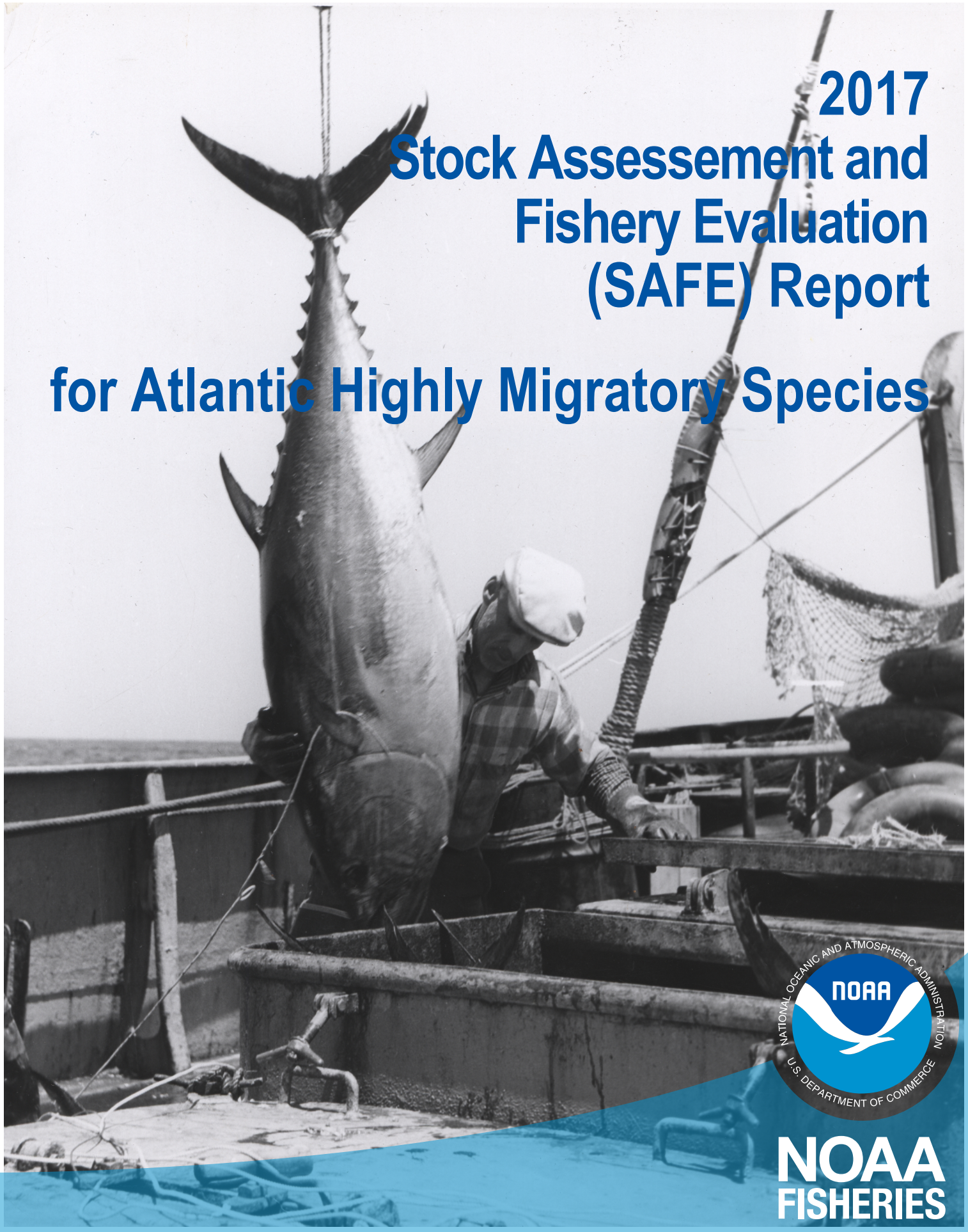

2017 Stock Assessement and Fishery Evaluation (SAFE) Report

for Atlantic Highly Migratory Species

NOAA FISHERIES

2017
Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic Highly Migratory Species

Atlantic Highly Migratory Species Management Division
January 2018

For HMS permitting information and regulations:
HMS Recreational, Commercial, and Dealer compliance guides
https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-compliance-guides
Regulatory updates for tunas
https://hmspermits.noaa.gov/

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

For HMS SAFE Reports:
2014 – current:
https://www.fisheries.noaa.gov/content/atlantic-hms-stock-assessment-and-fisheries-evaluation-reports
2000 – 2013:
Please contact nmfs.sf.webmaster@noaa.gov, or the Highly Migratory Species Management Division (contact information below).

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: Bluefin tuna being hoisted aboard the research vessel DELAWARE, under the federal fisheries service (then part of the Department of the Interior's Fish and Wildlife Service). The date of the photo is unknown. The R/V Delaware was in service to FWS between 1950 and 1968. Photo credit to NOAA Central Library Historical Fisheries Collection.

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LIST OF COMMONLY USED ACRONYMS

AA	Assistant Administrator for Fisheries
ACCSP	Atlantic Coastal Cooperative Statistics Program
ACL	Annual catch limit
ACT	Annual catch target
ALRS	Automated Landings Reporting System
ALWTRT/P	Atlantic Large Whale Take Reduction Team/Plan
AM	Accountability measure
ANPR	Advanced notice of proposed rulemaking
AP	Advisory panel
ASMFC	Atlantic States Marine Fisheries Commission
ATCA	Atlantic Tunas Convention Act
ATR	Atlantic Tournament Registration and Reporting
B	Biomass
BAYS	Bigeye, albacore, yellowfin, and skipjack tunas
BFT	Bluefin tuna
BiOp	Biological opinion
BLL	Bottom longline
BLLOP	SEFSC Bottom Longline Observer Program
B_{MSST}	Biomass of the minimum stock size threshold
B_{MSY}	Stock biomass needed for maximum sustainable yield
B_{OY}	Stock biomass needed for optimum yield
CBP	U.S. Bureau of Customs and Border Protection
CAR	Caribbean area
CFMC	Caribbean Fishery Management Council
CFL	Curved fork length
CFR	Code of Federal Regulations
CITES	Convention on International Trade in Endangered Species of wild fauna, flora
COASTSPAN	Cooperative Atlantic States Shark Pupping and Nursery survey
CPCs	Contracting parties, non-contracting parties, entities, or fishing entities
CPUE	Catch per unit effort
CZMA	Coastal Zone Management Act
DEIS	Draft environmental impact statement
DPS	Distinct population segment
dw	Dressed weight
eBCD	Electronic international bluefin tuna catch documentation system
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
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
F_{OY}	Fishing mortality rate expected to yield optimum yield
FR	Federal Register
FRFA	Final regulatory flexibility analysis
GOM	Gulf of Mexico
GMFMC	Gulf of Mexico Fishery Management Council
GNOP	Southeast Gillnet Observer Program
GULFSPAN	Gulf of Mexico Shark Pupping and Nursery survey
GSMFC	Gulf States Marine Fisheries Comm
GRA(s)	Gear Restricted Area(s)
HAPC	Habitat area of particular concern
HMS	Highly migratory species: Atlantic sharks, tunas, swordfish, and billfish
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
IMO	International Maritime Organization
IPOA	International plan of action
IRFA	Initial regulatory flexibility analysis
ITDS	International Trade Data System
ITS	Incidental Take Statement
IUU	Illegal, unreported, unregulated
LAP	Limited access permit
LCS	Large coastal sharks
LOA	Letter of acknowledgment

LOF	List of Fisheries
LPS	Large Pelagics Survey
MAB	Mid Atlantic Bight area
MAFMC	Mid-Atlantic Fishery Management Council
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MBTA	Migratory Bird Treaty Act
MFMT	Maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MRIP	Marine Recreational Information Program
MSST	Minimum stock size threshold
MSY	Maximum sustainable yield
mt	Metric tons
NCA	North central Atlantic area
NEC	Northeast coastal area
NED	Northeast distant area/waters
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fisheries Observation Program
NEFSC	Northeast Fisheries Science Center
NGO	Non-governmental organization
nmi	Nautical mile
NOA	Notice of Availability
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NPOA	National Plan of Action
NS	National Standards
OSF	Office of Sustainable Fisheries
OY	Optimum yield
PLTRT/P	Pelagic Longline Take Reduction Team/Plan
PLL	Pelagic longline
POP	Pelagic [Longline] Observer Program
OPR	Office of Protected Resources
PRA	Paperwork Reduction Act
RBS	Recreational Billfish Survey
RIR	Regulatory Impact Review
RPAs	Reasonable and Prudent Alternatives
RPMs	Reasonable and Prudent Measures
SAB	South Atlantic bight area
SAFE	Stock Assessment and Fishery Evaluation
SAFMC	South Atlantic Fishery Management Council
SAR	Sargasso Sea area
SBRM	Standardized bycatch reporting methodology
SCRS	Standing Committee for Research and Statistics
SCS	Small coastal sharks
SEDAR	Southeast Data and Assessment Review
SEFSC	Southeast Fisheries Science Center
SEIS	Supplemental environmental impact statement
SERO	Southeast Regional Office
SFA	Sustainable Fisheries Act
SFL	Straight fork length
SRP	Scientific research permit
SSB	Spawning stock biomass
SSF	Spawning stock fecundity
SWO	Swordfish
TAC	Total allowable catch
TL	Total length
TUN	Tuna North area
TUS	Tuna South area
UDP	United Data Processing, replaced Fisheries Logbook System (FLS) in 2015
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	Vessel monitoring system
VTR	Vessel trip report
ww	Whole weight
YOY	Young of the year

EXECUTIVE SUMMARY

This 2017 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 2016 HMS SAFE Report, the HMS Management Division: held two HMS Advisory Panel meetings; finalized two Fishery Management Plan (FMP) Amendments – one on dusky sharks (Amendment 5b) and one on essential fish habitat (EFH) (Amendment 10); published several rules regarding HMS fisheries, including final rule adjusting the 2018 shark quotas, a proposed rule to modify the timing of individual bluefin tuna quota program accountability measures, and proposed and final rules creating a separate provision for the commercial sale of Atlantic HMS by HMS Charter/Headboat permit holders; and enacted numerous inseason actions for the management of Atlantic HMS, particularly for bluefin tuna. The 25th Regular Meeting of the International Commission for the Conservation of Atlantic Tunas (ICCAT) was held in Marrakech, Morocco, November 14 - 21, 2017. The United States helped develop recommendations aimed at promoting the conservation, management, and rebuilding of Atlantic HMS stocks (e.g., tunas, billfish, swordfish, and sharks). At this meeting, ICCAT adopted recommendations regarding western Atlantic bluefin tuna, North and South Atlantic swordfish, North Atlantic albacore tuna (including ICCAT's first harvest control rule/mangement strategy evaluation), Atlantic bigeye, yellowfin, and skipjack tunas, and North Atlantic shortfin mako sharks, as well as recommendations on monitoring, control, and surveillance measures. ICCAT also evaluated the reporting and compliance with conservation and management measures of the 52 members.

Four stocks of HMS relevant to U.S. fisheries underwent assessments in 2017. The Standing Committee on Research and Statistics (SCRS) completed stock assessments for North Atlantic shortfin mako shark, north Atlantic swordfish, south Atlantic swordfish, and western Atlantic bluefin tuna. A stock assessment update is underway for sandbar sharks through the Southeast Data and Assessment Review (SEDAR) process (SEDAR 54). NMFS continued shark nursery grounds research and essential fish habitat 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 2016 data that were completed and/or published in 2017. 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. In 2017, the Recreational Billfish Survey was

combined with the HMS tournament database registry, and renamed the Atlantic Tournament Registration and Reporting System, or ATR.

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

NMFS permits data are collected from the Office of Science and Technology's International Fisheries 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 Registry and Reporting System.

Most NOAA Fisheries webpages will be undergoing a transition to a new content management system in 2018. At the time of publication we have provided the most recent web addresses to relavent Atlantic HMS content, but some web addresses may be subject to change. In those cases where the relevant information is not displayed, please refer to: https://www.fisheries.noaa.gov.

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 Fishery Conservation and Management Act (Magnuson-Stevens Act) is the primary Federal legislation governing the management of marine fisheries of the United States. The guidelines for National Standard (NS) 2 of the Magnuson-Stevens Act (50 CFR 600.315) require the National Marine Fisheries Service (NMFS) to prepare a Stock Assessment and Fishery Evaluation (SAFE) Report, or similar document, and summarize, on a periodic basis, the best scientific information available concerning condition of the stocks, essential fish habitats (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 2017 SAFE Report for Atlantic Highly Migratory Species (HMS) managed under the 2006 Consolidated Atlantic Highly Migratory Species Fisheries Management Plan (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, EFH, marine ecosystems, and fisheries managed under Federal regulation from a variety of sources across a wide range of disciplines. This includes information from the latest stock assessment data, and a summary of recommendations and resolutions from the International Commission for the Conservation of Atlantic Tunas (ICCAT) and its Standing Committee on Research and Statistics (SCRS). It also provides updated information regarding the economic status of HMS fisheries, fishing communities, and industries, as well as the socio-economic and environmental impacts of recently implemented regulations.

1.1 Agency Activities and Regulatory Actions for HMS

Since the publication of the 2016 SAFE Report, NMFS proposed or implemented a number of actions with regard to Atlantic HMS. These actions were published in the Federal Register (FR) and are listed in Table 1.2 and the major actions are discussed below. Most documents related to these and previous actions are available on the Atlantic HMS website at https://www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species or by calling the HMS Management Division at (301) 427-8503.

NMFS held two Atlantic HMS Advisory Panel meetings in 2017: May 9 – May 11 in Silver Spring, MD; and September 6 - 7 in Silver Spring, MD. These meetings provided valuable opportunities for comments on a suite of management actions that NMFS pursued or considered in 2017. Meeting presentations and transcripts are posted on the HMS website.

On April 4, 2017, NMFS published its final rule for Amendment 5b to the 2006 Consolidated Atlantic HMS FMP (82 FR 16478). The purpose of the rule is to reduce dusky shark fishing mortality and rebuild the stock, consistent with the results of the 2016 stock assessment update to the Southeast Data and Assessment Review (SEDAR) report, SEDAR 21. The final rule also clarifies the annual catch limit (ACL) and accountability measures (AMs) for the prohibited shark complex, which includes dusky sharks, and established AMs for dusky sharks. As dusky sharks are already prohibited species, the final measures focus on reducing bycatch and post-release mortality rates, and improving compliance, species identification, and reporting. For the recreational fisheries, the final 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 non-offset, non-stainless steel circle hooks while fishing for sharks within a specified geographic range unless using flies or artificial lures. For the commercial fisheries, the final measures include requiring pelagic longline (PLL) vessels to use a dehooker or safely 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 (BLL) vessels to use circle hooks. The commercial measures became effective June 5, 2017 except for circle hook requirement for BLL vessels. This requirement, in addition to the recreational measures, becomes effective January 1, 2018. More details and new outreach materials are available on the HMS website, http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/am5/a5b_index.html, and a reminder bulletin is available at https://www.fisheries.noaa.gov/bulletin/reminder-new-requirements-recreational-and-commercial-shark-fishing-take-effect.

On September 9, 2017, NMFS published a Notice of Availability (NOA) for Final Amendment 10 (82 FR 42329). The purpose of this Final Amendment was to update Atlantic HMS EFH with recent information using the same EFH delineation methods used in Amendment 1 to the 2006 Consolidated Atlantic HMS FMP; update and consider new Habitat Areas of Particular Concern (HAPC)s for Atlantic HMS based on recent information, as warranted; minimize to the extent practicable the adverse effects of fishing on EFH; and identify other actions to encourage the conservation and enhancement of EFH. Maps showing the previous EFH boundaries ("2009 EFH") and the new, updated EFH boundaries ("2017 EFH") are available at this website through January 2018: http://www.nmfs.noaa.gov/sfa/hms/documents/fmp/am10/index.html. After January 2018, these maps will be available at NOAA's new website: https://www.fisheries.noaa.gov/bulletin/final-amendment-10-essential-fish-habitat. Shapefiles will be uploaded to the Atlantic HMS website and online mappers at a future date, and are currently available by written request (mailto:Jennifer.Cudney@noaa.gov).

On September 18, 2017, NMFS adjusted the 2017 annual baseline quota for northern albacore tuna with available underharvest of the 2016 adjusted U.S. northern albacore quota, adjusted the 2017 baseline quota for North and South Atlantic swordfish based on available underharvest from the 2016 adjusted U.S. quota and international quota transfers, and augmented the 2017 Atlantic bluefin tuna Reserve category quota with available underharvest of the 2016 adjusted U.S. Atlantic bluefin tuna quota (82 FR 43500), consistent with the annual quota adjustment processes established in Amendment 7 and the 2016 Swordfish Quota Adjustments Final Rule. These quota adjustments were consistent with ICCAT Recommendations 16-06, 16-03, 16-04, and 16-08, respectively, and were effective for 2017 only.

On November 22, 2017, NMFS published a final rule (82 FR 55512) that established quotas, opening dates, and retention limits for the 2018 Atlantic commercial shark fisheries. The quota adjustments are based on over- and/or underharvests experienced during 2017 and previous fishing seasons. The large coastal shark (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. The proposed rule for this action published on August 21, 2017 (82 FR 39735) and the public comment period ended on September 21, 2017. All shark management groups open on January 1, 2018.

On December 6, 2017, NMFS published a final rule (82 FR 57543) creating a commercial sale endorsement provision for Atlantic HMS by HMS Charter/Headboat permit holders. Previously, all vessels issued an HMS Charter/Headboat permit and also in possession of a state commercial state permit, were categorized as "commercial fishing vessels" and thus subject to United States Coast Guard (USCG) commercial fishing vessel safety requirements, regardless of whether the permit holder engaged in commercial fishing. Under the final rule, HMS Charter/Headboat permit holders are prohibited from selling Atlantic tunas or swordfish unless they obtain a "commercial sale" endorsement on their permit. In addition to the commercial sale endorsement, a separate commercial shark permit is still required for HMS Charter/Headboat vessels to sell sharks. The endorsement clarifies which HMS Charter/Headboat permitted vessels are properly categorized as commercial fishing vessels. NMFS data shows that only 7% of HMS

Charter/Headboat permitted vessels ever sell their catch and are appropriately subject to the USCG requirements, which are expensive and can be logistically difficult to implement due to limited space onboard smaller vessels. This action was administrative in nature and did not affect fishing practices or result in any significant environmental or economic impacts. The proposed rule for this action published on October 27, 2017 (82 FR 49773) and the public comment period ended on November 13, 2007. This rule becomes effective January 5, 2018.

On December 28, 2017, NMFS published a final rule (82 FR 64189) that modified HMS Individual Bluefin Quota (IBQ) regulations to require vessels in the PLL fishery to account for bycatch of bluefin tuna using IBQ on a quarterly basis instead of before commencing any fishing trip with less than the minimum required IBQ balance or with quota debt. Specifically, vessels would be allowed to fish with an IBQ balance below the minimum amount currently required to depart on a fishing trip with PLL gear, or with quota debt incurred by exceeding their IBQ balance, during a given calendar quarter; however, vessels would be required to reconcile quota debt and satisfy the minimum IBQ requirement prior to departing on a PLL fishing trip in the subsequent calendar quarter. The proposed rule for this action published on October 25, 2017 (82 FR 49303) and the public comment period closed on November 24, 2017. The rule becomes effective January 27, 2018.

Based on public comments regarding Caribbean HMS regulations, 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, the Atlantic HMS Management Division has presented potential issues and options associated with 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 (Jan 1, 2017 to Dec 21, 2017)

Federal Register Cite	Date	Rule or Notice
		HMS Fisheries (General)
82 FR 3209	1/11/2017	Technical Amendment for Prohibitions Section of the Atlantic HMS Regulations
82 FR 4856	1/17/2017	Notice of Receipt of an Application for Exempted Fishing Permit and Availability of Draft Environmental Assessment for Pelagic Longline Research in East Florida Coast Closed Area
82 FR 10746	2/15/2017	Extension of Comment Period and Announcement of Public Webinar for Exempted Fishing Permit Application for Pelagic Longline Research in East Florida Coast Closed Area
82 FR 12340	3/2/2017	Notice of Receipt of Applications for Exempted Fishing Permits for White Shark Research
82 FR 12444	3/3/2017	Notice of Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops
82 FR 16575	4/5/2017	Notice of Public Meeting of the Atlantic HMS Advisory Panel
82 FR 26670	6/8/2017	Notice of Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops
82 FR 32684	7/17/2017	Notice of Receipt of Application for Exempted Fishing Permit from the Cape Cod Commercial Fishermen's Alliance
82 FR 37566	8/11/2017	Issuance of Exempted Fishing Permit and Availability of Final Environmental Assessment for Pelagic Longline Research in East Florida Coast Closed Area
82 FR 39569	8/21/2017	Notice of Public Meeting of the Atlantic HMS Advisory Panel
82 FR 42329	9/7/2017	Notice of Availability of Final Amendment 10 to the 2006 Consolidated Atlantic HMS Fishery Management Plan: Essential Fish Habitat
82 FR 43500	9/18/2017	Adjustments to 2017 Northern Albacore Quota, North and South Atlantic Swordfish Quotas, and Atlantic Bluefin Tuna Reserve Category Quota
82 FR 44162	9/21/2017	Notice of Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops
82 FR 48216	10/17/2017	Notice of Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops
82 FR 49004	10/23/2017	Request for Atlantic Highly Migratory Species Advisory Panel Member Nominations
82 FR 49596	10/26/2017	Notice of Intent to Issue Exempted Fishing Permits, Scientific Research Permits, Display Permits, Letters of Acknowledgment, and Shark Research Fishery Permits for Atlantic HMS in 2018
82 FR 49773	10/27/2017	Proposed Rule for an Atlantic Highly Migratory Species Charter/Headboat Permit Commercial Sales Provision
82 FR 57543	12/6/2017	Final rule for an Atlantic Highly Migratory Species Charter/Headboat Permit Commercial Sales Provision
82 FR 57588	12/6/2017	Notice of Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops
		Bluefin and BAYS Tunas
82 FR 12296	3/2/2017	Annual Adjustment of Atlantic Bluefin Tuna Purse Seine and Reserve Category Quotas; Inseason Quota Transfer of 45 mt from the Reserve Category to the Longline Category
82 FR 12747	3/7/2017	Inseason Transfer of 40 mt Atlantic Bluefin Tuna Quota from the Reserve Category to the General Category and Adjusted Daily Retention Limit for March 5 – March 31
82 FR 14162	3/17/2017	Atlantic Bluefin Tuna Angling Category Southern Area Trophy Fishery Closure March 20
82 FR 16136	4/3/2017	Atlantic Bluefin Tuna General Category Fishery Closure March 29 – May 31
82 FR 19615	4/28/2017	Atlantic Bluefin Tuna Angling Category Recreational Daily Retention Limit Adjustment April 30 – December 31

Federal Register Cite	Date	Rule or Notice
82 FR 22616	5/17/2017	Atlantic Bluefin Tuna General Category Fishery Daily Retention Limit Adjustment for June 1 - August 31
82 FR 26603	6/8/2017	Atlantic Bluefin Tuna Angling Category Gulf of Mexico Trophy Fishery Closure June 7
82 FR 36689	8/7/2017	Atlantic Bluefin Tuna General Category Fishery Daily Retention Limit Adjustment August 5 – December 31
82 FR 37825	8/14/2017	Atlantic Bluefin Tuna Angling Category Northern Area Trophy Fishery Closure August 11
82 FR 38853	8/16/2017	Inseason Transfer of 30 mt Atlantic Bluefin Tuna Quota from the Reserve Category to the Harpoon Category
82 FR 39047	8/17/2017	Atlantic Bluefin Tuna General Category Fishery Closure August 16-31
82 FR 41356	8/31/2017	Atlantic Bluefin Tuna General Category Fishery Daily Retention Limit Adjustment September 1 – December 31
82 FR 43711	9/19/2017	Atlantic Bluefin Tuna General Category Fishery Closure September 17-30
82 FR 43710	9/19/2017	Notification that the Northeast Distant Area (NED) quota is filled and Atlantic Tunas Longline Category Individual Bluefin Quota Accounting Rules Now Apply in the NED
82 FR 46000	10/3/2017	Inseason Transfer of 156.4 mt Atlantic Bluefin Tuna Quota from the Reserve Category to the General Category
82 FR 46934	10/10/2017	Atlantic Bluefin Tuna General Category Fishery Closure October 5 – November 30
82 FR 49303	10/25/2017	Proposed Rule to Modify Individual Bluefin Tuna Quota Program Regulations for Accounting for Bluefin Tuna
82 FR 55520	11/22/2017	Transfer of Unused Atlantic Bluefin Tuna Harpoon Category Quota to the General Category; General Category Fishery Opens December 1 with 12.7 mt Quota
82 FR 57885	12/8/2017	Atlantic Bluefin Tuna General Category Fishery Closure December 6-31, 2017
82 FR XXXXX	12/28/2017	Final Rule to Modify Individual Bluefin Tuna Quota Program Regulations for Accounting for Bluefin Tuna
		Sharks
82 FR 16478	4/4/2017	Final Rule to Implement Amendment 5b to the 2006 Consolidated Atlantic HMS Fishery Management Plan
82 FR 17765	4/13/2017	Atlantic Region Commercial Aggregated Large Coastal Shark and Hammerhead Shark Management Groups Retention Limit Adjustment April 15 – December 31
82 FR 20447	5/2/2017	Closure of Commercial Blacktip Shark, Aggregated Large Coastal Sharks, and Hammerhead Shark Management Groups in the Western Gulf of Mexico Sub-Region May 2
82 FR 32490	7/14/2017	Atlantic Region Commercial Aggregated Large Coastal Shark and Hammerhead Shark Management Groups Retention Limit Adjustment July 16 – December 31
82 FR 39735	8/22/2017	Proposed Rule to Establish Quotas, Opening Dates, and Retention Limits for the 2018 Atlantic Shark Commercial Fishing Season
82 FR 51218	11/3/2017	Request for Applications for Participation in the Atlantic HMS 2018 Shark Research Fishery
82 FR 55512	11/22/2017	Final Rule to Establish Quotas, Opening Dates, and Retention Limits for the 2018 Atlantic Shark Commercial Fishing Season
82 FR 56965	12/1/2017	Request for Nominations for Shark Assessment Advisory Panel
		Swordfish and Billfishes
82 FR 29010	6/27/2017	Swordfish General Commercial Permit Retention Limit Adjustment July 1 – December 31, 2017
82 FR 58761	12/14/2017	Swordfish General Commercial Permit Retention Limit Adjustment January 1 – June 30, 2018

1.2 2017 Accomplishments of the International Commission for the Conservation of Atlantic Tunas

ICCAT is a regional fishery management organization (RFMO) with 52 members, including the United States. The 25th Regular Meeting of ICCAT was held in Marrakech, Morocco, November 14-21, 2017 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 management, harvest control/management strategy evaluation for certain tuna stocks, swordfish conservation and management, sharks monitoring, control and surveillance measures, and compliance.

Bluefin Tuna: ICCAT adopted Recommendation 17-06 to establish interim conservation and management measures for 2018 through 2020, including establishing a total allowable catch (TAC) of 2,350 mt (an increase of approximately 17%). This recommendation was adopted to be responsive to a 2017 SCRS stock assessment while recognizing the need for a transition between the 20-year rebuilding program adopted in 1998 and a future approach to managing the stock that relies on management procedures to meet ICCAT convention objectives (i.e., to maintain populations at levels that will support maximum sustainable yield). Application of the western bluefin tuna allocations among Contracting Parties, Cooperating non-Contracting Parties, Entities, and/or Fishing Entities (CPCs), which remained unchanged, results in a total U.S. quota of 1,272.86 mt, including 25 mt for bycatch related to pelagic longline fisheries in the vicinity of the Northeast Distant management area (NED) boundary. The Recommendation also details work to be undertaken by the ICCAT and its scientific body toward the anticipated adoption of management procedures, including a harvest control rule, for western Atlantic bluefin tuna by 2020. For eastern Atlantic and Mediterranean bluefin tuna, Recommendation 17-07 increases the TAC for 2018-2020, while maintaining management measures until they can be considered more fully in 2018. The stock assessment ended the use of divergent high and low recruitment scenarios based upon biomass reference points that had dominated past assessments. Instead, an approach that relies on a fishing mortality proxy ($F_{0.1}$) was adopted to achieve sustainable yield over the long-term.

North Atlantic Albacore: ICCAT adopted Recommendation 17-04 to establish an interim harvest control rule for the North Atlantic albacore stock for 2018-2020, consistent with scientific advice, with the goal of adopting a long-term harvest control rule following further management strategy evaluation testing over the next few years. The Recommendation establishes biomass and fishing mortality reference points and includes the harvest control rule formula for setting the TAC. The 3-year constant annual TAC is increased 20% to 33,600 t for 2018-2020. The allocation percentages among ICCAT parties did not change and results in a U.S. quota of 632.4 mt.

Tropical tunas (Atlantic bigeye, yellowfin, and skipjack tunas): ICCAT adopted Recommendation 17-01 to prohibit discards of tropical tunas caught by purse seiners except when the master of the vessel determines that the fish are unfit for human consumption or the tunas have been caught during the last set of a trip and there is not enough storage capacity for the tunas. CPCs shall also encourage their vessels using other gear types (i.e., longline, baitboat and gillnets) to retain onboard and land or, to the extent possible and in compliance with

Recommendation 16-15, transship at port all bigeye, yellowfin and skipjack tuna caught except in the cases where ICCAT measures in force or national regulations prohibit their retention or encourage their release.

Swordfish: ICCAT adopted Recommendation 17-02 to reduce the TAC for North Atlantic swordfish by 500 mt to 13,200 mt following scientific advice, while retaining the historic CPC-specific catch limits, for four years until a new stock assessment in 2021. Recommendation 17-03 reduces the TAC for South Atlantic swordfish by 1,000 mt to 14,000 mt following scientific advice, while retaining historic CPC-specific catch limits, for four years until a new stock assessment in 2021.

Sharks: ICCAT adopted Recommendation 17-08 with measures to prevent further decrease of the North Atlantic shortfin mako shark population, stop overfishing and begin to rebuild the stock. CPCs shall require their vessels to release shortfin mako in a manner that causes the least harm. Vessels greater than 12 m in length may retain shortfin mako sharks that are dead when brought to the vessel with an observer or electronic monitoring system on board. Vessels may retain shortfin mako sharks that are dead or alive if the CPC implements a minimum size of at least 180 cm fork length for males and of at least 210 cm fork length for females. CPCs shall report their shortfin mako landings and dead discards for the first six months of 2018 to be reviewed at the 2018 annual meeting. The Recommendation requests the SCRS to provide additional information on the North Atlantic stock in 2019, to establish a rebuilding plan with a high probability of ending overfishing and rebuilding the stock to B_{msy} within a timeframe that takes into account the biology of the stock at the 2019 annual meeting.

Monitoring, Control and Surveillance Measures: ICCAT adopted improvements to its electronic bluefin tuna catch documentation system, which will deter illegal, unreported, and unregulated (IUU) fishing. In addition, ICCAT agreed to review key port state measures and vessel monitoring system measures intersessionally, with a view to strengthening them at the 2018 ICCAT annual meeting.

Compliance: ICCAT implemented improvements to its compliance review process in 2017 and took a number of actions to address non-compliance, including requiring repayment of quota overharvests, prohibiting retention of certain species by some parties until catch data are submitted to ICCAT, and identifying two countries under its trade measures recommendation for diminishing the effectiveness of ICCAT. Regarding the latter, if the problematic activities are not rectified, ICCAT could recommend the imposition of sanctions, including non-discriminatory trade restrictive measures in 2018. ICCAT also agreed to hold a special two-day session of its Compliance Committee just prior to the 2018 annual meeting to conduct in depth reviews of the fishing activities of members and non-members.

1.3 State Regulations

Table 1.3 outlines the state regulations regarding Atlantic HMS as of November 1, 2017. 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 Atlantic Tunas Conservation Act (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 Fishery Management Plan (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, New York, and Texas, 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 of 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. 01-04	Bluefin tuna - Federal regulations used to control size and seasons, and recreational catch required to be reported using catch cards and to be tagged. Swordfish - Federal regulations used to control size and seasons, and recreational catch required to be reported using catch cards and to be tagged. Billfish (blue/white marlin and sailfish) - Federal regulations control size and seasons, and recreational catch required to be reported using catch cards and to be tagged. Sharks –ASMFC Coastal Shark Plan Recreational -catch must be reported using catch cards and be tagged; all recreationally harvested sharks must have heads, tails, and fins attached naturally to the carcass through landing. Commercial – all commercially harvested sharks other than smoothhound must have tails and fins attached naturally to carcass through landing; smoothhound sharks harvested commercially may have dorsal, pectoral and caudal fins removed if smoothhound sharks make up at least 25 percent, by weight, of the total catch on board at the time of landing; if smoothhound fins are removed the total wet weight of the caudal fins may not exceed 4 percent of the total dressed weight of smoothhound carcasses landed or found on board a vessel; and the dorsal and pectoral fins may not exceed 8 percent of the total dressed weight of smoothhound carcasses landed or found on board a vessel; closure for certain species from May 15-July 15 unless the shark was legally harvested from federal waters and gear is stowed; closed to harvest when federal waters are closed.	MD Department of Natural Resources Sarah Widman Phone: (410) 260-8266
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 to NOAA within 24 hours unless the person harvested the billfish as a participant in a fishing competition in which participants must register or an award is offered for catching or landing a billfish; 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 hours unless the person harvested the billfish as a participant in a fishing competition in which participants must register or an award is offered for catching or landing a billfish. 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 Guyas 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 conditions for any beach goers, sun bathers, swimmers, or any other person; 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, sand tiger, smalltooth sawfish, smalltail, sevengill, sixgill, spotted eagle ray, whale, white, sandbar (unless fisherman possess a federal shark research fishery permit), silky (unless fisherman possess a Federal Atlantic shark 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 Director Scott Bannon Phone: (251) 861-2882 www.outdooralabama.com
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 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 Matt Hill Phone: (228) 374-5000

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			
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, except hammerhead sharks. Minimum size for great, smooth, and scalloped hammerhead sharks is 99" TL. Prohib species: all federally prohibited species and sandbar sharks. Buying, selling, offering to buy or sell, or possessing a for the purpose of sale, transport, or shipment a shark fin is prohibited.	TX Parks & Wildlife Department Perry Trial Phone: (361) 729-2328 Fax: (361) 729-1437 (fax)
Puerto Rico	X	X	X	X	Regulation #7949 Article 13 – Commercial Fishing Limits Article 18 – Recreational Fishing Limits	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
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

* Regulations, references, and contact information not confirmed by state before publication of this year's Report. Please see state resources for more information.

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.

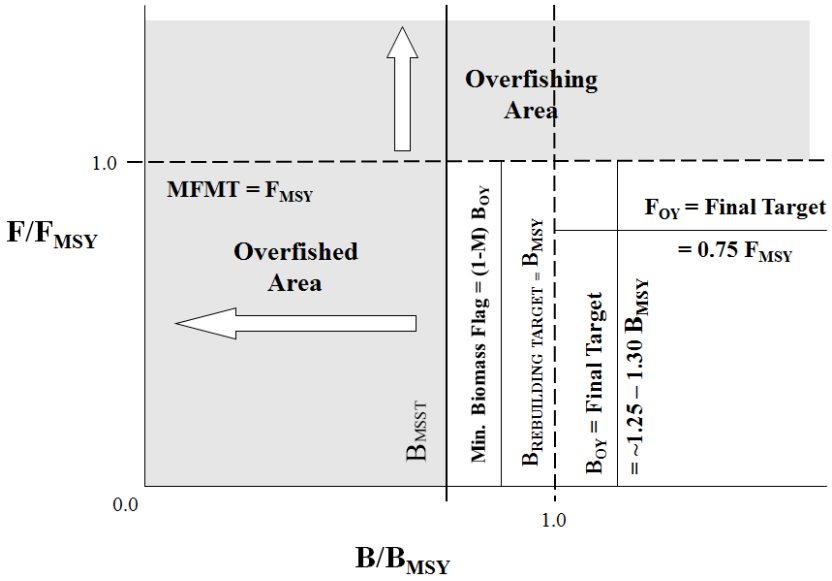

Figure 2.1 Illustration of the Status Determination Criteria and Rebuilding Terms

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 applicable, 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 (https://www.fisheries.noaa.gov/feature-story/fisheries-united-states-2016).

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

Species	Current Relative Biomass Level	B_{MSY}	International Threshold	Domestic Minimum Stock Size Threshold	International Stock Status	Domestic Stock Status	Years to Rebuild	Rebuilding Start Date (End Date)
North Atlantic blue sharks	B_{2013}/B_{MSY} = 1.35 - 3.45	*Unspecified* †	B_{MSY}	(1-M)B_{MSY}	Not likely overfished	Not Overfished		
North Atlantic shortfin mako sharks	B_{2015}/B_{MSY} = 0.57 - 0.95	62,555 mt-123,475 mt †††	B_{MSY}	(1-M) B_{MSY}‡‡*	Overfished	Overfished	‡‡**	‡‡**
Sandbar sharks	SSF_{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)
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		
Atlantic blacktip sharks	*Unknown*	*Unknown*	*NA*	(1-M)B_{MSY}	*NA*	*Unknown*		
Dusky sharks	SSF_{2015}/SSF_{MSY} = 0.41 - 0.64	*Unknown*†	*NA*	(1-M)SSB_{MSY}	*NA*	Overfished	~100	7/24/2008 (2107)
Scalloped hammerhead sharks	N_{2005}/N_{MSY} = 0.45	N_{MSY} = 62,000 (numbers of sharks)	*NA*	(1-M)N_{MSY}	*NA*	Overfished	10	7/3/2013 (2023)
Atlantic Bonnethead sharks	*Unknown*	*Unknown*	*NA*	*Unknown*	*NA*	*Unknown*		
Gulf of Mexico Bonnethead sharks	*Unknown*	*Unknown*	*NA*	*Unknown*	*NA*	*Unknown*		
Atlantic sharpnose sharks – Atlantic stock	SSF_{2011}/SSF_{MSY} = 2.07	SSF_{MSY} = 4,860,000 (numbers of sharks)	*NA*	(1-M)SSF_{MSY}	*NA*	Not overfished		
Atlantic sharpnose sharks - Gulf of Mexico stock	SSF_{2011}/SSF_{MSY}= 1.01	SSF_{MSY} = 17,900,000	*NA*	(1-M)SSF_{MSY}	*NA*	Not overfished		
Atlantic blacknose sharks – Atlantic stock	SSF_{2009}/SSF_{MSY} = 0.43 – 0.64	SSF_{MSY} = 77,577 - 288,360 (numbers of sharks)	*NA*	62,294 - 231,553 (1-M)SSF_{MSY}	*NA*	Overfished	30	7/3/2013 (2043)

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)
Atlantic blacknose sharks – Gulf of Mexico stock	*Unknown*	*Unknown*	*NA*	$(1\text{-}M)B_{MSY}$	*NA*	*Unknown*		
Finetooth sharks	$N_{2005}/N_{MSY} = 1.80$	N_{MSY} = 3,200,000 (numbers of sharks)	*NA*	2,400,000 $(1 - M)N_{MSY}$	*NA*	Not overfished		
Atlantic smooth dogfish	SSF_{2012}/SSF_{MSY} = 1.96 - 2.81	SSF_{MSY} = 4,746,000	*NA*	3,701,000 $(1 - M)SSF_{MSY}$	*NA*	Not overfished		
Gulf of Mexico smoothhound shark complex	N_{2012}/N_{MSY} = 1.68 - 1.83	N_{MSY} = 7,190,000	*NA*	5.53E+06 $(1 - M)N_{MSY}$	*NA*	Not overfished		

* In the 2017 stock assessment, the SCRS indicated that it is not possible to calculate biomass-based reference points (e.g., BMSY) absent additional knowledge (or basis for assumptions) about how future recruitment potential relates to spawning stock biomass. **South Atlantic swordfish are managed by ICCAT, and domestic stock status is not determined or reported in the United States stock status report... †A value for BMSY (or its proxy) was not provided in the stock assessment. ††There is insufficient information to estimate how many years it will take this stock to rebuild. ††† Only the BSP2-JAGS and JABBA models provided BMSY values in biomass. The BMSY range encompasses the 8 scenarios run of the BSP2-JAGS and JABBA models. The SS3 model provided BMSY values in numbers. ‡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. ‡‡* M is unknown. ‡‡** To be established by ICCAT in 2019.

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

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
West Atlantic bluefin tuna	$F_{current(2012-2014)}$ = 0.05 (0.04 - 0.10) $F_{0.1}$ = 0.09 (0.08 - 0.12) $F_{current}$ /$F_{0.1}$ = 0.59 (0.44 - 0.79)	F_{MSY} = *,†	Overfishing is not occurring*	Overfishing is not occurring*
Atlantic bigeye tuna	F_{2014}/F_{MSY} = 1.28 (0.62 - 1.85)	F_{MSY} = †	Overfishing is occurring	Overfishing is occurring
Atlantic yellowfin tuna	F_{2014}/F_{MSY}= 0.77 (0.53 - 1.05)	F_{MSY} = †	Overfishing is not occurring	Overfishing is not occurring
North Atlantic albacore tuna	F_{2014}/F_{MSY} = 0.54 (0.35 - 0.72)	F_{MSY} = 0.097 (0.079 - 0.109)	Overfishing is not occurring	Overfishing is not occurring
West Atlantic skipjack tuna	F_{2013}/F_{MSY}: probably close to 0.7	F_{MSY} = 1.02 (0.78 - 1.25)	Overfishing is not occurring	Overfishing is not occurring
North Atlantic swordfish	F_{2011}/F_{MSY} = 0.78 (0.62 - 1.01)	F_{MSY} = 0.17 (0.10 - 0.27)	Overfishing is not occurring	Overfishing is not occurring
South Atlantic swordfish	F_{2015}/F_{MSY} = 0.98 (0.70 - 1.36)	F_{MSY} = 0.28 (0.17 - 0.44)	Overfishing is not occurring	**
Blue marlin	F_{2009}/F_{MSY} = 1.63 (1.11 - 2.16)	F_{MSY} = 0.07	Overfishing is occurring	Overfishing is occurring
White marlin (and roundscale spearfish)	F_{2010}/F_{MSY} = 0.99 (0.75 - 1.27; low productivity) F_{2010}/F_{MSY} = 0.72 (0.51 - 0.93; high productivity)	F_{MSY} = 0.03 (0.027 - 0.035)	Overfishing is not likely occurring	Overfishing is occurring
West Atlantic sailfish	F_{2014}/F_{MSY} =0.33 (0.25 – 0.57) ‡ F_{2014}/F_{MSY} =0.63 (0.42 – 2.02) ‡‡	F_{MSY}	Overfishing is not likely occurring	Overfishing is not occurring
Longbill spearfish	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Northwest Atlantic porbeagle shark	F_{2008}/F_{MSY} = 0.03 – 0.36	F_{MSY} = 0.025 - 0.075	Overfishing is not occurring	Overfishing is not occurring
North Atlantic blue shark	F_{2013}/F_{MSY} = 0.04 - 0.75	F_{MSY} = 0.19 - 0.20	Overfishing is not likely occurring	Overfishing is not occurring
North Atlantic shortfin mako shark	F_{2015}/F_{MSY} = 1.93 - 4.38	F_{MSY} = 0.015 - 0.056††	Overfishing is occurring	Overfishing is occurring
Sandbar	F_{2009}/F_{MSY} = 0.29 - 2.62	F_{MSY} = 0.004 - 0.06	Not assessed internationally	Overfishing is not occurring

Species	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Threshold	International Stock Status	Domestic Stock Status
Gulf of Mexico blacktip	F_{2010}/F_{MSY} = 0.05 – 0.27	F_{MSY} = 0.021 - 0.163	Not assessed internationally	Overfishing is not occurring
Atlantic blacktip	*Unknown*	*Unknown*	Not assessed internationally	*Unknown*
Dusky shark	F_{2015}/F_{MSY} = 1.08 - 2.92	F_{MSY} = 0.015 - 0.046	Not assessed internationally	Overfishing is occurring
Scalloped hammerhead shark	F_{2005}/F_{MSY} =1.29	F_{MSY} = 0.11	Not assessed internationally	Overfishing is occurring
Bonnethead shark – Atlantic stock	*Unknown*	*Unknown*	Not assessed internationally	*Unknown*
Bonnethead shark – Gulf of Mexico stock	*Unknown*	*Unknown*	Not assessed internationally	*Unknown*
Atlantic sharpnose shark – Atlantic stock	F_{2011}/F_{MSY} = 0.23	F_{MSY} = 0.184	Not assessed internationally	Overfishing is not occurring
Atlantic sharpnose shark - Gulf of Mexico stock	F_{2011}/F_{MSY} = 0.57	F_{MSY} = 0.331	Not assessed internationally	Overfishing is not occurring
Atlantic blacknose shark – Atlantic stock	F_{2009}/F_{MSY} = 3.26 – 22.53	F_{MSY} = 0.01 - 0.15	Not assessed internationally	Overfishing is occurring
Atlantic blacknose shark – Gulf of Mexico stock	*Unknown*	*Unknown*	Not assessed internationally	*Unknown*
Finetooth shark	F_{2005}/F_{MSY} = 0.17	F_{MSY} = 0.03	Not assessed internationally	Overfishing is not occurring
Atlantic smooth dogfish	F_{2012}/F_{MSY} = 0.61-0.99	F_{MSY} = 0.129	Not assessed internationally	Overfishing is not occurring
Gulf of Mexico smoothhound shark complex	F_{2012}/F_{MSY} = 0.07-0.35	F_{MSY} = 0.106	Not assessed internationally	Overfishing is not occurring

*Where F year refers to the geometric mean of the estimates for 2012-2014 (a proxy for recent F levels). In the 2017 stock assessment, the SCRS indicated that it is not possible to calculate biomass-based reference points (e.g., FMSY). In the absence of such knowledge, the SCRS considers F0.1 to be a reasonable proxy for the western stock. F0.1 is the fishing mortality rate where the slope of the yield per recruit curve is 10% of the slope of the curve at its origin. It is derived from the yield per recruit curve and does not assume a stock-recruitment relationship. †A value for FMSY was not provided in the stock assessment. ** South Atlantic swordfish are managed by ICCAT, and domestic stock status is not determined or reported in the United States stock status report. †† Range obtained from 8 Bayesian production and 1 SS3 model runs. Value from SS3 is SSFMSY. Low value is lowest value from 4 production model (JABBA and BSP2JAGS) runs and high value is from the SS3 base run.. ‡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, 2017; Gibson and Campana 2005; NMFS 2006, 2007; Hayes et al., 2009; SEDAR 2011a, 2011b, 2011c, 2011d, 2013a, 2013b, 2015a, 2015b, 2016.

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 2017, the SCRS completed assessments for western Atlantic bluefin tuna, North and South Atlantic swordfish, and North Atlantic shortfin mako sharks. A history of Atlantic HMS stock assessments conducted by SCRS is shown in Table 2.3.

Atlantic shark stock assessments for large coastal, small coastal, and smoothhound sharks are generally completed by the SEDAR process. In 2016, a stock assessment update was completed for dusky sharks following the SEDAR process. An assessment for sandbar sharks is currently being conducted (SEDAR 54). 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). A history of domestic HMS stock assessments is shown in Table 2.4.

Table 2.3 International HMS Stock Assessments conducted by ICCAT's SCRS.

Stock	Last Assessment Year	Upcoming Assessment	Notes
Western Atlantic bluefin tuna	2017	2020	
Atlantic bigeye tuna	2015	2018	
Atlantic yellowfin tuna	2016	2021	
North Atlantic albacore tuna	2016	2020	
Western Atlantic skipjack tuna	2014	2019	
North Atlantic swordfish	2017	TBD	
South Atlantic swordfish	2017	TBD	
Blue Marlin	2011	2018	
White marlin (and roundscale spearfish)	2012	2019	
West Atlantic sailfish	2016	TBD	
Longbill spearfish	1997	TBD	
Porbeagle	2009	2019	Next assessment a combo ICES/ICCAT assessment
Shortfin mako	2017	TBD	
Blue shark	2015	2021	N/A

Table 2.4 Domestic HMS Stock Assessments generally conducted through SEDAR.

Shark Stock	Last Assessment Year		Last Assessment Type	Upcoming Assessment	Upcoming Assessment Type	Notes
Small Coastal Sharks						
Combined SCS	2007		Benchmark*	N/A	N/A	Need to assess each species and stock individually
Finetooth	2007		Benchmark	TBD	Benchmark	Expecting next assessment will split species into two stocks
Blacknose – Atlantic	2011		Benchmark	TBD	Standard	
Blacknose – Gulf of Mexico	2011		Benchmark	TBD	Benchmark	Most recent assessment rejected
Bonnethead – Atlantic	2013		Standard**	TBD	Benchmark	Last assessment looked at species, not stocks; Need to assess each stock individually
Bonnethead – Gulf of Mexico	2013		Standard	TBD	Benchmark	
Atlantic Sharpnose – Atlantic	2013		Standard	TBD	Benchmark	Last assessment looked at species, not stocks; Need to assess each stock individually
Atlantic Sharpnose – Gulf of Mexico	2013		Standard	TBD	Benchmark	
Large Coastal Sharks						
Combined LCS	2006		Benchmark	N/A	N/A	Need to assess each species individually due to life history differences
Blacktip – Atlantic	2006		Benchmark	2018	Benchmark	Previous assessment not accepted; Upcoming assessment will start late 2018/early 2019; expected to be finalized end of 2020
Scalloped Hammerhead	2009		Outside SEDAR	TBD	Benchmark	
Sandbar	2011		Benchmark	2017	Standard	Current assessment ongoing; expected to be finalized by end of 2017/early 2018
Blacktip – Gulf of Mexico	2012		Standard	2018	Update***	Upcoming assessment expected to start early 2018
Great Hammerhead	N/A		N/A	TBD	Benchmark	Individual species have not been assessed although stocks were included in the original LCS complex assessment
Smooth Hammerhead	N/A		N/A	TBD	Benchmark	
Bull	N/A		N/A	TBD	Benchmark	
Lemon	N/A		N/A	TBD	Benchmark	
Nurse	N/A		N/A	TBD	Benchmark	
Silky	N/A		N/A	TBD	Benchmark	
Spinner	N/A		N/A	TBD	Benchmark	
Tiger	N/A		N/A	TBD	Benchmark	
Smoothhound Sharks						
Smoothhounds – Atlantic	2015		Benchmark	TBD	Update	
Smoothhounds – Gulf of Mexico	2015		Benchmark	TBD	Update	
Pelagic Sharks						
Thresher	N/A		N/A	N/A	N/A	

Shark Stock	Last Assessment Year		Last Assessment Type	Upcoming Assessment	Upcoming Assessment Type	Notes
Oceanic Whitetip	N/A		N/A	N/A	N/A	Individual species have not been assessed
Prohibited Species						
Dusky	2016		Update	TBD	Benchmark	Next assessment expected to be a benchmark to correct some of the issues raised after the last update assessment
Atlantic angel	N/A		N/A	N/A	N/A	Individual species have not been assessed; some species may have been included in some of the early LCS complex assessments
Basking	N/A		N/A	N/A	N/A	
Bigeye sand tiger	N/A		N/A	N/A	N/A	
Bigeye sixgill	N/A		N/A	N/A	N/A	
Bigeye thresher	N/A		N/A	N/A	N/A	
Bignose	N/A		N/A	N/A	N/A	
Caribbean reef	N/A		N/A	N/A	N/A	
Caribbean sharpnose	N/A		N/A	N/A	N/A	
Galapagos	N/A		N/A	N/A	N/A	
Longfin mako	N/A		N/A	N/A	N/A	
Narrowtooth	N/A		N/A	N/A	N/A	
Night	N/A		N/A	N/A	N/A	
Sand tiger	N/A		N/A	N/A	N/A	
Sevengill	N/A		N/A	N/A	N/A	
Sixgill	N/A		N/A	N/A	N/A	
Smalltail	N/A		N/A	N/A	N/A	
Whale	N/A		N/A	N/A	N/A	
White	N/A		N/A	N/A	N/A	

* The Benchmark Approach is used to develop first-time assessments for stocks and to incorporate new datasets or new analytical methods into existing assessments. It is the most time-consuming and intensive approach for developing assessments. More information can be found at http://sedarweb.org/sedar-process. ** The standard approach is used to incorporate recent information into existing assessments. For this approach, existing input datasets are updated, and there is some leeway for consideration of new information and changes in model configuration. More information can be found at http://sedarweb.org/sedar-process. *** The update approach is used strictly to incorporate the most recent information into assessment analyses, and is the most rapid of the three approaches. Update assessments only allow for applying additional years of data to an existing assessment. More information can be found at http://sedarweb.org/sedar-process.

2.1 Stock Assessment Details

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

Western Atlantic Bluefin Tuna

Assessed by ICCAT's SCRS in 2017:
http://www.iccat.int/Documents/Meetings/Docs/2017_BFT_ASS_REP_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

Swordfish, North Atlantic and South Atlantic

Assessed by ICCAT's SCRS in 2017:
http://www.iccat.int/Documents/Meetings/Docs/2017_ATL_SWO_ASS_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

Assessment in progress: http://sedarweb.org/sedar-54

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 2017: http://iccat.int/Documents/Meetings/Docs/2017_SCRS_REP_ENG.pdf

Scalloped Hammerhead Sharks

Assessed in Hayes et al. (2009).

Smoothhound Sharks (Atlantic and Gulf of Mexico)

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

Chapter 2 References

Gibson AJA and 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-sccs/publications/resdocs-docrech/2005/2005_053-eng.htm

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 Shortfin 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.

SCRS. 2017. Report of the standing committee on research and statistics. ICCAT October 2-6, 2017; 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 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. EFH is defined in NMFS implementing regulations as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (50 CFR 600.10). A review of information available on EFH for federally managed species must be completed at least once every five years, and EFH provisions must be revised or amended, as warranted (§ 600.815(a)(10)).

On July 1, 2015, NMFS published its most recent EFH 5-Year Review and announced its 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), to 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). The preferred alternatives in Draft Amendment 10 proposed to modify existing HAPCs for bluefin tuna (*Thunnus thynnus*), and sandbar (*Carcharhinus plumbeus*), designate new HAPCs lemon (*Negaprion brevirostris*), and sand tiger sharks (*Carcharias taurus*); analyzed fishing and non-fishing impacts on EFH through a consideration of environmental and management changes and new information that became available since 2009; identified ways to minimize to the extent practicable the adverse effects of fishing activities on EFH; and identified actions to encourage the conservation and enhancement of EFH.

NMFS sought public comment on Draft Amendment 10, conducted two public hearing conference calls/webinars, and presented to the Caribbean (CFMC), Gulf of Mexico (GMFMC), South Atlantic (SAFMC), Mid-Atlantic (MAFMC), and New England (NEFMC) Fishery Management Councils. NMFS received 26 unique written comments, and a number of additional comments and/or clarifying questions at the Atlantic HMS AP meeting and at Council meetings. NMFS also identified several new datasets and completed a comprehensive analysis of agency datasets.

On September 7, 2017, NMFS published the Final Amendment 10 (82 FR 42329), modifying the HAPC for bluefin tuna (Preferred Alternative 3b) and sandbar shark (Preferred Alternative 4b) from that established in Amendment 1 to the 2006 Consolidated HMS FMP. New literature published by Muhling et al. (2010) suggested moderate (20-40 percent) probabilities of collecting larvae in areas of the eastern Gulf of Mexico that are not completely covered by the existing HAPC. In response, NMFS extended the HAPC for the Spawning, Eggs, and Larval life stage from its existing boundary of 86° W longitude (long.), eastward to 82° W long. The HAPC extends from the 100-meter isobath to the EEZ.

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

Final Amendment 10 also created new HAPCs for juvenile and adult lemon sharks (Preferred Alternative 5b) off southeastern Florida between Cape Canaveral and Jupiter Inlet and for sand tiger shark (Preferred Alternative 6b) in Delaware Bay (all life stages) and the Plymouth, Kingston, Duxbury Bay system in coastal Massachusetts (neonate/YOY and juveniles). The new HAPC for juvenile and adult lemon sharks is based upon tagging studies and public comments regarding protection of habitat in locations where aggregations of lemon sharks ~~are known to~~ occur. The two new sand tiger shark HAPCs are based on data collected by the Northeast Fisheries Science Center or NEFSC (Haulsee et al. 2014 and 2016) and Kilfoil et al. (2014) indicating that Delaware Bay constitutes important habitat for sand tiger sharks.

Maps of EFH and HAPCs delineated in Final Amendment 10 are available as shapefiles and PDF documents at https://www.fisheries.noaa.gov/bulletin/final-amendment-10-essential-fish-habitat. 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.

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.
2017 Amendment 10 to the 2006 Consolidated Atlantic HMS FMP	EFH updated for all federally managed Atlantic HMS. Existing HAPCs for sandbar shark and bluefin tuna adjusted, and new HAPCS for sand tiger shark and lemon shark created to reflect recommendations in the 2015 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. 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).

3.2.1 COASTSPAN Survey Results

The COASTSPAN program, administered by the NMFS NEFSC 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. Areas sampled during the 2016 COASTSPAN survey are shown in Figure 3.1. Results by region from the 2016 COASTSPAN and survey (McCandless, pers comm) are described below and Level 1 EFH point data summarized in Table 3.2.

Figure 3.1 Regions Sampled During the 2016 COASTSPAN Survey

New Jersey and Delaware (Delaware Bay)

COASTSPAN sampling encompassed the entire bay from the mouth of the Delaware River to the mouth of Delaware Bay using a random stratified design based on depth and geographic location. Additional sampling was also conducted at historical fixed stations throughout the bay. Sandbar shark was the most abundant shark species caught in 2016 (82 percent of the total catch), followed by sand tigers and smooth dogfish. Additionally, six adult male Atlantic sharpnose sharks were also caught in Delaware Bay near Brandywine Shoal and one adult female blacktip shark was caught off Primehook Beach. As in previous years, the majority (97 percent) of sandbar sharks caught were immature, with 14 percent as YOY; the remaining sandbar sharks caught were considered mature females based on length and girth measurements. Smooth dogfish were represented primarily by juveniles (76 percent) in 2016, with YOY dominating the catch. The sand tigers caught in 2016 were primarily immature sharks, and 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 main stem of the lower Chesapeake Bay, as well as coastal inlet and lagoon habitats along the Eastern Shore of Virginia. Sampling was conducted using a stratified random design, with

stratification based on depth and geographic location. Juvenile sandbar sharks dominated the catch in the bay, lagoon, and inlet habitats, and the majority of sandbar sharks caught were YOY. In addition to sandbar sharks, there were two large juvenile blacktip sharks caught along the Eastern Shore of Virginia in 2016. Within the Chesapeake Bay, three juvenile spinner sharks and one adult male and one juvenile male Atlantic sharpnose shark were also caught. Virginia's estuarine waters continue to provide important nursery habitat for sandbar sharks.

South Carolina

COASTSPAN sampling conducted by the South Carolina Department of Natural Resources 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 2016. Fifteen species of sharks were captured, the most abundant of which was Atlantic sharpnose. Other sharks captured, in order of abundance, were finetooth, sandbar, blacktip, bonnethead, blacknose, scalloped hammerhead, spinner, bull, tiger, lemon, nurse, and great hammerhead sharks, and one smooth dogfish. The majority of each shark species captured were immature, with the exception of these species: Atlantic sharpnose, bonnethead, blacknose, nurse, lemon, great hammerhead, bull, 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 University of North Florida took place in the estuarine waters of the St. Simon and St. Andrew sound systems. Of the seven species of shark captured, Atlantic sharpnose was the most abundant. Other sharks in order of abundance were bonnethead, blacktip, sandbar, finetooth, scalloped hammerhead and blacknose sharks. Three species captured were also present as YOY in estuarine waters: sandbar, Atlantic sharpnose, and blacktip sharks. The majority of sharks captured were immature, highlighting the importance of these areas as nursery habitat for both small and large coastal shark species. 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 2016 catch included, in order of abundance: Atlantic sharpnose, blacknose, blacktip, finetooth, sandbar, scalloped hammerhead, spinner, bonnethead, and one individual each for nurse, lemon and bull sharks. Nassau and Cumberland Sounds continue to provide nursery habitat for juvenile Atlantic sharpnose, blacktip, sandbar, and finetooth sharks. Cumberland Sound also provided nursery habitat for spinner sharks in 2016. 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.

Florida Atlantic University began a pilot study in 2016 to look at elasmobranch distribution in the Indian River Lagoon from Sebastian Inlet to Saint Lucie Inlet and the nearshore waters along the Atlantic coast in this region. Of the seven shark species caught in this region, Atlantic sharpnose and bull sharks were the most commonly encountered. Juvenile and mature Atlantic sharpnose were primarily caught in the nearshore waters off the Atlantic coast and juvenile bull sharks, including YOY, were all caught within the Indian River Lagoon. Other species represented, in order of abundance: bonnethead, nurse, blacknose, and one of each great hammerhead and lemon shark. All of these species only contained mature sized individuals with the exception of nurse shark, in which mature sized fish were caught in the nearshore coastal waters and juveniles were primarily caught within the lagoon. Bonnethead were only caught within the lagoon system and one blacknose shark was also caught within the lagoon. The remaining blacknose and the great hammerhead and lemon shark were caught in the nearshore coastal waters. Continued monitoring of this region will help to refine the essential fish habitat for species encountered there.

U.S. Virgin Islands

Sampling for sharks took place in the waters surrounding the Buck Island Reef National Monument off St. Croix in May 2016. This is part of an ongoing multi-species, multi-age study of community structure and habitat use within the national monument. Four shark species were captured, tagged, and released in June 2016: tiger, Caribbean reef, nurse, and lemon sharks. The majority of tagged sharks were immature with the exception of one female tiger shark that was within the size range for mature sharks. All lemon sharks caught in June were YOY. These results provide supporting evidence that Buck Island Reef National Monument contains nursery habitat for lemon sharks, in addition to the continued use of this area by tiger Caribbean reef, and nurse sharks as larger juveniles.

Table 3.2 Location and Species for Level 1 EFH Point Data in the 2016 COASTSPAN Survey.

Sampling Region	Species – New EFH Point Data	Sampling Locations
Delaware / New Jersey	Sandbar shark, sand tiger, smooth dogfish, Atlantic sharpnose shark, and blacktip shark	Mouth of the Delaware River, Delaware Bay
Virginia	Sandbar, blacktip, spinner, and Atlantic sharpnose sharks	Nearshore and estuarine waters including lower Chesapeake Bay, and the coastal inlets and lagoons of the Eastern Shore
South Carolina	Atlantic sharpnose, finetooth, sandbar, blacktip, bonnethead, blacknose, scalloped hammerhead, spinner, bull, tiger, lemon, sand tiger, nurse, great hammerhead, and smooth dogfish sharks	Nearshore and estuarine waters including Bulls Bay, Charleston Harbor, North Edisto, Port Royal Sound, St. Helena Sound, and Winyah Bay
Georgia	Atlantic sharpnose, bonnethead, blacktip, sandbar, finetooth, scalloped hammerhead, and blacknose sharks	St. Simon and St. Andrew sound systems
Florida (Atlantic Coast)	Atlantic sharpnose, blacknose, blacktip, finetooth, sandbar, scalloped hammerhead, spinner, bonnethead, bull, nurse, and lemon	Nearshore and estuarine waters including Cumberland Sound, Nassau Sound, Tolomato River, St. Johns River, and the Indian River Lagoon from Sebastian Inlet to Saint Lucie Inlet
U.S. Virgin Islands	Tiger, Caribbean reef, nurse and lemon sharks	Buck Island Reef National Monument

Source: NEFSC (C. McCandless, pers comm)

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 Fisheries Science Center (SEFSC) Panama City, Florida laboratory, includes in addition to NMFS scientists the states of Florida, Alabama, and Mississippi. GULFSPAN sampling in 2016 covered 5 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), and lower Tampa Bay, FL (Figure 3.2). The following is a summary of the 2015 GULFSPAN catch and noted habitat associations (Bethea et al. 2016). Location and species for which Level 1 EFH point data were collected in the 2016 GULFSPAN survey are illustrated in Table 3.3.

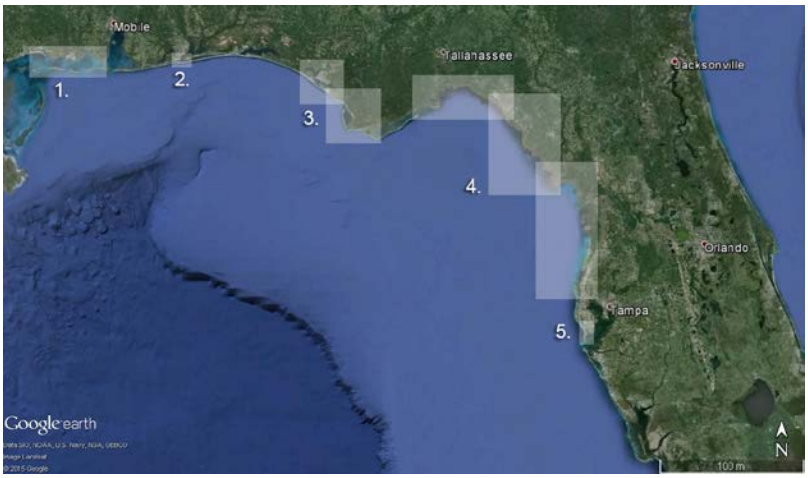

Figure 3.2 Regions Sampled During the 2016 GULFSPAN Survey

Mississippi Sound

In 2016, 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 2016. Seven species of shark (Atlantic sharpnose, finetooth, blacktip, spinner, bull (most abundant), bonnethead, and great hammerhead), for a total of 68 individuals were encountered. Batoids were represented by three ray species (cownose ray, Brazilian cownose ray, and bluntnose stingray) from 4 individuals. Over sixty-nine percent of the elasmobranchs captured were juvenile or YOY. The prevalence of YOY and juvenile animals sampled is consistent with previous years and implies Mississippi Sound continues to be a potential nursery area for several elasmobranch species.

The bull shark was the most abundant elasmobranch in 2016, while typically, blacktip shark and Atlantic sharpnose are more abundant. In previous years, the nearshore site sampled off Pascagoula Beach was suggested to be a putative pupping area. Though 2016 catches across the board in this area were low, it is interesting that the only individual confirmed to be pregnant contained fully developed pups and was caught south of the Pascagoula River.

Florida-Alabama Border

GULFSPAN sampling by the University of West Florida consisted of 12 sampling excursions of 35 sets throughout Pensacola Bay and Santa Rosa Sound. Excursions excluded previously sampled East Bay, Escambia Bay, and northern Pensacola Bay on account of low salinity levels observed, but overall 2016 sampling efforts increased from 2015, nearly doubling the number of gillnet sets performed. Sampling in Big Lagoon did not yield elasmobranchs. Four species of elasmobranchs were caught (Atlantic stingray, Atlantic sharpnose shark, blacktip shark, and cownose ray) for a total of 74 individuals. Most of the catch at the Florida-Alabama border consisted of sexually mature or maturing individuals. The main channel connecting Pensacola Bay to the Gulf of Mexico appears to provide a corridor of entry for opportunistic adult sharks, and the seagrass beds in west Santa Rosa Sound provides valuable cownose ray habitat, likely for feeding.

St. Andrew Bay to St. Vincent Island, FL

GULFSPAN sampling by NOAA Fisheries SEFSC Panama City Laboratory covered four major areas along the panhandle of Florida: St. Andrew Bay, Crooked Island Sound, St. Joseph Bay, and St. Vincent Island (Gulf of Mexico-side). One hundred gillnet sets captured eight species of shark (Atlantic sharpnose (most abundant), scalloped hammerhead, blacktip, bonnethead, finetooth, spinner, blacknose, and bull), and three species of batoid (cownose ray, southern ray, and Atlantic stingray) were encountered during this sampling year. Elasmobranch catch consisted of 32 percent adult and 68 percent immature animals. Of the immature animals, 31 percent were Age 1+ and 36 percent were YOY. Four neonates were collected: two scalloped hammerhead shark, and two Atlantic sharpnose shark.

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. The majority of immature blacktip sharks were collected in Crooked Island Sound and St. Vincent Island over muddy, sandy habitat. Immature scalloped hammerhead were generally caught in deeper waters with higher temperature, salinity, and water clarity. Finetooth shark were captured in a specific location (St. Vincent Island) in conditions of high salinity and low water clarity. Only one adult blacknose shark was collected in St. Joseph Bay in deep, clear water over a sandy bottom and all YOY blacknose shark were collected in Crooked Island Sound at similar temperature and salinity conditions, but in shallow water and over sandy/seagrass bottoms. YOY spinner sharks were generally caught in shallower water at Crooked Island Sound and St. Vincent Island. Lastly, one juvenile bull shark was encountered in St. Joseph Bay in September.

Big Bend of Florida

GULFSPAN sampling by Florida State University Coastal and Marine Laboratory covered more than 300 km of Florida's coastline from St. George Sound to Anclote Keys. Longlines and gillnets were used to collect data. A total of 827 elasmobranchs were captured, consisting of 15 species. Approximately 90 percent of the catch was comprised of three species: Atlantic sharpnose, bonnethead, and blacktip sharks. Other species captured include blacknose, spinner, bull, lemon, tiger, great hammerhead, nurse, and Florida smoothound sharks. Three species of batoid (Atlantic stringray, smooth butterfly, 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. Habitats sampled included seagrass (*T. testudinum, Syringodium filiforme, H. wrighti*), drift algae dominated bottom, mud bottom, sandy ridges, and hardbottom reefs (dominated by soft corals and sponges). This region primarily consists of seagrass habitats in waters shallower than 4 m; therefore most effort was in this habitat type. All lifestages of Atlantic sharpnose, except adult females found in all habitats sampled, although very few were captured over hardbottom reefs. Juvenile and adult bonnethead shark were most common in seagrass habitats. All life stages of blacktip sharks were typically captured on the edges of muddy channels and sandy ledges adjacent to seagrass habitats. YOY and juvenile blacknose were usually captured in sandy seagrass habitat, while adults were captured on the edges of muddy channels adjacent to seagrass habitats. 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).

Southern Tampa Bay, FL

The New College of Florida completed 2016 GULFSPAN sampling in Sarasota Bay. Five shark species (bonnethead (most abundant), Atlantic sharpnose, scalloped hammerhead, blacktip, and blacknose) and five ray species (cownose ray, bluntnose stingray, Atlantic stingray, spotted eagle ray, and southern stingray) with a total of 207 individuals were caught. Forty-three percent of the catch were immature animals.

Once heavily polluted, Sarasota Bay was named an estuary of national significance by the U.S. Congress in 1989. Efforts by the National Estuary Program led to dramatic improvements to water quality resulting in present-day record levels of seagrass habitat (46 percent). Approximately 100 miles of the shoreline consists of seawalls and other hardened structures, while the remainder is mainly mangrove-fringed. Available habitats consist predominantly of seagrass beds (primarily turtle grass, shoal grass, and manatee grass), as well as sandy bottom, oyster beds, and artificial reefs. Habitat profiles for all ten elasmobranch species were generally similar. Blacktip sharks and bluntnose stingrays were associated with sand-dominated habitat, where all other species were associated with seagrass-dominated habitat. Atlantic sharpnose sharks were found at cooler temperatures than the other species and were not encountered during the warmer months. They were also found within the areas of lowest salinity within the bay. While these data are preliminary, they suggest that Sarasota Bay may be a previously unknown nursery habitat for several species of elasmobranchs.

3.3 Conclusion

As part of the comprehensive information gathered for the HMS EFH 5-Year Review, 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 maintain their usefulness in the stock assessments for large and small coastal shark species and are essential for monitoring these populations and their habitat use.

Table 3.3 Location and Species for Level 1 EFH Point Data Collected in the 2016 GULFSPAN Survey

Sampling Region	Species – New EFH Point Data	Sampling Locations
Mississippi	Bull, blacktip, Atlantic sharpnose, finetooth, bonnethead, spinner, great hammerhead	Mississippi Sound
Alabama – west Florida panhandle	Atlantic sharpnose, blacktip	Perdido Bay, Pensacola Bay, Santa Rose Sound, East Bay, Escambia Bay
NW Florida – St. Andrew Bay to St. Vincent Island	Atlantic sharpnose, blacktip, bonnethead, scalloped hammerhead, finetooth, spinner, blacknose, bull	St. Andrew Bay, Crooked Island Sound, St. Joseph Bay, St. Vincent Island (Gulf of Mexico side)
NW Florida – Big Bend Region	Atlantic sharpnose, bonnethead, blacktip, Florida smoothhound, blacknose, great hammerhead, spinner, bull, lemon, tiger, great hammerhead, nurse	St. George Sound, Apalachee Bay, Suwanee Sound, Waccasassa Bay, Anclote Keys
West Central FL	Bonnethead, Atlantic sharpnose, scalloped hammerhead, blacktip, blacknose	Sarasota Bay

Source: Bethea et al. 2016

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.

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

Section 4.1 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 4.11. Section 4.2 reports the historical number, locations, and target species of HMS tournament registrations.

4.1 HMS Permits

Limited Access Permits

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

Table 4.1 Number of Limited Access Shark, Swordfish, and Atlantic Tunas Longline Vessel Permits and Permit Holders by State (2012-2017)

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

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

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 2017)

State	Incidental HMS Squid Trawl Permits
ME	2
MA	6
RI	11
CT	3
NY	4
NJ	27
VA	5
NC	7
2017 Total	65
2016 Total	63

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 two fish. The shark retention limit is zero; however, if the retention limit were increased, permit holders would be allowed to retain and sell non-prohibited species of sharks. The distribution of 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 2017)

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). The swordfish retention limits were maintained at six fish throughout 2017 by two inseason actions, publishing in December of

2016 (81 FR 91876) and June of 2017 (82 FR 29010). 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 2017)

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	

Smoothhound Shark Permits

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

Table 4.5 Number of Smoothhound Shark Permits by State (as of December 2017)

State	**Commercial Smoothhound Shark Permit**	**State**	**Commercial Smoothhound Shark Permit**
AL	1	MD	5
CT	1	NC	48
DE	2	NJ	34
FL	13	NY	12
GA	1	RI	9
LA	1	SC	6
MA	1	VA	20
2017 Total			154
2016 Total			103

Atlantic Tunas Permits

Commercial Atlantic tunas permits are categorized by gear type (longline, harpoon, trap, purse seine, and General category) (Table 4.6). The Atlantic Tunas General category permit is open access and authorizes the use of rod and reel, handline, harpoon, green-stick, and bandit gear.

The distribution of the General category permit by state can be found in Table 4.7. HMS Charter/Headboat permit holders (Table 4.8) may also sell tunas to permitted tuna dealers.

Table 4.6 Number of Commercial Atlantic Tunas Permits by Category (2010-2017)

Category	2011	2012	2013	2014	2015	2016	2017*
Longline	242	253	252	246	280	280	280
Harpoon	24	13	14	14	23	9	11
Trap	6	8	7	3	4	-	1
General	3,764	4,084	3,783	3,396	3,230	2,910	2,940
Purse seine	3	3	3	5	5	5	5
Total	4,039	4,361	4,059	3,664	3,542	3,204	3,237

* As of October 2017. The actual number of 2017 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 11 Atlantic Tunas Harpoon category permits issued in 2017 (Table 4.6) were Maine (four vessels), Massachusetts (six vessels), and California (one vessel).

Table 4.7 Number of Tunas General Category Permits by State/Territory (as of October 2017)

State	Tunas General Category Permits	State	Tunas General Category Permits
AL	33	MS	13
CA	1	NC	378
CT	54	NH	196
DE	19	NJ	116
FL	152	NY	122
GA	1	PA	6
HI	1	PR	65
ID	1	RI	116
LA	22	SC	15
MA	930	TX	18
MD	21	VA	53
ME	593	VI	7
MI	2	VT	4
2017 Total		2,940	
2016 Total		2,910	

HMS Charter/Headboat Permit

The Atlantic HMS Charter/Headboat permit is open access and authorizes recreational fishing for all Atlantic HMS, commercial fishing for Atlantic tunas under certain conditions, and commercial fishing for North Atlantic swordfish only on non for-hire trips. The distribution of 2016 Atlantic HMS Charter/Headboat permits is presented in Table 4.8.

Table 4.8 Number of Atlantic HMS Charter/Headboat Permits by State (as of October 2017)

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

HMS Angling Permit

The HMS Angling Permit is open access and required to recreationally fish for, retain, or possess (including catch-and-release fishing) any federally-regulated HMS, including sharks, swordfish, white and blue marlin, sailfish, spearfish, bluefin tuna, and BAYS tunas. It does not authorize the sale or transfer of HMS to any person for a commercial purpose. Atlantic HMS Angling permit distribution is reported in Table 4.9.

Table 4.9 Number of Atlantic HMS Angling Permits by State or Country (as of October 2017)

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

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

Atlantic Tunas, Swordfish, and Shark Dealer Permits

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

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

Table 4.10 Number of Domestic Atlantic Tunas, Swordfish, and Sharks Dealer Permits (2017 by State; 2012-2017 Totals by Permit)

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

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

Exempted Fishing Permits (EFPs), Display Permits, Letters of Acknowledgement (LOAs), 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. The number of EFPs, display permits, and SRPs issued from 2013 to 2017 by category and species are listed in Table 4.11. In 2017, NMFS received 11 applications for the Shark Research Fishery permit. Based on the qualification criteria and random selection process, five permits were issued.

Table 4.11 Number of Atlantic HMS Exempted Fishing Permits (EFPs), Display Permits, and Scientific Research Permits (SRPs) (2013-2017)

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

*As of October 31, 2017. **Multiple species

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

4.2 Atlantic HMS Tournaments

An Atlantic HMS tournament is 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 https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-highly-migratory-species-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 2017, more than 162 tournaments requested and received nearly 11,000 copies of these materials from the HMS Management Division. The number of HMS tournaments that registered from 2007 to 2017 is reported in Figure 4.1. Since 2007, an average of 265 HMS tournaments have registered each year. The highest number of HMS tournament registrations was received in 2007. The number of registered tournaments in 2017 was the highest since 2007, possibly due to increased outreach and compliance monitoring, and may have been influenced by an improving U.S. economy and lower fuel prices.

The following tables and figures are summary data from the HMS Atlantic Tournament Registration and Reporting (ATR) database. The average distribution of HMS fishing tournaments along the Atlantic and Gulf of Mexico coastal states and the U.S. Caribbean is represented in Figure 4.2.

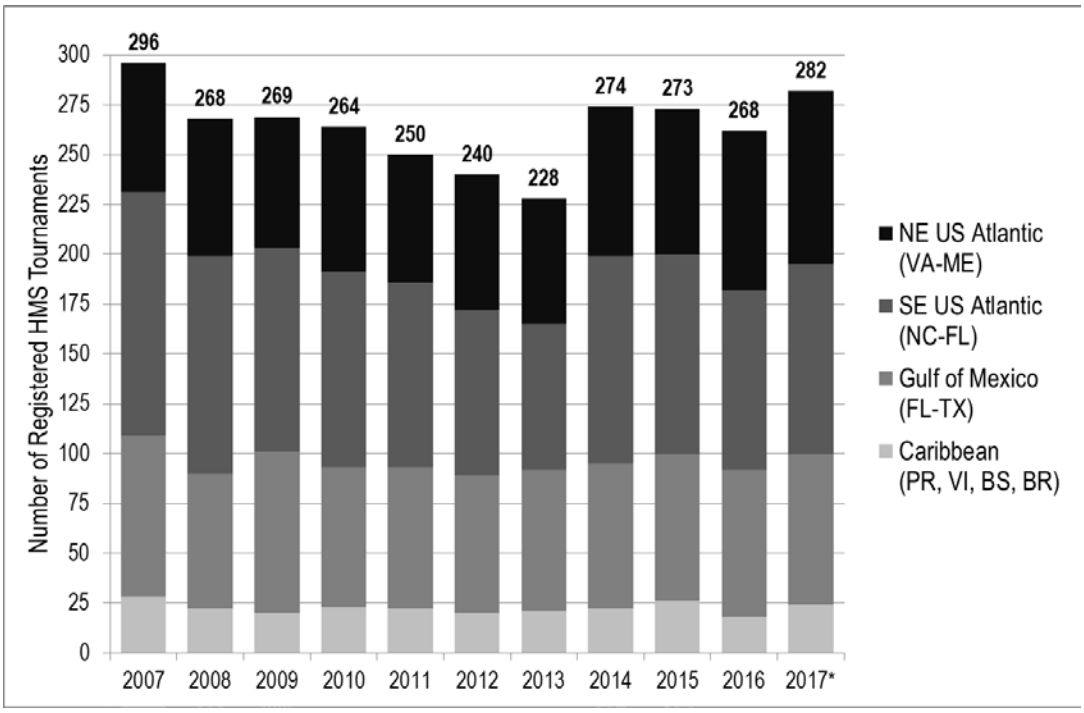

Figure 4.1 Annual Number of Registered Atlantic HMS Tournaments by Region (2007-2017)

*As of November 2017. Source: ATR database.

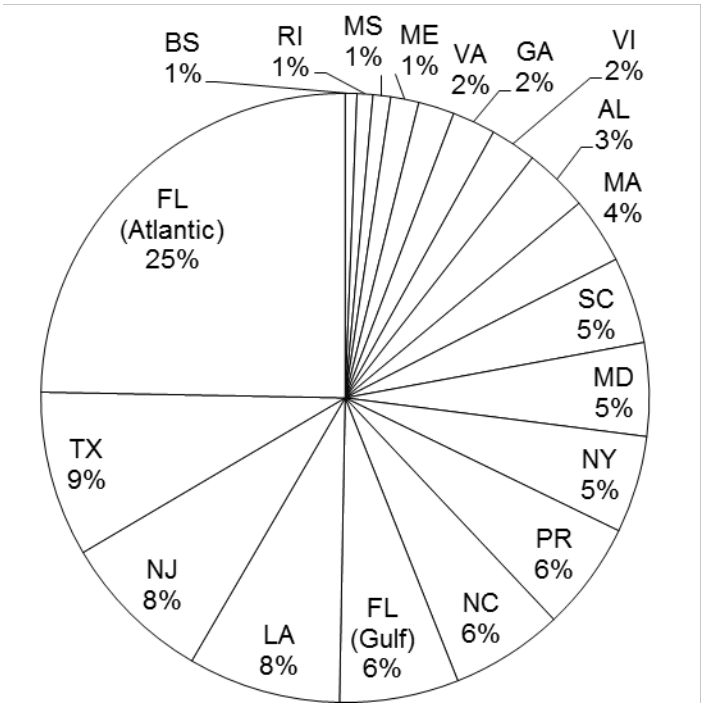

Figure 4.2 Percent of Atlantic HMS Tournaments Held in each State from 2007 to 2017

Number of tournaments: 2,762; Areas excluded (< 1%) are Bermuda (0%), Connecticut (0.07%), and Delaware (0.33%). Source: ATR database.

Participants may target one or more HMS in a tournament. Most tournaments register to catch multiple HMS; however, in 2016, 43 percent registered for only one species group, of which the majority were tunas, followed by swordfish, sharks, and billfish. There were 20 tournaments that targeted only sailfish in 2016. Often, there is a primary species targeted in the tournament, and other species are caught for entry in separate categories. Overall, there is a regional trend toward species that are present during the local fishing season. Figure 4.3 gives a breakdown of the number of tournaments in each state that registered for billfish, sharks, swordfish, or tuna species in 2016.

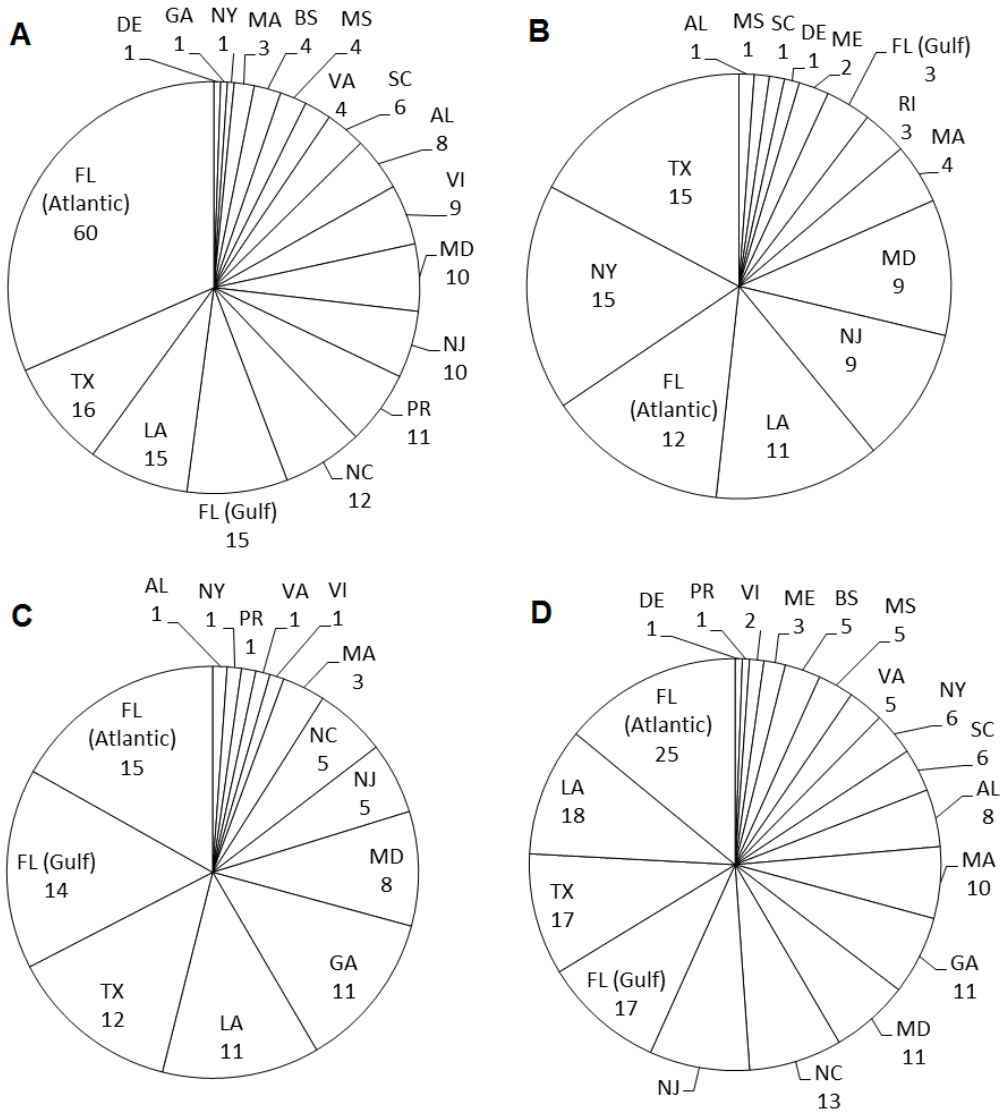

Figure 4.3 Number of Tournaments in each State that Registered for (A) Billfish, (B) Shark, (C) Swordfish, or (D) Tuna Species (2016)

Total numbers of tournaments divided by state were 182 (A), 73 (B), 71 (C), and 184 (D). Source: ATR database.

Table 4.12 provides the total numbers of HMS tournaments in 2015 and 2016 that registered to award points or prizes for the catch or landing of each HMS. Marlin, sailfish, and yellowfin tuna continue to be the most sought after species, which is further illustrated in Figure 4.4.

Table 4.12 Number of Atlantic HMS Tournaments per Species (2015-2016)

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

* includes Smooth dogfish, Florida smoothhound, and Gulf smoothhound. Source: ATR database.

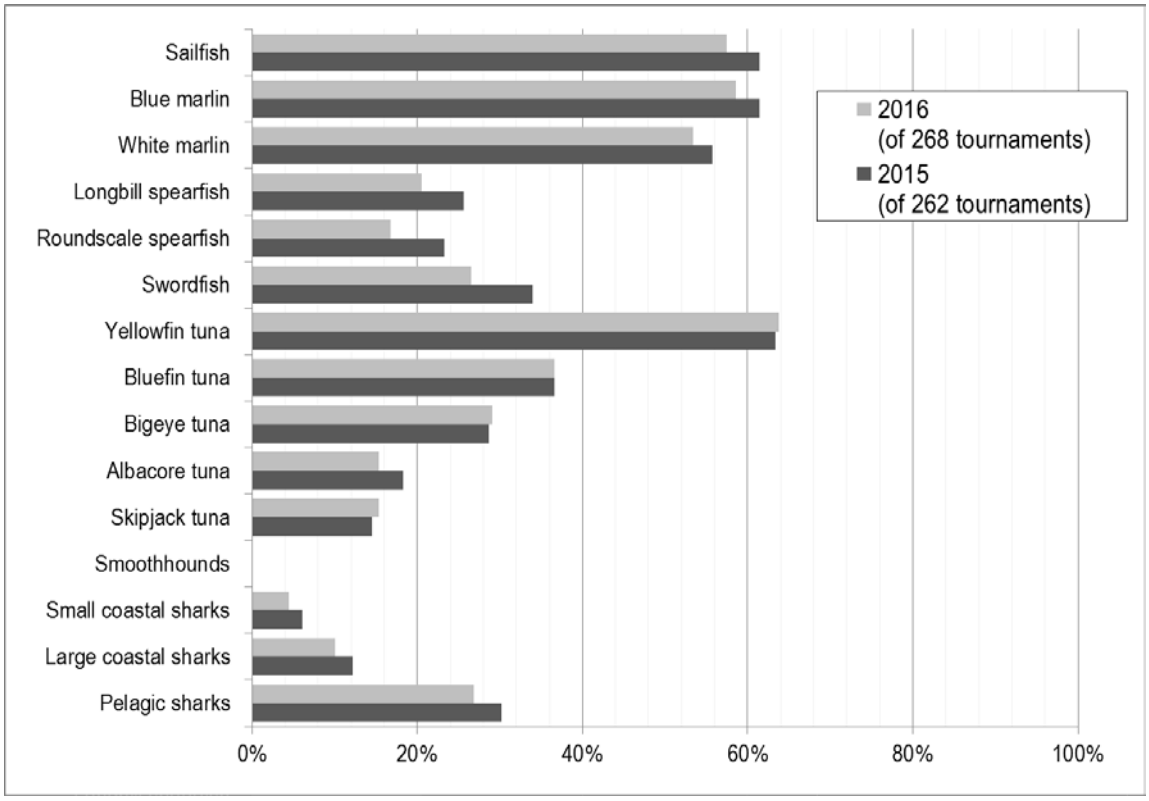

Figure 4.4 Percent of HMS Tournaments Registered for each Species or Group (2015-2016)

Source: ATR database.

Billfish Tournaments

A significant number of blue marlin, white marlin, and sailfish tournaments are "release-only," utilizing observers, angler affidavits, polygraph tests, photographs, or digital video camcorders to document the live release of billfish. All billfish tournaments are selected for reporting to the ATR System (previously to the Recreational Billfish Survey or 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 2016, all of the billfish tournaments occurring in January targeted sailfish along the Atlantic coast of Florida.

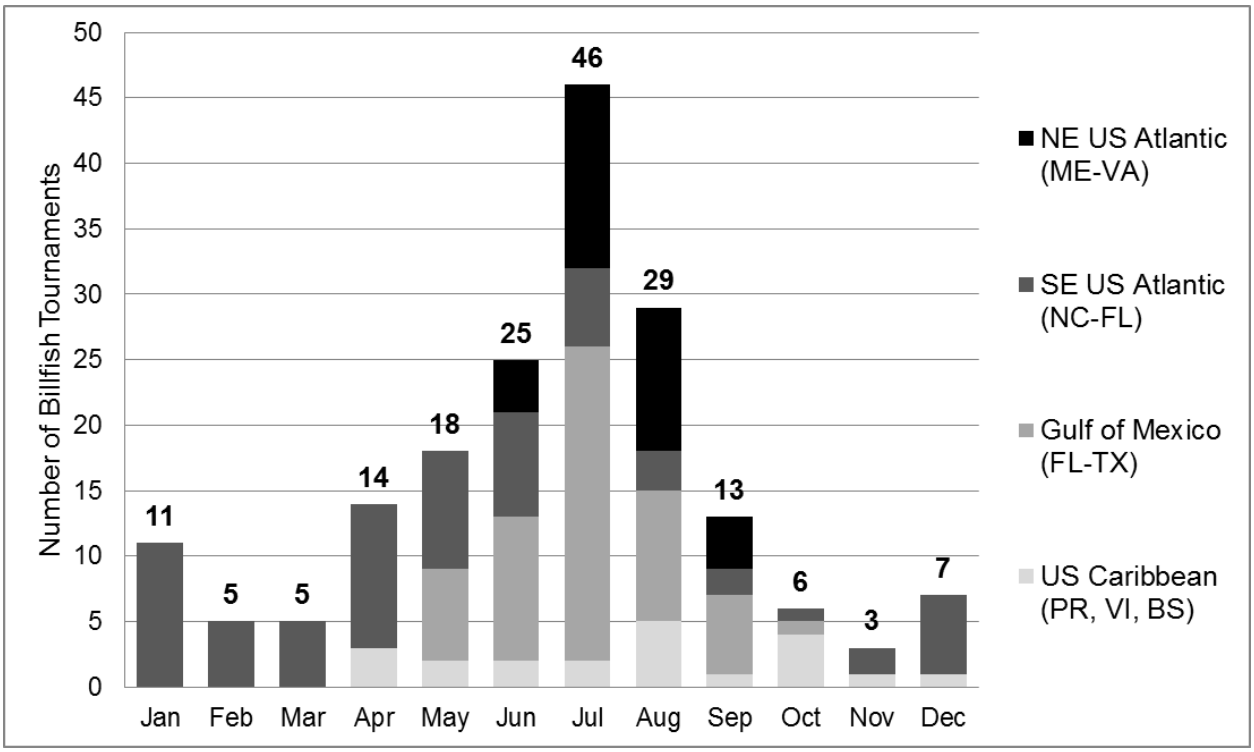

Figure 4.5 Number of Billfish Tournaments by Region and Month (2016)

5 FISHERY DATA

In this chapter, HMS fishery data are summarized by fishing 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 (50 CFR 600.725(v))

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

The U.S. percentage of regional and total catch (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 dead discards when available). International catch levels and U.S. reported catches for HMS (other than sharks) are taken from the 2017 ICCAT Report of the SCRS (SCRS 2017). 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 2016)

Species	Region		Catch (mt ww)*			U.S. Percentage of Total Catch
			Landed	Discarded Dead	Total	
Atlantic swordfish	N Atlantic	*U.S.*	*1,433*	*89*	*1,522*	
			10,301	103	10,404	14.6
	S Atlantic		7,724	2	7,726	0.0
	Total		18,025	105	18,130	8.4
Atlantic bluefin tuna	W Atlantic	*U.S.*	*1,003*	*23*	*1,026*	
			1,869	30	1,899	54.0
	E Atlantic + Med		20,094	4	20,098	0.0
	Total		21,963	34	21,997	4.7
Atlantic bigeye tuna	Atlantic + Med	*U.S.*	*533*	-	*533*	
			72,375	-	72,375	0.7
	Total		72,375	-	72,375	0.7
Atlantic yellowfin tuna	W Atlantic	*U.S.*	*3,274*	-	*3,274*	
			18,773	3	18,776	17.4
	E Atlantic		109,001	-	109,001	0.0
	Total		127,774	3	127,777	2.6
Atlantic albacore tuna	N Atlantic	*U.S.*	*250*	-	*250*	
			29,841	300	30,141	0.8
	S Atlantic + Med		17,182	16	17,198	0.0
	Total		47,023	316	47,339	0.5
Atlantic skipjack tuna	W Atlantic	*U.S.*	-	-	-	
			28,570	-	28,570	0.0
	E Atlantic + Med		217,363	-	217,363	0.0
	Total		245,933	-	245,933	0.0
Atlantic blue marlin	Atlantic + Med	*U.S.*	*30*	*24*	*54*	
			1,270	24	1,295	4.2
	Total		1,270	24	1,295	4.2
Atlantic white marlin	Atlantic + Med	*U.S.*	*1*	*3*	*4*	
			448	3	452	0.9
	Total		448	3	452	0.9
Atlantic sailfish	W Atlantic	*U.S.*	*3*	*7*	*10*	
			731	7	739	1.4
	E Atlantic		1,421	-	1,421	0.0
	Total		2,151	7	2,159	0.5
Blue shark	N Atlantic	*U.S.*	*30*	*43*	*73*	
			42,029	87	42,117	0.2
	S Atlantic + Med		24,018	139	24,156	0.1
	Total		66,047	226	66,273	0.2
Porbeagle shark	N Atlantic	*U.S.*	*5*	*1*	*6*	
			15	4	20	30.0

Species	Region	Catch (mt ww)*			U.S. Percentage of Total Catch
		Landed	Discarded Dead	Total	
	S Atlantic + Med	2	-	2	0.0
	Total	17	4	22	27.2
Shortfin mako shark	N Atlantic	*U.S. 296*	*4*	*300*	
		3,371	6	3,377	8.9
	S Atlantic + Med	2,637	4	2,641	0.0
	Total	6,008	10	6,018	5.0

Totals subject to rounding error. Catch reported in metric tons, whole weight (mt, ww). 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 2017.

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) 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 is required to be released, regardless of whether the catch is dead or alive.

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).

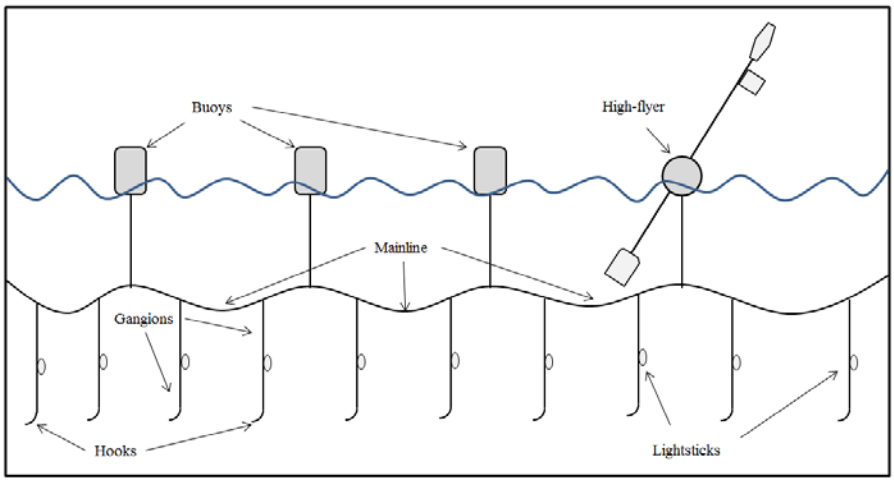

Figure 5.1 Typical U.S. Pelagic Longline Gear

Source: Redesign from original in Arocha (1997)

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 (2012-2016)

Target Species	2012	2013	2014	2015	2016
Swordfish	683	735	780	729	757
Bigeye tuna	865	620	811	641	619
Yellowfin tuna	628	638	608	571	641
Mix of tuna species	728	694	670	653	702
Shark	525	NA	293	298	274
Dolphin	1,129	933	1,093	1,140	943
Other species	300	NA	NA	150	NA
Mix of species	758	717	722	737	783

Source: Unified Data Processing (UDP, formerly the Fisheries Logbook System, or FLS).

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.

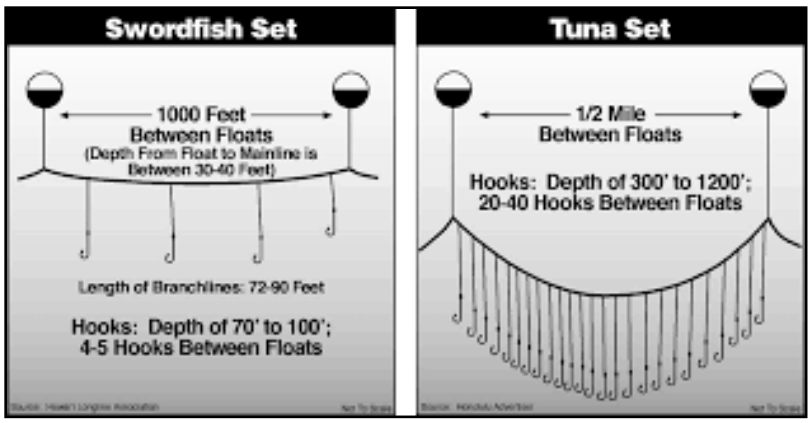

Figure 5.2 Pelagic Longline Gear Deployment Techniques

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 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 2017, approximately 280 tunas longline LAPs had been issued. In addition, approximately 185 directed swordfish LAPs, 72 incidental swordfish LAPs, 221 directed shark LAPs, and 269 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 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 PLL 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 PLL 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 (https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-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; note that this information will be moving to NOAA's new website, https://www.fisheries.noaa.gov).

PLL Observer Program

In 2016, NMFS observers recorded 1,230 PLL sets, an overall fishery coverage of 17.9 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 (2012-2016)

Year	Number of Sets Observed			Percentage of Total Number of Sets		
	Total	Non-EXP	EXP	Total	Non-EXP	EXP
2012[1]	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	-	-
2016	1,230	-	-	17.9	-	-

EXP=Experimental fishing operations. [1]100 percent observer coverage was required in a cooperative research program in the Gulf of Mexico (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. Sources: Garrison and Stokes 2013, 2014, 2015, 2016; unpublished Pelagic Longline Observer Program (POP) data (2017).

Increased Observer Coverage in the Mid-Atlantic Bight 2016 to 2017

NMFS increased the mandatory observer coverage for PLL vessels in the Mid-Atlantic bight (MAB), including the Cape Hatteras GRA from December 1, 2016 through April 30, 2017. The purpose of the increased coverage was to supplement scientific research on bycatch in the PLL 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 PLL 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 during 2017

NMFS continued an increased rate of mandatory observer coverage in the Gulf of Mexico (GOM) during 2017 (February through June 15, 2017), 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 (2012-2016)

Species	2012	2013	2014	2015	2016
Swordfish kept	51,544	44,556	32,908	27,730	24,456
Swordfish discarded	7,996	4,756	4,655	5,382	4,437
Blue marlin discarded	896	844	718	990	1,050
White marlin discarded	1,432	1,239	1,580	2,885	2,153
Sailfish discarded	795	456	445	715	855
Spearfish discarded	270	342	306	837	745
Bluefin tuna kept	392	273	379	320	411
Bluefin tuna discarded	563	266	390	210	582
Bigeye, albacore, yellowfin, and skipjack tunas kept	84,707	67,083	73,339	54,734	56,978
Pelagic sharks kept	2,794	3,384	3,804	2,208	2,172
Pelagic sharks discarded	23,038	28,151	38,496	45,082	27,900
Large coastal sharks kept	86	49	47	50	50
Large coastal sharks discarded	7,716	7,997	5,905	8,839	9,549
Dolphin kept	42,445	34,250	63,217	53,526	46,376
Wahoo kept	3,121	2,721	3,325	1,563	1,766
Sea turtle interactions	61	92	93	357	228
Number of Hooks (× 1000)	7,679	7,306	7,125	5,856	5,218

Source: Unified Data Processing

Table 5.6 Reported Landings (mt ww) in the U.S. Atlantic Pelagic Longline Fishery (2012-2016)

Species	2012	2013	2014	2015	2016
Yellowfin tuna	2,269.6	1,544.4	1,456.2	1,041.4	1,301.3
Skipjack tuna	0.4	0.5	0.31	0.2	1.2
Bigeye tuna	581.4	508.9	586.7	574.4	394.9
Bluefin tuna*	295.4	190.4	221.9	87.7	103.6
Albacore tuna	261.2	255.3	309.6	228.9	202.7
Swordfish N.*	3,346.6	2,812.0	1,832.3	1,592.7	1,394.4
Swordfish S.*	0.0	0.06	0.0	0.0	0.0
Total	6,755	5,312	4,407	3,525	3,398

* Includes landings and estimated discards from scientific observer and logbook sampling programs. Source: NMFS 2017.

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 through 2017 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 percent), medium (0.6 percent), or low (0.37 percent) 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 136 IBQ shareholders. The quota was distributed to only those IBQ shareholders associated with a vessel. 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 divided among each of the 136 qualified share recipients, and distributed equally to each IBQ shareholder associated with a vessel.

On January 1, 2017, the 148.3 mt annual base quota of Longline category bluefin tuna quota was divided among each of the 136 qualified share recipients, and NMFS distributed the quota to IBQ shareholders whose permit was associated with a vessel. The total amounts of quota distributed to the shareholder accounts on January 1, 2017 were based on the eligible permit's share percentage as determined by the Amendment 7 criteria. On March 2, 2017, NMFS distributed an additional 45 mt, which had been transferred from the Reserve category inseason. The March 4, 2017 quota was distributed to permitted Atlantic Longline vessels with recent fishing activity, rather than to all qualified IBQ share recipients. Specifically, IBQ was allocated to 90 permitted Atlantic Longline vessels with recent fishing activity.

Table 5.7 IBQ Allocations (mt) to the Pelagic Longline Category by Share Tier (lb, 2015, 2016, and 2017)

Quota Distribution	IBQ (mt)	Date	IBQ (lb) to each Eligible Shareholder*		
			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
Annual Allocation	148.3	January 1, 2017	3,913	1,956	1,206
Transfer from Reserve Category**	45.0	March 2, 2017	1,102	1,102	1,102
2017 Total	193.3		5,015	3,058	2,308

* Only allocated to eligible shareholders, for which the valid permit was associated with a vessel. ** Transfer from Reserve Category: Only to *active* vessels (vessels with recent fishing activity (1/1/16 through 2/22/17)).

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 and Other Metrics of the IBQ Program (2015, 2016)

Metric	2015	2016
Permits eligible for IBQ shares	136	136
# vessels that fished with PLL gear	104	85
# vessels landing bluefin tuna	59	55
Total Weight Bluefin landed (lb, ww)	157,388	196,142
Total Weight Bluefin landed (mt, ww)	71.3	89.0
Landed in Gulf of Mexico (mt, ww)	3.7	3.5
Landed in Atlantic (mt, ww)	67.6	85.5
# Bluefin landed	323	447
# landed in Gulf of Mexico	15	13
# landed in Atlantic	308	424
mt of NED* quota caught (max. 25 mt)	24.9	17.3
Total Bluefin Dead Discards (mt, ww)	17.1	22.6
Discarded in Gulf of Mexico (mt, ww)	5.6	7.1
Discarded in Atlantic (mt, ww)	11.5	14.8
Discarded in NED* (mt, ww)	0	0.7
# Trips with PLL gear	1,124	1,025
# PLL sets	7,769	6,885
# hooks	5,549,451	5,217,547
Number of IBQ leases	49	81
Number of participants leasing	44	63
Average amount leased per transaction (lb)	2,580	1,743
Total amount leased (lb)	126,407	141,183
Average price per pound (weighted average)	$ 3.46	$ 2.52
# Trips based on Vessel Monitoring System (VMS) prelanding declarations	1,030	990
# Sets based on VMS bluefin reports	5,472	5,921
# Vessels with installed Electronic Monitoring (EM) systems	111	113
# Hard drives received	785 (Jun-Dec)	975
# Vessels submitting hard drives	91 (Jun-Dec)	85

*NED = northeast distant area (See Figure 5.6). Sources: Dead discard data: POP and UDP; Landings, effort, and IBQ leasing data: UDP and IBQ Systems; Vessel Monitoring System Data; Electronic Monitoring (EM) data: Saltwater, Inc. (NMFS contractor for installation and maintenance of EM systems) and ERT Corp. (NMFS contractor for review and storage of EM data).

Table 5.9 provides data on the number of sets and vessels audited during 3-month audit periods. The numbers of PLL sets audited and number of vessels audited is variable due to the sample design. The sample design is referred as "two-stage stratified random sampling" with an underlying objective to maximize the opportunity of sampling trips/sets with bluefin interactions. The sample design targets specific geographic regions and seasons based on historical data,

samples each vessel annually, and samples among vessels in proportion to their annual fishing effort.

Table 5.9 Numbers of Pelagic Longline (PLL) Sets and Vessels Audited During 3-month Audit Periods within the Bluefin Tuna Electronic Monitoring Program

Audit Period	Period Coverage	# PLL Sets Audited	# Vessels Audited
1	Jun – Aug 2015	126	43
2	Sept – Nov 2015	70	25
3	Dec 2015 – Feb 2016	155	48
4	Mar – May 2016	160	44
5	Jun – Aug 2016	85	28
6	Sep – Nov 2016	77	24
7	Dec 2016*	35	12
8	Jan – Mar 2017	179	48
9	Apr – Jun 2017	181	55

Source: Electronic Monitoring Program

Compliance with the Amendment 7 Regulations

The data indicate that, in general, compliance with the Amendment 7 regulations was high. For example, one of the reporting requirements is for dealers and vessel operators to report bluefin tuna landings and dead discards in the online IBQ system at the point of sale. The amount of landings of bluefin tuna, as indicated by data entered into the IBQ online system, was very similar to the amount derived from the preexisting mandatory bluefin tuna dealer reports (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 2016 (Figure 5.3).

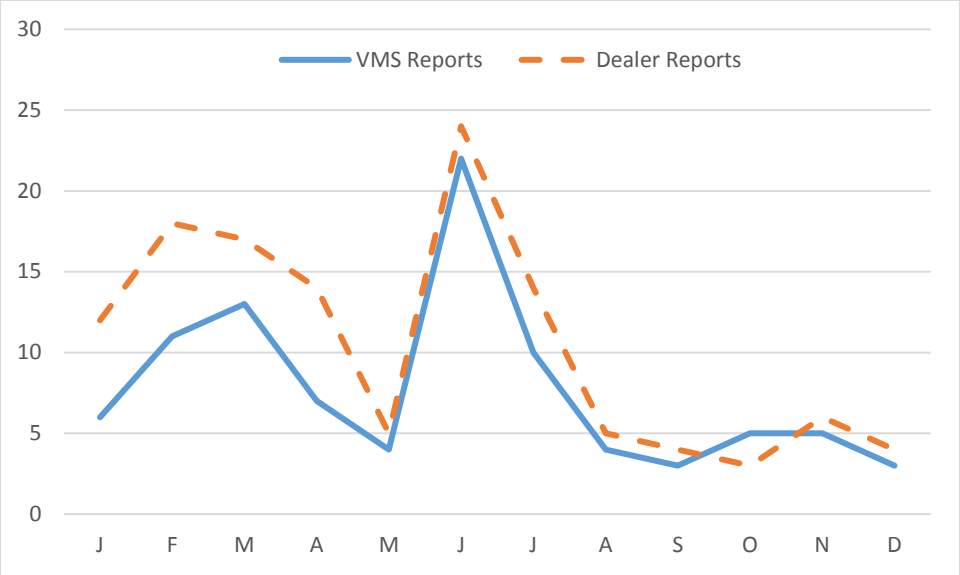

Figure 5.3 Number of Vessels using VMS to Report Retention of Bluefin Tuna and Number of Vessels that Dealers Reported to Have Landed Bluefin Tuna (Jan – Dec, 2016)

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 PLL vessels in 2016 is presented in Table 5.10.

Table 5.10 ICCAT-Designated Prohibited Shark Interactions and Dispositions in the Pelagic Longline Fishery (2016)

Species	Kept	Released Dead	Released Alive	Released Unknown	Lost at Surface
Bigeye thresher	0	28	41	1	0
Silky	0	111	130	0	1
Great hammerhead	0	10	7	0	0
Oceanic whitetip	0	22	66	0	2
Smooth hammerhead	0	7	11	0	0
Scalloped hammerhead	1	61	82	0	0
Unidentified hammerhead	0	72	173	1	1

Source: NMFS POP

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.

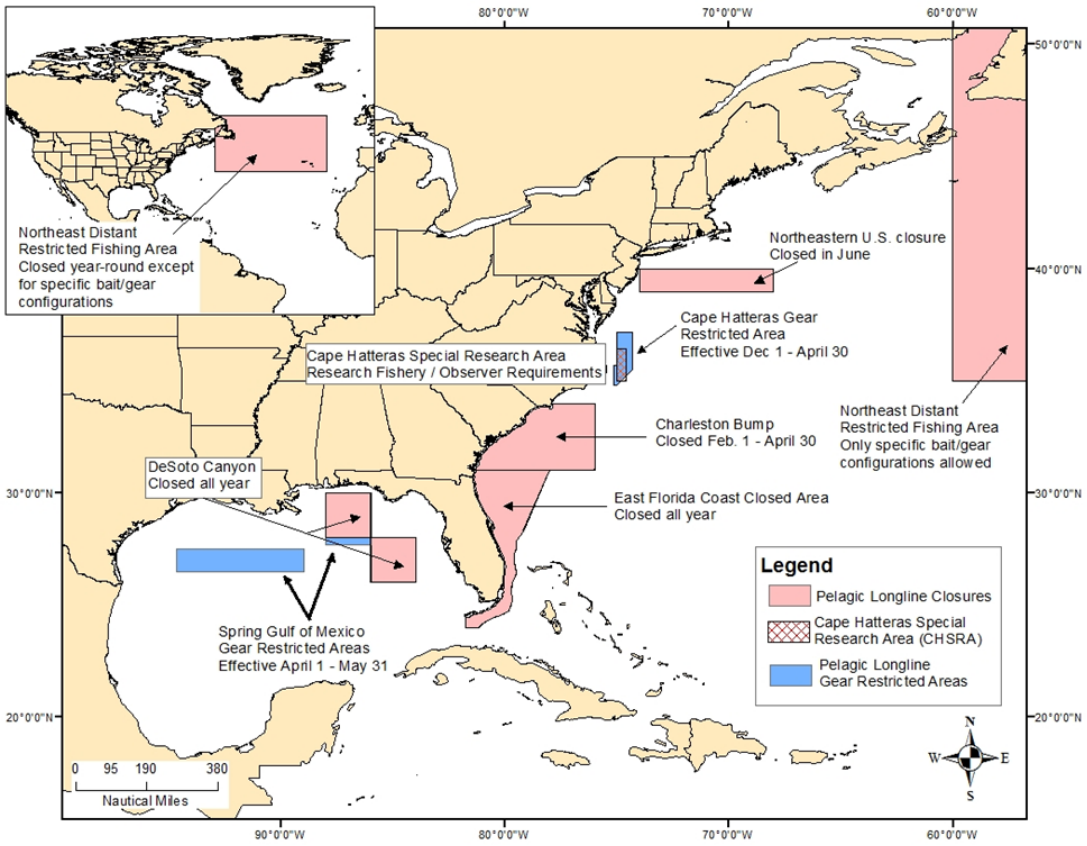

Figure 5.4 Areas Closed/Restricted to Pelagic Longline Fishing by U.S. Flagged Vessels

Areas where the use of PLL gear is restricted include "Pelagic Longline Closures" and GRAs. The locations of the PLL 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 PLL permit, such as buoy gear, green-stick gear, or rod and reel gear would be allowed by PLL vessels. Specifically, the criteria for access are: (1) ratio of bluefin interactions to designated species landings; (2) compliance with the POP requirements; and (3) compliance with HMS logbook reporting requirements.

The number of vessels not qualified for access to the GRA is shown below in Figure 5.5, along with the reasons for lack of access. "Compliance" means the vessel did not qualify for access as a result of either logbook or observer program compliance. Overall, there have been incremental improvements in bluefin tuna avoidance, observer compliance , and logbook reporting compliance based on the number of vessels with access to the Cape Hatteras GRA, The initial assessment of performance metrics (i.e., effective date of the final rule through the end of 2015) was based on data from 2006 through 2012. Subsequent assessments were based on the most recent complete three-consecutive-year-period as shown in Table 5.11. Permit holders are notified annually of the status of access for the relevant vessel. In order to access the Cape Hatteras GRA, permit holders must have the letter on board their vessel stating that the vessel is qualified to access the GRA.

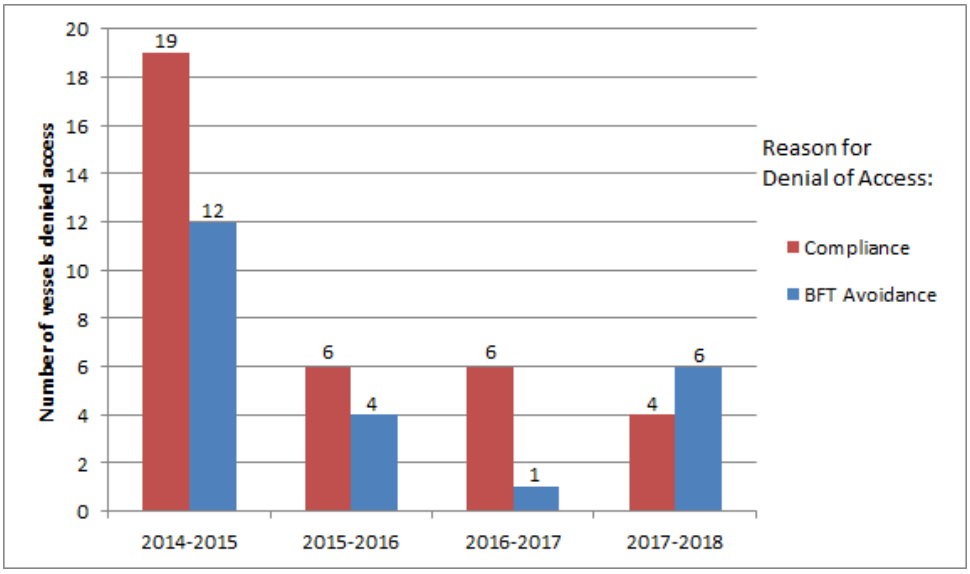

Figure 5.5 Number of Vessels Without Access to the Cape Hatteras GRA

Table 5.11 Time period of Data Used to Determine GRA Access

GRA Effective Dates	Data Used in Analysis Spans
Dec 1, 2014 - April 30, 2015	2006 - 2012
Dec 1, 2015 - April 30, 2016	2012 - 2014
Dec 1, 2016 - April 30, 2017	2013 - 2015
Dec 1, 2017 - April 30, 2018	2014 - 2016

The Spring Gulf of Mexico GRA consists of two areas in the GOM and limits access to these areas for vessels fishing with PLL 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 2012 - 2016 are summarized in Table 5.12. Marine mammals are caught primarily during the third and fourth quarters in the Mid Atlantic Bight (MAB), and during the second quarter in the South Atlantic Bight (SAB). These geographic areas are illustrated in Figure 5.6, below. In 2016, the majority of observed interactions were with short-finned pilot whales (Garrison, unpublished data). NMFS monitors observed interactions with sea turtles and marine mammals on a quarterly basis and reviews data for appropriate action, if any, as necessary.

Table 5.12 Marine Mammal Interactions in the Atlantic Pelagic Longline (PLL) Fishery (2012-2016)

Year	Species	Total		Mortality		Serious Injury*		Alive*	
		Obs.	Est.	Obs.	Est.	Obs.	Est.	Obs.	Est.
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	-	-
2014	Beaked Whale	1	10	-	-	0	0	1	10
	Minke whale	1	6	-	-	0	0	1	6
	Long-finned Pilot Whale	2	11	-	-	1	1	1	10
	Pantropical spotted Dolphin	1	10	-	-	0	0	1	10
	Risso's dolphin	1	8	-	-	1	8	0	0
	Rough-toothed dolphin	2	4	-	-	2	4	0	0
	Short-finned pilot whale	22	275	-	-	19	234	3	41
	Unidentified dolphin	1	14	-	-	1	14	0	0
2015	Beaked whale	1	4.0	-	-	1	4.0	-	-
	Bottlenose dolphin	1	4.7	-	-	-	-	1	4.7
	Common dolphin	2	14.4	-	-	1	9.0	1	5.4
	Risso's dolphin	2	8.4	-	-	2	8.4	-	-
	Short-finned pilot whale	38	233.5	-	-	32	202.9	6	30.7
	Sperm whale	1	1.3	-	-	1	1.3	-	-
	Unidentified dolphin	2	8.5	-	-	-	-	2	8.5
	Unidentified marine mammal	2	10.5	-	-	1	5.8	1	4.7
2016	Long-finned pilot whale***	0.3	1.3	-	-	0.2	1.1	0.1	0.2
	Risso's dolphin	4	22.0	1	5.6	1.5	10.5	1.5	5.9
	Short-finned pilot whale***	22.7	130.8	-	5.1	19.3	111.1	3.4	14.6
	Unidentified dolphin	2	9.3	-	-	1	1.2	1	8.1
	Unidentified marine mammal	2	4.1	-	-	0.5	0.8	1.5	3.3
	Unidentified whale	1	9.2	-	-	0.5	4.7	0.5	4.5

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

at the time of the interaction. Sources: Garrison and Stokes, 2012, 2013, 2014. Garrison 2015, 2016, 2017 - 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 (BiOp) on June 1, 2004. The June 2004 BiOp 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 BiOp 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 each subsequent three-year period (NMFS 2004). The estimated sea turtle takes for regular fishing and experimental fishing effort for 2011 - 2016 are summarized in Table 5.13 and Table 5.14. Loggerhead interactions are more widely distributed; however, the NED, NEC (northeast coastal), FEC (Florida east coast), and SAB appear to be areas with high interaction levels each year. These geographic areas are defined in Figure 5.6, below.

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 (Walsh and Garrison, 2006). In 2016, the U.S Atlantic PLL fishery was estimated to have interacted with 154 loggerhead sea turtles and 339 leatherback sea turtles (Garrison, unpublished data) (Table 5.15). In 2016, the majority of loggerhead sea turtle interactions occurred in the FEC, MAB, and NEC areas (

Table 5.13). Interactions with leatherback sea turtles were highest in the GOM, MAB, NED, and NEC areas (Table 5.14). The total interactions for the most recent and complete 3-year ITS period (2013-15) were below the level established by the ITS in the 2004 BiOp 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.

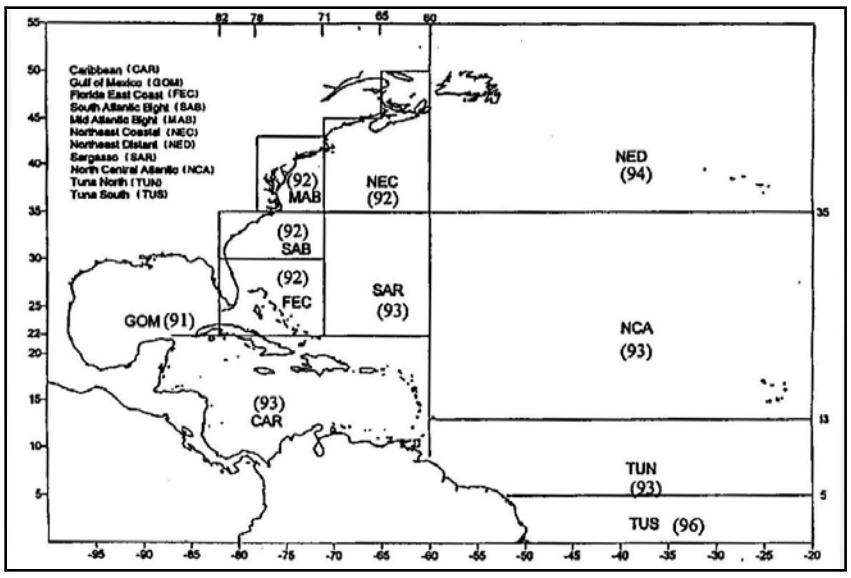

Figure 5.6 Geographic Areas Used in Summaries of Pelagic Logbook Data

The geographic zones are referred to as Caribbean (CAR), Gulf of Mexico (GOM), Florida east coast (FEC), South Atlantic Bight (SAB), Mid-Atlantic Bight (MAB), northeast coastal (NEC), northeast distant (NED), Sargasso Sea (SAR), north central Atlantic (NCA), tuna north (TUN), and tuna south (TUS). Source: Cramer and Adams 2000.

Table 5.13 Estimated Number of Loggerhead Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery, by Statistical Area (2011-2016)

Area	2011	2012	2013	2014	2015	2016
CAR	4	0	4	3	1	6
GOM	0	56	20	23	1	4
FEC	92	157	50	83	90	49
SAB	9	37	14	19	18	63
MAB	81	71	91	56	70	9
NEC	103	199	139	10	52	17
NED	105	161	49	27	7	6
SAR	44	0	11	28	4	0
NCA	0	0	0	0	0	0
TUN	0	0	0	0	0	0
TUS	0	0	0	0	0	0
Total	438	681	376	259	243	154
Experimental fishery (2008-14)	0	0	1	2	-	-
Total	438	681	377	261	243	154

Sources: Garrison and Stokes 2012, 2013, 2014. Garrison 2015, 2016, 2017- unpublished data.

Table 5.14 Estimated Number of Leatherback Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery, by Statistical Area (2011-2016)

Area	2011	2012	2013	2014	2015	2016
CAR	3	0	3	2	0	0
GOM	33	250	144	235	99	80
FEC	17	75	41	9	30	31
SAB	12	119	11	11	8	21
MAB	140	46	52	0	61	63
NEC	26	60	93	9	60	56
NED	8	41	11	0	24	84
SAR	0	3	6	2	12	0
NCA	0	0	0	0	0	0
TUN	1	2	2	0	5	4
TUS	0	0	0	0	0	0
Total	239	596	363	268	299	339
Experimental fishery (2005; 2008-14)	1	2	3	2	-	-
Total	240	598	366	270	299	339

Sources: Garrison and Stokes, 2012, 2013, 2014. Garrison 2015, 2016, 2017, unpublished data.

Table 5.15 Estimated Sea Turtle and Marine Mammal Interactions and Sea Turtle Incidental Take Levels in the US Atlantic Pelagic Longline Fishery (by Species, , 2010-2016)

Species	Total (2010 – 12)	2013	2014	2015	Total (2013 – 15)	2016	*Total 3-year ITS Level
Leatherback	1,006	366	279	300	945	339	1,764
Loggerhead	1,463	377	247	243	867	154	1,905
Other/unidentified sea turtles	22	0	6	18	24	3	105
Marine mammals	N/A	289	336	286	N/A	---	N/A

* Applies to all subsequent 3-year ITS periods (e.g.; 2010-12, 2013-15, 2016-18); 2016 data are preliminary estimates.

Protected Species - Seabirds

Observer data indicate that seabird bycatch is low in the U.S. Atlantic PLL fishery (Table 5.16 and Table 5.17). In 2016, there were 84 active U.S. PLL vessels in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea that reportedly set approximately 5.2 million hooks. Eleven seabirds were observed taken (one greater shearwater, four herring gulls, four northern gannets, one brown pelican, and one unidentified gull). Five seabirds were released dead and six seabirds were released alive.

Table 5.16 Status of Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery (1992-2016)

Species	Release Status		Total	Percent Dead
	Dead	Alive		
Greater shearwater	31	3	34	91.2
Cory's shearwater	2	-	2	100.0
Unidentified shearwater	3	1	4	75.0
Herring gull	16	-	16	100.0
Great black-backed gull	9	1	10	90.0
Laughing gull	3	1	4	75.0
Unidentified gull	15	9	24	62.5
Northern gannet	3	13	16	18.8
Storm petrel	1	-	1	100.0
Unidentified seabird	41	19	60	68.3
Brown pelican	3	1	4	75.0
Parasitic jaeger	1	0	1	100.0
Total	128	48	176	72.7

Source: NMFS POP

Table 5.17 Observed Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery (2011-2016)

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
2016	1	GOM	Greater shearwater	1	dead
	1	GOM	Herring gull	1	dead
	1	GOM	Northern gannet	1	alive
	1	MAB	Northern gannets	3	alive
	1	SAB	Unidentified gull	1	alive
	1	GOM	Brown pelican	1	alive
	4	NEC	Herring gull	3	dead

Source: NMFS POP

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 SEFSC. This project aimed to improve the identification of incidental seabird catch on the Western North Atlantic U.S. PLL 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 PLL fleet based on observer reports of seabird interactions and allowed for preparation of the U.S. National Report on Seabird Bycatch of the Western North Atlantic U.S. Pelagic Longline Fishery for ICCAT.

Figure 5.7 provides extrapolated estimates of incidental seabird catch in U.S. Atlantic longline fisheries, which includes the GOM and Western North Atlantic fisheries (Li and Jiao 2014). The study showed that the highest estimate of seabird bycatch occurred in the MAB, followed by the NEC. Estimated PLL 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.

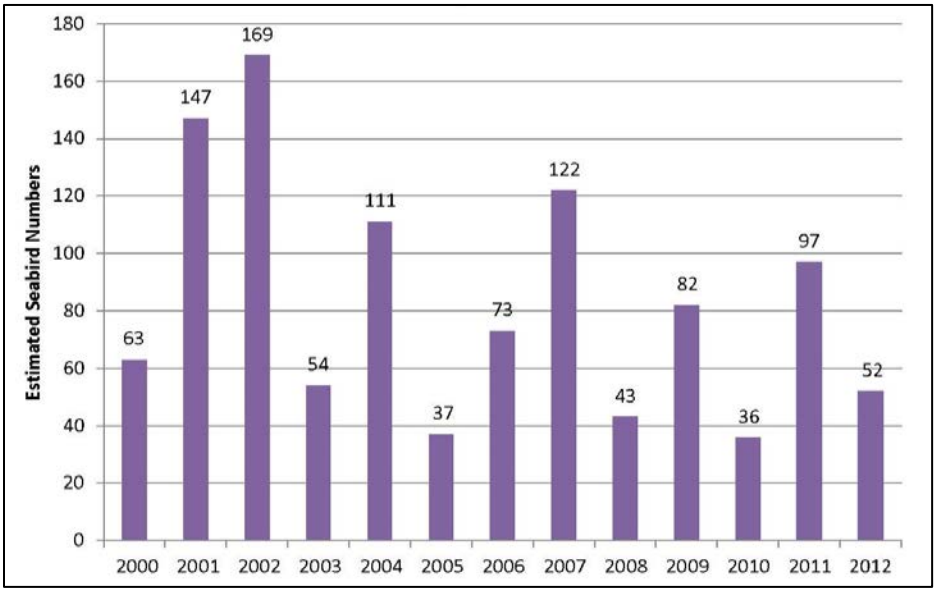

Figure 5.7 Estimated Incidental Seabird Catch in Atlantic Longline Fisheries (2000-2012)

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 (2012 – 2016), U.S. longline landings have averaged 5.4 percent of total Atlantic longline landings, ranging from a high of 7.0 percent in 2012 to a low of 4.2 percent in 2015 and remaining steady at 4.3 percent in 2016. Table 5.18 contains aggregate longline landings of HMS, other than sharks, for all countries in the Atlantic for the period 2012 – 2016.

Table 5.18 Estimated International Longline Landings (mt ww) of HMS (Excluding Sharks) for All Countries in the Atlantic (2012-2016)

Species (Region)	2012	2013	2014	2015	2016
Swordfish (N. Atl + S. Atl)	23,210	19,233	19,792	20,140	17,108
Yellowfin tuna (W. Atl)[1]	12,558	12,308	8,384	7,347	7,647
Bigeye tuna	35,005	32,037	37,008	39,792	35,398
Bluefin tuna (W. Atl.)[1]	478	470	497	553	562
Albacore tuna (N. Atl + S. Atl)	21,605	20,377	11,977	14,428	15,946
Skipjack tuna (W. Atl)[1]	107	1,194	462	35	83
Blue marlin (Atl. + Med.)[2]	1,536	934	1,249	1,370	919
White marlin (Atl. + Med.)[2]	391	262	314	353	332
Sailfish (W. Atl.)[3]	1,094	841	737	848	717
Total International longline landings[4]	95,984	87,656	80,420	84,866	78,712
Total U.S. longline landings[5]	6,755	5,312	4,407	3,525	3,398
U.S. landings as a percent of total International landings	7.0%	6.1%	5.5%	4.2%	4.3%

[1] Note that the United States has not reported participation in the E. Atlantic yellowfin tuna fishery since 1983 and has not participated in the E. Atl bluefin or the E. Atl skipjack tuna fishery since 1982. [2] Includes U.S. and foreign discards. [3] Includes U.S. dead discards. [4] From SCRS 2017. [5] From U.S. National Reports to ICCAT, 2013-2017. Includes swordfish, blue marlin, white marlin, and sailfish longline discards. Sources: U.S. ICCAT National Reports 2013 – 2017 (NMFS 2013a, 2014, 2015a, 2016, 2017); SCRS, 2017.

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 5.19 provides the most recent catch totals for blue, shortfin mako, and porbeagle sharks.

Table 5.19 Estimated International Longline Landings (mt ww)[1] of Pelagic Sharks for All Countries in the Atlantic (2012 - 2016)

Species (Region)	2012	2013	2014	2015	2016
Blue shark (N. Atl + S. Atl + Med)	62,468	56,325	60,597	60,216	65,159
Shortfin mako (N. Atl + S. Atl + Med)	7,035	5,315	5,868	5,585	5,770
Porbeagle (N. Atl + S. Atl + Med)	117	144	21	12	5
Total International longline catches	69,620	61,784	66,486	65,813	70,934
U.S. blue shark catches[1]	162	131	161	113	73
U.S. shortfin mako catches[1]	430	411	409	532	300
U.S. porbeagle catches[1]	4	29	14	43	6
Total U.S. catches[1]	596	571	584	688	379
U.S. catches[1] as a percent of total International catch	0.9	0.9	0.9	1.0	0.5

[1]Includes catches and discards. Source: SCRS 2017.

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 6 of this report. A brief history of the Atlantic purse seine fishery and regulations is available in Amendment 7 to the 2006 Consolidated HMS FMP.

Purse seine vessel owners are required to use VMS and must submit through a set report within 12 hours of completion of each purse seine set. 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, if available (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 PLL 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 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. Table 5.20 summarizes observer coverage and Bluefin tuna (BFT) catch for 2013 through 2015, allowing comparison of results with and without the EFP.

Table 5.20 Bluefin Tuna Purse Seine Fishery Comparison, 2013, 2014, and 2015

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

All weights are in mt, ww. * = Min. 5% required by ICCAT, as measured in number of sets or trips. Source: NEFSC Observer Program, BFT Dealer Database.

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.

In 2016 and 2017, NMFS did not open (i.e., announce a start date for) the Atlantic tunas Purse Seine fishery 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 and 2017. Although NMFS received an EFP application for purse seine fishing (similar to those submitted for 2014 and 2015), NMFS did not grant an EFP.

5.2.2 Recent Catch and Landings

Table 5.21 shows purse seine catch (landings + dead discards) of Atlantic bluefin tuna from 2008 through 2016. 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 metric tons, whole weight (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 U.S. purse seine fleet has opted not to direct any effort on HMS other than bluefin tuna; therefore, Table 5.21 only includes bluefin tuna.

Table 5.21 Domestic Atlantic Bluefin Tuna Catch (mt ww) for the Purse Seine Fishery in the Northwest Atlantic Fishing Area (2008-2016)

Species	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bluefin tuna	0.0	11.4	0.0	0.0	1.7	42.5	41.8	38.8	0.0

Source: NMFS 2017

5.2.3 International Issues and Catch

The U.S. purse seine fleet has historically accounted for a small percentage of the total international Atlantic tuna landings. Table 5.22 shows that since 2008, the U.S. purse seine fishery has contributed to less than 0.10 percent of the total purse seine catch reported to ICCAT. In Recommendation 10-10, ICCAT established a minimum standard for scientific fishing vessel observer programs and adopted a minimum of 5 percent observer coverage of fishing effort in the purse seine fishery, as measured in number of sets or trips.

Table 5.22 Estimated International Atlantic Tuna Landings (mt ww) for the Purse Seine Fishery in the Atlantic and Mediterranean (2006-2016)

Tuna Species	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bluefin	13,540	11,461	4,987	4,306	6,186	8,108	8,277	10,034	11,361
Yellowfin	73,152	78,210	76,597	70,243	74,198	68,093	71,780	84,430	99,372
Skipjack	88,501	100,052	127,749	148,552	170,257	184,102	176,200	183,856	190,153
Bigeye	18,676	22,730	27,630	29,506	27,589	28,628	29,101	28,118	28,051
Albacore	175	1,474	429	1,077	672	184	91	491	88
Total	194,044	213,927	237,392	253,684	278,902	289,115	285,449	306,929	328,989
U.S. total	0.0	11.4	0.0	0.0	1.7	42.7	41.8	38.8	0.0
U.S. percentage	0	< 0.01	0	0	< 0.01	< 0.01	< 0.01	< 0.01	0

Source: SCRS 2017

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.

Handgear Trip Estimates

Table 5.23 displays the estimated number of rod and reel and handline trips targeting large pelagic species (e.g., tunas, billfishes, swordfish, sharks, wahoo, dolphin, and amberjack) from Maine through Virginia from 2012 to 2016. The trips include commercial and recreational trips, and are not specific to any particular species. It should be noted that the 2016 estimates are preliminary and subject to change.

Table 5.23 Estimated Number of Rod and Reel and Handline Trips Targeting Atlantic Large Pelagic Species, by State (ME-VA, 2012-2016)

Year	AREA							Total
	NH/ME	MA	CT/RI	NY	NJ (North)	NJ (South) and MD/DE	VA	
Private Vessels								
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
2016	4,224	10,511	3,802	6,481	3,337	11,193	2,754	42,302
Charter Vessels								
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
2016	669	3,756	552	1,423	1,439	2,798	263	10,900

Source: Large Pelagics Survey (LPS)

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.

Buoy gear effort, as reported by the fishery, is presented from 2012 to 2016 in Table 5.24.

Table 5.24 Reported Buoy Gear Effort (2012-2016)

Specifications	2012	2013	2014	2015	2016
Number of vessels	55	46	39	37	42
Number of trips	688	629	467	353	337
Average buoy gears deployed per trip	14.1	17.95	20.9	21.1	23.6
Total number of set hooks	11,639	12,557	10,740	8,267	8,588
Average number hooks per gear	1.2	1.1	1.1	1.1	1.1

Source: Unified Data Processing

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 also occurs during the winter months. Fishing usually takes place between five and 125 miles 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 5.8 shows bluefin tuna commercial landings, which are predominately handgear landings, in metric tons (whole weight) 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.

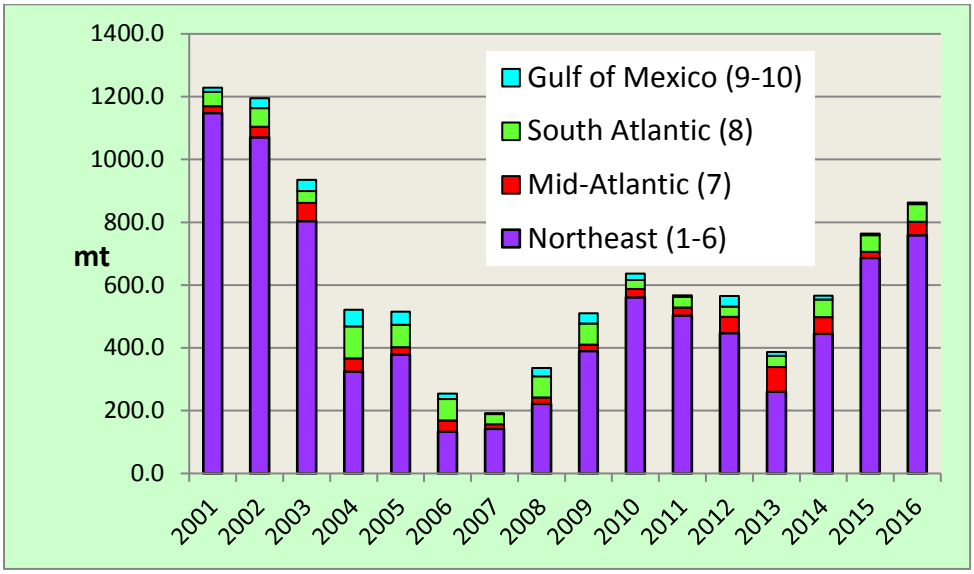

Figure 5.8 Commercial Landings (mt, ww) of North Atlantic Bluefin Tuna by U.S. Geographic Region (2001 – 2016)

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) with a commercial endorsment. 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 https://www.greateratlantic.fisheries.noaa.gov/aps/permits/data/index.html or by calling the Permit Office at (978) 281-9370.

Vessels that are permitted in the General and Charter/Headboat (with a commercial endorsement) 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 (CFL) 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 FMP, 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 CFL (“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. These reports are in addition to any information submitted by Federally-permitted dealers.

The Swordfish General Commercial permit allows permit holders to retain and sell a limited number of swordfish caught on rod and reel, handline, harpoon, green-stick, or bandit gear. The HMS Charter/Headboat permit regulations also allow for the commercial retention of swordfish on non-for-hire trips, provided the permit has a commercial endorsement, 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 2016, bluefin tuna commercial handgear landings accounted for approximately 75 percent of the total U.S. bluefin tuna landings and 87 percent of commercial bluefin tuna landings. Figure 5.9 shows the U.S. Atlantic bluefin tuna landings in metric tons (whole weight) by category since 1999. Note that the commercial handgear landings are comprised of bluefin tuna landed by both general and harpoon categories.

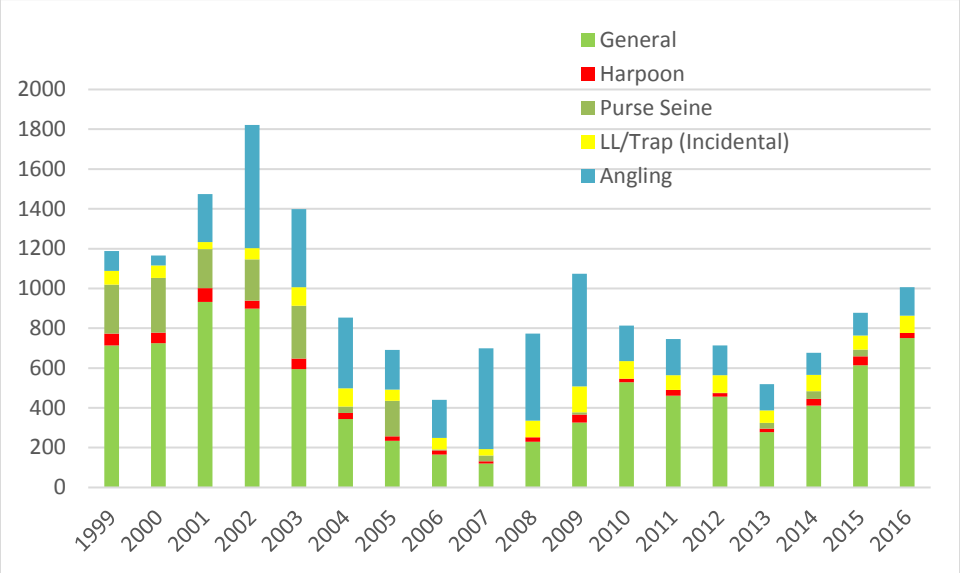

Figure 5.9 Landings of Bluefin Tuna (mt, ww) by Fishing Category (1999 – 2016)

Source: NMFS Commercial BFT Landings Database.

Also in 2016, two percent of the total yellowfin catch, or four percent of the commercial yellowfin catch, was attributable to commercial handgear. Commercial handgear landings of skipjack tuna accounted for approximately one percent of total skipjack landings, or about thirty percent of commercial skipjack landings. For albacore, commercial handgear landings

accounted for less than one percent of total albacore landings, and less than one percent of commercial albacore landings. Commercial handgear landings of bigeye tuna accounted for approximately two percent of total bigeye landings and three percent of total commercial bigeye landings. These species-specific percentages are calculated using values from Table 5.55, Table 5.58, Table 5.59 and Table 5.58. Landings attributed to buoy gear landings are presented in Table 5.25.

Table 5.25 Reported Buoy Gear Landings (lb dw, 2012-2016)

Species	2012	2013	2014	2015	2016
Swordfish	178,088	140,038	114,153	85,304	94,451
Dolphin	1,324	486	996	216	733
Oilfish	719	693	362	490	121
Shortfin mako shark	2,295	1,194	1,117	932	1,709
Wahoo	163	70	35	45	58
Bigeye tuna	0	0	0	0	0
Blacktip shark	38	0	13	0	0
King mackerel	56	134	143	29	323
Yellowfin tuna	0	0	0	0	0
Hammerhead shark	400	0	0	0	0
Silky shark	120	0	0	0	0
Greater amberjack	0	0	0	0	0
Bonito	54	0	0	0	0
Blackfin tuna	97	32	84	189	96

Source: Unified Data Processing

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

Table 5.26 U.S. Atlantic Commercial Handgear Landings of Tunas and Swordfish (mt ww) by Gear Type (2012-2016)

Species	Gear	2012	2013	2014	2015	2016
Bluefin tuna	Rod and Reel	419.5	249.5	378.9	581.4	722.1
	Handline	1.3	0.5	0.0	0.0	1.1
	Harpoon	52.3	45.0	67.5	77.1	52.9
	Total	473.1	295.0	446.4	658.5	776.1
Bigeye tuna	Troll	0.2	5.0	4.5	6.4	1.0
	Handline	7.9	15.96	16.4	51.3	9.6
	Total	8.1	20.96	20.9	57.7	10.6
Albacore tuna	Troll	0.0	0.2	0.2	0.0	0.03
	Handline	1.1	2.32	2.37	2.7	0.5
	Total	1.1	2.32	2.57	2.7	0.53
Yellowfin tuna	Troll	0.3	30.1	28.7	25.6	17.9
	Handline	86.7	67.0	82.7	66.8	38.4
	Total	87.0	97.1	111.4	92.4	56.3
Skipjack tuna	Troll	0.0	0.0	0.0	0.0	0.0
	Handline	6.06	1.22	2.01	0.7	1.2
	Total	6.06	1.22	2.01	0.7	1.2
Swordfish	Handline	154.6	105.3	87.2	76.4	75.7
	Harpoon	0.3	0.5	0.0	0.0	0.0
	Total	154.9	105.8	87.2	76.4	75.7

Source: NMFS 2017

Table 5.27 U.S. Atlantic Commercial Handgear Landings of Tunas and Swordfish (mt ww) by Region (2012-2016)

Species	Region	2012	2013	2014	2015	2016
Bluefin tuna	NW Atl	473.1	295.0	446.4	658.5	776.1
Bigeye tuna	NW Atl	7.9	15.9	16.4	51.3	10.4
	GOM	0.0	0.0	0.0	0.0	0.0
	Caribbean	0.0	0.06	0.0	0.0	0.2
Albacore tuna	NW Atl	0.6	2.3	2.3	2.7	0.4
	GOM/Caribbean	0.5	0.02	0.07	0.0	0.1
Yellowfin tuna	NW Atl	66.0	66.4	82.1	64.3	48.1
	GOM	17.5	0.0	0.0	1.9	6.9
	Caribbean	3.2	0.6	0.6	0.6	1.3
Skipjack tuna	NW Atl	2.0	0.8	1.3	0.2	0.3
	GOM	0.06	0.02	0.01	0.0	0.0
	Caribbean	4.0	0.4	0.7	0.5	0.9
Swordfish	NW Atl	151.3	104.8	86.9	70.7	71.3
	GOM	3.3	0.5	0.3	5.5	3.5
	Caribbean	0	0	0.3	0.2	0.9

Source: NMFS 2017

Table 5.28 Reported Buoy Gear Landings and Discards, in Numbers of Fish (2012-2016)

Species	2012	2013	2014	2015	2016
Landings					
Swordfish	2,699	2,155	1,856	1,561	1,558
Dolphinfish	196	51	182	18	48
Oilfish	13	18	8	12	3
Bigeye tuna	0	0	0	0	0
Blackfin tuna	10	3	10	16	13
Wahoo	12	2	1	1	2
Bonito	1	0	0	0	0
King mackerel	2	14	5	4	43
Shortfin mako	14	13	9	6	11
Hammerhead shark	3	0	0	0	0
Blacktip shark	1	0	1	0	0
Silky shark	4	0	0	0	0
Yellowfin tuna	0	0	0	0	0
Greater amberjack	0	0	0	0	0
Thresher shark	1	0	0	0	0
Released Alive					
Swordfish	1,221	478	447	311	223
Dolphinfish	14	4	15	0	0
Blue marlin	2	1	0	0	0
White marlin	0	0	0	0	0
Sailfish	0	0	0	0	0
Hammerhead shark	93	68	32	23	22
Blue shark	5	0	0	0	0
Thresher shark	6	1	0	0	0
Dusky shark	9	97	1	2	1
Night shark	238	129	79	83	58
Oceanic whitetip shark	0	1	3	7	1
Bigeye thresher shark	2	1	0	1	0
Tiger shark	2	3	3	0	0
Sandbar shark	0	0	0	0	1
Longfin mako shark	6	4	2	0	1
Shortfin mako shark	5	6	6	1	0
Blacktip shark	39	11	4	0	0
Silky shark	12	33	8	18	6
Oilfish	0	0	0	0	0
Greater amberjack	0	0	0	0	0
Blackfin Tuna	0	0	0	0	0
Bignose shark	0	0	0	1	0
Skipjack Tuna	0	0	0	0	0
Released Dead					
Swordfish	139	75	76	45	13
Silky shark	0	0	0	0	0
Hammerhead shark	0	0	0	1	0
Blackfin tuna	0	0	0	0	0
Blue marlin	0	0	0	0	0
Night shark	1	2	1	14	2
Longfin mako shark	1	0	0	0	0
Shortfin Mako	0	0	0	0	0

Source: Unified Data Processing

5.4 Recreational Handgear

5.4.1 Current Management

Domestic recreational fishermen target various HMS using a variety of handgear including rod and reel gear. Recreational fishing for federally-managed Atlantic HMS in federal waters requires an HMS Angling permit. Permit requirements for state waters varies by state and target species. For-hire vessels taking passengers recreational fishing are required to obtain an HMS Charter/Headboat permit (*note: the HMS Charter/Headboat permit also allows for sale of Atlantic tunas on for-hire and non-for-hire trips and the sale of swordfish on non-for-hire trips when combined with a commercial endorsment*). Two 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.

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

All non-tournament recreational landings of Atlantic marlins, roundscale spearfish, sailfish, bluefin tuna (including dead discards), and swordfish must also be reported to NMFS through dedicated calls lines or the Automated Landings Reporting System (ALRS) within 24 hours of landing. In Maryland and North Carolina, vessel owners are required to report their billfish bluefin tuna, and some shark landings through the submission of catch cards at state-operated landings stations. Participation in the Large Pelagic Survey (LPS) or Marine Recreational Information Program surveys (MRIP, formerly MRFSS) does not fulfill reporting obligations; vessel operators must still report bluefin tuna, billfish and swordfish as described above. MRIP funds and conducts various surveys and studies of recreational fishing activities and 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.

5.4.2 Recent Catch, Landings, and Bycatch

The recreational landings presented here for Atlantic HMS consist of information obtained through the MRIP, the LPS, the Southeast Headboat Survey, Texas Headboat Survey, the ATR, and the ALRS.

Tuna and swordfish landings for HMS recreational rod and reel fisheries are presented below in Table 5.29 from 2012 through 2016.

Table 5.29 Domestic Landings (mt ww)* for the Atlantic Tunas and Swordfish Recreational Rod and Reel Fishery (2012-2016)

Species	Region	2012	2013	2014	2015	2016
Bluefin tuna*	NW Atlantic	148.7	131.4	99.6	112.9	143.7
	GOM	0.0	0.0	0	0	1.7
	Total	148.7	131.4	99.6	112.9	145.4
Bigeye tuna**	NW Atlantic	269.6	337.5	251.9	197.7	126.9
	GOM	0.1	7.0	0.06	0.01	0.2
	Caribbean	0.0	0.0	1.4	0.5	0
	Total	269.7	344.5	253.36	198.21	127.1
Albacore**	NW Atlantic	144.3	340.3	136.7	12.9	43
	GOM and Caribbean	0.7	0.0	0	0.2	1.3
	Total	145.0	340.3	136.7	13.1	44.3
Yellowfin tuna**	NW Atlantic	1,433	495.4	999.8	795.6	1,610.7
	GOM	294.1	191.8	73.2	134.2	266.6
	Caribbean	0.0	0.0	16.2	6.7	34.2
	Total	1,721.1	687.2	1,089.2	936.3	1,911.5
Skipjack tuna**	NW Atlantic	98.0	37.7	46.0	32.7	93.2
	GOM	2.5	77.1	9.8	35.7	33.3
	Caribbean	3.0	0.0	9.4	7.2	3.4
	Total	103.5	114.8	65.2	75.6	129.9
Swordfish	Total	70.8	22.0	36.7	46.0	45.8

* Rod and reel catch and landings estimates of bluefin tuna < 73 in curve forked length, or 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 2013a, 2014, 2015a, 2016, 2017.

Atlantic Billfish Recreational Fishery

Table 5.30 provides a summary of reported billfish and swordfish landings from 2012 through 2016. 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 ATR 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 ATR, 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 5.30). The number of registered tournaments and reported tournament landings by state are shown in Table 5.31.

"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 5.30 Atlantic HMS Recreational Billfish and Swordfish Landings, in Numbers (2012-2016)

Species	Recreational Reporting	2012	2013	2014	2015	2016
Blue Marlin	Tournament*	45	44	49	40	63
	Non-Tournament**	18	11	5	23	17
	Total***	63	55	54	63	80
White Marlin	Tournament*	23	34	36	46	46
	Non-Tournament**	7	15	6	20	14
	Total***	30	49	42	66	60
Roundscale Spearfish (RSP)	Tournament*	4	1	2	10	21
	Non-Tournament**	0	0	0	0	1
	Total***	4	1	2	10	22
Total Landings of Marlin and RSP		106	97	100	98	139
Balance Remaining (from 250 Limit)		144	153	150	152	111
Sailfish	Tournament*	21	2	5	1	0
	Non-Tournament**	163	171	113	113	114
	Total***	184	173	118	114	114
Swordfish	Tournament*	29	16	23	17	42
	Non-Tournament**	386	263	281	315	458
	Total	415	279	304	332	500

Sources: Billfish (2012-2016) and Swordfish (2014-2016) include Tournament = ATR, MD and NC HMS Catch Cards, LPS, and MRIP; and Non-Tournament = ALRS, MD and NC HMS Catch Cards, LPS, and MRIP. Swordfish (2012-2013) include Tournament = ATR; and Non-Tournament = ALRS; Total = ATR, ALRS, MD and NC HMS Catch Cards, LPS, and MRIP.

Table 5.31 Tournament Landings of Billfishes and Swordfish by State or Area (2016)

State(s)	Tournaments	White Marlin	Blue Marlin	Sailfish	Roundscale Spearfish	Swordfish
ME	3	0	0	0	0	0
MA/RI	12	0	0	0	0	0
NY	15	0	0	0	0	3
NJ	28	0	5	0	0	6
DE/MD	14	14	8	0	21	2
VA	7	0	-	0	0	0
NC	14	0	9	0	0	0
SC	10	0	2	0	0	0
GA	11	0	-	0	0	0
FL	74	1	16	0	0	30
AL	9	0	2	0	0	0
MS	4	0	16	0	0	0
LA	21	0	3	0	0	0
TX	21	0	2	0	0	1
PR	10	0	0	0	0	0
USVI	8	0	0	0	0	0

Some states are aggregated to protect tournament reporting privacy. Six registered tournaments were held outside the United States and are not shown. Sources: ATR, ALRS, NC and MD Catch Cards, LPS, and MRIP.

Shark Recreational Fishery

Recreational shark landings are required to be reported to NMFS when 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. Maryland recreational shark landings are summarized by species in Table 5.32. North Carolina catch cards indicate two shortfin mako sharks were landed and reported in both 2014 and in 2015, and two bull sharks were reported in 2016, via North Carolina catch cards (six sharks total).

Table 5.32 Recreational Shark Landings Reported from the Maryland Catch Card Program (2013-2016)

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

Source: Maryland Department of Natural Resources (MD DNR)

The following tables provide estimated recreational landings for each of the three groups of shark species by region: large coastal sharks (Table 5.33, Table 5.34, and Table 5.35), pelagic sharks (Table 5.36), and small coastal sharks (Table 5.37 and Table 5.38); as well as for smoothhound (smooth dogfish) sharks (Table 5.39). Please note the changes in these tables from

previous SAFE reports. Where, in past years, estimates of zero harvest were provided for these tables, they are not provided in this 2017 SAFE report. An estimate of zero harvest indicates that the survey did not interview a single angler who harvested that species in a given year. This lack of data could indicate no harvest (i.e., a true estimate of zero harvest) or it could indicate that the survey missed interviewing anglers who harvested that species. Given the rare nature of catching some of these species, missing values are expected for some species, as can be seen in the highly variable nature of harvest for some species, such as silky sharks. Hence, these tables have been updated to provide a more accurate sense of missing values.

Table 5.33 Estimated Recreational Harvest of Large Coastal Sharks in the Atlantic Region, in Number of Fish per Species (2012-2016)

Species	2012	2013	2014	2015	2016
Basking[2]	.	.	.	.	.
Bignose[1]	.	.	.	.	.
Bigeye sand tiger[2]	.	.	.	.	.
Blacktip	1,164	962	1,730	1,718	1,511
Bull	68	77	3	2	27
Caribbean reef[1]	.	.	.	.	.
Dusky[1]	15	16	2	.	.
Galapagos[1]	.	.	.	.	.
Hammerhead, great	37	.	.	1	.
Hammerhead, scalloped	4	248	900	.	.
Hammerhead, smooth	.	352	.	.	.
Hammerhead, unclassified	.	.	.	.	261
Lemon	.	.	.	144	177
Night[1]	.	.	.	.	.
Nurse	706	13	418	298	21
Sandbar[3]	857	399	1,873	1,252	5
Sand tiger[2]	.	.	.	.	.
Silky[3]	232	.	176	38	.
Spinner	1,145	390	847	82	124
Tiger	2	8	324	417	835
Whale[2]	.	.	.	.	.
White[2]	.	.	.	.	.
Requiem shark, unclassified	6,070	97	4,513	153	405
Total	10,299	2,562	10,785	4,105	3,366

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

Table 5.34 Estimated Recreational Harvest of Large Coastal Sharks in the Gulf of Mexico Region, in Number of Fish per Species (2012-2016)

Species	2012	2013	2014	2015	2016
Basking[2]	.	.	.	.	.
Bignose[1]	.	.	.	.	.
Bigeye sand tiger[2]	.	.	.	.	.
Blacktip	22,530	105,315	10,338	8,071	9,303
Bull	2,415	2,786	3,498	400	6
Caribbean reef[1]	.	.	.	.	.
Dusky[1]	42	20	598	1	.
Galapagos[1]	.	.	.	.	.
Hammerhead, great	5	7	2	.	2
Hammerhead, scalloped	24	516	14	5	2
Hammerhead, smooth	.	.	.	.	.
Hammerhead, unclassified	.	.	.	.	.
Lemon	.	.	.	.	805
Night[1]	.	55	.	.	.
Nurse	2	2	.	1	1
Sandbar[3]	46	1,405	62	4	366
Sand tiger[2]	.	.	.	.	.
Silky[3]	.	615	.	1	.
Spinner	4,975	6,021	569	653	483
Tiger	.	3	4	2	1
Whale[2]	.	.	.	.	.
White[2]	.	.	.	.	.
Requiem shark, unclassified	16,453	17,606	2,440	3,445	5,416
Total	46,492	134,351	17,525	12,583	18,401

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

Table 5.35 Estimated Recreational Harvest of Large Coastal Sharks in Puerto Rico, in Numbers of Fish (2012-2016)

Species	2012	2013	2014	2015	2016
Dusky[1]	384	.	.	.	.
Lemon	.	.	12	.	.
Hammerhead, scalloped	98	.	.	.	.
Nurse	.	.	.	.	201
Silky[3]	263	215	85	334	.
Caribbean reef[1]	521	.	.	.	.
Total	745	215	97	334	201

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

Table 5.36 Estimated Recreational Harvest of Pelagic Sharks in the Atlantic, Gulf of Mexico, and U.S. Caribbean in Number of Fish per Species (2012-2016)

Species	2012	2013	2014	2015	2016
Bigeye thresher*	.	.	.	.	.
Bigeye sixgill*	.	.	.	.	.
Blue Shark	.	4,165	3,449	9,421	.
Mako, longfin*	.	.	.	.	.
Mako, shortfin	1,314	6,856	16,531	12,835	7,156
Mako, unclassified	14	12	5	34	13
Lamnidae (mackerel sharks)	.	.	.	436	.
Oceanic whitetip	.	.	.	132^	.
Porbeagle	.	.	.	.	.
Sevengill*	.	.	.	.	.
Sixgill*	.	.	.	.	.
Thresher	.	.	3,164	12,274	3,620
Total	1,328	11,033	23,149	35,000	10,789

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

Table 5.37 Estimated Recreational Harvest of Small Coastal Sharks in the Atlantic Region, in Number of Fish per Species (2012-2016)

Species	2012	2013	2014	2015	2016
Atlantic angel*	.	.	.	.	.
Blacknose	.	70	4,146	1,211	223
Bonnethead	9,798	14,376	28,532	2,870	8,918
Finetooth	.	.	2,896	326^	.
Atlantic sharpnose	23,207	44,832	56,052	28,869	46,513
Caribbean sharpnose*	.	.	.	.	.
Smalltail*	.	.	.	.	.
Total	33,005	59,278	91,626	33,276	55,654

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

Table 5.38 Estimated Recreational Harvest of Small Coastal Sharks in the Gulf of Mexico Region, in Number of Fish per Species (2012-2016)

Species	2012	2013	2014	2015	2016
Atlantic angel*	.	.	.	.	.
Blacknose	2,637	232	4,381	741	38
Bonnethead	6,763	7,755	19,072	6,659	12,791
Finetooth	248	239	80	112	350
Atlantic sharpnose	40,301	45,617	25,410	29,167	29,883
Caribbean sharpnose*	.	.	.	.	.
Smalltail*	.	.	.	.	.
Total	49,949	53,843	48,943	36,679	43,062

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

Table 5.39 Estimated Recreational Harvest of Smoothhound Sharks* in the Gulf of Mexico and Atlantic Regions, in Number of Fish per Species (2012-2016)

Region	2012	2013	2014	2015	2016
Atlantic	31,669	17,308	49,835	43,721	22,073
Gulf of Mexico	1,258	214	7	3	3
Total	32,927	17,522	49,842	43,724	22,076

*Atlantic stock includes smooth dogfish. Gulf of Mexico stock includes smooth dogfish, Florida smoothhound, and Gulf smoothhound. Sources: TX PWD, MRIP, Southeast Headboat Survey.

Bycatch Issues

Bycatch can result in death or injury to discarded fish; therefore, bycatch mortality is incorporated into fish stock assessments and into the evaluation of management measures. Bycatch in the recreational rod and reel fishery is difficult to quantify because many fishermen 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 (CFR Title 50 Part 635.26(c)). Bycatch (dead discards) of bluefin tuna must be reported online or via phone.

Most evidence suggests that circle hooks reduce at-vessel and post-release mortality rates for many HMS without reducing catch of target speciescompared to J-hooks, although it varies by species, gear configuration, bait, and other factors. By design, circle hooks tend to hook sharks in the jaw more frequently than in the throat or gut (deep-hooking), thereby reducing injury and associated mortality compared to J-hooks (Godin et al. 2012, Campana et al. 2009). Willey et al. (2016) examined the frequencies of jaw, throat, gut, and foul hooking of sharks using recreational fishing gear with non-offset circle and J-hooks. Across all species, they found that sharks caught recreationally with circle hooks were deep hooked in 3 percent of the interactions while sharks caught on J-hooks were deep hooked in 6 percent of the interactions. This equates to a 50-percent reduction in the frequency of deep-hooking with the use of circle hooks (N=624). Campana et al. (2009) observed that 96 percent of blue sharks that were deep hooked were severely injured or dead while 97 percent of sharks that were hooked superficially (in the mouth or jaw) were released healthy and with no apparent trauma. Therefore, assuming that deep hooking in sharks results in comparable post-release mortality rates (96-percent), converting recreational shark fisheries from J-hooks to circle hooks should reduce the mortality rate of hooked sharks by 63 percent ((17.5%-6.0%/17.5%)*96% = 63%).

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 created a brochure that provides guidelines on how to increase the survival of hook-and-line caught large pelagic species. This brochure was updated in 2017 as a result of finalization of Amendment 5b, and is available at: https://www.fisheries.noaa.gov/resource/outreach-and-education/careful-catch-and-release-brochure.

NMFS recently finalized Amendment 5b to the 2006 Consolidated HMS FMP in order to end overfishing on, and rebuild, dusky shark stocks. Several measures were included to educate anglers and reduce post-release mortality of dusky sharks caught as bycatch by recreational fishermen. A video on the safe handling and release of prohibited Atlantic sharks is available at: https://youtu.be/s5jXRRrjEj8 and on the HMS permits website. Anglers and charter-headboat permit holders must add a shark endorsement onto recreational permits in order to fish for, retain, possess or land sharks. Applicants must complete a brief online shark identification and fishing regulations training course and quiz prior to purchasing or renewing an applicable HMS Permit. As of January 1, 2018, anglers fishing recreationally for sharks on a vessel with HMS Angling or HMS Charter-Headboat Permits must use non-offset, nonstainless steel circle hooks when fishing south of 41° 43' N latitude (near Chatham, Massachusetts, which is the northern extent of the dusky shark's U.S. Atlantic range), except when fishing with flies or artificial lures.

The number of kept and released fish reported or observed through the LPS dockside intercepts for 2012 – 2016 are presented in Table 5.40 and Table 5.41.

Table 5.40 HMS Retained by the Rod and Reel Fishery as Reported in the Large Pelagics Survey (ME-VA, May-October, 2012-2016)

Species	2012	2013	2014	2015	2016
White marlin	5	14	8	13	10
Blue marlin	3	6	1	4	6
Sailfish	.	.	.	.	1
Swordfish	28	15	16	43	27
Giant bluefin tuna	65	37	56	119	132
Large medium bluefin tuna	23	14	7	29	63
Small medium bluefin tuna	21	29	26	33	28
Large school bluefin tuna	73	97	60	40	128
School bluefin tuna	146	104	147	141	147
Young school bluefin tuna	2	1	4	.	.
Bigeye tuna	97	250	215	240	99
Yellowfin tuna	3,296	2,719	2,072	1,942	2,968
Skipjack tuna	200	109	109	125	181
Albacore tuna	358	1,040	444	310	127
Common Thresher shark	39	31	55	68	43
Shortfin Mako shark	151	179	180	152	129
Sandbar [2] shark	.	.	.	1	.
Dusky [1] shark	.	.	.	.	.
Tiger shark	2	.	2	3	.
Porbeagle	2	6	3	3	5
Blacktip shark	.	.	.	.	.
Atlantic sharpnose shark	3	22	6	13	2
Blue shark	28	12	10	25	39
Hammerhead shark	.	.	.	.	.
Smooth hammerhead shark	.	.	.	.	.
Scalloped hammerhead shark	.	.	.	.	.
Unidentified hammerhead shark	.	.	.	.	.
Wahoo	206	92	59	135	102
Dolphin	3,055	3,902	5,904	9,814	6,222
King mackerel	3	7	2	.	8
Atlantic bonito	79	77	454	46	41
Little tunny	172	84	157	108	262
Amberjack	40	37	25	46	18
Spanish mackerel	146	66	44	165	20

1Prohibited in the recreational fishery as of July 1, 1999. 2Prohibited as of July 2008. Source: LPS.

Table 5.41 HMS Released Alive and Dead by the Rod and Reel Fishery as Reported in the Large Pelagics Survey (ME-VA, May-October, 2012-2016)

Species	2012	2013	2014	2015	2016
White marlin	1,996	1,200	1,281	1,528	1,705
Blue marlin	137	109	99	170	113
Sailfish	61	15	16	25	145
Swordfish	12	18	15	14	7
Giant bluefin tuna	.	2	.	.	.
Large medium bluefin tuna	9	1	.	3	2
Small medium bluefin tuna	45	70	35	51	30
Large school bluefin tuna	64	87	40	14	71
School bluefin tuna	184	135	84	277	70
Young school bluefin tuna	21	14	6	29	90
Bigeye tuna	3	5	102	14	12
Yellowfin tuna	195	999	480	920	2,061
Skipjack tuna	325	464	137	217	278
Albacore tuna	25	112	29	11	30
Common Thresher shark	16	10	23	42	20
Shortfin Mako shark	238	206	237	385	128
Sandbar shark [2]	14	44	62	50	90
Dusky shark [1]	76	90	57	102	49
Tiger shark	26	19	32	18	10
Porbeagle	18	22	21	42	29
Blacktip shark	346	89	33	13	.
Atlantic sharpnose shark	4	22	3	36	26
Blue shark	2,705	2,240	1,894	2,164	1,462
Hammerhead shark	2	.	1	7	4
Smooth hammerhead shark	3	.	6	2	3
Scalloped hammerhead shark	4	.	2	2	0
Unidentified hammerhead shark	30	20	23	28	33
Wahoo	5	2	.	2	.
Dolphin	192	209	213	508	314
King mackerel	.	.	.	.	.
Atlantic bonito	120	46	138	55	88
Little tunny	993	133	614	339	875
Amberjack	48	56	35	10	62
Spanish mackerel	.	.	.	2	.

[1]Prohibited in the recreational fishery as of July 1, 1999. [2]Prohibited as of July 2008. Source: LPS.

5.5 Bottom Longline

Bottom longline (BLL) is the primary commercial gear employed for targeting LCS in all regions. Small coastal sharks (SCS) are also caught on BLL gear. Gear characteristics vary by region and target species. In 2016, hauls targeting LCS used BLL between 0.2 to 8.0 km (0.1 – 5.0 miles) long with 25 to 509 hooks attached and the average soak duration was 8 hours. Both circle and J hooks are used; the type(s) and size of hook depends on which shark species is being targeted. Beginning on January 1, 2018, as part of Amendment 5b to the 2006 Consolidated HMS FMP, directed shark permit holders using BLL gear will be required to use circle hooks.

Fishermen targeting LCS with BLL gear most 18.0 circle hooks (23.7 percent of the time) and 9.0 J hooks (23.7 percent). Hauls targeting sandbar sharks used BLL an average of 4.4 km (2.7 miles) long with 72 to 300 hooks attached and the average soak duration was 5.3 hours. Fishermen targeting sandbar sharks with BLL gear most commonly used 16.0 circle hooks (35.8 percent of the time) (Mathers et al., 2017a).

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

Table 5.42 Reported Bottom Longline Effort Targeting Sharks (2010-2016)

Specifications	Region	2010	2011	2012	2013	2014	2015	2016
Number of Vessels	Gulf of Mexico	7	11	20	16	20	18	16
	Atlantic	32	26	21	24	19	14	13
Number of Trips	Gulf of Mexico	54	194	379	457	604	527	259
	Atlantic	486	434	281	329	369	330	282
Average Sets per Trip	Gulf of Mexico	1.2	1.4	1.2	1.1	1.1	1.1	1.2
	Atlantic	1.4	1.3	1.5	1.5	1.7	1.8	1.4
Total Number of Set Hooks	Gulf of Mexico	15,380	48,112	99,675	105,559	139,709	139,956	89,123
	Atlantic	239,952	183,465	98,094	136,475	193,561	170,032	104,665
Average Number of Hooks per Set	Gulf of Mexico	215.6	213.8	229.0	212.1	206.1	236.1	272.3
	Atlantic	327.3	330.3	237.1	253.5	276.7	294.9	269.6
Total Soak Time (Hours)	Gulf of Mexico	396.0	1,361.0	2,912.0	2,589.5	3,011.0	2,917	1408
	Atlantic	3,490.5	3,331.0	2,289.5	2,438.0	2,649.5	2,293	2041
Average Mainline Length (Miles)	Gulf of Mexico	2.6	3.0	2.8	2.1	1.9	2.1	2.6
	Atlantic	4.7	5.1	3.9	3.4	3.4	3.8	3.6

Source: Unified Data Processing

5.5.1 Current Management

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

A rulemaking to prevent quota exceedances of blacknose sharks went into effect January 13, 2017, impacting fishermen landing small coastal sharks. The final rule establishes a commercial 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 published Amendment 5b to the 2006 Consolidated HMS FMP on April 4, 2017, which changed shark regulations based on the latest stock assessment for dusky sharks.

The measures implemented on June 5, 2017, specific to BLL fishermen include the completion of additional shark identification and fishing regulation training at existing safe handling and release workshops and a requirement to move one nautical mile (1 nmi) after interacting with a dusky shark along with notifying other vessels in the area of the dusky shark catch. Additionally, beginning on January 1, 2018, all HMS directed shark permit holders must use only circle hooks when fishing 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 Bottom Longline Observer Program (BLLOP). 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 percent (Mathers et al., 2017a).

In 2016, the BLL observer program selected 11 vessels for the entire fishing season, five within the Shark Research Fishery and seven in the non-research Shark BLL Fishery, with one vessel participating in both sectors. These vessels were observed for a total of 76 BLL hauls (defined as setting gear, soaking gear for some duration of time, and retrieving gear) and a total of 119 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) (Mathers et al., 2017a). 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 and the Gulf of Mexico region. The observed non-research shark fishery hauls targeted coastal shark species in the southern U.S. Atlantic. Approximately 23 trips with 38 hauls were observed. These trips caught mostly blacktip sharks with blacknose, sandbar, and Atlantic sharpnose sharks being the next most caught species (Table 5.43).

Table 5.43 Shark Species Caught on Observed Bottom Longline Trips (non-Shark Research Fishery) Targeting Sharks in the South Atlantic and Gulf of Mexico (2016)

Species	Total Caught (#)	Kept (%)	Discarded Dead (%)	Discarded Alive (%)	Disposition Unknown (%)
Blacktip Shark	383	90.1	0.8	8.6	0.5
Blacknose Shark	127	18.1	14.2	67.7	0.0
Sandbar Shark	75	0.0	96.0	4.0	0.0
Atlantic Sharpnose Shark	67	10.5	1.5	88.1	0.0
Bull Shark	44	86.4	2.3	4.6	6.8
Tiger Shark	28	71.4	28.6	0.0	0.0
Lemon Shark	26	100.0	0.0	0.0	0.0
Nurse Shark	17	0.0	100.0	0.0	0.0
Scalloped Hammerhead Shark	12	41.7	41.7	16.7	0.0
Spinner Shark	11	100.0	0.0	0.0	0.0
Finetooth Shark	6	33.3	0.0	66.7	0.0
Bonnethead Shark	4	0.0	0.0	100.0	0.0
Southern Stingray	4	0.0	100.0	0.0	0.0
Shortfin Mako Shark	3	66.7	0.0	33.3	0.0
Smooth Dogfish	2	100.0	0.0	0.0	0.0
Great Hammerhead Shark	2	50.0	50.0	0.0	0.0
Requiem Shark	2	0.0	0.0	50.0	50.0
Dusky Shark	1	0.0	100.0	0.0	0.0
Total	814				

Source: Mathers et al., 2017a

In 2016, there were five 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 for this limitied fishery and allowing observers to retain and land up to three whole sharks per trip (Table 5.44). Shark Research Fishery regions are shown in Figure 5.10.

Table 5.44 Summary of Shark Research Fishery Management Measures (2013-2016)

Management Measure	2013	2014	2015	2016
Number of Vessels	6	5	7	5
Number of Trips per Month	1	1	1	1
Captain's Meeting Held	Yes	Yes	Yes	No
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: 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
Individual Vessel Quota	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	Sandbar quota and LCS research quota split equally among selected vessels Sandbar: 14.5 mt dw Non-sandbar LCS: 8.0 mt dw
Mid-Atlantic 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)	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)

Management Measure	2013	2014	2015	2016
Dusky Bycatch Cap	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.	Once two dead dusky sharks are observed, a three-hour soak time restriction is implemented and no more than two dusky shark interactions were allowed in any of the designated regions (North Atlantic, the Florida Keys, and the Gulf of Mexico) through the entire year. Once three dead dusky sharks are observed, a three-hour soak time restriction is implemented and no more than three dusky shark interactions were allowed in any of the designated regions (North Carolina) through the entire year. Once six dead dusky sharks are observed, a three-hour soak time restriction is implemented and no more than six dusky shark interactions were allowed in South Atlantic region through the entire year (Figure 5.10).

Figure 5.10 Dusky Shark Bycatch Cap Regions for the Shark Research Fishery

Fishermen in the Shark Research Fishery targeted sandbar sharks and fished primarily in the Gulf of Mexico and southern Atlantic regions. In 2016, a total of 53 trips with 81 hauls were observed. These trips caught mostly sandbar sharks with Atlantic sharpnose, tiger, and blacktip sharks being the next most caught species (Table 5.45). Dusky sharks were only observed on trips targeting sandbar sharks, not on any trips targeting other shark species.

Table 5.45 Shark Species Caught on Observed Bottom Longline Trips in the Sandbar Shark Research Fishery in the Gulf of Mexico and Southern Atlantic (2016)

Species	Total Caught (#)	Kept (%)	Discarded Dead (%)	Discarded Alive (%)	Disposition Unknown (%)
Sandbar Shark	2569	98.6	0.1	0.2	1.1
Atlantic Sharpnose Shark	462	44.8	8.9	46.3	0.0
Tiger Shark	299	37.1	59.5	1.7	1.7
Blacktip Shark	250	96.8	0.0	2.8	0.4
Bull Shark	115	97.4	0.0	0.0	2.6
Dusky Shark	112	0.0	79.5	19.6	0.9
Scalloped Hammerhead Shark	102	73.5	21.6	4.9	0.0
Sand Tiger Shark	84	2.4	94.1	2.4	1.2
Nurse Shark	57	1.8	96.5	0.0	1.8
Blacknose Shark	42	0.0	28.6	71.4	0.0
Lemon Shark	40	97.5	0.0	0.0	2.5
Great Hammerhead Shark	37	83.8	13.5	2.7	0.0
Spinner Shark	33	100.0	0.0	0.0	0.0
Requiem Shark	4	0.0	75.0	25.0	0.0
Hammerhead Shark, Uncl.	2	0.0	100.0	0.0	0.0
Silky Shark	2	100.0	0.0	0.0	0.0
White Shark	1	0.0	100.0	0.0	0.0
Total	4211				

Source: Mathers et al., 2017a

5.5.3 Bottom Longline Bycatch

For more detailed information on the fishery classification and requirements under the MMPA and the Endangered Species Act (ESA), please see the Final Environmental Assessment (EA) prepared for Amendment 9 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 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 (OSF), 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 5.46 provides information on observed interactions with protected resources for BLL vessels targeting sharks in the Gulf of Mexico and Atlantic regions. In 2016, one smalltooth sawfish and eight loggerhead sea turtles were observed in the Shark Research Fishery. The smalltooth sawfish and six of the loggerhead sea turtles were released alive. No sea bird or marine mammal interactions were observed. One Kemp's ridley sea turtle, and three brown pelicans were observed in BLL fishing in the Gulf of Mexico and South Atlantic regions outside

of the Shark Research Fishery. The Kemp's ridley sea turtle was released alive, but the disposition of all brown pelicans was unknown (Mathers et al., 2017a). The ITS of listed sea turtles, smalltooth sawfish, or Atlantic sturgeon over any three-year period has not exceeded levels authorized in the ITS in the 2012 BiOp.

Table 5.46 Protected Species Interactions Observed Bottom Longline Trips Targeting Sharks in the Gulf of Mexico and Atlantic Ocean (2008-2016)

Year	Sea Turtles	Sea Birds	Marine Mammals	Smalltooth Sawfish	Total
2008	1 (A)	-	-	2 (A)	3
2009	2 (D)	-	-	5 (A)	7
2010	4 (2A, 2D)	-	-	10 (A)	14
2011	4 (1A, 3D)	-	-	2 (A)	6
2012	2 (A)	-	-	1 (D)	3
2013	-	-	-	2 (A)	2
2014	7 (5A, 2D)	-	-	5 (A)	12
2015	4 (4A, 0D)	-	-	2 (A)	6
2016	9 (7A, 2D)	3 (U)	-	1 (A)	10
Total	37 (U)	3	0	33 (U)	73

Letters in parentheses indicate whether the animal was released alive (A), dead (D), or unknown (U). Source: Mathers et al., 2017a.

5.6 Gillnet Fishery

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

The overall gillnet effort targeting sharks by region is available from 2008 through 2016 (Table 5.47). The majority of the vessels and trips targeting sharks occur in the southern portion of the Atlantic region. Most of the data from the Gulf of Mexico region is considered confidential since fewer than three vessels used gillnet gear to target sharks in the region.

Table 5.47 Gillnet Gear Effort in the U.S. South Atlantic and Gulf of Mexico Regions Targeting Sharks (2008-2016)

Specifications	Region	2009	2010	2011	2012	2013	2014	2015	2016
Number of Vessels	Gulf of Mexico	C	C	3	3	C	C	C	0
	Atlantic	37	37	35	33	22	24	19	21
Number of Trips	Gulf of Mexico	C	C	43	46	C	C	C	0
	Atlantic	357	241	291	366	305	354	161	206
Average Sets per Trip	Gulf of Mexico	C	C	2.9	2.0	C	C	C	n/a
	Atlantic	1.9	1.6	1.6	1.5	1.1	1.2	2.1	1.8
Total Soak Time (Hours)	Gulf of Mexico	C	C	743.0	945.0	C	C	C	n/a
	Atlantic	1,093.9	827.5	763.5	1,074.5	849.0	1,220.5	539.8	852.5
Average Gillnet Length (Yards)	Gulf of Mexico	C	C	1,830.2	1,443.5	C	C	C	n/a
	Atlantic	879.9	871.1	757.7	844.4	761.0	771.8	726.7	1,155.1
Average Mesh Size (Inches, Stretched Mesh)	Gulf of Mexico	C	C	7.3	7.9	C	C	C	n/a
	Atlantic	5.3	5.8	4.7	4.8	5.0	5.2	5.2	5.2

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

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. Federal management of smoothhound sharks was implemented through Amendment 9 to the 2006 Consolidated HMS FMP (November 24, 2015; 80 FR 46217) and began on March 15, 2016. Generally, fishermen use sink gillnet to target smooth dogfish in the northeast, although the species is often caught incidentally in bottom otter trawl gear as well. The smooth dogfish sink gillnet fishery is a mixed fishery with a large portion of trips catching and retaining a variety of other species, dominated by bluefish, croaker, and spiny dogfish. Unlike the southeast and Gulf of Mexico regions, the northeast gillnet fisheries do not specificially target sharks in a given trip, but rather a variety of species in any given trip.

In 2016, a total of 2,403 sets in 966 trips comprised of various northeast gillnet and trawl fisheries were observed by the Northeast Fisheries Observer Program (NEFOP). Table 5.48 outlines summary information for smooth dogfish caught during observed gillnet and trawl trips with observers onboard in 2016.

Table 5.48 Smooth Dogfish Caught on Observed Gillnet and Trawl Fisheries Targeting Mixed Fisheries (2016)

Gear	# of Trips	# of Sets	Total Caught (#)	Kept (%)	Discarded (%)
Otter Bottom Trawl	701	1,686	1,793	25.2	74.7
Fixed Gillnet	182	426	478	60.9	39.1
Sink Gillnet	67	218	226	56.6	43.3
Drift or Floating Gillnet	8	11	11	45.5	54.5
Bottom Longline	6	58	61	46.0	54.1
Shrimp Trawl	1	3	3	0.0	100.0
Handline	1	1	1	0.0	100.0
Total	966	2,403	2,573		

Source: NEFOP

5.6.1 Current Management

Many of the commercial regulations for the Atlantic shark fishery are the same for both the BLL 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 2016, a total of 256 sets comprised of various southeast gillnet fisheries were observed by the Southeast Gillnet Observer Program (GNOP). A total of five strike gillnet fishery vessels were observed making 13 strike sets on six trips in 2016. A total of 57 sink gillnet fishery vessels were observed making 195 sink net sets on 25 vessels in 2016. Table 5.49 through Table 5.51 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 2016 (Mathers et al., 2017b).

Table 5.49 Shark Species Caught on Observed Southeast Sink Gillnet Trips Targeting Spanish Mackerel (2016)

Species	Total Caught (#)	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose shark	90	25.6.0	67.8	6.7
Bonnethead shark	28	14.3	60.7	25.0
Scalloped Hammerhead shark	12	8.3	75.0	16.7
Blacktip shark	10	0	100.0	0.0
Sand Tiger Shark	3	0.0	100.0	0.0
Common Thresher shark	2	0.0	100.0	0.0
Blacknose shark	2	0.0	100.0	0
Spinner shark	2	50.0	50.0	0.0
Finetooth shark	1	100.0	0.0	0.0
Atlantic Angel shark	1	0.0	100.0	0.0
Total	151			

Source: Mathers et al. 2017b

Table 5.50 Shark Species Caught on Observed Southeast Sink Gillnet Trips Targeting Mixed Sharks (2016)

Species	Total Caught (#)	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Smooth dogfish	13	92.3	7.7	0.0
Atlantic sharpnose shark	4	0.0	100.0	0.0
Sand tiger shark	3	0.0	100.0	0.0
Bonnethead shark	3	100.0	0.0	0.0
Blacknose shark	2	100.0	0.0	0.0
Spinner shark	2	100.0	0.0	0.0
Blacktip shark	2	100.0	0.0	0.0
Scalloped Hammerhead shark	2	0.0	0.0	100.0
Common Thresher shark	1	100.0	0.0	0.0
Finetooth shark	1	0.0	100.0	0.0
Total	33			

Source: Mathers et al. 2017b

Table 5.51 Shark Species Caught on Observed Southeast Sink and Strike Gillnet Trips by Target Species (2016)

Shark Species Caught	Trip Type: Target Species			Total
	King Mackerel	Spanish Mackerel	Mixed Teleosts and Sharks	
Blacktip shark	3	10	2	15
Atlantic sharpnose shark	-	90	4	94
Bonnethead shark	-	28	3	31
Blacknose shark	-	2	2	4
Sand tiger shark	1	3	3	7
Spinner shark	12	-	2	14
Smooth dogfish	12	-	13	25
Scalloped hammerhead shark	-	12	2	14
Sandbar shark	6	-	-	6
Spiny dogfish	-	-	-	0
Finetooth shark	-	1	1	2
Dusky shark	1	-	-	1
Atlantic angel shark	1	1	-	2
Tiger shark	1	-	-	1
Nurse shark	1	-	-	1
Common thresher shark	-	2	1	3
Total	38	149	33	220

Source: Mathers et al. 2017b

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., 2017b).

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 2016 in the observed gillnet fisheries are on Table 5.52.

Sea Turtles and Sea Birds

There were no sea turtles or sea birds observed caught in sink gillnet gear in 2016 (Mathers et al., 2017b).

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., 2015).

Marine Mammals

The MMPA Category II classification refers to occasional serious injuries and mortalities. In 2016, there were no observed interactions with marine mammals in gillnet gear (Mathers et al. 2017b).

Smalltooth Sawfish and Atlantic Sturgeon

In 2016, 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 5.52 Protected Species Interactions in the Shark Gillnet Fishery Targeting Mixed Sharks Other than Smoothhounds (2008-2016)

Year	Sea Turtles	Sea Birds	Marine Mammals	Smalltooth Sawfish	Atlantic Sturgeon	Total
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
2016	-	-	-	-	-	0
Total	9	2	1	0	0	13

Letters in parentheses indicate whether the animal was released alive (A) or dead (D). Source: Mathers et al., 2017b.

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 as a PLL or a BLL gear as defined in this section or as described at §635.21(c) or §635.21(d), respectively." Green-stick gear may be used to harvest BAYS tunas and bluefin tuna aboard Atlantic tunas General category, HMS Charter/Headboat, and Atlantic tunas Longline permitted vessels.

Onboard Atlantic tunas Longline permitted vessels, up to 20 J-hooks may be possessed for use with green-stick gear and no more than 10 J-hooks may be used with a single green-stick gear. J-hooks may not be used with 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. Green-stick gear has been used in the Atlantic tuna fisheries since the mid-1990s. Determining historical landings attributed to this gear, however, was not easily quantifiable due to the lack of reporting mechanisms available in fisheries data collection programs in the past. Limited data allowed the catch to be characterized and presented in the 2008 SAFE Report (NMFS 2008a). In 2008, a green-stick gear code was designated for use in existing reporting systems, such as trip tickets in the southeast and electronic reporting programs in the northeast. Following this, NMFS has, with some success, encouraged states to utilize the green-stick gear code in their trip ticket programs. With these gear code additions, data on landings specific to green-stick gear are expected to improve. Beginning in 2013, the HMS eDealer electronic reporting system was required to be used by Atlantic HMS dealers, improving the precision of green-stick landings data. Table 5.53 presents greenstick landings data from this system.

Table 5.53 Select Landings with Greenstick Gear (lb ww, 2013-2016)

Species	Region	2013	2014	2015	2016
Yellowfin tuna	Atlantic	43,175	57,064	44,673	0
	Gulf of Mexico	19,212	1,082	-	1,055
Bigeye tuna	Atlantic	-	-	-	1,666
	Gulf of Mexico	-	-	-	35,334

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 2012-2016 in the northern GOM 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 occupational safety statistics and safety issues in fisheries. The USCG maintains websites for each of its regions (https://www.uscg.mil/Units/Organization/), many of which provide regulatory and safety information, and region-specific statistics. The Coast Guard also maintains a blog, the Coast Guard Maritime Commons, which provides safety alerts, news bulletins, and regulatory information: http://mariners.coastguard.dodlive.mil/.

5.8.1 Commercial Fisheries

Commercial fishing is one of the most dangerous occupations in the United States (Lambert et al. 2015). The Bureau of Labor Statistics 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 23 fatalities in the fishing industry in 2015 (inclusive of finfish and shellfish fishing) (https://www.bls.gov/iif/oshcfoi1.htm#2015), equivalent to a fatal work injury rate of 54.8 per 100,000 full-time equivalent workers. Statistical data on vessel safety may also be obtained from the USCG, including "Analysis of Fishing Vessel Casualties – A Review of Lost Fishing Vessels and Crew Fatalities 1992-2010" (Dickey 2011; http://www.fishsafe.info/FVStudy_92_10.pdf).

In 2017, the National Institute for Occupational Safety and Health (NIOSH) published new reports summarizing commercial fishing fatality data in the Gulf of Mexico and Atlantic region (https://www.cdc.gov/niosh/topics/fishing/pubs.html). Between 2000 and 2014, 164 and 225 commercial fishing deaths occurred respectively in GOM and Atlantic east coast fisheries; the majority of fatalities were due to falls overboard and vessel disasters (e.g., sinking, capsizing, fires, groundings). Two of these incidents occurred in Gulf of Mexico shark fisheries.

NS 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" (Lambert et al. 2015). The Technical Memorandum provides two tools (a safety checklist and a risk assessment methodology) 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 http://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/MSIB/2014/018_14_12-1-2014.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 if the vessel has more than 16 individuals on board (regardless of where the vessel is being operated);

[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.

- **Vessels that are 79 feet or longer** must be assigned a load line if operated outside the Boundary line.

Beginning October 15, 2015, the USCG required that all commercial fishing vessels that operate or transit more than 3 nmi 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 dockside safety examinations. Decals for dockside safety examinations expire after 2 years, and mandatory exams must be completed within 5 years from the issue date of the most recent decal. More information on the this requirement can be found at the USCG Commercial Fishing Safety website: http://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Commercial-Regulations-standards-CG-5PS/Marine-Safety-Center-MSC/ or http://www.fishsafewest.info/PDFs/MSIB_CFVSReq.pdf.

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 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 http://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/MSIB/2016/004_16_2-18-2016.pdf.

The USCG published an additional notice of proposed rulemaking 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).

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

different regions of the United States. The GAO conducted public forums at fishery management council meetings in 2016 and 2017. At these public forums, GAO representatives solicited information from the commercial fishing industry on the costs, challenges, benefits and savings associated with meeting new classification requirements. The draft report is currently in development (Laura Jezewski, U.S. Government Accountability Office, pers. comm. October 11, 2017).

In January 2017, the Coast Guard released a document entitled "*Voluntary Safety Initiatives and Good Marine Practices for Commercial Fishing Vessels,*" which provided best practices for older commercial fishing vessels not covered under recent expansion of classification requirements enacted under the Coast Guard Authorization Act of 2010 and the Coast Guard and Marine Transportation Act of 2012. The safety measures and practices contained in this document were focused primarily toward fishing vessels 50 feet or greater in length, operating beyond three nmi from shore, and that are more than 25 years of age. USCG personnel will discuss these measures with owners/operators during dockside safety examinations and at-sea boardings and inquire if any have been implemented on the vessel. The document can be accessed at: http://docs.wixstatic.com/ugd/b66831_17d92499038a4322b9c1fea39d4db260.pdf

On July 13, 2017, the Coast Guard released Commercial Fishing Vessel Marine Safety Information Bulletin 008-17 (HMS Permitted Handgear Vessels) to provide the Coast Guard's current interpretation on the applicability of commercial fishing vessel safety requirements and regulations for those vessels fishing for Atlantic HMS. The bulletin reviews recent safety and certificate of endorsement regulations for HMS commercial and recreational vessels, such as:

- *Charter/Headboats must have a Coastwise Endorsement on its Coast Guard Certificate of Documentation, or a State Registration that includes or designates commercial operations.*
- *Charter/Headboats must have a Coast Guard-licensed master when operating in that capacity, whether the vessel is federally-documented or state-registered.*
- *Charter operations that take customers out to fish are considered engaged in coastwise trade. If catch is sold, the vessel is engaged in commercial fishing activity and is subject to 46 CFR Part 28 requirements for safety and survival equipment, and must complete a dockside safety examination.*

More information is available at: http://mariners.coastguard.dodlive.mil/2017/07/13/7132017-msib-008-17-application-of-commercial-fishing-vessel-requirements-on-atlantic-hms-permitted-handgear-vessels/.

On October 6, 2017, the USCG published a marine safety alert concerning vessel stability and watertight integrity following an accident in the Bering Sea that resulted in multiple casualties and loss of the vessel. Vessel owners are strongly encouraged to review and understand vessel Stability Instructions. This safety alert included links to online training and resources concerning vessel stability (http://mariners.coastguard.dodlive.mil/2017/10/06/1062017-marine-safety-alert-1117-remain-upright-by-fully-understanding-vessel-stability/).

5.8.2 Recreational Fisheries

Safety at Sea is not just an issue for commercial fisheries. In 2016, there were 11,861,811 recreational vessels registered by states. The following summarizes recreational boating statistics, inclusive of recreational fishing activities for 2016:

- The USCG reported 4,463 accidents involving 701 deaths, approximately 49 million dollars in damages, and 2,903 injuries as a result of recreational boating accidents.
- The fatality rate for 2016 was 5.9 deaths per 100,000 registered recreational vessels. Most fatalities (80 percent) are associated with drowning, and 83 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. The top five contributing factors in accidents included operator inattention, operator inexperience, improper lookout, excessive speed, and machinery failure.
- From a summary of accident reports, approximately 709 vessels were engaged in fishing activities at the time of accidents which resulting in 197 deaths and 320 injuries.

Recreational boating statistics are published annually by the USCG Office of Auxiliary and Boating Safety (USCG 2017; http://www.uscgboating.org/library/accident-statistics/Recreational-Boating-Statistics-2016.pdf).

New Safety Regulations for Recreational Fisheries

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

5.9 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 5.54 - Table 5.59) of Atlantic HMS landings are taken from the 2017 National Report of the United States to ICCAT (NMFS 2017). Landings for sharks (Table 5.60- Table 5.67) were updated based on 2016 landings from eDealer.

Table 5.54 U.S. Landings (mt ww) of Atlantic Bluefin Tuna, by Area and Gear (2012-2016)

Area	Gear	2012	2013	2014	2015	2016
NW Atlantic	Longline**	189.4	153.0	171.7	70.1	80.1
	Handline	1.3	0.5	0.0	0.0	1.1
	Purse seine	1.7	42.5	41.8	38.8	0.0
	Harpoon	52.3	45.0	67.5	77.1	52.9
	Commercial rod and reel	419.5	249.5	378.9	581.4	722.1
	Recreational rod and reel	148.7	131.4	99.6	112.9	143.7
Gulf of Mexico	Longline	101.2	33.5	41.3	9.3	10.6
	Recreational rod and reel	0.0	0.0	0.0	0.0	1.7
NC Area 94a	Longline	3.9	3.5	8.9	8.3	12.7
Caribbean	Longline	0.9	0.4	0.0	0.0	0.2
All areas	All gears	919.0	658.9	810.0	898.8	1,025.1

Source: NMFS 2017

Table 5.55 U.S. Landings (mt ww) of Atlantic Yellowfin Tuna, by Area and Gear (2012-2016)

Area	Gear	2012	2013	2014	2015	2016
NW Atlantic	Longline	873.7	539.9	671.0	438.9	481.1
	Rod and reel*	1,433.0	495.4	997.8	795.6	1,610.7
	Troll	0.3	30.1	28.7	25.6	16.6
	Gillnet	1.5	0.8	1.3	0.8	2.3
	Trawl	0.2	0.0	0.3	0.0	0.0
	Handline	66.0	66.4	82.1	64.3	31.5
	Trap	0.0	0.0	0.0	0.0	0.0
	Unclassified	4.5	2.1	7.7	2.5	2.5
Gulf of Mexico	Longline	1,251.0	834.9	701.2	490.8	695.4
	Rod and reel*	294.1	191.8	53.2	134.2	266.6
	Handline	175	0.0	9.7	1.9	5.6
	Unclassified	8.7	0.0	0.0	0.0	0.03
Caribbean	Longline	141.9	169.6	80.7	109.9	123.8
	Handline	3.2	0.6	0.6	0.6	1.3
	Gillnet	0.0	0.0	0.0	0.0	0.0
	Rod and reel*	0.0	0.0	16.2	6.6	34.2
NC Area 94a	Longline	3	0.0	1.7	1.8	1.0
SW Atlantic	Longline	-	-	-	-	-
All areas	All gears	4,099.5	2,331.6	2,666.2	2,073.9	3,273.9

* 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 2017.

Table 5.56 U.S. Landings (mt ww) of Atlantic Skipjack Tuna, by Area and Gear (2012-2016)

Area	Gear	2012	2013	2014	2015	2016
NW Atlantic	Longline	0.3	0.5	0.3	0.2	1.2
	Rod and reel*	98.0	37.7	46.0	32.7	93.2
	Gillnet	1.6	0.27	6.7	0.2	0.7
	Trawl	0.006	0.0	0.0	1.1	0.0
	Handline	2.0	0.8	1.3	0.2	0.3
	Unclassified	0.6	0.7	2.7	0.06	0.2
Gulf of Mexico	Longline	0.0	0.0	0.01	0.0	0.0
	Rod and reel*	0.06	77.1	9.8	35.7	33.3
	Handline	2.5	0.02	0.01	0.0	0.0
Caribbean	Longline	0.1	0.0	0.0	0.0	0.0
	Gillnet	-	0.0	0.0	0.0	0.0
	Rod and reel*	3.0	0.0	9.4	7.2	3.4
	Handline	4.0	0.0	0.7	0.5	0.9
	Trap	1.0	-	-	-	-
All areas	All gears	112.2	117.5	77.0	77.9	133.8

* 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 2017.

Table 5.57 U.S. Landings (mt ww) of Atlantic Bigeye Tuna, by Area and Gear (2012-2016)

Area	Gear	2012	2013	2014	2015	2016
NW and North Central Atlantic	Longline	564.9	490.9	574.5	557.7	368.9
	Gillnet	0.2	0.06	0.08	0.5	0.2
	Rod and reel*	269.6	337.5	251.9	198.0	126.9
	Troll	0.2	5.0	4.5	6.4	1.0
	Handline	7.9	15.9	16.4	51.3	9.4
	Trawl	0.2	0.0	0.0	0.1	0.1
	Unclassified	7.3	6.2	3.5	.025	0.4
Gulf of Mexico	Longline	13.5	9.2	6.8	9.2	6.6
	Rod and reel*	0.1	7.0	0.06	0.01	0.2
	Handline	0.0	0.0	0.0	0.0	0.0
	Unclassified	0.4	0.0	0.0	0.0	0.0
Caribbean	Longline	0.002	8.6	5.4	7.5	5.6
	Rod and reel*	0.0	0.0	2.9	0.5	0.0
	Handline	0.0	0.0	0.0	0.0	0.2
SW Atlantic	Longline	3.0	0.2	0.05	0.0	13.8
All areas	All gears	867.4	880.6	866.1	831.4	533.3

* Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. Source: NMFS 2017.

Table 5.58 U.S. Landings (mt ww) of Atlantic Albacore Tuna, by Area and Gear (2012-2016)

Area	Gear	2012	2013	2014	2015	2016
NW Atlantic	Longline	157.7	139.9	187.0	83.9	59.9
	Gillnet	5.7	0.02	3.6	0.5	1.7
	Handline	0.6	2.3	2.3	2.7	0.4
	Trawl	0.3	0.0	0.0	1.7	0.4
	Trap	0.0	0.0	0.0	0.0	0.0
	Troll	0.0	0.2	0.2	0.0	0.03
	Rod and reel*	144.3	340.3	136.7	12.9	43
	Unclassified	4.4	0.6	6.8	0.0	0.0
Gulf of Mexico and Caribbean	Longline	103.5	115.4	122.6	145.0	142.8
	Rod and reel*	0.7	0.0	0.0	0.2	1.3
	Handline	0.5	0.02	0.07	0.0	0.1
NC Area 94a	Longline	-	-	-	-	-
SW Atlantic	Longline	-	-	-	-	-
All areas	All gears	417.7	598.7	459.4	246.9	249.6

* 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 2017.

Table 5.59 U.S. Catches and Landings (mt ww) of Atlantic Swordfish, by Area and Gear (2012-2016)

Area	Gear	2012	2013	2014	2015	2016
NW Atlantic	Longline*	1,987.0	1,720.5	1,200.4	1,088.6	840.7
	Gillnet	0.08	0.0	0.0	0.0	0.0
	Handline	151.3	104.8	86.9	70.7	71.3
	Trawl	26.8	2.9	5.3	2.8	6.0
	Harpoon	0.3	0.5	0.0	0.0	0.0
	Rod and reel**	64.3	21.7	35.1	45.1	41.0
	Unclassified	0.5	1.6	0.4	0.0	0.0
	Unclassified discards	3.6	0.0	0.0	0.0	0.0
Gulf of Mexico	Longline*	673.3	531.6	307.4	127.4	175.3
	Handline	3.3	0.5	0.3	5.5	3.5
	Rod and reel**	6.3	0.3	1.5	1.0	4.8
	Unclassified discards	6.8	0.0	0.0	0.0	0.0
Caribbean	Longline*	3.7	20.8	16.5	8.8	73.5
	Rod and reel**	0.2	0.0	0.07	0.0	0.0
	Handline	0.0	0.0	0.3	0.2	0.9
	Unclassified discards	0.0	0.0	0.0	0.0	0.0
NC Atlantic	Longline*	682.6	539.1	308.0	367.9	304.9
	Handline	0.0	.0.0	0.0	0.2	0.0
SW Atlantic	Longline*	0.0	0.06	0.0	0.0	0.0
All areas	All gears	3,609.9	2,944.0	1,962.2	1,718.4	1,522.0

* 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 2017.

Table 5.60 Commercial Landings (lb dw) of Large Coastal Sharks in the Atlantic Region (2011-2016)

Large Coastal Sharks	2011	2012	2013	2014	2015	2016
Aggregated Large Coastal Sharks						
Blacktip	176,136	215,403	256,277	282,009	229,823	248,470
Bull	49,927	24,504	33,980	32,372	33,737	31,417
Lemon	45,448	21,563	16,791	13,047	18,158	19,205
Nurse	0	81	0	0	24	0
Silky	992	29	186	289	1,246	446
Spinner	4,113	10,643	26,892	25,716	33,002	55,610
Tiger	36,425	23,245	16,561	29,062	28,460	14,896
Total Aggregated LCS carcass weight	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)	370,045 (168 mt dw)
Hammerhead Sharks						
Hammerhead, Great	0	371	7,406	13,538	36,892	20,454
Hammerhead, Scalloped	0	15,800	27,229	24,652	13,197	12,329
Hammerhead, Smooth	110	3,967	1,521	601	304	125
Hammerhead, Uncl.	35,618	9,617	0	0	0	0
Total Hammerhead carcass weight	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)	32,908 (15 mt dw)
Shark Research Fishery						
Sandbar*	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)	62,984 (29 mt dw)
Unclassified Sharks						
Unclassified, assigned to LCS	50,711 (23 mt dw)	53,705 (24 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total LCS carcass weight	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)	465,937 (211 mt dw)

*Some unauthorized non-shark research fishery sandbar shark landings exist. Sources: 2011-2012 PDC (Pelagic Dealer Compliance) and ALS (Accumulated Landings System); 2013-2016 eDealer.

Table 5.61 Commercial Landings (lb dw) of Large Coastal Sharks in the Gulf of Mexico Region (2011-2016)

Large Coastal Sharks	2011	2012	2013	2014	2015	2016
Blacktip sharks						
Blacktip	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)	413,414 (188 mt dw)
Aggregated Large Costal Sharks						
Bull	178,595	255,892	279,379	259,825	274,195	154,820
Lemon	38,132	29,362	12,869	5,259	13,023	32,034
Nurse	27	11	0	0	62	95
Silky	643	0	1,714	7	612	111
Spinner	66,996	49,647	68,576	61,607	43,185	65,578
Tiger	21,594	26,209	14,062	16,796	18,536	38,534
Total Aggregated LCS carcass weight	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)	291,172 (132 mt dw)
Hammerhead Sharks						
Hammerhead, Great	49	99	28,591	29,783	33,439	30,474
Hammerhead, Scalloped	0	33,216	1,101	5,299	6,290	26,503
Hammerhead, Smooth	0	0	0	0	0	0
Hammerhead, Uncl.	68,709	8,005	0	0	0	0
Total Hammerhead carcass weight	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)	56,977 (26 mt dw)
Shark Research Fishery						
Sandbar*	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)	52,244 (24 mt dw)
Unclassified Shark						
Unclassified, assigned to LCS	169,651 (77 mt dw)	188,566 (85 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	2,221 (1 mt dw)
Total LCS carcass weight	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)	816,028 (370 mt dw)

*Unauthorized non-shark research fishery sandbar shark landings are included. Sources: 2011-2012 PDC and ALS; 2013-2016 eDealer

Table 5.62 Commercial Landings (lb dw) of Small Coastal Sharks in the Atlantic Region (2011-2016)

Small Coastal Sharks	2011	2012	2013	2014	2015	2016
Blacknose Sharks						
Blacknose	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)	26,842 (12 mt dw)
Non-Blacknose Small Coastal Sharks						
Bonnethead	28,284	19,907	22,845	13,221	5,885	1,688
Finetooth	52,318	15,922	19,452	19,026	8,712	5,647
Sharpnose, Atlantic	214,382	345,625	183,524	198,568	293,128	175,890
Total Non-Blacknose SCS carcass weight	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)	183,225 (83 mt dw)
Unclassified Shark						
Unclassified, assigned to small coastal	36,639 (17 mt dw)	492 (1 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total SCS carcass weight	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)	210,067 (95 mt dw)

Sources: 2011-2012 PDC and ALS; 2013-2016 eDealer.

Table 5.63 Commercial Landings (lb dw) of Small Coastal Sharks in the Gulf of Mexico Region (2011-2016)

Small Coastal Sharks	2011	2012	2013	2014	2015	2016
Blacknose Sharks						
Blacknose	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)	5 (<1 mt dw)
Non-Blacknose Small Coastal Sharks						
Bonnethead	12,986	2,601	4,436	8,391	968	9
Finetooth	159,558	130,278	60,118	64,023	60,169	33,431
Sharpnose, Atlantic	53,723	100,253	116,133	89,674	137,121	126,626
Total Non-Blacknose SCS carcass weight	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)	160,066 (73 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)	2,719 (1 mt dw)
Total SCS carcass weight	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)	162,790 (74 mt dw)

Sources: 2011-2012 PDC and ALS; 2013-2016 eDealer.

Table 5.64 Commercial Landings (lb dw) of Smoothhound Sharks in the Gulf of Mexico and Atlantic Regions (2016)*

Region	2016
Atlantic **	701,727
Gulf of Mexico ***	0
Total Smoothhound carcass weight	701,727 (318 mt dw)

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

Table 5.65 Commercial Landings (lb dw) of Atlantic Pelagic Sharks (2011-2016)

Pelagic Sharks	2011	2012	2013	2014	2015	2016
Blue Sharks						
Blue	13,370 (6 mt dw)	17,200 (8 mt dw)	9,767 (4 mt dw)	17,806 (8 mt dw)	1,114 (1 mt dw)	607 (<1 mt dw)
Porbeagle Sharks						
Porbeagle	5,933 (3 mt dw)	4,250 (2 mt dw)	54 (1 mt dw)	6,414 (3 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Pelagic Sharks Other Than Blue or Porbeagle						
Mako, Shortfin	207,630	198,841	199,177	218,295	141,720	160,829
Mako, unclassified	0	0	0	0	0	0
Oceanic Whitetip	2,435	258	62	22	0	0
Thresher	47,462	63,965	48,768	116,012	72,463	78,219
Total Other Pelagic carcass weight	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)	239,048 (108 mt dw)
Unclassified Shark						
Unclassified, assigned to pelagic	33,884 (15 mt dw)	28,932 (13 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total Pelagic carcass weight	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)	239,655 (109 mt dw)

Sources: 2011-2012 PDC and ALS; 2013-2016 eDealer.

Table 5.66 Commercial Landings (lb dw) of Shark Fins (2011-2016)

Fins	2011	2012	2013	2014	2015	2016
Atlantic Large Costal Shark and Small Coastal Shark Fins						
Blacktip	0	0	2,047	288	177	274
Bull	0	0	23	120	14	256
Hammerhead, Great	0	0	82	518	272	387
Hammerhead, Scalloped	0	0	7	0	6	0
Hammerhead, Smooth	0	0	0	0	11	0
Lemon	0	0	1,457	0	0	0
Spinner	0	0	3	0	0	0
Tiger	0	0	134	5	3	0
Unclassified LCS	21,535	15,370	0	0	0	0
Blacknose	0	0	3	4	15	0
Bonnethead	0	0	315	1	14	0
Finetooth	0	0	91	0	0	0
Sharpnose, Atlantic	0	0	202	2	6	7
Unclassified SCS	0	0	0	0	0	0
Smoothhound *	NA	NA	NA	NA	NA	25,107
Unclassified	0	0	16,609	19,868	20,824	15,603
Total Atlantic Fin weight	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)	41,634 (19mt dw)
Gulf of Mexico Large Costal Shark and Small Coastal Shark Fins						
Blacktip	0	0	20,939	16,141	23,819	12,917
Bull	0	0	12,019	10,132	12,996	3,677
Hammerhead, Great	0	0	220	351	729	585
Hammerhead, Scalloped	0	0	3	44	45	757
Lemon	0	0	61	23	110	0
Silky	0	0	58	0	0	0
Spinner	0	0	2,463	1,833	1,015	1,344
Tiger	0	0	76	150	40	46
Unclassified LCS	40,768	40,693	0	0	0	0
Bonnethead	0	0	14	196	28	0
Finetooth	0	0	2,866	2,092	1,593	870
Sharpnose, Atlantic	0	0	277	10	249	242
Unclassified SCS	0	0	0	0	0	0
Unclassified	0	0	6,103	6,209	8,955	13,213
Total Gulf of Mexico Fin weight	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)	33,651 (15 mt dw)
Pelagic Shark Fins						
Mako, shortfin	0	0	1,303**	451	1,119	299
Porbeagle	0	0	2**	0	0	0
Thresher	0	0	1,638	512	405	448
Unclassified Pelagic	0	0	0	0	0	0
Total Pelagic Fin weight	0 (0 mt dw)	0 (0 mt dw)	3,151 (1 mt dw)	963 (1 mt dw)	1,524 (1 mt dw)	747 (1 mt dw)
Total Fin weight	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)	76,032 (34 mt dw)

* Smoothhound shark quota effective March 15, 2016 (80 FR 73128; November 24, 2015). ** NMFS determined that the porbeagle shark fins should have been reported as shortfin mako fins after the 2014 SAFE Report was published. Sources: 2011-2012 PDC and ALS; 2013-2016 eDealer.

Table 5.67 Commercial Landings (lb, dw) of Prohibited Shark Species (2011-2016)

Prohibited Sharks	2011	2012	2013	2014	2015	2016
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]	14	172	0	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]	20	66	0	0	0	0
Whale[2]	0	0	0	0	0	0
White[2]	0	0	0	0	0	0
Atlantic angel[1]	11	171	0	0	0	0
Sharpnose, Caribbean[1]	0	0	38	0	0	0
Total Atlantic carcass weight	45 (1 mt dw)	409 (1 mt dw)	38 (1 mt dw)	0 (0 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	109	0	0	0	0
Bigeye sand tiger[2]	0	0	0	0	0	0
Caribbean reef[1]	0	0	0	0	0	272
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]	208	0	0	0	0	0
Sand tiger[2]	0	0	0	0	0	0
Whale[2]	0	0	0	0	0	0
White[2]	27	0	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	235 (1 mt dw)	109 (1 mt dw)	0 (0 mt dw)	0 (0 mt dw)	0 (0 mt dw)	272 (<1 mt dw)
Previously Pelagic Sharks						
Bigeye thresher[1]	135	276	0	0	0	0
Bigeye sixgill[1]	0	0	0	0	0	0
Mako, Longfin[1]	3,465	362	112	147	0	0
Sevengill[1]	0	0	0	0	0	0
Sixgill[1]	0	0	0	0	0	0
Total Pelagic carcass weight	3,600 (2 mt dw)	638 (<1 mt dw)	112 (<1 mt dw)	147 (<1 mt dw)	0 (0 mt dw)	0 (0 mt dw)
Total Prohibited carcass weight	3,880 (2 mt dw)	1,156 (<1 mt dw)	150 (<1 mt dw)	147 (<1 mt dw)	0 (0 mt dw)	272 (<1 mt dw)

[1] Prohibited in the commercial fishery as of June 21, 2000. [2] Prohibited since April 1997. Sources: 2011-2012 PDC and ALS; 2013-2016 eDealer reports

5.10 Total Allowable Catch (TAC) and Annual Catch Limit (ACL) for Atlantic HMS Management Groups

In 2006, the Magnuson-Stevens Act was amended to require that FMPs include a mechanism for specifying ACLs at a level such that overfishing does not occur (Magnuson-Stevens Act section 303(a)(15)). Thus, for certain shark stocks, NMFS establishes TACs and ACLs, consistent with the Magnuson-Stevens Act. These TACs and ACLs are established from information provided through stock assessments. For sharks assessed through SEDAR, the overfishing limit is equal to the TAC, and the discard, recreational, and research catch estimates are deducted from the TAC. These deductions constitute the sector ACLs, while the remainder is used to provide the commercial sector ACL. More details on these calculations and the establishment of TACs and ACLs can be found in the amendments to the 2006 Consolidated HMS FMP that focused on shark management, including Amendment 2 (2008), Amendment 3 (2010), Amendment 5a (2013a), Amendment 6 (2015), Amendment 9 (2015), and Amendment 5b (2017). The specific ACLs for sharks are in **Error! Reference source not found.** below.

Table 5.68 Total Allowable Catches (TAC) and Annual Catch Limits (ACL) of Current Shark Management Groups (mt, dw)

Fishery	TAC = ACL	Commercial Sector ACL	Recreational Sector ACL	Dead Discard Sector ACL
Aggregated LCS – Atlantic	346.2	168.9	273.7	N/A[1]
Aggregated LCS – Eastern Gulf of Mexico	175.2	85.5	89.7	N/A
Aggregated LCS – Western Gulf of Mexico	147.6	72.0	75.6	N/A
LCS Shark Research Fishery	50.0	50.0	N/A	0
Blacktip – Gulf of Mexico	413.4	256.6	60.3	96.2
Blacktip – Eastern Gulf of Mexico	40.5	25.1	5.9	9.4
Blacktip – Western Gulf of Mexico	372.9	231.5	54.4	86.7
Hammerhead – Atlantic	41.2	27.1	2.5	11.4
Hammerhead – Eastern Gulf of Mexico	20.4	13.4	1.3	5.6
Hammerhead – Western Gulf of Mexico	18.1	11.9	1.1	5.0
Sandbar Shark	158.3	90.7	39.7	25.9
Non-Blacknose SCS – Atlantic	489.3	264.1	100.6	122.4
Non-Blacknose SCS – Gulf of Mexico	999.0	112.6	66.2	818.7
Blacknose Shark – Atlantic	21.2	17.2	0.4	3.5
Blacknose Shark – Gulf of Mexico	34.9	0	2.6	32.3
Prohibited Species[2]	0	0	0	0
Pelagic Shark Complex	488.0	Undefined	Undefined	Undefined
Porbeagle Shark	11.3	1.7	0.1	9.5
Blue Shark[3]	273.0	Undefined	Undefined	Undefined
Smoothhound – Atlantic	1,430.6	1,201.7	188.4	39.1
Smoothhound – Gulf of Mexico	509.6	336.4	0.6	169.8

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

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

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, D.H. 2011. Analysis of Fishing Vessel Casualties – A Review of Lost Fishing Vessels and Crew Fatalities 1992-2010. United States Coast Guard Compliance Analysis Division (CG-5452). 51 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.

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. 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.

Lambert, D.M., E.M. Thunberg, R.G. Felthoven, J.M. Lincoln, and W.S. Patrick. 2015. Guidance on Fishing Vessel Risk Assessments and Accounting for Safety at Sea in Fishery Management Design. NOAA Technical Memorandum NMFS-OSF-2, 56 p.

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., B.M. Deacy, J.K. Carlson. 2015. Catch and Bycatch in U.S. Southeast Gillnet Fisheries, 2014. NOAA Technical Memorandum NMFS-SEFSC-675.

Mathers, A.N., B.M. Deacy, M.P. Enzenauer, and J.K. Carlson. 2017a. Characterization of the shark bottom longline fishery: 2016. NOAA Technical Memorandum NMFS-SEFSC-714.

Mathers, A.N., B.M. Deacy, M.P. Enzenauer, and J.K. Carlson. 2017b. Catch and bycatch in U.S. Southeast gillnet fisheries, 2016. NOAA Technical Memorandum NMFS-SEFSC-713.

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

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

NMFS. 2008a. 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. 2008b. Regulatory amendment 2 to the 2006 HMS FMP: Atlantic Shark Management Measures, July 15, 2008 NOAA, NMFS, HMS Management Division.

NMFS. 2013a. Annual report of the United States to ICCAT. US Department of Commerce, NOAA Fisheries. ANN-045/2013.

NMFS. 2013b. Regulatory amendment 5a to the 2006 HMS FMP: Atlantic Shark Management Measures, July 3, 2013 NOAA, NMFS, HMS Management Division.

NMFS. 2014. Annual report of the United States to ICCAT. US Department of Commerce, NOAA Fisheries. ANN-048/2014.

NMFS. 2015a. Annual report of the United States to ICCAT (2014). US Department of Commerce, NOAA Fisheries. ANN-038/2015.

NMFS. 2015b. Regulatory amendment 6 to the 2006 HMS FMP: Future of the Shark Fishery, August 18, 2015 NOAA, NMFS, HMS Management Division.

NMFS. 2015c. Regulatory amendment 9 to the 2006 HMS FMP: Atlantic Shark Management Measures, November 24, 2015 NOAA, NMFS, HMS Management Division.

NMFS. 2016. Annual Report of the United States to ICCAT (2015). US Department of Commerce, NOAA Fisheries. ANN-048/2016.

NMFS. 2017. Annual Report of the United States to ICCAT (2016). US Department of Commerce, NOAA Fisheries. ANN-048/2017.

SCRS. 2017. Report of the standing committee on research and statistics. ICCAT October 2-6, 2016; Madrid, Spain.

USCG. 2017. 2016 Recreational Boating Statistics. United States Coast Guard Office of Auxiliary and Boating Safety, United States Department of Homeland Security. COMDTPUB P16754.30. http://www.uscgboating.org/library/accident-statistics/Recreational-Boating-Statistics-2016.pdf.

Walsh, C.F. and L.P Garrison, 2006. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2005. NOAA Technical Memorandum. NMFS-SEFSC-539. 51 p.

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 2009 to 2016 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 (2009-2016)

Year	CPI-U	GDP Deflator	PPI Unprocessed Finfish
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
2016	240.0	111.4	690.4

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 2017a). In 2016, 9.6 billion pounds valued at $5.3 billion were landed for all fish species by U.S. fisherman at U.S. ports. 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. The overall value of landings between 2015 and 2016 increased by 2.1 percent. The total value of commercial HMS landings in 2016 was $37.5 million.. Revenues of HMS fisheries are further discussed in section 6.1.2.

The estimated value of the 2016 domestic production of all fishery products was $9.6 billion, down $1.8 billion (16.1 percent) from 2015. The total import value of fishery products was $35.8 billion in 2016. This is a decrease of $1.5 billion from 2015. The total export value of fishery products was $28.0 billion in 2016. This is a decrease of $409.8 million from 2015.

6.1.1 Ex-Vessel Prices

The average ex-vessel prices per pound dressed weight for 2009 to 2016 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 (2009-2016)

Species	Area	2009	2010	2011	2012	2013	2014	2015	2016
Bigeye tuna	Gulf of Mexico	$5.80	$5.79	$5.64	$6.19	$3.18	$3.54	$5.76	$6.06
	S. Atlantic	4.11	4.03	4.73	4.75	5.14	5.25	5.00	5.01
	Mid-Atlantic	5.42	5.86	6.38	6.90	6.35	6.66	5.88	5.64
	N. Atlantic	5.18	4.79	5.39	5.67	5.49	5.25	4.79	5.45
Bluefin tuna	Gulf of Mexico	4.65	5.42	6.38	7.16	6.72	6.49	5.75	5.88
	S. Atlantic	14.43	8.75	7.34	8.20	7.52	8.06	7.27	6.79
	Mid-Atlantic	10.10	8.94	10.64	10.95	9.02	7.66	7.20	5.98
	N. Atlantic	7.06	8.38	10.21	11.57	8.60	7.87	6.37	7.23
Yellowfin tuna	Gulf of Mexico	3.04	3.72	3.65	3.51	3.65	3.86	4.27	3.49
	S. Atlantic	2.90	3.53	3.93	4.63	3.64	3.69	3.46	3.18
	Mid-Atlantic	2.50	3.43	3.45	4.46	4.72	4.53	4.07	4.24
	N. Atlantic	2.86	2.80	3.39	4.22	3.89	3.52	3.18	3.57
Albacore tuna	Gulf of Mexico	0.55	1.40	1.09	0.68	0.77	0.77	0.75	0.70
	S. Atlantic	1.29	1.36	1.42	1.64	2.06	1.86	1.70	1.80
	Mid-Atlantic	1.10	1.30	1.19	1.25	1.41	1.27	1.34	1.38
	N. Atlantic	1.26	1.56	1.55	1.34	1.80	1.20	1.34	1.93
Skipjack tuna	Gulf of Mexico	0.50	-	0.90	0.75	-	-	-	-
	S. Atlantic	0.95	1.13	1.25	1.10	0.80	0.75	0.68	0.88
	Mid-Atlantic	-	-	0.60	1.06	0.88	1.12	0.72	0.76
	N. Atlantic	-	-	-	-	0.93	-	-	-
Swordfish	Gulf of Mexico	2.69	3.53	4.15	3.42	3.46	3.42	2.67	3.03
	S. Atlantic	4.12	4.63	4.84	4.97	4.99	4.85	4.30	4.75
	Mid-Atlantic	3.40	4.43	4.44	4.51	4.45	4.66	3.86	4.31
	N. Atlantic	3.49	4.61	4.22	4.49	4.61	4.43	3.25	4.67
Large coastal sharks	Gulf of Mexico	0.52	0.48	0.38	0.40	0.46	0.52	0.49	0.60
	S. Atlantic	0.55	0.65	0.61	0.75	0.77	0.72	0.78	0.73
	Mid-Atlantic	0.57	0.64	0.54	0.67	0.65	0.78	0.74	0.70
	N. Atlantic	-	-	-	-	-	-	-	-
Pelagic sharks	Gulf of Mexico	1.25	1.47	1.54	1.33	1.45	1.31	1.00	1.84
	S. Atlantic	1.25	1.27	1.46	1.74	1.66	1.47	1.57	1.62
	Mid-Atlantic	1.16	1.19	1.30	1.39	1.69	1.37	1.19	1.31
	N. Atlantic	1.23	1.28	1.48	1.68	2.03	2.00	1.68	1.93
Small coastal sharks	Gulf of Mexico	0.69	0.55	0.58	0.66	0.33	0.37	0.35	0.38
	S. Atlantic	0.71	0.79	0.81	0.99	0.71	0.74	0.76	0.73
	Mid-Atlantic	0.57	0.57	0.59	0.68	0.83	0.80	0.81	0.89
	N. Atlantic	-	-	-	-	-	-	-	-
Smoothhound	Gulf of Mexico							-	-
	S. Atlantic							0.71	0.84
	Mid-Atlantic							0.67	0.77
	N. Atlantic							0.35	0.47
Shark fins	Gulf of Mexico	15.09	16.48	15.11	14.97	11.05	9.75	9.92	11.47
	S. Atlantic	13.15	15.35	14.91	11.00	6.04	9.57	10.26	8.50
	Mid-Atlantic	3.62	6.83	3.50	2.79	1.45	1.77	1.95	2.36
	N. Atlantic	3.67	2.40	1.60	1.86	1.90	-	0.80	-

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.
Sources: HMS eDealer, Dealer weighout slips from the SEFSC, NEFSC, and bluefin tuna dealer.

Average ex-vessel prices for bluefin tuna have increased 12.1 percent since 2015. 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 2016.

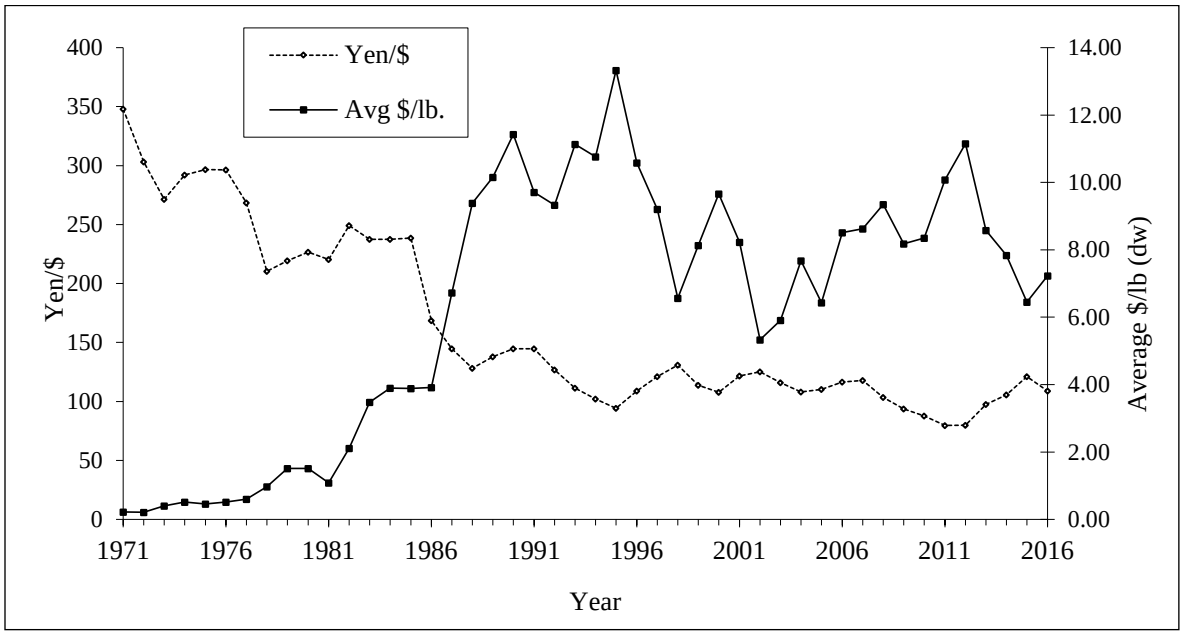

Figure 6.1 Average Annual Yen/$ Exchange Rate and Average U.S. Bluefin Tuna Ex-vessel $/lb (dw) for All Gears (1971-2016)

Sources: 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 2016 and weight reported to the NMFS Northeast HMS Office by Atlantic bluefin tuna dealers. These values indicate that the estimated total annual revenue of Atlantic HMS fisheries has increased in 2016 to $37.5 million from $36.5 million in 2015. From 2015 to 2016, the Atlantic tuna fishery's total revenue increased by $1.4 million. From 2015 to 2016, the annual revenues for the shark fisheries decreased by $0.5 million. Finally, the annual revenues for swordfish increased by $0.2 million from 2015 to 2016 due to an increase in ex-vessel price.

Table 6.3 Estimates of the Total Ex-vessel Annual Revenues of Atlantic HMS Fisheries (2009-2016)

Species		2009	2010	2011	2012	2013	2014	2015	2016
Bigeye tuna	Ex-vessel $/lb dw	$5.09	$5.22	$5.77	$6.42	$5.72	$5.79	$5.35	$5.26
	Weight (lb dw)	774,087	799,934	1,122,619	1,039,585	851,669	1,063,914	1,129,017	711,488
	Fishery revenue	$3,940,103	$4,175,655	$6,477,512	$6,674,136	$4,673,419	$5,716,850	$5,454,461	$3,454,060
Bluefin tuna	Ex-vessel $/lb dw	$8.18	$8.35	$10.08	$11.15	$8.58	$7.84	$6.45	$7.23
	Weight (lb dw)	899,477	1,119,937	996,661	995,583	682,533	1,002,549	1,347,920	1,522,634
	Fishery revenue	$7,357,722	$9,351,474	$10,046,343	$11,100,750	$5,826,566	$7,810,287	$8,716,613	$11,008,644
Yellowfin tuna	Ex-vessel $/lb dw	$2.87	$3.52	$3.60	$4.16	$3.91	$3.96	$3.71	$3.53
	Weight (lb dw)	3,159,665	2,154,728	2,676,682	4,349,482	2,580,759	2,779,487	1,965,050	2,351,936
	Fishery revenue	$9,068,239	$7,584,643	$9,636,055	$18,093,845	$11,214,871	$11,833,261	$8,494,781	$9,622,286
Skipjack tuna	Ex-vessel $/lb dw	$0.91	$1.13	$1.17	$1.06	$0.85	$0.98	$0.72	$0.88
	Weight (lb dw)	30,688	16,269	12,931	17,804	3,857	17,919	3,421	6,213
	Fishery revenue	$28,057	$18,451	$15,164	$18,949	$3,204	$14,478	$2,269	$5,597
Albacore tuna	Ex-vessel $/lb dw	$1.11	$1.36	$1.29	$1.31	$1.70	$1.49	$1.46	$1.56
	Weight (lb dw)	291,187	290,827	491,133	489,800	402,400	554,428	409,210	373,792
	Fishery revenue	$324,439	$394,754	$632,450	$639,370	$583,230	$800,870	$593,911	$563,784
Total tuna	Fishery revenue	$20,718,559	$21,524,977	$26,807,524	$36,527,050	$22,301,290	$26,175,746	$23,262,035	$24,654,371
Swordfish	Ex-vessel $/lb dw	$3.46	$4.40	$4.50	$4.41	$4.66	$4.65	$4.07	$4.54
	Weight (lb dw)	3,762,280	3,676,324	4,473,140	5,561,605	4,099,851	2,952,835	2,576,537	2,448,044
Total Swordfish	Fishery revenue	$13,031,079	$16,186,878	$20,130,595	$24,534,334	$19,178,743	$13,887,650	$10,175,662	$10,351,695
Large coastal sharks	Ex-vessel $/lb dw	$0.54	$0.60	$0.53	$0.59	$0.64	$0.65	$0.66	$0.68
	Weight (lb dw)	1,532,969	1,566,741	1,469,142	1,445,597	1,392,440	1,368,178	1,593,989	1,276,747
	Fishery revenue	$828,003	$938,044	$779,993	$854,916	$683,359	$764,162	$885,305	$720,802
Pelagic sharks	Ex-vessel $/lb dw	$1.18	$1.23	$1.35	$1.43	$1.67	$1.48	$1.40	$1.54
	Weight (lb dw)	225,575	312,195	314,314	314,084	247,833	353,623	215,298	239,850
	Fishery revenue	$266,548	$382,527	$425,831	$449,759	$384,419	$504,860	$323,129	$387,688
Small coastal sharks	Ex-vessel $/lb dw	$0.69	$0.69	$0.75	$0.87	$0.54	$0.56	$0.57	$0.56
	Weight (lb dw)	708,279	397,766	590,174	667,501	439,704	434,377	553,419	370,118
	Fishery revenue	$488,374	$272,590	$441,269	$578,126	$275,346	$342,887	$410,305	$253,406
Smoothhound	Ex-vessel $/lb dw	-	-	-	-	-	-	$0.65	$0.75
	Weight (lb dw)	-	-	-	-	-	-	915,723	702,400
	Fishery revenue	-	-	-	-	-	-	$570,805	$502,717
Shark fins*	Ex-vessel $/lb dw	$12.45	$14.02	$11.90	$8.96	$6.08	$7.71	$8.46	8.36
	Weight (lb dw)	123,341	113,835	118,682	121,359	150,853	110,560	105,189	76,048
	Fishery revenue	$1,535,469	$1,596,472	$1,412,129	$1,086,979	$738,189	$672,200	$839,642	$660,378
Total sharks	Fishery revenue	$3,118,394	$3,189,633	$3,059,222	$2,969,779	$2,081,313	$2,284,109	$3,029,186	$2,524,991
Total HMS	Fishery revenue	$36,868,033	$40,901,488	$49,997,341	$64,031,163	$43,561,346	$42,347,505	$35,896,078	$37,531,057

* Shark fin total weight for 2008 through 2012 was estimated using 5% of all sharks landed. In 2013 to 2016, it was based on reported shark fin landings reported to eDealer. Sources: HMS eDealer Program, NMFS Northeast Commercial Fisheries Database Service, NMFS SEFSC PDC Program.

A variety of fishing gears are used to harvest Atlantic HMS. Figure 6.2 displays the percent composition of the $37.5 million ex-vessel annual revenues landed in 2016 by fishing gear category. Based on eDealer and Atlantic bluefin tuna bi-weekly dealer report data, approximately 64 percent of 2016 total revenues in the fishery were landed by PLL gear. In addition, 27 percent of landings by value were from vessels using commercial rod and reel gear, 2 percent from BLL gear, 2 percent from gillnet, and 4.9 percent from other gear categories. These other gear categories include harpoon, purse seine, buoy gear, green-stick, hand line, and other miscellaneous gears.

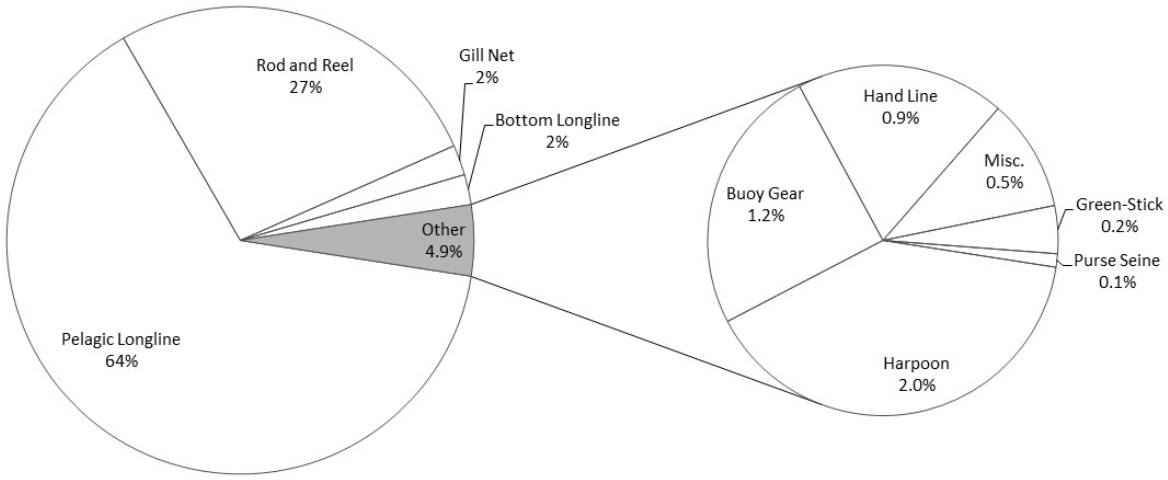

Figure 6.2 Percent of 2016 Total Ex-vessel Revenues of Atlantic HMS Fisheries By Gear

Sources: HMS eDealer and Atlantic bluefin tuna dealer reports.

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 continued to decrease (18.1 percent) from 2015 to 2016 while the cost per pound for bait slightly increased (8.7 percent) from 2015 to 2016. The unit cost per light stick increased, for the first time since 2012 (16.6 percent) from 2015 to 2016.

Table 6.4 Pelagic Longline Vessel Median Unit Costs for Fuel, Bait, and Light Sticks (2009–2016)

Input Unit Costs ($)	2009	2010	2011	2012	2013	2014	2015	2016
Fuel (per gallon)	2.00	2.50	3.40	3.50	3.35	3.25	2.20	1.80
Bait (per lb)	0.81	0.90	1.31	1.50	1.59	1.33	1.15	1.25
Light sticks (per stick)	0.37	0.25	0.25	0.30	0.30	0.30	0.30	0.35

Source: Unified Data Processing

Table 6.5 provides the median total cost per trip for the major variable inputs associated with Atlantic HMS trips taken by PLL vessel. Fuel costs are one of the largest variable expenses. Total median PLL vessel fuel costs per trip decreased 5.3 percent from 2015 to 2016.

Table 6.5 Median Input Costs for Pelagic Longline Vessel Trips (2009–2016)

Input Costs ($)	2009	2010	2011	2012	2013	2014	2015	2016
Fuel	2,862	2,386	2,814	2,784	2,860	2,567	1,920	1,818
Bait	1,785	1,895	3,150	3,000	3,000	2,565	2,250	2,205
Light sticks	592	500	633	750	750	750	720	679
Ice costs	514	430	600	675	584	660	750	900
Grocery expenses	895	780	900	900	900	900	900	900
Other trip costs	1,671	1,500	1,622	1,289	1,200	500	603	800

Source: Unified Data Processing

Labor costs are also an important component of operating costs for HMS PLL vessels. Table 6.6 lists the number of crew on a typical PLL 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 2016 received 25 percent on average. These shares are typically paid out after costs are netted from gross revenues. Median total shared costs per trip on PLL vessels have ranged from $6,157 to $9,949 from 2009 to 2016.

Table 6.6 Median Labor Inputs for Pelagic Longline Vessel Trips (2009–2016)

Labor	2009	2010	2011	2012	2013	2014	2015	2016
Number of crew	3	3	3	3	3	3	3	3
Owner share (%)	47	50	50	50	50	50	50	50
Captain share (%)	20	23	23	25	23	25	25	25
Crew share (%)	25	25	25	28	25	25	25	25
Total shared costs ($)	6,500	7,295	9,949	8,266	8,032	6,699	6,426	6,157

Source: Unified Data Processing

In 2016, median reported total trip sales were $18,000. In 2015, median reported total trip sales were $16,156. After adjusting for operating costs, median net earnings per trip were $9,090 in 2015. Median net earnings per trip increased to $10,892 in 2016.

The primary expenses associated with operating an Atlantic HMS-permitted BLL 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. BLL trips primarily target shark species and are of short duration. Table 6.7 provides the median reported trip input costs from 2009 to 2016.

Table 6.7 Median Input Costs for Bottom Longline Vessel Trips (2009–2016)

Input Costs	2009	2010	2011	2012	2013	2014	2015	2016
Fuel	$106	$130	$184	$175	$124	$162	$156	$120
Bait	$20	$50	$50	$100	$75	$85	$50	$61
Ice costs	$20	$50	$50	$36	$40	$48	$36	$50
Grocery expenses	$20	$50	$50	$50	$25	$50	$40	$40
Misc. trip costs	$15	$15	$34	$26	$30	$24	$54	$20
Number of crew	2	2	2	2	2	2	2	2
Days at sea	1	1	2	1	1	1	1	1

Source: Unified Data Processing

In 2016, median reported total trip sales were $1,081 for vessels using BLL gear. In 2015, median reported total trip sales were $1,438. After adjusting for operating costs, median net earnings per BLL trip were $1,091 in 2015. Median net earnings per trip increased to $798 in 2016.

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 $93.2 billion for fish products in 2016, including $63.4 billion at food service establishments, $29.8 billion in retail sales for home consumption, and $75.8 million for industrial fish products. The commercial marine fishing industry contributed $46.7 billion (in value added) to the U.S. Gross National Product in 2016 (NMFS 2017a).

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 2017a). Table 6.8 provides a summary of available information.

Table 6.8 Processors and Wholesalers: Plants and Employment (2016)

Area and State	Processing[1]		Wholesale[2]		Total	
	Plants	Employment	Plants	Employment	Plants	Employment
New England						
Maine	37	837	180	1,339	217	2,176
New Hampshire	8	201	10	92	18	293
Massachusetts	50	2,286	150	2,304	200	4,590
Rhode Island	9	*	30	*	39	*
Connecticut	4	78	18	197	22	275
Total	108	3,399	388	3,929	496	7,334
Mid-Atlantic						
New York	21	419	265	2,123	286	2,542
New Jersey	17	612	83	966	100	1,578
Pennsylvania	5	83	32	709	37	792
Delaware	3	*	6	19	9	16
District of Columbia	-	-	-	-	-	*
Maryland	18	371	44	729	62	1,100
Virginia	33	1,448	65	519	98	1,967
Total	97	2,930	495	5,065	592	7,995
South U.S. Atlantic						
North Carolina	29	702	62	627	91	1,329
South Carolina	3	*	23	170	26	167
Georgia	6	769	37	793	43	1,562
Florida	41	1,631	326	2,662	367	4,293
Total	79	3,099	448	4,252	527	7,351
Gulf of Mexico						
Alabama	34	1,423	13	237	47	1,660
Mississippi	23	2,425	20	129	43	2,554
Louisiana	60	1,626	105	699	165	2,325
Texas	52	1,611	137	1,334	189	2,945
Total	169	7,085	275	2,399	444	9,484
Inland States or Other						
Areas**, Total	66	1,642	244	3,100	310	4,742

[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, 2017a.

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 an 80 percent margin on sales in 2016, which is lower than margins in 2015.

Table 6.9 Summary of the Mark-Up and Consumer Expenditures for the Primary Wholesale and Processing of Domestic Commercial Marine Fishery Products (2014-2016)

	2014	2015	2016
Purchase of fishery inputs ($)	9,690,909,000	10,924,641,000	10,202,656
Percent mark-up of fishery inputs (%)	77	62	80
Total mark-up ($)	7,510,336,000	6,791,794	8,154,970
Value added as percent of total mark-up (%)	60	60	60
Value added within sector ($)	4,534,951,000	4,101,187,000	4,933,744
Total value of sales within sector ($)	17,201,245,000	17,716,435,000	18,357,627

Source: NMFS 2017a

6.3 International Trade

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

6.3.1 International HMS Trade Programs

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

HMS Trade Documentation Programs

NMFS implemented the HMS International Trade Program (ITP) in 2005 (69 FR 67268, November 17, 2004) to identify importers and exporters of HMS products that require trade monitoring documentation (i.e., bluefin tuna, swordfish, and frozen bigeye tuna). Under the ITP, traders in these species and shark fins were required to obtain the International Trade Permit. On August 3, 2016 (81 FR 514126) NMFS replaced the International Trade Permit with the International Fisheries Trade Permit (IFTP), and expanded its scope to include dolphin-safe tuna imports covered by the Tuna Tracking and Verification Program (https://www.fisheries.noaa.gov/dolphin-safe) and the trade of Patagonia/Antarctic toothfish,

also known as Chilean sea bass (https://www.fisheries.noaa.gov/national/international-affairs/importing-and-exporting-antarctic-marine-living-resources-and). This rulemaking also implemented mandatory electronic reporting of import and export documentation per the SAFE Port Act of 2006. On April 1, 2016 (81 FR 18796), NMFS implemented the electronic version of the trade ICCAT bluefin tuna catch documentation (eBCD) program for Atlantic bluefin tuna. On December 9, 2016, (81 FR 88975) NMFS promulgated the Seafood Import Monitoring Program (SIMP), which added shark and tuna importers to the list of traders required to obtain the IFTP and report trade data to NMFS via ITDS (effective January 1, 2018). Trade monitoring programs established by NMFS for HMS are described in greater detail in the 2011 HMS SAFE Report. Further information on the IFTP and associated reporting requirements is available on the HMS website.

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

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

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

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

On June 27, 2012, the CITES Secretariat sent a notification to the parties regarding the inclusion of two shark species, scalloped hammerhead and porbeagle, in CITES Appendix III, requiring member parties to issue CITES permits or certificates for the import, export, and re-export of

these species (or any of their parts or products). It also means that any U.S. import, export, or re-export of these species requires a declaration to and clearance from the U.S. Fish and Wildlife Service. In accordance with provisions of Article XVI paragraph 2 of the CITES Convention, the inclusion of these species in Appendix III took effect 90 days after the notification (i.e., effective as of September 25, 2012).

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 2006 and includes data from the NMFS eBCD 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. However, 2016 was the first time that the eBCD program export amount exceeded the amount of exports tracked by CBP. This is likely due to the new electronic trade tracking programs (i.e., eBCD and ITDS) that were implemented in 2016. These programs could have increased NMFS' access to data, and improved summary data accuracy. 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 (2006-2016)

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)
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
2016	863.1	375.1	287.7	662.8	624	5.95

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] Atlantic HMS Management Division, [2] NMFS Bluefin Tuna Catch Document Program (eBCD), and [3] U.S. Census Bureau.

In the time series shown in Table 6.10 and depicted in Figure 6.3, U.S. exports of Atlantic bluefin tuna generally increased when commercial landings increased. For most of the time series, domestic consumption of U.S. landings remained fairly constant (i.e., between 100 and 200 mt) from year to year; however, domestic landings consumption increased to over 400 mt in 2015 and 2016. 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, to a low of about 35 percent in 2015. It was also relatively low in 2014 and 2016, and when landings declined to their lowest point in 2006-2007.

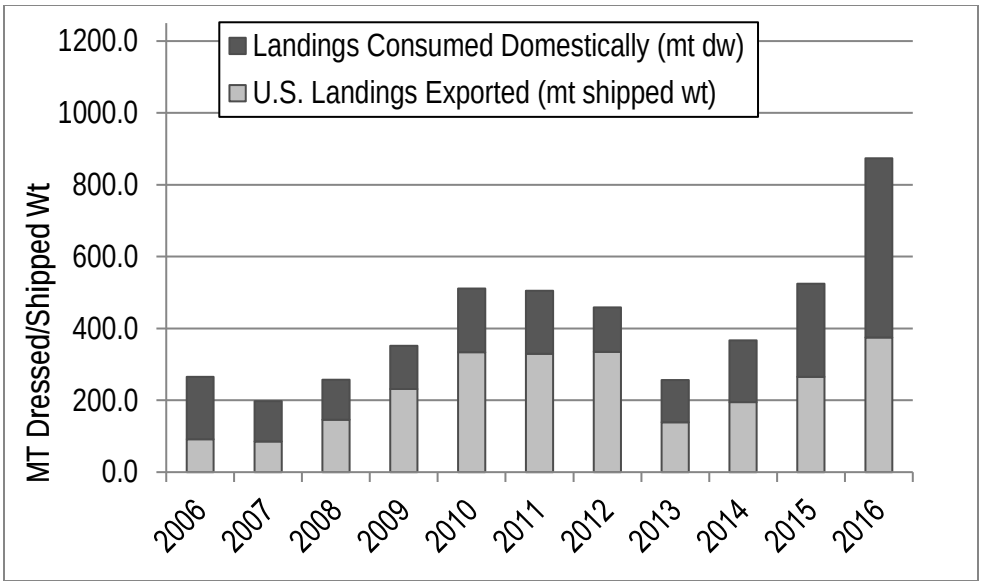

Figure 6.3 Annual U.S. Domestic Landings of Atlantic Bluefin Tuna, Divided into U.S. Export (mt shipped weight) and U.S. Domestic Consumption (mt dw) (2006-2016)

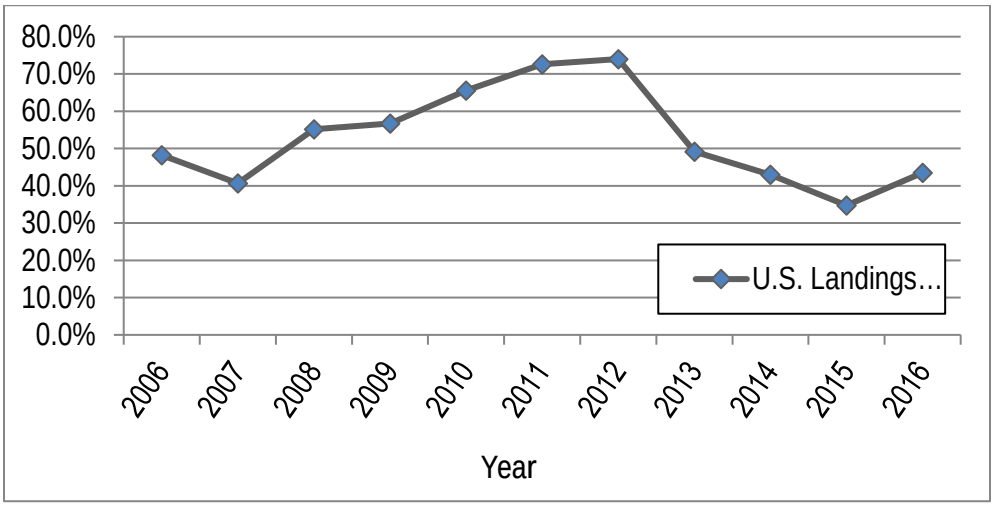

Figure 6.4 Annual Percentage (by weight) of Commercially-Landed U.S. Atlantic Bluefin Tuna that was Exported (2006-2016)

Other Tuna Exports

Export data for other tunas is gathered by the U.S. Census Bureau, and includes trade data for albacore, yellowfin, bigeye, and skipjack tuna from all ocean areas of origin combined. The value of annual albacore exports has exceeded the value for any other tuna export since the beginning of the time series, and has remained over $20 million per year for the time series (Table 6.11). Most albacore exports are Pacific in origin, as Atlantic landings have ranged between 189 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 9,187 mt in 2006. Exports from all ocean areas were lowest in 2015 but rebounded in 2016 to the second highest value of the time series.

Table 6.11 U.S. Atlantic Landings and Total U.S. Exports of Albacore Tuna (2006–2016)

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)
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
2016	250	983	2.83	13,749	37.61	14,732	40.44

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, 2017b, [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. Total yellowfin tuna exports for 2012-2015 were consistent at about 850 mt, but decreased by almost half in 2016.

Table 6.12 U.S. Atlantic Landings and Total U.S. Exports of Yellowfin Tuna (2006–2016)

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)
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
2016	3,274	82	0.84	401	1.44	483	2.29

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, 2017b, [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 54-134 mt. Total value peaked in 2013 while total exports peaked in 2009.

Table 6.13 U.S. Atlantic Landings and Total U.S. Exports of Skipjack Tuna (2006–2016)

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)
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
2016	134	47	0.12	26	0.13	73	0.25

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, 2017b, [2] U.S. Census Bureau.

Bigeye tuna exports and Atlantic landings are given in Table 6.14. Atlantic landings were fairly consistent from 2012-2015 but fell in 2016 to the fourth lowest value of the time series. 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 peaked in 2012, and have dropped substantially since then.

Table 6.14 U.S. Atlantic Landings and Total U.S. Exports of Bigeye Tuna (2006–2016)

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)
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
2016	533	36	0.45	6	0.09	43	0.54

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 2017b, [2]U.S. Census Bureau.

Shark Exports

Export data for sharks are gathered by the U.S. Census Bureau, and include trade data for sharks from any ocean area of origin. Shark exports are not categorized to the species level, with the exception of spiny dogfish, and are not identified by specific product code other than fresh 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 2006 – 2016 (not including smoothhound sharks). The amount and value of exports has been relatively highsince 2011, due mostly to large amounts of frozen product. The price per kg for frozen product consistently rose from 2010 to 2014, and reached a high for the time series in 2014. Exports of shark fins were highest in 2009 (56 mt) but have been much lower since then, ranging between 11 and 19 mt for 2011-2016. The price of shark fins was greatest in 2011 ($100.67/kg).

Table 6.15 Amount and Value of U.S. Shark Products Exported (2006–2016)

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

$ 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 (2008-2016)

	Swordfish Fillet				Swordfish				Swordfish Meat					
	Fresh		Frozen		Fresh		Frozen		Fresh		Frozen		Total	
Year	Amount (mt)	Value ($MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
2008	24	0.25	48	0.34	121	0.89	1.2	0.01	-	-	154.0	0.88	349	2.4
2009	43	0.38	19	0.23	133	0.81	12.1	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	0.23	94	.56	19.9	0.12	1.2	0.01	8.8	0.04	148	1.0
2016	1	0.01	5	0.04	87	.46	38.1	0.31	5.8	0.07	3.1	0.02	140	0.9

$ 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 (2006–2016)

Year	Product	Amount (mt)	Value ($ million)
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	-	-
2016	none	-	-

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

Table 6.18 shows the re-exports of bluefin tuna since 2006. Re-exports of bluefin tuna in 2013 were particularly high, with 2010 being the second higest re-export year in the time series.

Summary of Atlantic HMS Exports

As indicated in the previous section, the value of HMS exports (from all ocean areas combined) is nationally dominated by tuna products. In 2016, fresh and frozen tuna products accounted for 17,457 mt dw of the 1.2 million mt dw of principal fresh and frozen seafood products exported from the United States, as indicated in *Fisheries of the United States, 2016* (NMFS 2017a). The value of these HMS tuna products accounted for $55.1 million, out of a national total of $4.7 billion.

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

6.3.3 U.S. Imports of HMS

All import shipments must be reported to and cleared by CBP. "General" imports are reported when a commodity enters the country, and "consumption" imports consist of entries into the United States for immediate consumption combined with withdrawals from CBP bonded warehouses. "Consumption" import data reflect the actual entry of commodities originating outside the United States into U.S. channels of consumption. As discussed previously, CBP data for certain products are provided to 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 2006 through 2016, 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 (2006–2016)

	NMFS BFT Catch Document Program		U.S. Customs and Border Protection	
Year	Imports (mt)	Re-exports (mt)	Imports (mt)	Value ($ million)
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
2016	1338.0	39.8	1,303.5	25.65

Note: Most imports of bluefin tuna (BFT) were in dressed form, and some were round and gilled/gutted fish, fillets or belly meat (dw); data are preliminary and subject to change. Sources: NMFS Bluefin Tuna Catch Document Program and U.S. CBP.

The rise in popularity of sashimi in the United States has created a market for imports of Atlantic and Pacific bluefin tuna (Table 6.18). U.S. consumption of Atlantic bluefin tuna (landings + imports – exports – re-exports) has increased over the last four years to an all-time high for the time series in 2016 (Figure 6.5). Consumption of domestic landings had been fairly consistent, ranging between about 100 to 200 mt per year until 2015 and 2016 when domestic landings consumption climbed to about 500 mt. Consumption of imported bluefin tuna has been more variable, and is also higher for the last two years.

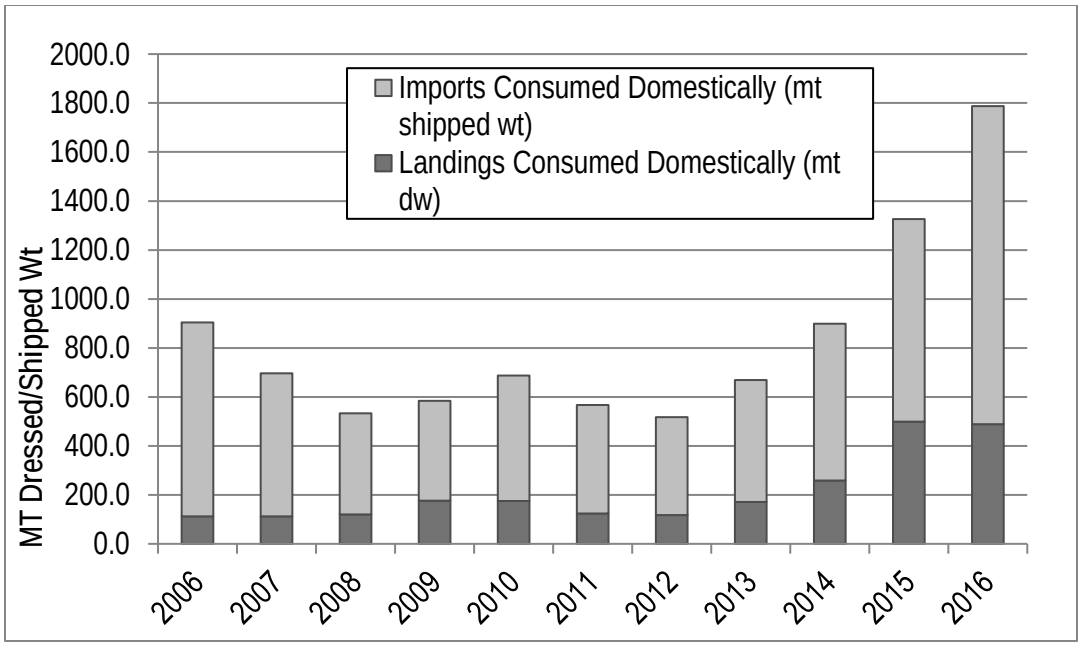

Figure 6.5 U.S. Annual Consumption of Atlantic and Pacific Bluefin Tuna, by Imports and U.S. Landings (2006-2016)

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 in 2016.

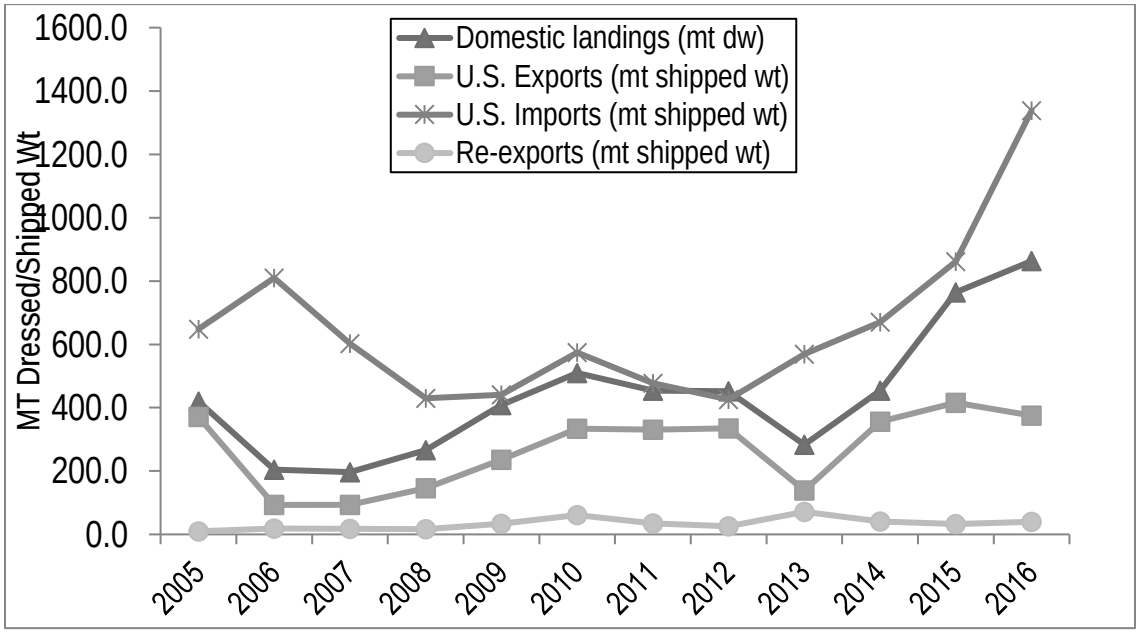

Figure 6.6 U.S. Domestic Landings (mt dw) of Atlantic Bluefin Tuna, and Exports, Imports and Re-exports of Atlantic and Pacific Bluefin Tuna (shipped weight) (2006-2016)

Other Tuna Imports

CBP collects species-specific import information for bigeye tuna, grouped to include all ocean areas. The total amount of bigeye tuna imports has generally been between 4-5,000 mt since 2010, as shown in Table 6.19. Value of total fresh and frozen bigeye imports dropped in 2016 from 2015 levels, but otherwise remained the highest level since 2009.

Table 6.19 U.S. Imports of Bigeye Tuna from All Ocean Areas Combined (2006–2016)

	Fresh		Frozen		Total for all Imports	
Year	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
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
2016	4,217	36.91	36	0.09	4,253	37.00

$ 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 2006 to 2007 (about 23,000 mt). Total amount has been fairly consistent since 2010, but rose in 2016. Total value continues to fluctuate over the time series with 2016 levels higher than those in 2014 and 2015. Most imported yellowfin products were fresh.

Table 6.20 U.S. Imports of Yellowfin Tuna from All Ocean Areas Combined (2006–2016)

	Fresh		Frozen		Total for all Imports	
Year	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)
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
2016	16,550	150.96	3,207	24.91	19,757	175.87

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). Imports for both fresh and frozen product and value increased in 2016. 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 (2006–2016)

	Fresh		Frozen		Total for all Imports	
Year	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)	Amount (mt)	Value ($ million)
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
2016	1,014	5.07	2,240	4.26	3,254	9.33

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 total amount of skipjack imports has generally been decreasing since 2006, except for an increase in 2012. 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 (2006–2016)

	Fresh		Frozen		Total for all Imports	
Year	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)	Amount (mt)	Value ($ MM)
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
2016	0	0	251	0.37	251	0.37

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 2006 to 2016, 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 three-year increase beginning in 2013 to reach the greatest values in 2015.

Table 6.23 Imported Swordfish Products (2006–2016)

	Fresh (mt)				Frozen (mt)					Total for All Imports	
Year	Steaks			Other	Fillets		Steaks		Other	(mt)	($ million)
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
2016	3	20	2	7,780	1,905	266	379	2	10	10,367	87.36

* 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 2016 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 (2016)

Swordfish Import Data for the 2016 Calendar Year Collected Under the NMFS Swordfish Statistical Document Program								
Flag of Harvesting Vessel	**Ocean Area of Origin**							**Total**
	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)**	**(mt dw)**
Australia				11.40	109.60			121.00
Brazil	0.42		417.56					417.97
Canada		414.29						414.29
Chile				191.52				191.52
China				0.36				0.36
Costa Rica				563.78				563.78
Ecuador				1201.20				1201.20
Fiji Islands				8.57	7.55			16.12
France						4.57		4.57
French Polynesia				2.03				2.03
Indonesia						174.86		174.86
Marshall Islands				2.51				2.51
Mauritus						6.52		6.52
Mexico				111.88				111.88
Mozambique						29.03		29.03
New Zealand					374.86			374.86
Nicaragua				15.04				15.04
Panama				362.64				362.64
Republic of Maldives				1.35		73.77		75.13
Seychelles						5.91		5.91
South Africa			22.84			2.40		25.24
Sri Lanka				1.54		278.07		279.62
Tonga				0.31				0.31
Trinidad & Tobago		6.26						6.26
Vanuatu				138.92				138.92
Vietnam				70.34				70.34
Total Imports Reported by SDs								4611.91
Total Imports Reported by U.S. Customs & Border Protection								10559.12
Total Imports Not Reported by SDs								5947.21

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

Table 6.25 U.S. Imports of Shark Products from All Ocean Areas Combined (2006–2016)

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

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.

6.4 Recreational Fisheries

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

6.4.1 Recreational Angling

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

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

This survey also included a separate survey of HMS Angling permit holders from the LPS region (Maine to Virginia) plus North Carolina (Hutt et al., 2014). Estimated trip-related expenditures and the resulting economic impacts for HMS recreational fishing trips are presented in Table 6.26. For the HMS Angler Expenditure Survey, randomly selected HMS Angling permit holders were surveyed every two months, and asked to provide data on the most recent fishing trip in which they targeted HMS. Anglers were asked to identify the primary HMS they targeted, and their expenditures related to the trip. Of the 2,068 HMS anglers that returned a survey, 1,001 anglers indicated they targeted a species of tuna (i.e., bluefin, yellowfin, bigeye, or albacore tuna) on their most recent private boat trip, or simply indicated they fished for tuna in general without identifying a specific species. Of the rest of those surveyed, 88 reported on trips targeting billfish (i.e., blue marlin, white marlin, sailfish), 105 reported on trips targeting shark (i.e., shortfin mako, thresher shark, blacktip shark), and 874 either reported on trips that did not target HMS or failed to indicate what species they targeted. Average trip expenditures ranged from $534/trip for tuna trips to $900 for billfish trips. Boat fuel was the largest trip-related expenditure for all HMS trips, and made up about 73 percent of trip costs for billfish trips, which is not unexpected given the predominance of trolling as a fishing method for billfish species such as marlin. Total trip-related expenditures for 2011 were estimated by expanding average trip-related expenditures by estimates of total directed boat trips per species group from the LPS and MRIP. Total expenditures were then divided among the appropriate economic sectors, and entered into an input-output model to estimate total economic output and employment supported

by the expenditures within the study region (coastal states from Maine to North Carolina). Overall, $23.2 million of HMS angling trip-related expenditures generated approximately $31.3 million in economic output, and supported 216 full time jobs from Maine to North Carolina in 2011. An updated trip expenditures survey of Atlantic HMS Angling Permit holders from Maine to Texas is currently being conducted for 2016, and a final report will be issued in spring 2018.

Table 6.26 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 National Marine Recreational Fishing Expenditure Survey (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 conducted an Atlantic HMS Tournament Economic Study for 2016. This study was conducted in two parts. The first part involved a survey of all Atlantic HMS tournaments on their costs and earnings associated with the operation of a tournament. The second part involved a survey of HMS tournament participants on their expenditures associated with participating in an HMS

tournament. For the second part, half of Atlantic HMS tournaments were selected to distribute surveys to their participants. The goal of this targeted survey was to provide expenditure data on a unique group of saltwater angling trips that are largely under-represented in national surveys. A final report will be issued in spring 2018.

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 6.27). 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 6.27 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. Source: Hutt and Silva, 2015.

Of the 19 headboat trips that reported targeting coastal sharks, none reported targeting any other species. The HMS most commonly targeted by headboats were yellowfin tuna (37 %), 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 6.28). 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 6.28 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

Source: Hutt and Silva, 2015.

In the Northeast, the LPS estimated that there were 4,936 charter trips from July to November, 2013, that targeted HMS (Table 6.29). 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 (Minnesota IMPLAN 2010) estimated that these expenditures generated $31.9 million in total economic output, $8.0 million in labor income, and 460 full and part-time jobs (Table 6.30).

In the Southeast, the MRIP estimated that there were 3,008 charter trips from July to November, 2013, that targeted HMS (Table 6.29). 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 6.30).

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 6.29). 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 6.30).

Table 6.29 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. Source: Hutt and Silva, 2015.

Table 6.30 Estimated Total Expenditures and Economic Impacts Generated by Atlantic HMS Charter Boat Trip Operations by Region (July-November 2013)

		Economic Impacts		
Region	Total Expenses ($1,000)	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

Source: Hutt and Silva, 2015

This study estimated 1,131 jobs were generated as a result of HMS charter vessel operations during the study period (Table 6.30). 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 2017 (82 FR 26419, June 7, 2017). This plan required review of rules issued

during 2010. Table 6.31 reviews the Atlantic HMS regulations issued in 2010 using the criteria established in Section 610 of the Regulatory Flexibility Act. Final rules should be reviewed to determine whether they should be continued without change, or whether they should be amended or rescinded, consistent with the stated objectives of applicable statutes. Section 610 of the Regulatory Flexibility Act requires NMFS to consider the following factors when reviewing rules to minimize any significant economic impact of the rule on a substantial number of small entities:

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

Table 6.31 Regulatory Flexibility Act Section 610 Review of Atlantic Highly Migratory Species Regulations in 2010

Name of Action, Date, and FR Cite	Atlantic Highly Migratory Species; Atlantic Shark Management Measures; Amendment 3; Final Rule. RIN 0648-AW65 (75 FR 30483, June 2, 2010)
Current Status of Rule (Expired, Rescinded, Superseded, Amended, or Continuing)	Amended
Description of Management Measures and Complexity	This final rule implemented the management measures described in Final Amendment 3 to the Atlantic HMS FMP. These management measures were designed to rebuild overfished species and prevent overfishing of Atlantic sharks. This final rule implemented the final conservation and management measures in Amendment 3 for blacknose sharks, shortfin mako sharks, and smooth dogfish. In order to reduce confusion with spiny dogfish regulations, this final rule placed both smooth dogfish and Florida smoothhound into the ''smoothhound shark complex.'' This final rule also announced the opening date and 2010 annual quotas for small coastal sharks (SCS). These changes affected all fishermen, commercial and recreational, who fish for sharks in the Atlantic Ocean, the Gulf of Mexico, and the Caribbean Sea. NMFS considers that this was a complex rule given that it was a major amendment to the fishery management plan with many provisions.
Economic Impacts of Management Measures and Nature of Public Comments	Amendment 3 to the Consolidated HMS FMP modified the SCS management group and reduced the overall quota. Previously, the SCS group included finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks which were managed under a 454 mt dw quota. To end overfishing and rebuild the blacknose shark stock, Amendment 3 established a separate quota of 19.9 mt dw for blacknose sharks, and reduced the SCS quota for the remaining non-blacknose SCS to 221.6 mt dw. These two quotas were also linked so that if one was reached or exceeded, then both would close. NMFS estimated these quota reductions would lead to a loss of $116,832 in blacknose shark landings, or $2,290 per permit holder with reported blacknose shark landings. The reduction in the remaining non-blacknose SCS quota was estimated to generate a loss of $42,484 in revenue overall, and $622 per directed shark permit holder. In addition to modifying the SCS quotas, Amendment 3 also included measures for shortfin mako sharks and smooth dogfish. Amendment 3 determined to address potential overfishing for shortfin mako sharks through international action at ICCAT, and promotion of live release by U.S. fishermen. Amendment 3 also added smooth dogfish to NMFS management, and established a federal permit and quota after a two-year delay to 2012. Neither of these measures were determined to have significant economic impacts. NMFS received a comment regarding the ability to distribute the small SCS quota across all the permit holders. NMFS examined the per vessel impacts of the proposed SCS quotas across all permit holders in the IRFA and also in this FRFA. Based on data from 2004 to 2007 for directed and incidental shark permit holders that landed non-blacknose SCS, the average directed shark permit holder earned $9,427 in average annual gross revenues, and the average incidental shark permit holder earned $707 in average annual gross revenues from non-blacknose SCS landings. For those permit holders that actually landed blacknose shark during that same time period, the average directed shark permit holder earned $3,640 in average annual gross revenues, and the average incidental shark permit holder earned $1,722 in average annual gross revenues from blacknose shark landings. NMFS acknowledges that the availability of SCS quota proposed in the DEIS would be limited if spread across all permit holders. NMFS made changes to the SCS quotas based, in part, on the comments received. The preferred alternative in the FEIS for SCS was 221.6 mt

	versus 56.9 mt preferred under the DEIS. The preferred alternative for blacknose shark quota was raised from 14.9 mt under the DEIS to 19.9 mt in the FEIS. Another comment NMFS received noted that the fins attached rule decreased fishing effort on SCS because it is too much work processing the sharks twice in hot weather. Prices are lower for SCS because the fins on rule decreased the quality due to increased processing time. NMFS acknowledged that the fins on rule could decrease the quality of the product due to increased processing time. However, other factors such as market demand and decreased supplies might also affect prices. NMFS indicated it would examine the impacts of leaving fins on sharks on the prices for SCS as information becomes available. NMFS also received comments that the preferred blacknose shark recreational alternative in the DEIS would eliminate the recreational fishery and that there are no analyses of the economic benefits to the nation associated with this defacto allocation to the commercial sector. NMFS notes that blacknose sharks rarely reach a size greater than the current federal minimum size, therefore, the current 54 inch FL size limit creates a defacto retention prohibition of blacknose sharks in federal waters. NMFS determined that prohibiting the retention of blacknose sharks in the recreational fishery could have some negative social and economic impacts on recreational fishermen, including tournaments and charter/headboats, if the prohibition of blacknose sharks resulted in fewer charters. However, since blacknose sharks are not one of the primary species targeted by recreational anglers, in tournaments or on charters and they rarely reach a size greater than the current federal minimum size, NMFS did not anticipate much negative social and economic impacts on recreational anglers, tournaments, or in the charter/headboat sector. Leaving blacknose sharks under the existing 54 inch FL size limit was the preferred alternative because the effect was the same as prohibiting the retention of blacknose sharks, thereby contributing to the rebuilding of the species. A few commenters, including the State of Virginia, noted that there is no indication that finning has been, is, or is likely to become a problem in the smooth dogfish fishery because of the economics of the fishery. The State of Virginia notes that the smooth dogfish fishery subsists as a high volume and labor intensive endeavor, as a typical whole round weight of 1,000 pounds contains 200 to 250 individual dogfish. In a typical processed catch of smooth dogfish, the dockside value of the fins represents 20 to 30 percent of the price paid to fishermen for their total catch, and fishermen return dockside with meat and fins in separate containers. Delaying the removal of fins and tail until landing would result in decreased marketability. Smooth dogfish are harder than other species to extract from the net, butcher and clean, with the result that labor costs represent a higher percentage of the total value of the product. Cutting fins at sea is important practically to the fishery in order to maintain proper product freshness. In the absence of processing, there would be a loss of profitability to the industry because of the increased labor with re-handling each carcass. NMFS agreed that the smooth dogfish fishery is likely a labor intensive operation. While the delay in the removal of fins and tails until landing could reduce the quality and marketability of smooth dogfish, it was unclear whether any decreases in ex-vessel prices would exceed potential cost savings from reduced labor needs at sea associated with finning on the vessel. There would potentially be an increase in operating costs at dealers, if they end up processing the fins from the smooth dogfish carcasses.
Overlap with other State or Federal Rules	This final rule does not duplicate, overlap, or conflict with any other Federal rules.
Changes in Technology, Economic Conditions, or	Since 2010, annual revenue for the SCS fishery has varied considerably since 2013. SCS revenue was $272,590 in 2010, $410,305 in 2015, and $253,406 in 2016. Early closure of the non-blacknose SCS quota due to the quota linkage with the blacknose fishery has resulted in significant loss

Other Factors since Last Evaluation	of revenue in some years, but the establishment of a 8 shark/ trip limit for blacknose sharks in 2017 will minimize the occurrence of early closures in the future allowing for full utilization of the commercial non-blacknose SCS quota.
Recommendation to Continue, Rescind, or Amend and Rationale	Amendment 6 to the Consolidated HMS FMP made major changes to the management of the SCS fishery by prohibiting retention of blacknose sharks in the Gulf of Mexico and in the Atlantic north of 34° 00' N latitude. The linkage between the blacknose and non-blacknose SCS quotas in the Atlantic was also removed north of the 34° 00' N latitude boundary to allow for further exploitation of the non-blacknsoe SCS quota in a region where blacknose landings are minimal. Amendment 6 also increased the non-blacknose SCS commercial quota in both the Atlantic and Gulf of Mexico. Amendment 9 to the Consolidated HMS FMP implemented the smooth dogfish/smoothhound shark measures that were delayed in Amendment 3. These included establishment of an open access commercial smoothhound shark permit. As authorized by the Shark Conservation Act, this permit allows for the removal of fins at sea from smooth dogfish so long as they make up at least 25 percent of retained catch on board by weight, and the fin-to-carcass ratio does not exceed 12 percent. Amendment 9 also established regional smooth dogfish quotas in the Atlantic and Gulf of Mexico, and required Shark recreational anglers to obtain an HMS Angling or Charter/Headboat permit to retain smooth dogfish caught in federal waters. Dealers purchasing smooth dogfish caught in federal waters were also required to obtain a HMS Dealer permit. Overall, NMFS concludes this rule is continuing as currently amended to meet the objectives of the Magnuson-Stevens Act and the 2006 Consolidated HMS FMP.
Name of Action, Date, and FR Cite	Atlantic Highly Migratory Species; 2011 Commercial Fishing Season and Adaptive Management Measures for the Atlantic Shark Fishery. RIN 0648-AY98 (75 FR 76302, December 8, 2010)
Current Status of Rule (Expired, Rescinded, Superseded, Amended, or Continuing)	Continuing
Description of Management Measures and Complexity	This final rule implemented adaptive management measures in the Atlantic shark fisheries to extend the shark fishing season by allowing for delaying the opening date of the different shark fisheries or inseason reductions of trip limits for non-sandbar large coastal sharks (LCS) to slow down the harvest of sharks within a given fishing season. It also established specifications for the 2011 shark season. These changes affect all commercial shark fishermen in the Atlantic and Gulf of Mexico, but those impacts were expected to be beneficial as the measures were intended to extend the shark season and ensure more equitable utilization of the resource across fishing regions. NMFS considers this to be a low complexity rule as it only increased flexibility in the inseason management of the shark fishery.
Economic Impacts of Management Measures and Nature of Public Comments	This final rule implemented two adaptive management measures in the Atlantic shark fisheries. The first allowed NMFS to delay opening the regional shark fisheries if it is determined that doing so would provide the most benefit to most of the fishermen while also considering the ecological needs of the different shark species. The second allowed NMFS to make inseason adjustments to daily trip limits for non-sandbar LCS in order to extend the fishing season and ensure a more equitable distribution of landings to fishermen in different regions. Both measures were expected to have neutral to slightly positive overall economic impacts to the non-sandbar LCS fishery as they do not modify the overall quota, but they were expected to have an overall positive effect on the fishery by ensuring a more equitable distribution of landings and revenue generated by the fishery. Reductions in trip limits could have minor negative impacts on if the trip limit is set too low, reducing per trip revenue to the point of encouraging fishermen to switch to other fisheries, and converting the shark fishery to an indirect fishery until the trip limit is

	increased. This could be advantageous from a management perspective if the quota has been largely filled, and an indirect fishery would be preferable to a closed fishery to minimize dead discards. NMFS received comments both for and against this rule on economic grounds. NMFS received comments expressing opposition to increased flexibility in setting season opening dates on the grounds that commercial fishermen need certainty to make good business decisions, and because a short season is more economically beneficial. NMFS still conducts annual proposed and final rulemaking to establish the quotas and season opening dates. As part of these rulemaking, interested parties could provide comments and have notice of the season opening dates, as is currently the process. In addition, NMFS provides five days notice of changes in shark trip limits, as is currently done with the closing of a particular shark fishery when 80 percent of a given quota is harvested. Such a process provides the same amount of notice to fishermen and associated shark industries of changes in the fishery as is currently provided. NMFS believes that five days notice of changes provides enough time for business decisions while also providing NMFS with the ability and flexibility to manage the fishery, as appropriate. NMFS acknowledges that shorter seasons may result in some reduced trip-related expenses. A shorter season may result in less fuel expenditures for travel, lower costs associated with changing over gear types, and reduced crew turnover. A shorter season may reduce the at-sea time associated with harvesting the shark quota, and, therefore, provide fishermen with more time to pursue other fisheries. However, there are both social and private costs potentially associated with shorter seasons. Shorter fishing seasons often result in derby-style fishing conditions, which can result in fishing under unsafe conditions, such as poor weather and long hours. Derby fishing can also result in a market glut of fish during the early part of a fishing season when there is heavy fishing if there is insufficient demand for the product during that short period. Furthermore, when fishing in other fisheries, such as snapper/grouper or mackerel fisheries, fishermen are likely to encounter sharks. If the season for sharks is closed, those sharks caught as bycatch need to be discarded, resulting in fishing inefficiencies and increased mortality of sharks. NMFS received comments from fishermen in various states indicating their preference for season starting dates at different times of the year based on the seasonal availability of sharks in their region. Florida fishermen generally preferred early season openings in January or February when sharks are more abundant in their waters, while fishermen in North Carolina and further north preferred opening the season in July when sharks would be more abundant in their region. Consistent with National Standard 4, NMFS must not discriminate between residents of different states. NMFS must consider fishing opportunities that are fair and equitable to all fishermen. Having the flexibility to open the non-sandbar LCS fishery later in the year would allow the furtherance of equitable fishing opportunities to all fishermen in the Atlantic region; fishermen in the south Atlantic and north Atlantic would all have the ability to harvest a portion of the non-sandbar LCS quota in the Atlantic region with such an opening date. NMFS received comments from fishermen in the Gulf of Mexico supporting various opening dates for the shark fishing season. Some fishermen supported opening the season early in the year when few other fisheries are open. Other fishermen in the Gulf commented that shark meat is easier to sell around Lent, and supported flexibility in setting season opening dates so that they could be set around Lent each year. Finally, other fishermen around Louisiana supported delaying the opening until July when discharge from the Mississippi River is lower and sharks are easier to catch. NMFS believes the diversity in preferences for season opening dates in the Gulf of Mexico region further justifies the need for continued flexibility in setting season opening dates and inseason adjustments of trip limits to ensure the fishery remains open for as much of the year as possible. NMFS also received comment that we should not lower the trip limit to extend the season. Anything less than 33 non-sandbar LCS per trip would shut the fishery down since it would not be profitable for Federal fishermen. With the implementation of Amendment 2, NMFS anticipated that setting the trip limit at 33 non-sandbar LCS would lead to non-sandbar LCS being caught in an incidental manner in other fisheries, as the reduced trip limit would no longer provide an economically viable targeted fishery for non-sandbar LCS. However, an analysis of logbook data indicated that

	the non-sandbar LCS fishery had harvested, on average, less than the 33 non-sandbar LCS per trip limit. Specifically, the Coastal Fisheries Logbook data indicate that between the implementation of Amendment 2 (*i.e.*, 2008-2009) and this rule, the overall average number of non-sandbar LCS landed per trip in the Gulf of Mexico and Atlantic regions was 21 and 13, respectively. Additionally, NMFS was aware that many shark fishermen continued to direct large coastal sharks, particularly during times when other fisheries are closed. Therefore, it seemed that targeted non-sandbar LCS trips were conducted at lower harvest levels than the previous trip limit. In this final rule, NMFS did not change the trip limits. However, NMFS did implement criteria for trip limit adjustments through inseason actions to provide fishermen more equitable access to the relevant shark resource throughout their appropriate region.
Overlap with other State or Federal Rules	This final rule does not duplicate, overlap, or conflict with any other Federal rules.
Changes in Technology, Economic Conditions, or Other Factors since Last Evaluation	Since 2010, annual revenue in the non-sandbar LCS fishery has fluctuated slightly. Annual revenues in 2010 were $938,044, declined to $683,359 in 2013, but rose back to $885,305 in 2015 and was $720,802 in 2016. The flexibility provided in this rulemaking have allowed NMFS to regulate the length of the season in such a way as to make sure it remains open throughout the year in most years, thus assuring a more equitable distribution of landings across regions.
Recommendation to Continue, Rescind, or Amend and Rationale	This rule is continuing as currently amended to meet the objectives of the Magnuson-Stevens Act and the 2006 Consolidated HMS FMP. The rule has increased management flexibility of the non-sandbar LCS fishery which has allowed for more equitable utilization of the resource across regions.

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, C., S. Lovell, and G. 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, C. and G. 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, S., S. Steinback, and J. 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., J. Hilger, S. Steinback, and C. Hutt. 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. 2015. Annual report of the United States to ICCAT (2014). US Department of Commerce, NOAA Fisheries. ANN-038/2015.

NMFS. 2016. Annual Report of the United States to ICCAT (2015). US Department of Commerce, NOAA Fisheries. ANN-048/2016.

NMFS. 2017a. Fisheries of the United States: 2016. Alan Lowther and Michael Liddel, Editors. Office of Science and Technology, Fisheries Statistics and Economics Division, NOAA, U.S. Department of Commerce, Silver Spring, MD. https://www.fisheries.noaa.gov/resource/document/fisheries-united-states-2016-report

NMFS. 2017b. Annual Report of the United States to ICCAT (2016). US Department of Commerce, NOAA Fisheries. ANN-048/2017.

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.

U.S. Fish and Wildlife Service (USFWS) 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 2016. Please refer to prior SAFE reports for previous years' hurricane impact information.

The 2016 Atlantic hurricane season was above the 1981-2010 long-term average and well above that seen during the 2013-15 hurricane seasons (Stewart 2016). During the 2016 hurricane season, a total of fifteen tropical storms formed, in which seven became hurricanes, and four reached major hurricane strength, based on the Saffir-Simpson Hurricane Wind Scale. Of the fifteen storms that formed during the 2016 Atlantic hurricane season, five made landfall on the continental United States. Those storms included, Tropical Storm Bonnie, Tropical Storm Colin, Hurricane Hermine, Tropical Storm Julia, and Hurricane Matthew. Tropical Storm Bonnie made landfall in South Carolina, and affected areas as far north as North Carolina. Rainfall totals from Bonnie ranged from four to ten inches in parts of South Carolina and Georgia. Areas along the North Carolina coast reported rainfall totals of three to five inches of rain, with Cape Hatteras reporting over ten inches of rain. Tropical Storm Colin made landfall in Florida and moved northward over extreme southeastern Georgia before emerging over the Atlantic. Although this

storm did not last long over the United States, it managed to produce heavy rainfall totals in excess of ten inches over northern and central Florida, with Seminole in Pinellas County, Florida, reporting a high of 17.54 inches. Hurricane Hermine was responsible for $550 million dollars of property damage within the United States. Areas affected by this storm ranged from Florida to North Carolina before the storm weakened and became a low pressure system. Hermine produced storm surges of 4 ft from Florida to North Carolina, with Cedar Key, Florida, reporting a storm surge of 7.5 ft. Additionally, Hermine produced rainfall totals in excess of ten inches in various locations of the southeastern United States, with Tarpon Springs, Florida, receiving 22.36 inches of total rainfall. Hurricane Hermine produced ten total tornadoes from Florida to North Carolina. Tropical Storm Julia made landfall near Jensen Beach, Florida, and moved northward over southeastern Georgia. The system moved slowly northward then near the coast of the Carolinas as an extratropical low hooking back westward over coastal North Carolina. Rainfall accumulations were low, however, as an extratropical system Julia assisted with very heavy rainfall and flooding in North Carolina and the Hampton Roads area of Virginia. The strongest storm of the 2016 season was Hurricane Matthew. This storm became the first category 5 hurricane in the Atlantic since Hurricane Felix in 2007. Widespread heavy rain occurred along the track of Hurricane Matthew from Florida to North Carolina, with significant storm surges occurring along the southeastern United States. Matthew was responsible for $10 billion of property damage within the United States, and vast damage to Haiti, Cuba, and the Bahamas.

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 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 2011).

Socioeconomic impacts from the oil spill on HMS communities include losses in HMS revenue and negative psychological impacts. One study (Sumaila et al, 2012) estimated 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.

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

The 2018 repose will have several enhancements. Beginning in 2018 (and in subsequent project years) the repose period will be six months from January 1 to June 30, 2018. Participation has been expanded to include participants from throughout the Gulf States. There were two separate regions of focus in the Gulf of Mexico, the Western Gulf (vessels with a hailing port of Louisiana, Mississippi, Alabama and Texas), and the Eastern Gulf (vessels with a hailing port of Florida and the Atlantic Coast). Participants will have more alternative gear choices as they had the option to use greenstick for yellowfin tuna, buoy gear for swordfish, buoy gear for yellowfin tuna (under an EFP), and deep drop gear for swordfish. Participants will be able to fish using alternative gear for up to 60 sea-days, and will be compensated for alternative gear trips taken during the repose period. 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 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) originally developed a series of social indicators of vulnerability and resilience for over 3,800 coastal communities of the United States. These indices are regularly updated based on new data, and the most recent indices and scores can be found on the NMFS Social Indicators webpage listed above. Nine social indicators are presented in this document for 25 communities selected for having a greater than average number of Atlantic HMS permits associated with them (Table 7.1). This series of indices developed by 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 U.S. Census, permit sales, landings reports, and recreational fishing effort estimates from the MRIP survey (Jepsen and Colburn 2013). The nine social indices developed by Jepsen and Colburn (2013) can be divided into two categories: 1) fishing engagement and reliance, and 2) social vulnerability. For each index, the community is ranked as scoring high (one standard deviation or more above the mean score), medium high (0.5 to 0.99 standard deviations above the mean score), medium (0 to 0.49 standard deviations above the mean score), or low (below the mean score) on the index scale.

Fishing Reliance and Engagement Indices

Jepsen and Colburn (2013) developed two indices each to measure community reliance and engagement with commercial and recreational fishing, respectively. Commercial fishing engagement was assessed based on pounds of landings, value of landings, number of commercial fishing permits sold, and number of dealers with landings. Commercial fishing reliance was assessed based on value of landings per capita; number of commercial permits per capita; dealers with landings per capita; and data on percentage of people employed in agriculture, forestry, and fishing from the Bureau of Labor Statistics. The recreational fishing engagement index was measured using MRIP estimates of the number of charter, private boat, and shore recreational fishing trips originating in each community. The recreational fishing reliance index was generated using the same fishing trip estimates adjusted to a per capita basis. MRIP data is not available for the state of Texas, so the recreational indexes for Texas were instead calculated based on recreational permit data from NMFS, and boat ramp data from the state of Texas. As such, recreational index scores for Texas communities are only comparable to other communities within the state.

In Table 7.1, fishing reliance and engagement index scores are presented for 25 HMS communities. Ten of the twenty-five HMS communities scored either high or medium high on at

least three indicators of fishing reliance and engagement, and only one community (Port Aransas, TX) failed to score at least medium high on one of the four indices. Five communities that scored high on all four indices included Montauk, NY; Barnegat Light, NJ; Cape May, NJ; Dulac, LA; and Grand Isle, LA, indicating that these communities have greater than normal dependence on the recreational and commercial fishing sectors for jobs and economic support. New Bedford, MA scored high or medium high on both fishing engagement indices, while scoring medium or low on both fishing reliance indices indicating that while New Bedford has a significant fishing community, it is not a massive component of the city's overall population. Conversely, Atlantic Beach, NC; Islamorada, FL; and Orange Beach, AL all scored high or medium high on the recreational fishing indices, while scoring low or medium on both commercial fishing indices suggesting these communities have greater than normal dependence on the recreational fishing sector for jobs and economic support.

Social Vulnerability Indices

Five indices of social vulnerability developed by Jepsen and Colburn (2013) are presented in this section (Table 7.1). The personal disruption index includes the following community variables representing disruptive forces in family lives: percent unemployment, crime index, percent with no diploma, percent in poverty, and percent separated females. The population composition index shows the presence of populations who are traditionally considered more vulnerable due to circumstances associated with low incomes and fewer resources. The poverty index includes several variables measuring poverty levels within different community social groups including: percent receiving government assistance, percent of families below the poverty line, percent over age of 65 in poverty, and percent under age of 18 in poverty. The labor force index characterizes the strength and stability of the labor force and employment opportunities that may exist. A higher ranking indicates fewer employment opportunities and a more vulnerable labor force. Finally, the housing characteristics index is a measure of infrastructure vulnerability and includes factors that indicate housing that made be vulnerable to coastal hazards such as severe storms or coastal flooding. Fort Pierce, FL was the only HMS community to score high or medium high on all five indices of social vulnerability, while Dulac, LA, and Freeport, TX scored high or medium high on four indices. Three other HMS communities scored high or medium high on three social vulnerability indices: New Bedford, MA; Apalachicola, FL; and Grand Isle, LA. These scores suggest these communities would likely experience greater difficulty recovering from economic hardships caused by job losses in the recreational and commercial fishing sectors.

Table 7.1 Social Vulnerability Indices for 25 HMS Communities

Community	Population	Fishing Engagement and Reliance				Social Vulnerability				
		Commercial Engagement	Commercial Reliance	Recreational Engagement	Recreational Reliance	Personal Disruption	Population Composition	Poverty	Labor Force	Housing
Gloucester, MA	29,237	HIGH	MEDIUM	HIGH	LOW	LOW	LOW	LOW	LOW	LOW
Nantucket, MA	7,787	MEDIUM	MEDIUM	HIGH	HIGH	LOW	LOW	LOW	LOW	LOW
New Bedford, MA	94,873	HIGH	MEDIUM	MED HIGH	LOW	HIGH	MED HIGH	HIGH	MEDIUM	MEDIUM
Narragansett, RI	15,786	HIGH	MEDIUM	HIGH	MEDIUM	LOW	LOW	LOW	MEDIUM	LOW
Montauk, NY	3,471	HIGH	HIGH	HIGH	HIGH	LOW	LOW	LOW	MEDIUM	LOW
Barnegat Light, NJ	592	HIGH	HIGH	HIGH	HIGH	LOW	LOW	LOW	HIGH	LOW
Brielle, NJ	4,772	MEDIUM	LOW	HIGH	MEDIUM	LOW	LOW	LOW	MED HIGH	LOW
Cape May, NJ	3,576	HIGH	HIGH	HIGH	HIGH	LOW	LOW	MEDIUM	HIGH	MEDIUM
Ocean City, MD	7,093	HIGH	MEDIUM	HIGH	HIGH	LOW	LOW	LOW	HIGH	MED HIGH
Atlantic Beach, NC	1,618	MEDIUM	MEDIUM	HIGH	HIGH	LOW	LOW	MEDIUM	MEDIUM	HIGH
Beaufort, NC	4,119	HIGH	MEDIUM	HIGH	MED HIGH	MED HIGH	LOW	LOW	LOW	MED HIGH
Morehead City, NC	9,030	MED HIGH	MEDIUM	HIGH	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM	HIGH
Wanchese, NC	1,753	HIGH	MED HIGH	MED HIGH	HIGH	LOW	LOW	MED HIGH	LOW	MED HIGH
Fort Pierce, FL	42,744	MED HIGH	LOW	HIGH	MEDIUM	HIGH	HIGH	HIGH	MED HIGH	MED HIGH
Islamorada, FL	6,318	MEDIUM	LOW	HIGH	MED HIGH	LOW	LOW	LOW	MEDIUM	LOW
Pompano Beach, FL	103,234	MEDIUM	LOW	HIGH	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MED HIGH
Port Salerno, FL	10,070	LOW	LOW	MED HIGH	MEDIUM	LOW	LOW	LOW	MEDIUM	MEDIUM
Apalachicola, FL	2,129	MED HIGH	MEDIUM	HIGH	HIGH	HIGH	MEDIUM	HIGH	LOW	MED HIGH
Destin, FL	12,840	HIGH	LOW	HIGH	HIGH	LOW	LOW	LOW	LOW	MEDIUM
Madeira Beach, FL	4,297	MED HIGH	MEDIUM	HIGH	MEDIUM	LOW	LOW	LOW	MEDIUM	MEDIUM
Panama City, FL	36,405	HIGH	LOW	HIGH	LOW	MEDIUM	MEDIUM	MED HIGH	MEDIUM	MED HIGH
Orange Beach, AL	5,629	LOW	LOW	HIGH	HIGH	MEDIUM	LOW	LOW	MED HIGH	MEDIUM
Dulac, LA	1,116	HIGH	HIGH	HIGH	HIGH	HIGH	MEDIUM	HIGH	HIGH	HIGH
Grand Isle, LA	1,002	HIGH	HIGH	HIGH	HIGH	MED HIGH	LOW	MEDIUM	HIGH	MED HIGH
Freeport, TX	12,108	MED HIGH	LOW	LOW	LOW	HIGH	HIGH	MED HIGH	MEDIUM	HIGH
Port Aransas, TX	3,677	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW	MEDIUM	MEDIUM	MED HIGH

Source: Jepson and Colburn 2013; also found on the Social Indicators website https://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index.

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).

NOAA. 2011. 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 ESA, MMPA, and the Migratory Bird Treaty Act (MBTA). In 1998, NOAA Fisheries developed a report, "Managing the Nation's Bycatch: Priorities, Programs and Actions for the National Marine Fisheries Service," 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 2004, the United States published a report entitled "Evaluating Bycatch: A National Approach to Standardized Bycatch Monitoring Programs," which established goals for bycatch estimates.

In December 2016, NMFS issued a *National Bycatch Reduction Strategy* (https://www.fisheries.noaa.gov/national/bycatch/national-bycatch-reduction-strategy) to guide and coordinate efforts to reduce bycatch and bycatch mortality in support of sustainably managing fisheries and recovering and conserving protected species. Specifically, the national strategy highlights the United States' commitment to continuing to reduce and minimize bycatch now and into the future. For the purposes of this Strategy, reducing bycatch includes efforts to minimize the amount of bycatch, as well as minimize the mortality, serious injury, and adverse impacts of bycatch. In addition, reducing bycatch can also include actions that increase utilization of fish that would otherwise be economic discards, taking into account conservation and management requirements. NMFS (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 by commercial fishing gear; undersized swordfish and tunas in recreational hook and line fisheries; species for which there is little or no market such as blue sharks; species caught and released in excess of a bag limit; and prohibited species such as those in the prohibited shark complex and longbill spearfish. Table 8.1 lists methods that are employed to reduce bycatch in the Atlantic HMS fisheries. Final Amendment 5b to the 2006 Consolidated HMS FMP (all measures effective by January 1, 2018) will expand the use of several of these methods in HMS fisheries.

Table 8.1 Bycatch Reduction Methods in the Atlantic HMS Fisheries

Commercial Fisheries	Recreational Fisheries
Gear Modifications (including hook and bait types)	Circle Hooks (mortality reduction only)
Circle Hooks	Formal Voluntary or Mandatory Catch-and-Release Program for all Fish or Certain Species
Weak Hooks	Prohibiting retention of fish
Time/Area Closures	Education/Outreach
Performance Standards	De-hooking Devices (mortality reduction only)
Education/Outreach	
Effort Reductions (i.e., Limited Access)	
De-hooking Devices (mortality reduction only)	
Prohibiting retention of fish	

As very few legal fishing gears are perfectly selective for the target species of each fishing operation, expecting to eliminate bycatch of all non-target species in Atlantic HMS fisheries would be impractical. The goal of bycatch reduction, therefore, is to minimize the amount of bycatch to the extent practicable and safely minimize the mortality of species caught as bycatch.

8.1.1 Standardized Bycatch Reporting Methodology

Section 303(a)(11) of the Magnuson-Stevens Act requires all FMPs to "establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery" (16 U.S.C. § 1853(11)). The scope of the Standardized Bycatch Reporting Methodology (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 2011), 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). That final rule required that a standardized reporting methodology must meet

the specific purpose under §600.1610, may be different for different fisheries, and must address information about the characteristics of bycatch in the fishery, feasibility, data uncertainty, and data use. SBRM for Atlantic HMS were described in the 2006 Consolidated Atlantic HMS FMP and are further described with updated information in this SAFE Report. Under 600.1605, standardized reporting methodology means an established, consistent procedure or procedures used to collect, record, and report bycatch data in a fishery, which may vary from one fishery to another. Bycatch assessment is not part of the standardized reporting methodology, but must be considered. The purpose of a standardized reporting methodology is to collect, record, and report bycatch data in a fishery that, in conjunction with other relevant sources of information, are used to assess the amount and type of bycatch occurring in the fishery and inform the development of conservation and management measures that, to the extent practicable, minimize bycatch and bycatch mortality. The 2006 Consolidated Atlantic HMS FMP, as amended, and this SAFE Report fulfill the SBRM requirements by establishing and describing standardized reporting methodology that meets this purpose and regulations at §600.1610.

NMFS scientists and managers continue to consult as necessary on reporting methodology design considerations including changes in monitoring and reporting technology to improve the quality of target and non-target catch estimates as needed while considering cost, technical, and operational feasibilities. 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 PLL 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. Fishing mortality estimates from these sources of information, as incorporated in stock assessments, are critical to understanding the overall status and outlook of a stock as well as helping to understand the available options for conservation and management measures for the stock and potential implications for the ecosystem in which it lives.

HMS Pelagic Longline Fishery

The amount and type of bycatch occurring in the PLL is described in Section 5.1.2. 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 PLL fishery is also monitored via electronic monitoring (camera array) and vessel monitoring systems. Logbooks and the supplemental discard report form in the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook program (maintained in the Unified Data Processing system or UDP, formerly the Fisheries Logbook System or FLS) are mandatory, and reporting rates are generally high (Garrison and Stokes, 2016). Due to the management focus on HMS fisheries, there has been close monitoring of reporting rates, and observed trips can be directly linked to reported effort. In general, the gear characteristics and amount of

observed effort is consistent with reported effort, which helps to maintain the certainty of data.

The observer program has been in place since 1992 to document finfish bycatch, characterize fishery behavior, and quantify interactions with protected species (Beerkircher et al. 2002). Data collection priorities have been to collect catch and effort data of the U.S. Atlantic 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 2004a). Observer coverage in 2005-2007 ranged from 7.5 – 10.8 percent. NMFS increased the coverage of the PLL 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 PLL vessels in the Mid-Atlantic Bight, including the Cape Hatteras GRA, from December 1, 2015 through April 30, 2016, and December 1, 2016 through April 30, 2017. Expanding observer coverage in this area was intended to help scientists better understand bluefin tuna stock structure, biology and behavior, and assist in the rebuilding of the stock. The general increasing trend in observer coverage has reduced data uncertainty.

Fishery observer effort is allocated among 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 UDP (formerly 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 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.

Bluefin Tuna Purse Seine Fishery

Recent catch and landings for the U.S. Atlantic purse seine fishery are reported in section 5.2.2. Since 2015, there have been no active vessels permitted to fish for bluefin tuna, thus no effort or catch. In Recommendation 10-10, ICCAT established a minimum standard for scientific fishing vessel observer programs and adopted a minimum of 5 percent observer coverage of fishing effort in the purse seine fishery, as measured in number of sets or trips. This coverage rate is feasible and should provide a reasonable level of data certainty should vessels in this fishery become active. Amendment 7 to the 2006 Consolidated HMS FMP requires purse seine vessel owners to use VMS and must submit through a set report within 12 hours of completion of each purse seine set. Specifically, the report must include: date the set was made; area in which the set was made; and 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.

Shark Bottom Longline Fishery

Recent catch and landings for the BLL fishery are reported in sections 5.5.2 and 5.5.3. Since 2002, shark BLL vessels have been required to take an observer if selected. As a condition of participation in the shark research fishery, vessels are subject to 100 percent observer coverage of shark research fishery trips, which allow targeting sandbar sharks. Outside the research fishery, and depending on the time of year and fishing season, vessels that target sharks, possess current valid directed shark permits, and reported fishing with longline gear in the previous year are randomly selected for observer coverage with a target coverage level of 5-10% for shark directed trips. These coverage rates are feasible and provide a reasonable level of data certainty. NMFS utilizes both self-reported logbook data and observer data to monitor bycatch in the shark BLL fishery. Logbooks and the supplemental discard report form in the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook program (maintained in the Unified Data Processing system or UDP, formerly the Fisheries Logbook System or FLS) are mandatory, and reporting rates are generally high (Garrison and Stokes, 2016). 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.

Shark Gillnet Fishery

Recent catch and landings for the gill net fishery are reported in sections 5.6.2 and 5.6.3. Various southeast gillnet fisheries including strike, sink, and trammel gillnet fisheries are observed at varying rates by the SEFSC GNOP. The coverage rates provide a reasonable level of data certainty considering the feasibility of observed trips from a cost and operational perspective. NMFS utilizes both self-reported logbook data and observer

data to monitor bycatch in the shark gillnet fishery. Logbooks and the supplemental discard report form in the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook program (maintained in the Unified Data Processing system or UDP, formerly the Fisheries Logbook System or FLS) are mandatory, and reporting rates are generally high (Garrison and Stokes, 2016). Disposition of discards is recorded by observers and can be used to estimate discard mortality. Observer coverage, bycatch and disposition, and protected species interactions in this fishery are reported in section 5.6

HMS Commercial Handgear Fishery

Recent catch and landings for the commercial handgear fishery are reported in section 5.3.2. The commercial handgear fishery is not currently selected for observer coverage as selection is not feasible from a cost perspective given the expense of additional pelagic observer capacity. Commercial handgear fishermen, including those in the harpoon fishery, are required to report bluefin tuna dead discards online; this requirement was effective January 2015. Vessels targeting bluefin tuna with harpoon gear have not been selected for observer coverage since the deliberate fishing nature of the gear is such that bycatch is expected to be low. Bycatch in the swordfish harpoon fishery is expected to be virtually, if not totally, non-existent; therefore, bycatch mortality would be near zero. Vessels in the buoy gear fishery are selected for mandatory logbook reporting of catch and effort. The combination of online reporting of bluefin tuna dead discards and logbook reporting, as applicable, in the commercial handgear fishery provides a reasonable level of data certainty considering the feasibility of observed trips and comprehensive logbook reporting from a cost and operational perspective. As technological advances occur and costs decrease for methods such as electronic logbook reporting, the feasibility of additional reporting methods may be reassessed.

Recreational Handgear Fishery

Recent catch and landings for the recreational handgear fishery are reported in section 5.4.2. The recreational handgear fishery is not currently selected for observer coverage as selection is not feasible from a cost and operational perspective. The recreational landings database for Atlantic HMS consists of information obtained through surveys including the MRIP, LPS, Southeast Headboat Survey, Texas Headboat Survey, RBS/ATR tournament data, and the HMS Recreational Reporting Program (non-tournament swordfish, billfishes, and bluefin tuna) via https://hmspermits.noaa.gov/. Descriptions of these surveys, the geographic areas they include, and their limitations are discussed in the 2006 Consolidated HMS FMP (NMFS 2006) and section 5.4.

Historically, fishery survey strategies (including the MRIP, LPS, and RBS/ATR) have not captured all landings of recreationally-caught swordfish. Although some swordfish handgear fishermen have commercial permits, many others land swordfish strictly for personal consumption; therefore, 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 https://hmspermits.noaa.gov/. All reported recreational swordfish landings are counted toward the incidental swordfish quota. Reported domestic landings of Atlantic tunas and swordfish are presented in

Section 5.4.2. Bycatch in the recreational BAYS spearfish fishery is expected to be virtually, if not totally, non-existent; therefore, bycatch mortality would be near zero. As a whole, the combination of applicable surveys and mandatory landings reporting provide a reasonable level of data certainty considering the feasibility from a cost and operational perspective.

Green-stick Fishery

Recent catch and landings for the greenstick fishery are reported in section 5.7.1. SBRM for the commercial greenstick fishery is identical to that described for the commercial handgear fishery above, but it listed under its own subheading because it is not considered a handgear.

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 2006), and in HMS SAFE Reports. In addition, an HMS Bycatch Reduction Implementation Plan was developed in late 2003 and updated through 2010, which identified priority issues to be addressed in the following areas: 1) monitoring; 2) research; 3) management; and 4) education/outreach. Individual activities in each of these areas were identified and new activities may be added or removed as they are addressed or identified.

8.2 Bycatch Mortality

The reduction of bycatch mortality is an important component of National Standard 9. Atlantic HMS regulations state that all fish must be released in a manner that increases their chances of survival. Research has shown that removing fish from the water significantly increases the likelihood of post-release mortality due to injuries associated with the stress of being hooked or caught in a net that are not immediately apparent. Because of these stress injuries, post-release mortality may not be anticipated by the fisherman who releases the fish, even in a rapid and safe manner. Thus, regulations require releasing Atlantic HMS without removing the fish from the water. Ongoing research uses data on release techniques and from pop-up satellite tags to examine in situ mortality rates of Atlantic HMS. Information on bycatch mortality of these fish will continue to be collected, and in the future, 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 5.10 - Table 5.17, Table 5.46, and Table 5.52, 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 (RPA) 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); release all sharks not being retained by dehooker or cutting the gangion less than 3 feet from the hook, shark identification course for vessel owners and operators, move 1 nm after a dusky shark interaction and notify other vessels (2017).

Fishery/Gear Type	Bycatch Species	MMPA Category	ESA Requirements	Bycatch Data Collection	Management Measures
Shark bottom longline	Prohibited shark species Target species after closure Sea turtles Smalltooth sawfish Non-target finfish	Category III	ITS, Terms & Conditions, RPMs	Permit requirement (1993); logbook requirement (1993); observer coverage (1994)	Quotas (1993); trip limit (1994); gear marking (1999); handling & release guidelines (2001); line clippers, dipnets, corrodible hooks, de-hooking devices, move 1 nm after an interaction (2004); South Atlantic closure, VMS (2005); shark identification workshops for dealers (2007); sea turtle control device (2008); shark research fishery (2008); shark identification course for vessel owners and operators, move 1 nm after a dusky shark interaction and notify other vessels (2017); circle hooks (2018).
Northeast sink and Mid-Atlantic shark gillnet (smoothhound)	Marine mammals	Category I			Sink gillnet soak time limits and net check requirements for drift gillnets (2016)
Northeast, Southeast U.S. Atlantic, and Gulf of Mexico shark gillnet	Prohibited shark species Sea turtles Marine mammals Non-target finfish Smalltooth sawfish	Category II	ITS, Terms & Conditions, RPMs	Permit requirement (1993); logbook requirement (1993); observer coverage (1994)	Quotas (1993); trip limit (1994); gear marking (1999); deployment restrictions (1999); 30-day closure for leatherbacks (2001); handling & release guidelines (2001); net checks (2002); whale sighting (2002); VMS (2004; revised 2016); closure for right whale mortality (2006); shark identification workshops for dealers (2007); sink gillnet soak time limits and net check requirements for drift gillnets (2016); shark identification course for vessel owners and operators, move 1 nm after a dusky shark interaction and notify other vessels (2017).
Bluefin tuna purse seine	Undersize target species Non-target finfish	Category III	ITS, Terms & Conditions	Permit requirement (1982); observer requirement (1996, 2001 only); EFPs (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);	Quotas (BFT - 1982; SW0 - 1985); minimum size (BFT - 1982; SWO - 1985); Online catch reporting (2015)

Fishery/Gear Type	Bycatch Species	MMPA Category	ESA Requirements	Bycatch Data Collection	Management Measures
				Online catch reporting (2015)	
Handgear - commercial	Undersize target species Non-target finfish	Category II	ITS, Terms & Conditions	Permit requirement (BFT - 1982; SWO 1987; SHK - 1993); logbook requirement (SWO - 1985; SHK - 1993); Online catch reporting (2015)	Regulations vary by species, including quotas, minimum sizes, retention limits, landing form; Online catch reporting (2015).
Handgear – For-Hire	Undersize target species Non-target finfish	Category III	ITS, Terms & Conditions	LPS (1992); MRFSS (1981); Online catch reporting (2015)	Regulations vary by species, including minimum sizes, retention limits, landing form; BFT quotas; Online catch reporting (2015); Circle hooks when fishing for sharks south of Chatham, MA; online shark identification and management measure video and quiz to obtain shark endorsement (2018).

MMPA – Marine Mammal Protection Act; ESA – Endangered Species Act; ITS – Incidental take statement; MRFSS/MRIP – Marine Recreational Fishing Statistics Survey (now the Marine Recreational information Program or MRIP); 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 Survey.

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, eDealer, Atlantic Catch and Landings Reports, and Commercial Bluefin Tuna Landings; and recreational landings from the LPS, the RBS/ATR, and the MRIP. 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 ATR.

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.

HMS Pelagic Longline Fishery

PLL 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 dusky sharks and protected species that becomes entangled or hooked must be immediately released, and gear must be immediately retrieved and moved at least one nmi from that location before fishing is resumed to avoid interacting with the species again. 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 PLL 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 5.15 for sea turtle and marine mammal interactions in the PLL fishery.

Bluefin Tuna 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.

Shark Bottom Longline Fishery

The BLL 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 dusky shark and protected species that becomes entangled or hooked must be immediately released, and gear must be immediately retrieved and moved at least one nmi from that location before fishing is resumed to avoid interacting with the species again. Marine mammal entanglements must be reported to 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. BLL 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. Circle hooks are required starting in 2018. 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 BLL fishery. Observer reports also include disposition of the catch as well as information on hook location, trailing gear, and injury status of protected species interactions. Protected species interactions are summarized in Table 5.46.

Shark Gillnet Fishery

Vessel owners and operators 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. Dusky sharks must be released immediately and vessels must move 1 nm after a dusky shark interaction and notify other vessels.

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.

HMS Commercial Handgear Fishery

Vessels targeting bluefin tuna with harpoon gear have not been selected for observer coverage since the deliberate fishing nature of the gear is such that bycatch is expected to be low. Bycatch in the swordfish harpoon fishery is expected to be virtually, if not totally, non-existent; therefore, bycatch mortality would be near zero. Disposition of bycatch reported in logbooks is used to estimate mortality of bycatch in the swordfish buoy gear fishery. Bycatch and disposition in the buoy gear fishery are reported in section 5.3.

HMS Recreational Handgear Fishery

The LPS (dockside and telephone survey) collects data on disposition of bycatch (released alive or dead) in recreational Atlantic HMS fisheries from Virginia to Maine during June through October. Rod and reel discard estimates can be monitored through the expansion of survey data derived from the LPS, however, the actual numbers of fish discarded for many species are low. Post-release mortality estimation of billfishes has been examined in a review by Graves and Horodosky (2015). 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. To reduce dusky shark mortality, starting January 1, 2018, fishermen wishing to fish for sharks must watch an online shark identification video and take a quiz in order to obtain a shark endorsement on their Angling permit. These fishermen will also be required to use circle hooks when fishing for sharks south of Chatham, MA.

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 (MMPA, ESA, and MBTA) primarily affecting protected species, along with a description of the PLTRT, PLTRP, and measures to address protected species concerns, is available on the NMFS Office of Protected Resources (OPR) website (https://www.fisheries.noaa.gov/about/office-protected-resources) and discussed in the 2011 HMS SAFE Report (NMFS 2011). The interaction of seabirds and longline fisheries is 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: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments while draft stock assessment reports are available at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports.

Table 8.3 outlines the marine mammal species that occur off the Atlantic and Gulf Coasts that are or could be of concern with respect to potential interactions with HMS fisheries.

Table 8.3 Atlantic and Gulf Coast Marine Mammal Species that 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*
Dwarf sperm whale	*Kogia sima*
False killer whale	*Pseudorca crassidens*
Long-finned pilot whale	*Globicephela melas*
Minke whale	*Balaenoptera acutorostrata*
Pantropical spotted dolphin	*Stenella attenuata*
Pygmy sperm whale	*Kogia breviceps*
Risso's dolphin	*Grampus griseus*
Short-finned pilot whale	*Globicephela macrorhynchus*

Source: NMFS (https://www.fisheries.noaa.gov/national/marine-mammal-protection/2017-list-fisheries).

Under MMPA requirements, NMFS produces an annual 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 2017 was effective March 21, 2017 (February 8, 2017; 82 FR 9690). 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 (OPR) 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 PLL 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, PLTRP, and Atlantic Large Whale Take Reduction (ALWTRP) Plans.

The PLTRT was formed to address the incidental mortality and serious injury of long-finned pilot whales and short-finned pilot whales in the mid-Atlantic region of the Atlantic 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, which will migrate to NOAA's new website (https://www.fisheries.noaa.gov) in 2018. The PLTRT last met in December 2015 in Virginia Beach, VA to discuss progress under the Plan, Interactions and the ESA.

The ESA of 1973, as amended (16 U.S.C. §1531 et seq.), provides for the conservation and recovery of endangered and threatened species of fish, wildlife, and plants. The listing of a species is based on the status of the species throughout its range or in a specific portion of its range in some instances. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. §1532(20)] if no action is taken to stop the decline of the species. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. §1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NMFS, is authorized to list marine and anadromous fish species, marine mammals (except for walrus and sea otter), marine reptiles (such as sea turtles), and marine plants. The Secretary of the Interior, acting through the USFWS, is authorized to list walrus and sea otter, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species. 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
Northern right whale *(Eubalaena glacialis)*	Endangered
Sei whale *(Balaenoptera borealis)*	Endangered
Sperm whale *(Physeter macrocephalus)*	Endangered
Sea Turtles	
Green turtle *(Chelonia mydas)*	* Threatened
Hawksbill sea turtle *(Eretmochelys imbricata)*	Endangered
Kemp's ridley sea turtle *(Lepidochelys kempii)*	Endangered
Leatherback sea turtle *(Dermochelys coriacea)*	Endangered
Loggerhead sea turtle *(Caretta caretta)*	Threatened
Olive ridley sea turtle *(Lepidochelys olivacea)*	Threatened
Critical Habitat	
Northern right whale	Endangered
Finfish	
Smalltooth sawfish *(Pristis pectinata)*	Endangered
Atlantic Sturgeon, Gulf Subspecies (*Acipenser oxyrinchus desotoi*)	Threatened
Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)	**Endangered/Threatened

*Green sea turtles in the Florida breeding population were changed from endangered to threatened, April 6, 2016 (81 FR 20057). ** Atlantic sturgeon have five distinct population segments. The population in the Gulf of Maine 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. A copy can be found at http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_sa/turtle_sawfish_release/documents/pdfs/turtle_release_protocols.pdf.

A BiOp completed on June 14, 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 RPA, 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 ITS in the June 14, 2001 BiOp, NMFS published a Notice of Intent (NOI) to prepare an Supplemental Environmental Impact Statement (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 2004a). 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 2004b). 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, 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, BLL, 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 PLL fishery. These species and all other seabirds are protected under the MBTA. The majority of longline interactions with seabirds occur as the gear is being set. The birds eat the bait and become hooked on the line. The line then sinks and the birds are subsequently drowned.

Bycatch of seabirds in the shark BLL 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 BLL 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 ESA on actions in the Atlantic PLL fishery. Despite sea turtle takes that were lower than specified in the ITS, leatherback mortality rates and total mortality levels exceeded the level specified in the RPAs in the 2004 BiOp. Additionally, new information has become available about leatherback and loggerhead sea turtle populations and sea turtle mortality. While the mortality rate measure will be re-evaluated during consultation, the overall ability of the RPA to avoid jeopardy is not affected, and NMFS is continuing to comply with the terms and conditions of the RPA and Reasonable and Prudent Measures (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 RPA 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, BLL, buoy gear, handline, and rod and reel) and associated fisheries management actions in the 2006 Consolidated Atlantic HMS FMP and its amendments. These management actions were previously consulted in the 2001 Atlantic HMS BiOp and the 2012 Shark and Smoothhound BiOp, to assess potential adverse effects of these gear types on the Central and Southwest DPS of scalloped hammerhead sharks and seven threatened coral species. NMFS has preliminarily determined that the ongoing operation of the fisheries is consistent with existing BiOps 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 RPA 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 nmi of the coast (Southeast US Restricted Area North); 2) a restricted area from December 1 – March 31 from 27º 51’N to 29º 00’N from shore eastward to 80º 00’W (Southeast US Restricted Area South); 3) additional seasonal boundaries for EEZ waters east of 80º 00’W from 26º 46.50’N to 32º 00’N (Other Southeast Gillnet Waters); and 4) a monitoring area specific to the Atlantic shark gillnet fishery that extends from the area along the coast from 27º 51’N south to 26º 46.50’N eastward to 80º 00’W (Southeast 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, 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 ALWTRP 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 decreased from 2012 for swordfish; while landings of tunas in trawl fisheries are relatively minor. Swordfish landings remain low relative to the directed fishery landings. An Incidental HMS Squid Trawl permit allows squid trawl fishermen with an *Illex* squid trawl moratorium permit to land up to 15 swordfish per trip, although regulatory discards may still occur.

Table 8.5 Atlantic HMS Landed (mt ww) Incidental to Trawl Fisheries (2012-2016)

Species	2012	2013	2014	2015	2016
Yellowfin tuna	0.2	0.0	0.3	0.0	0.0
Skipjack tuna	0.01	0.0	0.0	0.07	0.0
Bigeye tuna	0.2	0.0	0.0	0.09	0.1
Albacore tuna	0.3	0.0	0.0	1.7	0.4
Swordfish	26.8	2.9	5.3	2.9	6.0
Total	27.6	2.9	5.6	4.8	6.5

Source: NMFS 2017

8.4.2 Shrimp Trawl Fishery

For a summary of shark bycatch in the shrimp trawl fishery, please see the 2011 HMS SAFE Report. More recent estimates of blacknose shark bycatch in the shrimp fisheries can be found in the most recent blacknose stock assessment, SEDAR 21 (Cortés and Baremore, 2011). Estimates of Atlantic sharpnose and bonnethead shark bycatch in the shrimp fisheries can be found in the most recent stock assessment reports for each (SEDAR 34a, SEDAR 34b).

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

Since 2000, 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 PLL 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 2005-2016 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 25.3 percent during 2005-2016 from 1997-1999 (Table 8.6). Declines were noted for both the numbers of kept and discards of almost all species examined including swordfish, tunas, pelagic sharks, billfish, and sea turtles. The only positive changes from the base period were the numbers of bluefin tuna and dolphin kept, and spearfish and large coastal shark discards. The reported number of bluefin tuna kept increased by 56.2 percent for 2005-2016 compared to 1997-1999 (Table 8.6). The total number of reported discards (live and dead) of bluefin tuna decreased by 5.9 percent between the same time periods, which is less than the predicted 10.7 percent increase from the analyses in Regulatory Amendment 1. The number of dolphin kept increased by 10.4 percent (Table 8.7). Reported billfish (blue marlin, white marlin, and sailfish) discards decreased by 37 - 60 percent from 1997-1999 to 2005-2016 (Table 8.7). The reported discards of spearfish increased by 55.4 percent, although the absolute number of discards was low. The reported number of turtle interactions decreased by 70.8 percent from 1997-1999 to 2005-2016.

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 12.9 percent from 1997-1999 to 2005-2016. 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 25.3 percent from 1997-1999 to 2005-2016. Increases in the number of hooks set were noted in three areas. The SAR area exhibited increases in reported effort more than ten-fold from the period 1997-1999; however, this effort represents only 2.8 percent of the overall effort reported in the fishery. Effort increased in the FEC area by 14.4 percent and in the SAB by 9.5 percent. The reported effort in the MAB decreased slightly from what was reported in 1997-99 (2.2% decrease). 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 80.6 percent in the CAR were reported; however these represent less than three percent and less than one percent of total reported effort, respectively. The GOM, representing almost 35 percent of the total reported effort, declined 33.9 percent after a brief increase of reported hooks set 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 through 2015. However, the reported number of bluefin kept in these areas increased in 2016 to 245 and the reported discards also increased (Table 8.9). The reported number of bluefin kept from areas other than the MAB/NEC (Table 8.10) decreased from 246 in 2015 to 166 in 2016 while the number of bluefin discarded increased from 64 to 133. There appears to be an inverse relationship of the number of bluefin kept and discarded in the MAB/NEC compared to the reported hooks set from 2015 to 2016. Reported effort (hooks set) decreased 21.1 percent from 2015 to 2016, while the number of bluefin kept increased from 74 to 245 and discards increased from 146 to 449. Reporting accuracy may also have improved with the implementation of electronic monitoring under Amendment 7.

The time/area closures and live bait prohibition in the Gulf of Mexico have been successful at reducing bycatch in the HMS PLL fishery. Reported discards of all species of billfish except spearfish have declined. The reported number of turtles caught, swordfish discarded, and pelagic and large coastal shark discards have also declined. However, the number of bluefin tuna kept and discarded (live and dead) has increased in 2016.

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 (2012–2016) 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
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
2016	5,217.6	24,456	4,427	411	582	36,807	3,658	11,835	1,064	56,978	7,898
(B) 2005-16	6,374.5	39,171	7,729	372	826	42,600	1,399	12,986	464	63,885	3,198
% 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)	-25.3	-43.3	-64.1	56.2	-5.9	-41.1	-43.8	-39.1	-59.0	-37.0	-24.3
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: Unified Data Processing.

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 (2012–2016) 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
2012	2,794	23,038	86	7,716	42,445	432	3,121	92	896	1,432	795	270	61
2013	3,809	28,800	50	8,629	34,448	181	2,721	59	851	1,243	458	342	99
2014	3,804	38,496	47	5,880	63,217	205	3,235	74	718	1,580	445	306	93
2015	2,208	45,082	50	8,839	53,526	1,413	1,563	163	990	2,855	715	837	253
2016	2,172	27,900	50	9,549	46,376	1,108	1,766	180	1,050	2,153	855	745	228
(B) 2005-16	3,142	34,701	587	4,025	43,846	564	2,528	104	739	1,236	533	331	174
% 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)	-19.4	-33.4	-93.4	-36.2	10.4	-7.3	-51.1	-40.6	-54.4	-37.3	-60.3	66.4	-70.8
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: UDP.

Table 8.8 Reported Distribution of Hooks Set by Area (2012-2016) 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
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
2016	158,359	1,618,640	625,484	947,527	982,870	378,990	210,031	116,920	17,650	161,116	5,217,547
(B) 2005-16	64,356	2,212,261	85426,799	890,390	1,240,155	515,305	267,784	177,460	17,811	162,183	6,374,484
% 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)	-80.4	-33.9	14.4	9.5	-2.2	-42.8	-47.6	1,140.0	-90.7	-62.9	-25.3

(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: Unified Data Processing.

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 (2012-2016)

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
2012	2,301.1	102	270	12,597	1,396	2,199	13,535	9	1,972	650	16
2013	1,966.6	55	107	9,806	2,766	2,711	17,958	9	1,366	693	31
2014	1,740.4	104	122	5,027	1,015	3,115	16,405	6	1,050	710	18
2015	1,727.1	74	146	6,637	2,235	1,795	17,625	8	3,668	1,888	256
2016	1,361.9	245	449	4,707	1,489	1,799	15,046	19	4,170	1,023	98

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

Table 8.10 Number of Bluefin Tuna, Swordfish, Pelagic and Large Coastal Sharks, Billfish, and Sea Turtles Reported Kept and/or Discarded in All Areas Other than the Mid-Atlantic Bight and Northeast Coastal (2012-2016)

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
2012	5,377.4	290	293	38,947	6,600	595	9,503	77	5,744	2,743	45
2013	5,339.3	218	159	34,750	2,583	683	9,842	41	7,263	2,190	61
2014	5,384.8	275	258	27,881	3,640	689	22,101	41	4,855	2,339	77
2015	4,128.9	246	64	21,093	3,147	413	27,457	42	5,171	3,509	101
2016	3,855.7	166	133	19,749	2,938	373	12,854	31	5,379	3,780	130

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

8.6 Evaluation of Weak Hook Requirement in the Gulf of Mexico

A final rule to implement a requirement for the mandatory use of weak hooks in the Gulf of Mexico PLL 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 (2012-16). Annual reported landings of swordfish and yellowfin tuna immediately following implementation of the weak hook requirement appeared to be on the rise but decreased in 2014-2015. Landings of yellowfin tuna and particularly swordfish increased in 2016. Bluefin tuna landings and discards decreased since 2012. In order to remove interannual differences, the mean reported landings for each period were calculated and compared. The mean reported landings of albacore tuna were greater following implementation. The mean reported landings of swordfish, bluefin and bigeye tuna were lower in the years following implementation of the weak hook requirement. Mean yellowfin tuna landings were about the same before and after implementation. Discards of swordfish and bluefin tuna were lower after implementation while blue marlin discards were slightly higher.

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 2012-2016 versus 2007-2010. The CPUE of bluefin tuna kept and discards were lower in 2012-2016 as were the CPUEs of swordfish discards and bigeye tuna kept. The CPUE of bluefin tuna kept was 39.5 percent lower following weak hook implementation and the CPUE of bluefin tuna discards were 38.9 percent lower. Blue marlin CPUE was greater after the weak hook requirement went into effect.

Table 8.11 Reported Number of Hooks Fished and Landings of Major Target Species and Blue Marlin Interactions from the Gulf of Mexico (2007-2016)

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	254	277
2009	3,037.2	8,438	116	23,278	160	577	2,831	229	478
2010	1,005.8	3,003	65	5,265	133	171	1,000	123	58
2011	1,334.7	5,464	23	13,512	30	648	1,882	19	152
2012	2,655.5	10,129	137	25,419	292	818	3,292	206	484
2013	2,312.2	9,143	44	17,593	180	627	2,022	67	279
2014	2,219.7	4,868	53	15,212	151	352	1,401	68	223
2015	1,465.5	2,304	17	9,877	189	459	1,036	31	229
2016	1,618.6	2,907	14	15,263	135	810	1,370	84	276
2007-10 mean	2,331.5	6,419.3	99.3	16,775	282.3	387	2,954	198	273.8
2012-16 mean	2,054.3	5,870	53.0	16,673.0	189	613	1,824.2	91.2	298.0
2007-10 CPUE		2.7533	0.0426	7.1951	0.1211	0.166	1.267	0.0849	0.1174
2012-16 CPUE		2.8575	0.0258	8.116	0.0922	0.2985	0.8464	0.0519	0.1705

Source: UDP. Weak hooks implemented in 2011.

8.7 Bycatch in the Prohibited Shark Complex

As described in Amendment 5b, the ACL for prohibited sharks is zero, and the fisheries for those stocks are closed, although a small amount of bycatch does occur. NMFS monitors that bycatch and ensures that the ACL of zero remains appropriate. This section includes the annual analysis specified by Amendment 5b to monitor the recreational estimates and observed bycatch of prohibited sharks.

These updated annual data (Table 8.12) include prohibited sharks that were observed or reported as discarded dead or landed (most likely due to misidentification issues or a lack of awareness of shark fishing regulations) in both recreational and commercial fisheries. Data were compiled from the following sources: SEFSC BLLOP, SEFSC GNOP, SEFSC POP, NEFOP, HMS EFP Program, LPS, and the MRIP. The recreational data from LPS and MRIP include estimated landings whereas observer program data include observed dead discards. More information about these data used can be found in Chapter 1 of Amendment 5b. These are the best available data with which to evaluate observed bycatch mortality trends in the prohibited shark complex, and the annual numbers (Table 8.12) form the basis for the three-year moving average analysis below (Table 8.13).

Table 8.12 Observed and estimated shark mortality (dead discards and kept in numbers of sharks) in the prohibited shark complex from 2011-2016.

Species	2011	2012	2013	2014	2015	2016
Basking	24	19	19	40	13	8
Bigeye Thresher	24	31	33	27	39	28
Bignose	0	0	0	0	1	1
Caribbean Reef	5	522	1	1	0	0
Dusky	235	707	53	649	141	29
Galapagos	0	0	0	0	0	0
Longfin Mako	10	19	36	7	8	15
Night	33	107	68	56	14	8
Sand Tiger	12	27	33	21	16	26
Whale	0	0	0	0	0	0
White	2	2	1	3	5	0
Atlantic Angel	37	23	31	67	52	113
Sevengill	5	4	1	0	1	0
Sixgill	112	0	0	0	0	0
Narrowtooth	0	0	0	0	0	0
Caribbean Sharpnose	0	0	0	0	0	0
Bigeye Sand Tiger	0	0	0	0	0	0
Bigeye Sixgill	5	0	0	0	0	0
Total	504	1,461	276	871	290	228

Sources: BLLOP, GNOP, POP, NEFOP, EFP Program, LPS, and MRIP.

Because of the limited amount of data available for the prohibited shark complex, and highly variable interannual observed catches, three-year rolling averages were used to smooth the interannual variability, as is commonly done in time series with high variance. Table 8.13 presents the three-year rolling averages from 2011 through 2016, and identifies whether observed bycatch mortality since the previous three-year average for each species has increased, decreased, or not changed. If there are significant increases in the observed three-year moving average mortality for a particular species or fishery, then NMFS may consider additional management actions to address that mortality and ensure that bycatch remains small. For species with long-term mean observations of less than ten individuals per year, NMFS considers an order of magnitude (10x) to represent a significant increase. For species with long-term mean observations of ten or greater, NMFS considers an increase of more than two standard deviations from the mean to represent a significant increase.

Table 8.13 Three-year moving average observed and estimated shark mortality (dead discards and kept in numbers of sharks) in the prohibited shark complex from 2011-2016, and the directional change between the two most recent three-year averages.

Species	2011-2013	2012-2014	2013-2015	2014-2016	Increase (+)/Decrease (-)/No Change (0)
Basking	21	26	24	20	-
Bigeye Thresher	29	30	33	31	-
Bignose	0	0	0	1	*
Caribbean Reef	176	175	1	0	-
Dusky	332	470	281	273	-
Galapagos	0	0	0	0	0
Longfin Mako	22	21	17	10	-
Night	69	77	64	26	-
Sand Tiger	24	27	23	21	-
Whale	0	0	0	0	0
White	2	2	3	3	-
Atlantic Angel	30	40	50	77	*
Sevengill	3	2	1	0	-
Sixgill	37	0	0	0	0
Narrowtooth	0	0	0	0	0
Caribbean Sharpnose	0	0	0	0	0
Bigeye Sand Tiger	0	0	0	0	0
Bigeye Sixgill	2	0	0	0	0
Totals	745	869	479	463	-

* = significant increase. Sources: BLLOP, GNOP, POP, NEFOP, EFP Program, LPS, and MRIP.

These data are the best available for monitoring bycatch of prohibited sharks; however, they only provide initial insights into potential trends in the overall fishing mortality rates of these species. They are not direct indicators of fishing mortality on their own, but may signal species or fisheries that require closer evaluation. If significant increases in observed/estimated mortalities

are noted in a particular species or fishery, these data would then be evaluated in more detail in conjunction with other related information, including observer coverage rates, fishing effort and CPUE trends, and fishery-independent indicators of relative abundance. For example, a significant increase in observed mortality could indicate increased fishing mortality, or it could simply reflect an increase in observer coverage rates, an increase in fishing effort, and/or in an increase in the abundance of a rebuilding stock. At this time, there are increases in bignose sharks and Atlantic angel sharks. However, the increase in bignose sharks is not greater than an order of magnitude of the long-term mean; nor is the increase in Atlantic angel sharks greater than two standard deviations of the long-term mean. Thus, based on the available data, no significant increases in prohibited shark bycatch are apparent at this time.

8.8 Evaluation of Other Bycatch Reduction Measures

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

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, L.P. and L. Stokes. 2016. Estimated Bycatch of Marine Mammals and Sea Turtles in the US Atlantic Pelagic Longline Fleet during 2015. NOAA Technical Memorandum NOAA NMFS-SEFSC-709: 61p

Graves JE, and 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.

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. 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. 2004b. 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. 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.

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. 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.

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 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.