of yellowfin tuna, skipjack tuna, albacore tuna, bigeye tuna, and swordfish in 2014 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 increased from 2013 for swordfish; however, pre-2013 swordfish landings were an order of magnitude higher. 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 (2011-2015)

Species	2011	2012	2013	2014	2015
Yellowfin tuna	1.3	0.2	0.0	0.3	0.0
Skipjack tuna	0.0	0.01	0.0	0.0	0.07
Bigeye tuna	1.2	0.2	0.0	0.0	0.09
Albacore tuna	2.0	0.3	0.0	0.0	1.7
Swordfish	17.9	26.8	2.9	5.3	2.9
Total	22.4	27.6	2.9	5.6	4.8

Source: NMFS 2016

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, E. and I. 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 34).

8.5 Pelagic Longline Time/Area Closures and Gear Restrictions in Reducing Bycatch

Since 2000, NMFS has implemented a number of time/area closures and gear restrictions in the Atlantic Ocean and Gulf of Mexico to reduce discards and bycatch of a number of species (e.g., juvenile swordfish, bluefin tuna, billfish, sharks, sea turtles) in the pelagic longline fishery. Circle hooks 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 PLL fishery is available in the 2011 HMS SAFE Report. Amendment 7, effective January 1, 2015, implemented GRAs for the PLL fishery in the Gulf of Mexico and Atlantic in order to reduce interactions between PLL gear and bluefin tuna. The Amendment 7 Gulf of Mexico GRAs prohibit the use of PLL gear during April and May, and the Amendment 7 Cape Hatteras GRA provides conditional access to the area for vessels fishing with PLL during December through April.

The combined effects of the individual area closures and gear restrictions were examined by comparing the reported catch and discards from 2005-2015 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 24.1 percent during 2005-2015 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, sharks, billfish, and sea turtles. The only positive changes from the base period were the numbers of bluefin tuna and dolphin kept and bluefin tuna, large coastal sharks, and spearfish discards. The reported number of bluefin tuna kept increased by 54.7 percent for 2005-2015 compared to 1997-1999 (Table 8.6). The number of reported discards of bluefin tuna increased by 3.3 percent between the same time periods, which is less than the predicted 10.7 percent increase from the analyses in Regulatory Amendment 1. The number of dolphin kept increased by 9.8 percent (Table 8.7). Reported billfish (blue marlin, white marlin, and sailfish) discards decreased by 42 - 62 percent from 1997-1999 to 2005-2015 (Table 8.7). The reported discards of spearfish increased by 37.5 percent, although the absolute number of discards was low. The reported number of turtle interactions decreased by 70 percent from 1997-1999 to 2005-2015.

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 large coastal shark discards increased by 9.4 percent from 1997-1999 to 2005-2015. The numbers of bluefin tuna discards and dolphin kept have increased.

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 24.1 percent

from 1997-1999 to 2005-2015. Increases in the number of hooks set were noted in three areas. The Sargasso (SAR) area exhibited increases in reported effort more than ten-fold from the period 1997-1999; however, this effort represents only 2.8 percent of the overall effort reported in the fishery. Effort increased in the Florida East Coast (FEC) area by 17.0 percent and in the South Atlantic Bight (SAB) by 8.9 percent. The Mid-Atlantic Bight (MAB) returned to nearly the same level as that reported in 1997-99 (0.3% decrease; 3,864 hooks). Reported effort declined by 32 – 91 percent in all other areas. Large declines of 62.9 percent in the SAT area (Tuna North and Tuna South combined) and 83 percent in the Caribbean area (CAR) were reported; however these represent less than three percent and less than one percent of total reported effort, respectively. The Gulf of Mexico (GOM), representing almost 35 percent of the total reported effort, declined 32.3 percent after a brief increase of reported hooks between 2012 and 2014.

Concern over the status of bluefin tuna and the effects of the PLL 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 has remained low since. The number of bluefin tuna kept decreased to 55 in 2013, increased to 104 in 2014, and dropped again to 74 in 2015. The discards from the other areas (Table 8.10) have remained relatively constant, fluctuating between 100 and 300 for the past 10 years. The number of reported bluefin tuna discards in the areas other than MAB and NEC decreased 75 percent to 64, the lowest in the time series. The level of bluefin tuna discards in these areas does not appear to be effort-related (referring back to Table 8.8), as the reported number of hooks set has been relatively stable (MAB) or in decline (NEC).

The time/area closures and live bait prohibition in the Gulf of Mexico have been successful at reducing bycatch in the HMS pelagic longline fishery. Reported discards of all species of billfish except spearfish have declined. The reported number of turtles caught, swordfish discarded, and pelagic and large coastal shark discards have also declined. However, the number of bluefin tuna discarded has increased.

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 (2011–2015) 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
2011	5,914.5	38,012	8,510	355	764	40,993	728	16,338	453	68,401	2,850
2012	7,678.5	51,544	7,996	392	563	59,188	1,046	14,841	459	84,707	3,113
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
(B) 2005-15	6,479.7	40,509	8,030	368	848	43,123	1,194	13,090	410	64,513	2,771
% 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)	-24.1	-41.4	-62.7	54.7	3.3	-40.4	-52.0	-38.6	-63.8	-36.4	-34.4
Pred [1]		-24.6	-41.5		-1.0					-5.2	
Pred [2]		-13.0	-31.4		10.7					10.0	

(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: Fisheries Logbook System.

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 (2011–2015) 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 Discards	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
2011	3,694	43,778	130	6,085	29,442	335	1,848	50	539	921	556	281	66
2012	2,794	23,038	86	7,716	42,445	432	3,121	92	843	1,432	767	270	61
2013	3,394	28,800	50	8,629	34,250	181	2,721	59	844	1,239	456	342	92
2014	3,851	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	357
(B) 2005-15	3,230	35,320	636	6,899	43,616	514	2,597	97	710	1,153	504	293	179
% 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)	-17.1	-32.2	-92.8	9.4	9.8	-15.4	-49.8	-44.6	-56.2	-41.6	-62.4	37.5	-70.0
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

(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: Fisheries Logbook System.

Table 8.8 Reported Distribution of Hooks Set by Area (2011-2015) and Percent Change Since 1997-99

Year	CAR	GOM	FEC	SAB	MAB	NEC	NED	SAR	NCA	SAT	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
2011	29,600	1,247,892	1,129,555	984,858	1,330,542	665,706	173,038	206,923	11,270	135,069	5,914,453
2012	7,200	2,655,468	1,285,060	937,946	1,513,367	787,681	127,044	171,177	3,300	190,211	7,678,454
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
(B) 2005-15	55,792	2,266,227	854,100	858,196	1,263,545	527,697	273,035	182,963	17,825	162,280	6,479,660
% 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)	-83.0	-32.3	17.0	8.9	-0.3	-41.5	-46.6	1,178.4	-90.7	-62.9	-24.1

(A) and (B) are average values for the years indicated. CAR – Caribbean; GOM - Gulf of Mexico; FEC - Florida East Coast; SAB - South Atlantic Bight; MAB - Mid-Atlantic Bight; NEC - Northeast Coastal; NED - Northeast Distant; SAR - Sargasso; NCA - North Central Atlantic; SAT - Tuna North & Tuna South. Source: Fisheries Logbook System

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 (2011-2015)

Year	Hooks Set (x1000)	BFT Kept	BFT Discards	SWO Kept	SWO Discards	PEL Shark Kept	PEL Shark Discards	LCS Kept	LCS Discards	Billfish Discards	Sea Turtle Interactions
2011	1,996.3	168	583	9,995	2,474	2,793	19,867	90	1,809	497	28
2012	2,301.1	102	270	12,597	1,396	2,199	13,535	9	1,972	650	16
2013	1,966.6	55	107	9,806	2,766	2,711	17,958	9	1,366	693	31
2014	1,740.4	104	122	5,027	1,015	3,115	16,405	6	1,050	710	18
2015	1,727.1	74	146	6,637	2,235	1,795	17,625	8	3,668	1,888	256

BFT - Bluefin tuna; SWO – Swordfish; PEL – Pelagic sharks; LCS - Large coastal sharks. Source: Fisheries Logbook System.

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 (2011-2015)

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
2011	3,918.2	187	181	28,017	6,036	901	23,911	40	4,276	1,800	38
2012	5,377.4	290	293	38,947	6,600	595	9,503	77	5,744	2,743	45
2013	5,339.3	218	159	34,750	2,583	683	9,842	41	7,263	2,190	61
2014	5,384.8	275	258	27,881	3,640	689	22,101	41	4,855	2,339	77
2015	4,128.9	246	64	21,093	3,147	413	27,457	42	5,171	3,509	101

BFT - Bluefin tuna; SWO – Swordfish; PEL – Pelagic sharks; LCS - Large coastal sharks. Source: Fisheries Logbook System.

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 NMFS' current size and offset restrictions for the GOM PLL 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. 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 (2012-15). Annual reported landings of swordfish and yellowfin tuna immediately following implementation of the weak hook requirement appeared to be on the rise but have fallen off in 2014-2015. Bluefin tuna landings and discards have decreased since 2012. In order to remove interannual differences, the mean reported landings for each four-year period were calculated and compared. The mean reported landings of swordfish, yellowfin, and albacore tuna were greater following implementation. Bluefin tuna and bigeye tuna landings decreased and discards of swordfish and bluefin tuna also showed a decrease. The mean reported discards of blue marlin were greater during 2012-2015.

The next step was to examine the nominal catch per unit effort (cpue as expressed as catch per 1000 hooks) between the two time periods. The catch-per-unit of effort (CPUE) of swordfish, yellowfin, and albacore tuna kept was higher in 2012-2015 versus 2007-2010. The CPUE of bluefin tuna kept and discards were lower in 2012-2015 as were the CPUEs of swordfish discards and bigeye tuna kept. The CPUE of bluefin tuna kept was 32 percent lower following weak hook implementation and the CPUE of bluefin tuna discards were 50 percent lower. Blue marlin CPUE was greater after the weak hook requirement went into effect.

Table 8.11 Reported Number of Hooks Fished and Landings of Major Target Species and Blue Marlin Interactions from the Gulf of Mexico (2007-2015)

Year	Hooks (x1000)	Swordfish	Bluefin	Yellowfin	Bigeye	Albacore	Swordfish discards	Bluefin tuna discards	Blue marlin discards
2007	2,914.5	8,051	116	23,917	586	477	4,402	186	282
2008	2,368.4	6,155	100	14,640	250	323	3,583	270	277
2009	3,037.2	8,438	116	23,278	160	577	2,831	249	478
2010	1,005.8	3,003	65	5,265	133	171	1,000	113	58
2011	1,334.7	5,464	23	13,512	30	648	1,882	29	152
2012	2,655.5	10,129	137	25,419	292	818	3,292	226	494
2013	2,312.2	9,143	44	17,593	180	627	2,022	76	279
2014	2,219.7	4,868	53	15,212	151	352	1,401	87	223
2015	1,465.5	2,304	17	9,877	189	459	1,036	24	229
2007-10 mean	2,331.5	6,419.3	99.3	16,775	282.3	387	2,954	198	273.8
2012-15 mean	2,163.2	6,611	62.8	17,025.3	203	564	1,937.5	93	303.8
2007-10 CPUE		2.7533	0.0426	7.1951	0.1211	0.166	1.267	0.0849	0.1174
2012-15 CPUE		3.0561	0.029	7.8704	0.0938	0.2607	0.8958	0.043	0.1404

Source: Fisheries Logbook System

8.7 Evaluation of Other Bycatch Reduction Measures

NMFS 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.

Chapter 8 References

Angliss, R.P. and D.P. DeMaster. 1998. Differentiating serious and non-serious injury of marine mammals taken incidental to commercial fishing operations. NOAA Technical Memorandum NMFS OPR-13: 48 p.

Beerkircher, L. R., E. Cortés, and M. Shivji. 2002. Characteristics of shark bycatch observed on pelagic longlines off the southeastern United States, 1992–2000. Mar. Fish. Rev. 64:40–49.

Cortés, E. 2005. Stock assessment of small coastal sharks in the U.S. Atlantic and Gulf of Mexico. NOAA, NMFS, Southeast Fisheries Science Center, Panama City, FL. SFD-02/03-177. 222 p.

Cortés, E. and I. Baremore. 2011. Updated catches of sandbar, dusky, and blacknose sharks. SEDAR21-DW-09.

de Silva, J.A., R.E. Condrey, B.A. Thompson. 2001. Profile of shark bycatch in the U.S. Gulf menhaden fishery. North Amer. Jour. of Fish. Mgmt. 21:111-124.

Fairfield-Walsh, C., and L. P. Garrison. 2006. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2005. NOAA Tech Memo. NMFS-SEFSC-539, 52 p.

Garrison, LP. 2005. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2004. NOAA Tech Memo. NMFS-SEFSC-531. 52 p.

Graves JE, Horodysky AZ. 2015. Challenges of estimating post-release mortality of istiophorid billfishes caught in the recreational fishery: a review. Fish Res. 166(June 2015):163-168.

Mathers, A.N., B.M. Deacy, M.S. Passeroti, and J.B. Carlson. 2014. Catch and bycatch in U.S. southeast gillnet fisheries, 2013. NOAA Tech Memo. NMFS-SEFSC-657. 24 p.

NMFS. 1998. Managing the nation's bycatch: programs, activities, and recommendations for the National Marine Fisheries Service. USDOC, NOAA, NMFS, Silver Spring, MD, 192 p.

NMFS. 1999. Final fishery management plan for Atlantic tunas, swordfish and sharks. NOAA, NMFS, HMS Management Division.

NMFS. 2000. Regulatory amendment 1 to the 1999 HMS FMP: reduction of bycatch, bycatch mortality, and incidental catch in the Atlantic pelagic longline fishery, June 14, 2000. NOAA, NMFS, HMS Management Division.

NMFS. 2002. Regulatory adjustment 2 to the Atlantic tunas, swordfish, and sharks fishery management plan. USDOC, NOAA, NMFS, Highly Migratory Species Management Division, 174 p.

NMFS. 2003. Final amendment 1 to the fishery management plan for Atlantic tunas, swordfish, and sharks. USDOC, NOAA, NMFS, Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD.

NMFS. 2004a. Evaluating Bycatch: A national approach to standardized bycatch monitoring programs. USDOC, NOAA Tech. Memo. NMFS-F/SPO-66, 108 p.

NMFS. 2004b. Endangered Species Act-Section 7 Re-initiation of Consultation on the Atlantic Pelagic Longline Fishery for Highly Migratory Species. Biological Opinion, June 1, 2004. 154 p.

NMFS. 2004c. Final Supplemental Environmental Impact Statement. Reduction of Sea Turtle Bycatch and Bycatch Mortality in the Atlantic Pelagic Longline Fishery. NOAA, National Marine Fisheries Service, HMS Management Division, Silver Spring, MD.

NMFS. 2005. United States National Report to ICCAT, 2005. NAT-038.

NMFS. 2006. Final consolidated Atlantic highly migratory species fishery management plan. NOAA, NMFS, Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD. 1,600 p.

NMFS. 2011a. Stock assessment and fishery evaluation (SAFE) report for Atlantic highly migratory species. Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD 20910.

NMFS. 2011b. US National Bycatch Report. Karp, W.A.L.L. Desfosse and S.G. Brooke, eds. USDOC NOAA TM NMFS-F/SPO-117E, 508 p.

NMFS. 2012. Continued Authorization of the Atlantic Shark Fisheries via the Consolidated HMS Fishery Management Plan as Amended by Amendments 3 and 4 and the Federal Authorization of a Smoothhound Fishery (F/SER/201 1/06520). Biological Opinion, December 12, 2012. 378 p.

NMFS. 2013. Annual report of the United States to ICCAT. USDOC, National Marine Fisheries Service. ANN/045/2012.

NMFS. 2016. Draft national bycatch reduction strategy. NOAA Fisheries. February 2016. Accessed on 31 October 2016 at: http://www.nmfs.noaa.gov/sfa/fisheries_eco/bycatch/docs/national-bycatch-strategy-2-23-16-web.pdf.

NMFS. 2016a. U.S. National bycatch report first edition update 2. LR Benaka, D Bullock, J Davis, EE Seney, H Winarsoo (eds.). US Dept of Commer, 90 p. Accessed on 31 October 2016 at: https://www.st.nmfs.noaa.gov/Assets/Observer-Program/bycatch-report-update-2/NBR%20First%20Edition%20Update%202_Final.pdf.

Rago, P.J., S.E. Wigley, and M.J. Fogarty. 2005. NEFSC bycatch estimation methodology: allocation, precision, and accuracy. USDOC, Northeast Fish Sci Cent Ref Doc. 05-09; 44 p.

Ryder, C.E., T.A. Conant, and B.A Schroeder. 2006. Report of the workshop on marine turtle longline post-interaction mortality. USDOC, NOAA Tech. Mem. NMFS-F/OPR-29.

SEDAR 11. 2006. Stock assessment report: large coastal shark complex, blacktip, and sandbar shark. NOAA/NMFS, Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD.

SEDAR 13. 2007. Stock assessment report: small coastal shark complex, Atlantic sharpnose, blacknose, bonnethead, and finetooth shark. NOAA/NMFS, Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD.

SEDAR 34a. 2013. Stock assessment report: HMS Atlantic sharpnose shark. SEDAR, SAR Section II, 242 p.

SEDAR 34b. 2013. Stock assessment report: HMS Bonnethead shark. SEDAR, SAR Section II, 222 p.

Shah, A., J.W., Watson, D. Foster, and S. Epperly. 2004. Experiments in the Western Atlantic Northeast Distant Waters to Evaluate Sea Turtle Mitigation Measures in the Pelagic Longline Fishery – Summary of Statistical Analysis. NOAA, NMFS, SEFSC, Pascagoula, MS. Unpublished Report.

Watson, J.W., D.G. Foster, S. Epperly, and A. Shah. 2003. Experiments in the Western Atlantic Northeast Distant Waters to Evaluate Sea Turtle Mitigation Measures in the Pelagic Longline Fishery – Summary of Statistical Analysis. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Pascagoula, MS. Unpublished report.

Watson, J.W., D.G. Foster, S. Epperly, and A. Shah. 2004. Experiments in the Western Atlantic Northeast Distant Waters to Evaluate Sea Turtle Mitigation Measures in the Pelagic Longline Fishery: Report on experiments conducted in 2001–2003. February 4, 2004. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Pascagoula, MS. 123 p.

Yeung, C. 2001. Estimates of marine mammal and marine turtle bycatch by the U.S. Atlantic pelagic longline fleet in 1999 - 2000. NOAA Technical Memorandum NMFS-SEFSC-467. 43 p.