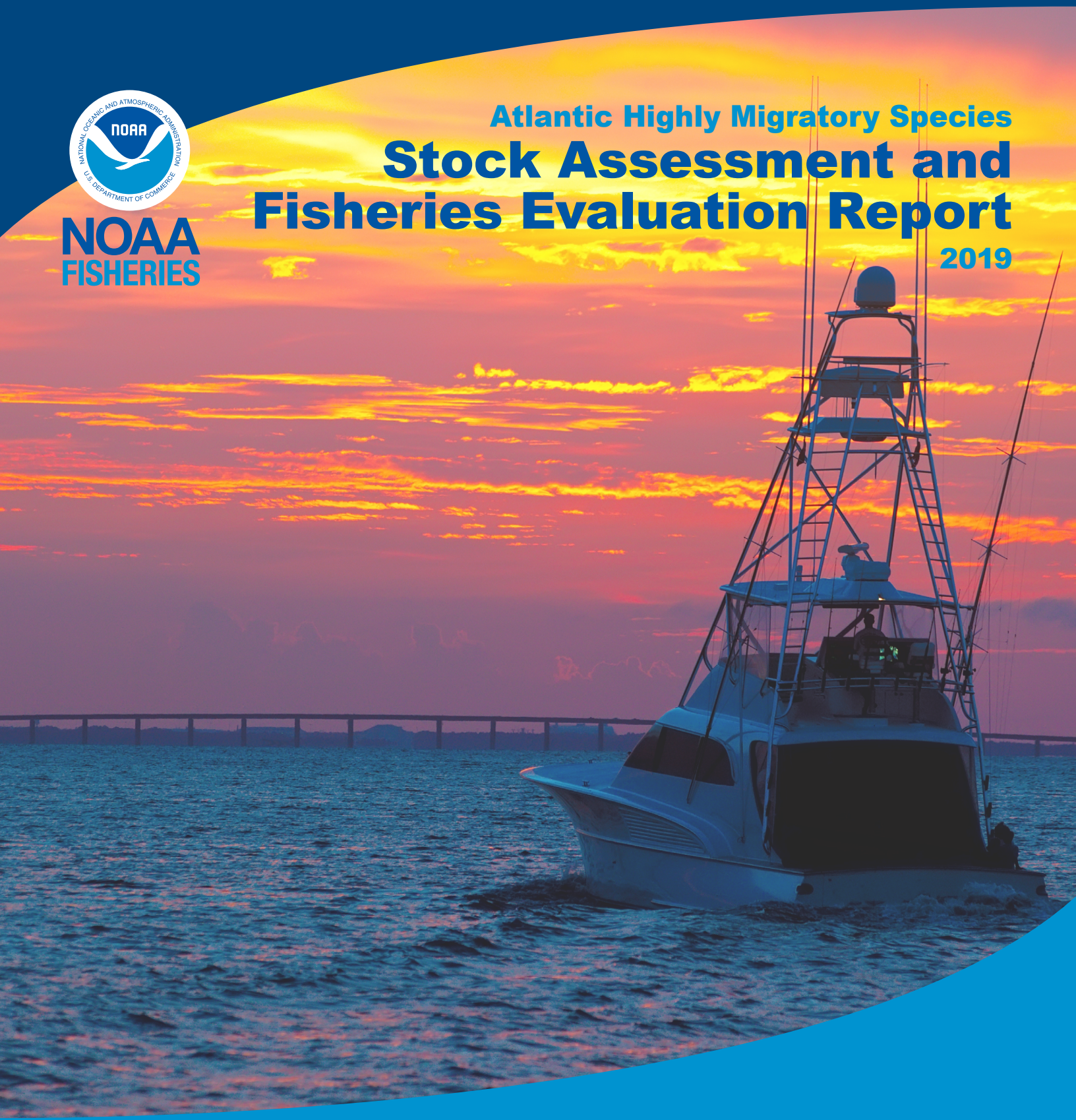
NOAA FISHERIES

Atlantic Highly Migratory Species

Stock Assessment and Fisheries Evaluation Report

2019



U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

2019 Stock Assessment and Fishery Evaluation Report for Atlantic Highly Migratory Species

Atlantic Highly Migratory Species Management Division
May 2020

Highly Migratory Species Management Division
NOAA Fisheries
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Silver Spring, MD 20910
Phone (301) 427-8503
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For HMS Permitting Information and Regulations

- HMS recreational fishermen, commercial fishermen, and dealer compliance guides: www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-compliance-guides
- Regulatory updates for tunas: hmspermits.noaa.gov

For HMS Permit Purchase or Renewals

Open Access Vessel Permits

Issuer	Permits	Contact Information
HMS Permit Shop	HMS Charter/Headboat, Atlantic Tunas (General, Harpoon, Trap), Swordfish General Commercial, HMS Angling (recreational)	(888) 872-8862 hmspermits.noaa.gov
Southeast Regional Office	Commercial Caribbean Small Boat, Smoothhound Shark	(727) 824-5326 www.fisheries.noaa.gov/southeast/resources-fishing/southeast-fisheries-permits
Greater Atlantic Regional Fisheries Office	Incidental HMS Squid Trawl	(978) 281-9370 www.fisheries.noaa.gov/new-england-mid-atlantic/resources-fishing/vessel-and-dealer-permitting-greater-atlantic-region

Limited Access Vessel Permits

Issuer	Permits	Contact Information
HMS Permit Shop	Atlantic Tunas Purse Seine category	(888) 872-8862 hmspermits.noaa.gov
Southeast Regional Office	Directed Shark, Incidental Shark, Directed Swordfish, Incidental Swordfish, Atlantic Tunas Longline category	(727) 824-5326 www.fisheries.noaa.gov/southeast/resources-fishing/southeast-fisheries-permits

Dealer Permits

Issuer	Permits	Contact Information
Greater Atlantic Regional Fisheries Office	Atlantic Tunas Dealer	(978) 281-9370 www.fisheries.noaa.gov/new-england-mid-atlantic/resources-fishing/vessel-and-dealer-permitting-greater-atlantic-region
Southeast Regional Office	Atlantic Shark Dealer and Atlantic Swordfish Dealer	(727) 824-5326 www.fisheries.noaa.gov/southeast/resources-fishing/southeast-fisheries-permits

For Safety-at-Sea Information through the U.S. Coast Guard

- Region-based regulatory and safety information: www.uscg.mil/Units/Organization
- Safety alerts, news bulletins and regulatory information: mariners.coastguard.blog

For Copies of HMS SAFE Reports

- 2014–present: www.fisheries.noaa.gov/content/atlantic-hms-stock-assessment-and-fisheries-evaluation-reports
- 2000–2013: Send email to: nmfs.sf.webmaster@noaa.gov

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List of Commonly Used Acronyms

Acronym	Definition
1999 FMP	1999 Atlantic Tunas, Swordfish, and Sharks Fishery Management Plan
ACL	Annual catch limit
APAIS	Access Point Angler Intercept Survey
ASMFC	Atlantic States Marine Fisheries Commission
ATCA	Atlantic Tunas Convention Act
ATR	Atlantic Tournament Registration and Reporting
B	Biomass
BAYS	Bigeye, northern albacore, yellowfin, and skipjack tunas
BFT	Bluefin tuna
BiOp	Biological opinion
B_{MSST}	Biomass of the minimum stock size threshold
B_{MSY}	Stock biomass needed for maximum sustainable yield
B_{OY}	Stock biomass needed for optimum yield
CAR	Caribbean area
CBP	U.S. Customs and Border Protection
CFL	Curved fork length
CFR	Code of Federal Regulations
CHTS	Coastal Household Telephone Survey
CITES	Convention on International Trade in Endangered Species of Wild Fauna, Flora
COASTSPAN	Cooperative Atlantic States Shark Pupping and Nursery survey
CPCs	Contracting Parties, Cooperating Non-Contracting Parties, Entities, or Fishing Entities
CPUE	Catch per unit effort
DPS	Distinct population segment
dw	Dressed weight
eBCD	Electronic international bluefin tuna catch documentation system
eBFT	Electronic bluefin tuna dealer landings database
eDealer	Electronic dealer reporting program
EEZ	Exclusive Economic Zone
EFH	Essential fish habitat
EFP	Exempted fishing permit
EM	Electronic monitoring (of pelagic longline gear at haulback)
ESA	Endangered Species Act
F	Fishing mortality
FEC	Florida East Coast
FES	Fishing Effort Survey
FHS	For-Hire Survey
FL	Fork length

Acronym	Definition
FMP	Fishery management plan
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
GARFO	Greater Atlantic Regional Fisheries Office
GOM	Gulf of Mexico
GULFSPAN	Cooperative Gulf of Mexico States Shark Pupping and Nursery survey
GRA	Gear restricted area
HAPC	Habitat Areas of Particular Concern
HMS	Highly migratory species
HTS	Harmonized Tariff Schedule
IBQ	Individual bluefin [tuna] quota
ICCAT	International Commission for the Conservation of Atlantic Tunas
ITP	International Trade Program
ITS	Incidental Take Statement
LCS	Large coastal sharks
LPS	Large Pelagics Survey
MAB	Mid-Atlantic Bight area
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
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 Waters
nmi	Nautical mile
NOAA	National Oceanographic and Atmospheric Administration
OPR	Office of Protected Resources
OSF	Office of Sustainable Fisheries
OY	Optimum yield
PLL	Pelagic longline
RPAs	Reasonable and prudent alternatives
RPMs	Reasonable and prudent measures
SAB	South Atlantic Bight area
SAFE	Stock assessment and fishery evaluation
SAR	Sargasso Sea area
SCRS	Standing Committee on Research and Statistics
SCS	Small coastal sharks
SEDAR	Southeast Data, Assessment, and Review
SEFSC	Southeast Fisheries Science Center
SSB	Spawning stock biomass

Acronym	Definition
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
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	Vessel monitoring system
ww	Whole weight

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Executive Summary

This 2019 Stock Assessment and Fisheries Evaluation (SAFE) Report is produced by the NOAA Fisheries Atlantic Highly Migratory Species (HMS) Management Division. It contains a review of the current status of Atlantic HMS stocks and describes the year's accomplishments in managing these tunas, swordfish, billfish, and sharks. Atlantic HMS SAFE Reports provide the public with information on the latest developments in Atlantic HMS management and fulfill Magnuson-Stevens Fishery Conservation and Management Act requirements.

Since the 2018 SAFE Report, the Atlantic HMS Management Division accomplished the key actions listed below. The referenced amendments are to the 2006 HMS Consolidated Fishery Management Plan.

- Held two HMS Advisory Panel meetings.
- Published final rules that addressed overfishing of North Atlantic shortfin mako sharks (Amendment 11), removed obsolete language regarding requirements of the Billfish Certificate of Eligibility, and adjusted North and South Atlantic swordfish 2019 baseline quotas.
- Published proposed and final rules increasing the U.S. Atlantic bluefin tuna quota and establishing quotas, opening dates, and retention limits for all 2020 Atlantic shark fisheries.
- Published a proposed rule to modify pelagic longline bluefin tuna area-based and weak hook management measures.
- Published scoping documents for:
    - Research and data collection in support of spatial fisheries management.
    - Modifying domestic HMS fishery management measures for maintaining consistency with revised national standards guidelines (Amendment 12).
    - Management improvements of Atlantic bluefin tuna (Amendment 13).
    - Implementation of updated National Standard 1 as it relates to annual catch limits and allowable biological catch levels for sharks (Amendment 14).
- Enacted more than 25 inseason actions for the management of Atlantic HMS, particularly for Atlantic bluefin tuna and large coastal and hammerhead shark fisheries.

In addition to agency actions, the International Commission for the Conservation of Atlantic Tunas (ICCAT) held their 26th Regular Meeting in Palma de Mallorca, Spain on November 18–25, 2019. The goals for the United States at this meeting were focused primarily on adoption of critical conservation measures for priority stocks while maintaining access to ICCAT-managed fisheries for U.S. recreational and commercial fishermen. The U.S. delegation developed recommendations aimed at promoting the conservation, management, and rebuilding of Atlantic HMS stocks, including those important to U.S. interests. ICCAT made progress on a number of issues, including the ongoing effort to amend the ICCAT Convention; developing management strategy evaluation for certain tuna stocks; establishing monitoring, control, and surveillance

measures; and ensuring compliance. At the meeting, the United States advocated for needed conservation and management measures for bigeye tuna and other tropical tunas, marlins, and sharks. The United States also advocated for measures promoting conservation of bycatch species such as sea turtles and cetaceans, although such measures were not adopted this year.

The ICCAT Standing Committee on Research and Statistics (SCRS) completed stock assessments in 2019 for Atlantic white marlin and yellowfin tuna and completed an update to shortfin mako. One stock assessment was initiated in 2019 through the Southeast Data, Assessment, and Review process for Atlantic blacktip shark (SEDAR 65). NOAA Fisheries continued research on shark nursery grounds and studies on essential fish habitat along the U.S. Atlantic, Gulf of Mexico, and Caribbean through the Cooperative Atlantic States Shark Pupping and Nursery and Gulf of Mexico Shark Pupping and Nursery surveys.

Much of the information in this report is based on final reports of 2018 data that were completed or published in 2019. Domestic fishery landings and bycatch data are obtained from the U.S. Annual Report to ICCAT, Fisheries of the United States 2019, and directly from NOAA Fisheries program databases. These include commercial landings from the HMS and coastal fisheries vessel logbook programs, Pelagic Longline and Southeast Gillnet and Bottom Longline Observer Programs, the electronic dealer reporting program (known as eDealer), the vessel online catch reporting system at hmspermits.noaa.gov, and the Standard Atlantic Fisheries Information System. Recreational landings come from the Marine Recreational Information Program, the Large Pelagics Survey, the Recreational Billfish Survey, North Carolina and Maryland recreational tagging programs, and the HMS recreational reporting program. In 2017, the Recreational Billfish Survey was combined with the HMS tournament database registry and was renamed the Atlantic Tournament Registration and Reporting system.

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

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

Some of the resources and references used for this report can be found at www.fisheries.noaa.gov. Feedback and comments on this SAFE Report are encouraged and should be sent to:

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1 Introduction

1.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) is the primary federal legislation governing the management of marine fisheries of the United States. The guidelines for National Standard 2 of the Magnuson-Stevens Act (50 CFR § 600.315) require NOAA Fisheries to prepare a Stock Assessment and Fishery Evaluation (SAFE) Report (as defined in 50 CFR 600.10), or similar document. NOAA Fisheries is also required to summarize, on a periodic basis, the best scientific information available concerning the condition of the stocks, essential fish habitat (EFH), marine ecosystems, and fisheries being managed under federal regulation. SAFE Reports are updated or supplemented as necessary when new information is available to inform management decisions.

This document constitutes the 2019 SAFE Report for the Atlantic highly migratory species (HMS) (Table 1.1) managed under the 2006 Consolidated Atlantic HMS Fishery Management Plan (FMP) and subsequent amendments.

Table 1.1 Species Managed under the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan and Amendments

Common Name	Scientific Name
Skipjack tuna	*Katsuwonus pelamis*
Albacore tuna	*Thunnus alalunga*
Yellowfin tuna	*Thunnus albacares*
Bigeye tuna	*Thunnus obesus*
Bluefin tuna	*Thunnus thynnus*
Swordfish	*Xiphias gladius*
Sailfish	*Istiophorus platypterus*
White marlin	*Kajikia albida*
Blue marlin	*Makaira nigricans*
Roundscale spearfish	*Tetrapturus georgii*
Longbill spearfish	*Tetrapturus pfluegeri*
Bigeye thresher shark	*Alopias superciliosus*
Thresher shark	*Alopias vulpinus*
Blacknose shark	*Carcharhinus acronotus*
Bignose shark	*Carcharhinus altimus*
Narrowtooth shark	*Carcharhinus brachyurus*
Spinner shark	*Carcharhinus brevipinna*
Silky shark	*Carcharhinus falciformis*
Galapagos shark	*Carcharhinus galapagensis*
Finetooth shark	*Carcharhinus isodon*
Bull shark	*Carcharhinus leucas*

Common Name	Scientific Name
Blacktip shark	*Carcharhinus limbatus*
Oceanic whitetip shark	*Carcharhinus longimanus*
Dusky shark	*Carcharhinus obscurus*
Caribbean reef shark	*Carcharhinus perezii*
Sandbar shark	*Carcharhinus plumbeus*
Smalltail shark	*Carcharhinus porosus*
Night shark	*Carcharhinus signatus*
Sand tiger	*Carcharias taurus*
White shark	*Carcharodon carcharias*
Basking shark	*Cetorhinus maximus*
Tiger shark	*Galeocerdo cuvier*
Nurse shark	*Ginglymostoma cirratum*
Sevengill shark	*Heptranchias perlo*
Sixgill shark	*Hexanchus griseus*
Bigeye sixgill shark	*Hexanchus nakamurai*
Shortfin mako	*Isurus oxyrinchus*
Longfin mako	*Isurus paucus*
Porbeagle	*Lamna nasus*
Smooth dogfish	*Mustelus canis*
Florida smoothhound	*Mustelus norrisi*
Gulf smoothhound	*Mustelus sinusmexicanus*
Lemon shark	*Negaprion brevirostris*
Bigeye sand tiger	*Odontaspis noronhai*
Blue shark	*Prionace glauca*
Whale shark	*Rhincodon typus*
Caribbean sharpnose shark	*Rhizoprionodon porosus*
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*
Scalloped hammerhead	*Sphyrna lewini*
Great hammerhead	*Sphyrna mokarran*
Bonnethead	*Sphyrna tiburo*
Smooth hammerhead	*Sphyrna zygaena*
Atlantic angel shark	*Squatina dumerili*

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

1.2 Agency Activities and Regulatory Actions for HMS in 2019

Since the publication of the 2018 SAFE Report, NOAA Fisheries proposed or implemented a number of actions with regard to Atlantic HMS. These actions were published in the Federal Register (FR) and are listed in Table 1.2. The major actions are also discussed below. Most documents related to these and previous actions are available on the Atlantic HMS website at www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species or by calling the Atlantic HMS Management Division at (301) 427-8503.

NOAA Fisheries held two Atlantic HMS Advisory Panel meetings in 2019 in Silver Spring, Maryland: May 21–23 and September 4–5. These meetings provided valuable opportunities for comments on a suite of management actions that NOAA Fisheries pursued or considered in 2019. Meeting presentations and transcripts are posted online at the Atlantic HMS website.

On February 21, 2019, NOAA Fisheries published the final rule for Amendment 11 to address overfishing of North Atlantic shortfin mako sharks in HMS recreational and commercial fisheries (84 FR 5358). The amendment was based upon the results of a 2017 stock assessment showing that the North Atlantic shortfin mako shark stock is overfished and experiencing overfishing as well as a binding recommendation by ICCAT for North Atlantic shortfin mako sharks. Amendment 11 implemented management measures to reduce fishing mortality on shortfin mako sharks and established the foundation for rebuilding the shortfin mako shark population consistent with legal requirements. In the commercial fishery, shortfin mako sharks caught using gillnet, bottom longline, or pelagic longline gear on properly permitted vessels can be retained if they are dead at haulback. Only vessels with pelagic longline gear are required to have a functional electronic monitoring system to retain shortfin mako sharks. In the recreational fishery, HMS permit holders are only allowed to retain male shortfin mako sharks that measure at least 71 inches (180 centimeters) fork length and female shortfin mako sharks that measure at least 83 inches (210 centimeters) fork length. In addition, recreational fishermen with the appropriate permit and shark endorsement are required to use non-offset, non-stainless steel circle hooks when fishing for sharks recreationally in federal waters, except when using flies or artificial lures. The final rule is consistent with the Magnuson-Stevens Act and the Atlantic Tunas Convention Act (ATCA) and went into effect on March 3, 2019.

On May 16, 2019, NOAA Fisheries published a Notice of Intent to prepare a draft environmental impact analysis related to research and data collection in support of spatial fisheries management (84 FR 22112). “Spatial management” refers to a suite of fisheries conservation and management measures based on geographic area. When spatial management tools, such as closed areas, are deployed, the collection of fishery-dependent data is reduced or eliminated. This loss of data can compromise effective fisheries management. Through this action, NOAA Fisheries is considering strategies to collect data and perform research in areas currently closed to select gears or fishing activities for Atlantic HMS. These closures restrict commercial or recreational fishing, making the collection of fisheries-dependent data challenging or impossible. NOAA Fisheries published an issues and options paper outlining the possible strategies. The public comment period ended on July 31, 2019.

On May 21, 2019, NOAA Fisheries published a Notice of Intent to prepare a draft environmental impact statement to initiate Amendment 14 of the 2006 Consolidated

Atlantic HMS FMP. This amendment relates to the implementation of updated 2016 National Standard 1 Guidelines as they relate to annual catch limits for sharks (84 FR 23014). The process for establishing these limits, including an examination of how to establish the acceptable biological catch and account for uncertainty arising from the stock assessment, and the impacts to the management measures are being re-examined. That process began with the publication of a scoping document in May. The public comment period ended on July 31, 2019.

Also on May 21, 2019, NOAA Fisheries published a Notice of Intent to prepare a draft environmental impact analysis related to Atlantic bluefin tuna management measures and announced the availability of the issues and options paper to consider a resulting amendment to the 2006 HMS FMP (84 FR 23020). The focus of Amendment 13 is Atlantic bluefin tuna management, including in the Atlantic and Gulf of Mexico incidental pelagic longline fishery and the directed bluefin fisheries. Potential management options being considered include:

- Modification of the Individual Bluefin Quota Program, such as allocations, permanent sale of quota shares, cap on quota shares, cost recovery, electronic monitoring provisions, and dealer reporting requirements.
- The sunsetting of the Purse Seine category and reallocation of associated bluefin tuna quota.
- Revision of the baseline bluefin tuna quota allocations.
- Variations to subquota rules, such as temporal or geographical division of the General or Angling category subquotas.
- Adjustments to the handgear fisheries.
- Revisions to reporting and monitoring methods for discards and landings.

The public comment period ended on July 31, 2019. Development of Amendment 13 will continue with a proposed rule published during 2020. A final rule is anticipated in 2021.

On July 12, 2019, NOAA Fisheries published a proposed rule to adjust regulatory measures to manage Atlantic bluefin tuna bycatch in the pelagic longline fishery (84 FR 33205). This rule specifically addresses the weak hook requirement in the Gulf of Mexico and several closed or restricted areas: the Northeastern United States Closed Area, the Cape Hatteras Gear Restricted Area, and the Spring Gulf of Mexico Gear Restricted Area. The public comment period ended September 30, 2019.

On September 3, 2019, NOAA Fisheries published the Notice of Availability of a scoping document and a Notice of Intent to initiate Amendment 12 of the 2006 Consolidated HMS FMP. This amendment is related to 2016 revised National Standards 1, 3, and 7 Guidelines and other national policy directives (84 FR 45941). NOAA Fisheries has determined that it is necessary to:

- Reassess current HMS FMP objectives to reflect the changing needs of the HMS fisheries and potentially adopt revised FMP objectives.
- Review stock status determination criteria for internationally managed HMS and adopt such criteria rather than continue to apply domestic criteria, which at times differ.

- Review the standardized bycatch reporting methodology for certain HMS fisheries and update, if necessary.
- Consider triggers for initiating allocation reviews of quota-managed HMS stocks and adopt such triggers, if appropriate.
- Consider revising the publication date of the annual SAFE Report and adopt such revision.

The goal of the scoping document was to examine potential options and modify domestic HMS fishery management measures to be consistent with the national standards guidelines and recent NOAA Fisheries policy directives and to request additional information and input from consulting parties and the public prior to development of Amendment 12. The public comment period ended on November 4, 2019.

Table 1.2 Atlantic Highly Migratory Species Federal Management Actions for January 1–December 31, 2019

BAYS = Bigeye, albacore, yellowfin, and skipjack tunas.

Fisheries Affected	Published	Rule or Notice	Citation
General	3/07/2019	Notice of Public Meeting of the Atlantic Highly Migratory Species Advisory Panel	84 FR 8306
General	3/11/2019	Notice of Atlantic Shark Identification Workshops and Safe Handling, Release, and Identification Workshops	84 FR 8670
General	4/15/2019	Notice related to the proposed collection of information on recreational catch	84 FR 15189
General	5/16/2019	Notice of intent to prepare a draft environmental impact analysis related to research and data collection in support of spatial fisheries management	84 FR 22112
General	5/21/2019	Notice of intent to prepare an environmental impact analysis for bluefin tuna management measures (Amendment 13)	84 FR 23020
General	5/22/2019	Notice of scoping meetings for three actions to evaluate possible revisions to measures implemented under the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan (Amendments 12, 13, 14)	84 FR 23519
General	6/12/2019	Notice of dates for Atlantic Shark Identification Workshops and Safe Handling, Release, and Identification Workshops	84 FR 27286
General	8/14/2019	Notice of public meeting of the Atlantic Highly Migratory Species Advisory Panel	84 FR 40396
General	8/30/2019	Notice of dates for Atlantic Shark Identification and Safe Handling, Release, and Identification Workshops.	84 FR 45732
General	9/3/2019	Notice of intent to initiate an amendment related to 2016 revised National Standards 1, 3, and 7 Guidelines and other national policy directives (Amendment 12)	84 FR 45941
General	9/16/2019	Correction of date for Safe Handling, Release, and Identification Workshop	84 FR 48599
General	10/30/2019	Notice to solicit nominations for the Atlantic Highly Migratory Species Advisory Panel	84 FR 58139

Fisheries Affected	Published	Rule or Notice	Citation
Bluefin tuna	2/13/2019	General category fishery inseason transfer of 60 metric tons Atlantic bluefin tuna quota from Reserve category	84 FR 3724
Bluefin tuna	2/28/2019	Annual adjustment of the Atlantic bluefin tuna Purse Seine and Reserve category quotas; General category fishery inseason transfer of 25 metric tons Atlantic Bluefin tuna quota from Reserve category	84 FR 6701
Bluefin tuna	3/4/2019	Closure of General category for large medium and giant Atlantic bluefin tuna	84 FR 7302
Bluefin tuna	3/18/2019	Closure of Atlantic bluefin tuna Angling category southern area trophy fishery	84 FR 9719
Bluefin tuna	5/09/2019	Daily retention limit adjustment to Atlantic bluefin tuna Angling category May 11–December 31	84 FR 20296
Bluefin tuna	5/20/2019	Daily retention limit adjustment to Atlantic bluefin tuna General category for June–August subquota time period	84 FR 22734
Bluefin tuna	6/04/2019	Closure of Atlantic bluefin tuna Angling category Gulf of Mexico trophy fishery	84 FR 25707
Bluefin tuna	6/28/2019	Closure of Atlantic bluefin tuna Angling category northern area trophy fishery	84 FR 30954
Bluefin tuna	7/11/2019	Daily retention limit adjustment to Atlantic bluefin tuna General category for June–August subquota period	84 FR 33008
Bluefin tuna	7/12/2019	Proposed rule to adjust Atlantic bluefin tuna pelagic longline area-based and weak hook measures	84 FR 33205
Bluefin tuna	7/23/2019	Harpoon category fishery inseason transfer of 30 metric tons Atlantic bluefin tuna from Reserve category	84 FR 35340
Bluefin tuna	8/06/2019	Harpoon category inseason transfer of 15 metric tons Atlantic bluefin tuna quota from Reserve category	84 FR 38143
Bluefin tuna	8/09/2019	Closure of Atlantic bluefin tuna Harpoon category fishery	84 FR 39208
Bluefin tuna	8/09/2019	Closure of Atlantic bluefin tuna General category fishery for June–August subquota period	84 FR 39978
Bluefin tuna	9/16/2019	Closure of Atlantic bluefin tuna General category fishery for September subquota period	84 FR 48566
Bluefin tuna	10/03/2019	General category fishery inseason transfer of 100 metric tons Atlantic bluefin tuna October–November 2019 subquota period from Reserve category	84 FR 52806
Bluefin tuna	10/17/2019	Closure of Atlantic bluefin tuna General category fishery for October–November subquota period	84 FR 55507
Bluefin tuna	11/19/2019	General category fishery transfer of 53.2 metric tons Atlantic bluefin tuna quota from the Reserve category	84 FR 63812
Bluefin, BAYS tunas, and swordfish	9/10/2019	Adjustment of 2019 northern albacore, north and south Atlantic swordfish, and Atlantic bluefin tuna Reserve category quotas	84 FR 47440
Swordfish	6/21/2019	Adjustment of Swordfish General Commercial permit retention limit	84 FR 29088

Fisheries Affected	Published	Rule or Notice	Citation
Sharks	2/21/2019	Final rule for Amendment 11 to address overfishing of shortfin mako sharks	84 FR 5358
Sharks	4/02/2019	Adjustment of commercial aggregated large coastal shark and hammerhead shark management group retention limit	84 FR 12524
Sharks	5/21/2019	Notice of Intent to prepare an environmental impact statement related to implementation of new National Standard 1 Guidelines as they relate to annual catch limits for sharks (Amendment 14)	84 FR 23014
Sharks	6/25/2019	Adjustment of commercial aggregated large coastal shark and hammerhead shark management group retention limit	84 FR 29808
Sharks	8/12/2019	Adjustment of commercial aggregated large coastal shark retention limit in the Gulf of Mexico	84 FR 39774
Sharks	8/19/2019	Adjustment of commercial aggregated large coastal shark retention limit in the Atlantic	84 FR 42827
Sharks	9/17/2019	Transfer of large coastal shark quota in the Gulf of Mexico	84 FR 48791
Sharks	9/19/2019	Proposed rule to adjust quotas and retention limits for Atlantic commercial shark fisheries	84 FR 49236
Sharks	10/10/2019	Adjustment of commercial aggregated large coastal shark and hammerhead shark retention limits in the Atlantic region	84 FR 54522
Sharks	11/29/2019	Final rule to establish quotas, opening dates, and retention limits for the 2020 Atlantic shark commercial fishing season	84 FR 65690
Billfishes	10/21/2019	Removal of Billfish Certificate of Eligibility requirements	84 FR 56136

1.3 International Commission for the Conservation of Atlantic Tunas 2019 Accomplishments

ICCAT is a regional fishery management organization with 53 members, also referred to as CPCs (Contracting Parties, Cooperating Non-Contracting Parties, Entities, or Fishing Entities). The United States is one of these. The 26th Regular Meeting of ICCAT was held in Palma de Mallorca, Spain on November 18–25, 2019. The United States' goals at this meeting focused primarily on the adoption of critical conservation measures for priority stocks while maintaining access to ICCAT-managed fisheries for U.S. recreational and commercial fishermen. The U.S. delegation developed recommendations aimed at promoting the conservation, management, and rebuilding of Atlantic HMS stocks, including those important to U.S. interests. ICCAT made progress on a number of issues:

- Amending the 50-year-old ICCAT Convention to reflect modern fishery management standards, clarify ICCAT's mandate to manage sharks, and ensure that all key fleets targeting ICCAT species are bound by its rules
- Advancing the development of management strategy evaluation for certain HMS stocks
- Monitoring, control, and surveillance measures to improve data collection and monitoring of ICCAT fisheries

- Compliance with existing ICCAT measures

Measures also were adopted for the conservation and management of tropical tunas and marlins, as well as for the protection and safety of observers in ICCAT's regional observer programs. The United States also advocated at ICCAT for needed conservation and management measures for sharks and measures promoting conservation of bycatch species such as sea turtles, although such measures were not adopted this year.

1.3.1 Bluefin Tuna

No actions were taken this year related to the western Atlantic bluefin tuna stock primarily fished in the United States. As the management of this species in other parts of the ocean affect U.S. management, summaries of management changes for these stocks are included.

For eastern Atlantic and Mediterranean bluefin tuna stocks, non-substantive changes were made to Recommendation 18-02 to clarify ambiguous language or incorrect text. ICCAT also adopted Resolution 19-15, establishing a working group on bluefin tuna control and traceability measures. The working group's main focus is strengthening the relevant eastern Atlantic and Mediterranean bluefin tuna management measures to prevent any illegal, unreported, and unregulated fishing activities and trading of illegal bluefin tuna.

1.3.2 Tropical Tunas

Tropical tunas include bigeye, albacore, yellowfin, and skipjack tunas. A new stock assessment for Atlantic yellowfin tuna conducted in 2019 determined the stock was not overfished and that overfishing was not occurring. Following extensive negotiations, ICCAT adopted Recommendation 19-02, a one-year conservation and management plan for tropical tunas. This plan includes a reduction of the total allowable catch (TAC) for Atlantic bigeye tuna, which is overfished with overfishing occurring, to 62,500 metric tons (mt) for 2020 and 61,500 mt for 2021. The recommendation includes measures to protect juvenile bigeye and yellowfin tunas, including an Atlantic-wide closure of purse seine and bait boat fishing activities in association with fish aggregating devices and reduced fish aggregating device deployment limits. Reduced juvenile mortality of bigeye tuna is expected to enable the stock to begin rebuilding. ICCAT is expected to revisit this measure in 2020, including at an intersessional meeting of Panel 1.

1.3.3 Marlins

A new stock assessment for Atlantic white marlin was conducted in 2019 and found that the stock was overfished but overfishing was not occurring. ICCAT adopted Recommendation 19-05, the first rebuilding program established for blue marlin and white marlin stocks. The measure reduces the annual limit for blue marlin from 2,000 to 1,670 mt, a level that would stop overfishing immediately. At that revised limit, there is a greater than 50 percent probability of rebuilding the stock by 2027. The annual limit for white marlin is set at 355 mt, consistent with scientific advice. The recommendation maintains a live release provision for purse seine and longline vessels, as well as a minimum size and other measures for recreational fisheries. It is designed to improve and strengthen data collection and reporting. It also requests that ICCAT's scientific body study the effect of hook type and hook size and explore potential technical changes to terminal gear and fishing practices that could reduce bycatch and bycatch mortality at-vessel and post-release.

1.3.4 Sharks

ICCAT adopted Recommendation 19-07, establishing a TAC of 39,102 mt for North Atlantic blue sharks and retaining existing measures regarding the recording, reporting, and use of catch information and scientific research. Individual CPC quotas were established for the European Union, Japan, and Morocco, while all other CPCs will endeavor to maintain their catches at recent levels.

In addition, ICCAT adopted Recommendation 19-06, which extended the existing management measures on North Atlantic shortfin mako shark, originally established in Recommendation 17-08, for one year. ICCAT is expected to revisit the North Atlantic shortfin mako shark measure in 2020, beginning at an intersessional meeting of Panel 4.

1.3.5 Monitoring, Control, and Surveillance Measures

ICCAT adopted Recommendation 19-10 to protect the health and safety of observers in ICCAT's regional observer programs, as well as the complementary Resolution 19-16 to harmonize global initiatives to address observer safety and stakeholder engagement.

Although the U.S. draft recommendation on transshipment was not discussed because of an objection to its late submission, the Permanent Working Group agreed to discuss the issue intersessionally at the next meeting of the ad hoc Working Group on Integrated Monitoring Measures.

ICCAT adopted Resolution 19-17, expanding the scope of a pilot program for the voluntary exchange of inspection personnel to include bluefin tuna farms and traps, and Recommendation 19-09, which includes provisions encouraging CPCs to board and inspect vessels without nationality operating in the convention area as well as non-CPC vessels operating in violation of ICCAT conservation measures. Taken together, the adoption of Resolution 19-17 and Recommendation 19-09 represents incremental progress towards the establishment of a high seas boarding and inspection scheme for ICCAT fisheries beyond eastern Atlantic and Mediterranean bluefin tuna.

ICCAT also adopted Recommendation 19-11, which focuses on preventing the loss and abandonment of gear and establishing reporting requirements.

1.3.6 Convention Amendment

After much anticipation, ICCAT took the significant step of adopting amendments to the 1969 ICCAT Convention to reflect a precautionary and ecosystem-based approach to fisheries management; clarify the scope of the Commission's management authority, particularly for sharks; and allow greater participation from Taiwan in ICCAT's deliberations. These amendments now require ratification by member nations.

1.3.7 Compliance

ICCAT implemented improvements to its compliance review process in 2019 and adopted a recommendation to continue developing an integrated online reporting system.

1.3.8 Harvest Control Rules and Management Strategy Evaluation

ICCAT updated the Road Map for the Development of Management Strategy Evaluation and Harvest Control Rules. This schedule is intended to guide the development of harvest

strategies for the priority stocks identified in Recommendation 15-07: North Atlantic albacore, North Atlantic swordfish, eastern and western Atlantic bluefin tuna, and tropical tunas. It provides an aspirational timeline that is subject to revision and should be considered in conjunction with the stock assessment schedule that is revised annually by SCRS. The aspirational nature of this timeline assumes adoption of a final management procedure for northern albacore in 2020 as well as interim management procedures for bluefin tuna in 2021, northern swordfish in 2022, and tropical tunas as soon as 2023. The exact timeline for delivery is contingent on funding, prioritization, and other work of ICCAT and SCRS.

ICCAT also adopted Resolution 19-14 regarding development of initial management objectives for North Atlantic swordfish. This resolution anticipates that a final set of operational management objectives would be proposed to ICCAT for adoption in 2022. The initial management objectives are very similar to those adopted for Atlantic bluefin tuna in Recommendation 18-03.

1.4 State Regulations

ATCA requires that NOAA Fisheries periodically review state tuna regulations for federal consistency. Atlantic bluefin, bigeye, albacore, yellowfin, and skipjack tunas are under federal jurisdiction from the outer boundary of the Exclusive Economic Zone to the shoreline. Federal regulations for Atlantic tunas apply in state waters of the U.S. Atlantic, Gulf of Mexico, and Caribbean, with the exception of the state waters of Maine, Connecticut, and Mississippi (50 CFR 635.1(b)).

In contrast, state fishery management measures for Atlantic sharks, as well as migratory coastal species, are coordinated through commissions. These commissions 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 Interstate FMP for Atlantic Coastal Sharks was approved by the commission in August 2008 and became effective January 1, 2010. The Gulf States Marine Fisheries Commission is composed of five member states along the U.S. Gulf of Mexico coast.

Two ASMFC motions of note were approved in 2019. On April 30, 2019, the commission approved a motion to implement minimum sizes consistent with federal regulations for shortfin mako sharks starting January 1, 2020. On October 30, 2019, ASMFC also approved a requirement in state waters for fishermen to use non-offset, corrodible, non-stainless steel circle hooks when fishing for sharks recreationally, except when fishing with flies or artificial lures. Member states must implement the requirement no later than July 1, 2020. With the exception of this new circle hook requirement, all management measures for coastal sharks in the interstate FMP and its addendums have been implemented by ASMFC members unless they have been granted *de minimus* status (as in Maine, Massachusetts, and New Hampshire) or they have equivalent conservation measures already in place. Member states can implement more restrictive management measures or, after ASMFC Board approval, alternative compliance measures.

Also of note are legislative bans on the possession and trade of shark fins in Delaware, Maryland, Massachusetts, New York, and Texas, although some of these states allow

limited exemptions for species such as smoothhound sharks. Some states on the West Coast of the United States, several U.S. territories, and Illinois have similar restrictions.

State rules and regulations pertaining to Atlantic HMS as of November 22, 2019, are listed in Table 1.3. While the Atlantic HMS Management Division updates this table annually, regulations are subject to change. Individuals interested in the current regulations for any state should contact that state directly.

Table 1.3 State Rules and Regulations Pertaining to Atlantic Highly Migratory Species

State regulations are subject to change. Please contact the appropriate state personnel to ensure that the regulations listed below are current. States are listed below in geographic order, descending from the north. X = Regulations in effect. FL = Fork length. CL = Carcass length. TL = Total length. LJFL = Lower-jaw fork length. CFL = Curved fork length. PFCFL = Pectoral fin curved fork length. EEZ = Exclusive Economic Zone. dw = Dressed weight. SCS = Small coastal shark. LCS = Large coastal shark. ATCA = Atlantic Tunas Convention Act. ASMFC = Atlantic States Marine Fisheries Commission.

State	Tuna	Swordfish	Billfishes	Shark Reg	Citation Reference	Regulatory Details	Contact Information
Maine	X			X	Tuna: ME Rev. Stat. Ann. tit. 12, " 6001, 6502, and 6551 Sharks: 13-188 CMR Ch. 50, § 50.02	Tuna: Recreational retention limit is one tuna/year and requires a non-resident special tuna permit; unlawful to fish for tuna with gear other than harpoon or hook and line or to possess tuna taken in unlawful manner. Sharks: Taking of coastal sharks in state waters is prohibited; when state waters are open, it is unlawful to harvest, land or possess more than 5,000 pounds of spiny dogfish per calendar day or 24-hour period commercially; one dogfish per day for personal use; porbeagle sharks shall only be taken recreationally from state waters when open; finning is prohibited; coastal sharks, porbeagle or spiny dogfish harvested elsewhere but landed in Maine, or sharks landed recreationally, must have the head, fins and tail attached naturally to the carcass through landing; dealers who purchase sharks must obtain a federal dealer permit; recreational anglers must obtain a federal HMS angling permit.	Maine Department of Marine Resources Amanda Ellis Regulations Officer Phone: (207) 624-6573 Fax: (207) 624-6024
New Hampshire			X	X	Billfish: N.H. Code Admin. R. Fis 603.13 Sharks: N.H. Code Admin. R. Fis 603.20 Bluefin tuna: N.H. Code Admin. R Fis 603.25	Billfish: Possession limit is one billfish/trip with a minimum size (LJFL) of 99" for blue marlin, 66" for white marlin, and 57" for sailfish; may be taken by rod and reel only; unlawful to sell blue or white marlin, sailfish, and longbill spearfish; personal use only. Sharks: No take, landings, or possession of prohibited shark species allowed (see Fis 603.20 list at gencourt.state.nh.us/rules/state_agencies/fis600.html); NH Wholesale Marine Species License and federal dealer permit required for all dealers purchasing listed sharks; porbeagle only taken by recreational fishing from state waters; head, fins, and tail must remain attached to all shark species through landing; persons recreationally fishing for sharks must use non-offset, corrodible circle hooks; recreational minimum size limit for North Atlantic shortfin mako of 71" FL for males and 83" FL for females. Bluefin tuna: Recreational size limit is 27" CFL (20" PFCFL); commercial size limit is 73" CFL (54" PFCFL); possession and seasonal limits are listed in 50 CFR § 635.	New Hampshire Fish and Game Department Cheri Patterson Renee Zobel Phone: (603) 868-1095 Fax: (603) 868-3305

State	Tuna	Swordfish	Billfishes	Shark Reg	Citation Reference	Regulatory Details	Contact Information
Massachusetts	X			X	Bluefin Tuna: 322 CMR 6.04 Sharks: 322 CMR 6.37	**Bluefin tuna**: References ATCA and federal regulations; bluefin tuna may be retained if caught in trap as incidental catch; fishing for bluefin tuna by means of any net prohibited prior to September 1; fishing for tuna by means of purse seine allowed in state waters if vessel is compliant with registration requirements in 322 CMR 6.04(4); purse seining for bluefin tuna 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 director of NOAA Fisheries. All commercial and recreational fishing regulations are at www.mass.gov/marine-fisheries-regulations.	Massachusetts Division of Marine Fisheries Jared Silva Phone: (617) 626-1534 Fax: (617) 626-1509
Rhode Island				X	Sharks: RI Code of Regulations 250-RICR-90-00-3.19	**Sharks**: ASMFC Coastal Shark Plan, with additional measures to complement HMS regulations; commercial fishing license or landing permit required to harvest or land sharks; no person fishing commercially shall possess shortfin mako or species listed in the prohibited or research commercial species groups; no person fishing recreationally shall possess a shark listed in prohibited or research species groups; minimum FL size of 54," with exception of 78" for scalloped, smooth, and great hammerhead sharks and 83" for shortfin mako; no minimum FL sizes for Atlantic sharpnose, bonnethead, and smoothhound; any person fishing recreationally for sharks with rod and reel must use corrodible circle hooks and maximize gear removal as safely as possible when releasing sharks. All commercial and recreational marine fisheries regulations are at www.dem.ri.gov/pubs/regs/regs/fishwild/rimftoc.htm.	Rhode Island Department of Environment Management, Division of Marine Fisheries Conor Mcmanus, Ph.D. Phone: (401) 423-1941 Fax: (401)423-1925 Conor.McManus@dem.ri.gov
Connecticut				X	Sharks: Regulations of Connecticut State Agencies § 26-159a-1; Connecticut General Statutes § 26-102, Declaration 19-02	**Sharks:** Prohibited species are same as federal regulations; possession of sandbar sharks prohibited except by permit for research and display purposes. No commercial fishing for LCS; no commercial small coastal shark fishing until further notice.	Connecticut Department of Energy and Environmental Protection Justin Davis Phone: (860) 447-4322 Fax: (860) 434-6150

State	Tuna	Swordfish	Billfishes	Shark Reg	Citation Reference	Regulatory Details	Contact Information
New York			X	X	Billfish: NY Environmental Conservation ' 13-0339 (5) Sharks: NY Environmental Conservation ' 13-0338; State of NY Codes, Rules and Regulations (Section 40.7)	**Billfish:** Blue marlin, white marlin, sailfish, and longbill spearfish shall not be bought, sold, or offered for sale; striped marlin, black marlin, and 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 shark was lawfully caught and person has recreational marine fishing registration or 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 with baited hooks; commercial shark fishermen must attend NOAA Fisheries' Safe Handling, Release, and Identification Workshop.	New York Department of Environmental Conservation Christopher Scott Phone: (631) 444-0429 Fax: (631) 444-0449
New Jersey				X	Sharks: NJ Admin Code, Title 7. Dept of Environmental Protection, NJAC 7:25-18.1 and 7:25-18.12(d)	**Sharks:** ASMFC Coastal Shark Plan. On January 9, 2020, the Governor of New Jersey signed a bill prohibiting the possession and sale of shark fins effective January 1, 2021.	New Jersey Division of Fish and Wildlife Russ Babb Phone: (609)748-2020 Fax: (609) 748-2032
Delaware			X	X	Billfish: DE Code Ann. titl. 7, ' 1310 Sharks: DE Code Regulations 3541	**Billfish:** Prohibition on sale of Atlantic sailfish and blue, white, and striped marlin. **Sharks:** ASMFC Coastal Shark Plan.	Delaware Division of Fish and Wildlife John Clark Phone: (302) 739-9914

State	Tuna	Swordfish	Billfishes	Shark Reg	Citation Reference	Regulatory Details	Contact Information
Maryland	X	X	X	X	Bluefin tuna: Code of Maryland Regulations 08.02.05.23 Swordfish: Md. Code. Regs. 08.02.05.27 Billfish: Md. Code Regs. 08.02.05.26 Sharks: Md. Code Regs. 08.02.22. 01-04	Bluefin tuna: Federal regulations used to control size and seasons; recreational catch required to be tagged and reported using catch cards. Sharks: ASMFC Coastal Shark Plan, with additional measures to complement HMS regulations. *Recreational:* Except when fishing with artificial flies or artificial lures, an angler must use corrodible, non-offset circle hooks and have in possession at least one device capable of quickly cutting either leader or hook; any shark, except smooth dogfish, not being kept must be released in water; for any shark that will be released, an individual may not (a) sit on shark, (b) hold shark's mouth open, (c) put shark on dry sand, (d) the shark on a boat deck, or (e) use a gaff; catch must be tagged and reported using catch cards; all recreationally harvested sharks must have heads, tails, and fins attached naturally to carcass through landing. *Commercial*: If smoothhound fins are removed, the total wet weight of caudal fins may not exceed 4 percent of total dw of smoothhound carcasses landed or found on board vessel, and dorsal and pectoral fins may not exceed 8 percent of the total dw of smoothhound carcasses landed or found on board a vessel.	Maryland Department of Natural Resources Sarah Widman Phone: (410) 260-8266
Virginia			X	X	Billfish: 4 VA Admin Code 20-350-10 Sharks: 4 VA Admin Code 20-490-10	Billfish: Prohibition on sale of billfish. Sharks: ASMFC Coastal Shark Plan.	Virginia Marine Resources Commission Robert O'Reilly Phone: (757) 247-2247 Fax: (757) 247-2002
North Carolina	X		X	X	Tunas: 15A N.C. Admin. Code 3M.0520 Billfish: 15A N.C. Admin. Code 3M.050 Sharks: 15A N.C. Admin. Code 3M.0505	Tuna: Commercial and recreational CFL minimum size of 27" for yellowfin tuna, 27" for bigeye tuna, and 73" for bluefin tuna; recreational bag limit of three yellowfin tuna/day. Billfish: Recreational possession limit of one blue or white marlin/vessel/trip; one sailfish/person/day; minimum size of 99" for blue marlin, 66" for white marlin, and 63" for sailfish; unlawful to sell or offer for sale blue or white marlin and sailfish. Sharks: Director may impose restrictions for size, seasons, areas, quantity, etc. via proclamation; ASMFC Coastal Shark Plan, plus longline in the shark fishery shall not exceed 500 yards or have more than 50 hooks.	North Carolina Division of Marine Fisheries Randy Gregory Phone: (252) 726-7021 Fax: (252) 726-0254

State	Tuna	Swordfish	Billfishes	Shark Reg	Citation Reference	Regulatory Details	Contact Information
South Carolina	X	X	X	X	Tuna/Swordfish: SC Code Ann 50-5-2725 and 2730 Billfish: SC Code Ann 50-5-1700, 1705, 2725 and 2730; 50-1-30 (7) Sharks: SC 50-5-2725, 2730	Tuna: CFL minimum size of 27" for bigeye, 27" for yellowfin, and 27–73" for bluefin. Billfish: Minimum size of 99" for blue marlin, 66" for white marlin, 63" for sailfish, and 47" for swordfish; spearfish possession prohibited; unlawful to sell billfish; hook and line gear only; unlawful to possess while transporting gillnets, seines, or other commercial gear. Sharks: See list for prohibited sharks; gillnets may not be used in the shark fishery in state waters; state permit required for shark fishing in state waters.	South Carolina Department of Natural Resources Wallace Jenkins Phone: (843) 953-9835 Fax: (843) 953-9386
Georgia			X	X	Gear Restrictions/Prohib: GA Code Ann 27-4-7; Billfish: GA Comp. R. & Regs. 391-2-4-.04 Sharks: GA Comp. R. & Regs. 391-2-4-.04	Gear restrictions: Use of gillnets and longlines prohibited in state waters. Possession and landing restrictions: 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). Billfish: Possession prohibited in state waters except for catch and release. Sharks (commercial/recreational): Prohibited species same as federal, plus silky sharks; Small Shark Composite (bonnethead, Atlantic sharpnose, spiny dogfish) retention limit one/person with minimum size of 30" FL; hammerheads retention limit (great, scalloped and smooth) one/person or boat (whichever less) with minimum size of 78" FL; other sharks retention limit one shark/person or boat (whichever is less) with minimum size of 54" FL; all species must be landed head and fins intact; sharks may not be landed if harvested with gillnets; ASMFC Coastal Shark Plan.	Georgia Department of Natural Resources Carolyn Belcher Phone: (912) 264-7218 Fax: (912) 262-3143

Florida		X	X	X	Sharks: FL Administrative Code 68B-44, 68B-4400 Billfish and Spearfish: FL Administrative Code 68B-33 Swordfish: FL Administrative Code 68B-58	Billfish: Longbill and Mediterranean spearfish harvest, possession, landing, purchase, sale, and exchange prohibited; blue and white marlin, roundscale spearfish, and sailfish sale prohibited, with aggregate possession of one fish/person/day; gear restriction (hook and line only); LJFL minimum size of 99" for blue marlin, 66" for white marlin, 66" for roundscale spearfish, and 63" for sailfish; all recreational landings must be reported to NOAA within 24 hours unless harvested as participant in fishing competition in which participants must register or an award is offered for catching or landing a billfish; must land in whole condition (gutting allowed). Swordfish: Minimum size of 47" LJFL/25" CK; authorized fishing gear hook and line in state waters; recreational possession limit for private boats of one fish/person/day or four fish/vessel/day (with four or more persons onboard), for hire-boats of one fish/paying customer/day up to 15 fish/vessel/day, and captain/crew on for-hire vessels of zero bag limit; commercial harvest and sale allowed only with FL saltwater products license, restricted species endorsement, and federal commercial swordfish permit (i.e. federal regulations apply in state waters unless state regulations are more restrictive); wholesale dealers must possess federal swordfish dealer permit; all recreational landings must be reported to NOAA Fisheries within 24 hours unless harvested as a participant in a fishing competition in which participants must register or an award is offered for catching or landing a swordfish. Sharks (commercial/recreational): Prohibited species same as federal regulations plus prohibition on harvest of spiny dogfish, lemon, sandbar, silky, tiger, great hammerhead, smooth hammerhead, and scalloped hammerhead sharks; hook and line only; unlawful to harvest any shark with the use of any multiple hook in conjunction with live or dead natural bait and unlawful to harvest shark by snagging (snatch hooking); minimum size of 54," except no minimum size on blacknose, blacktip, bonnethead, smooth dogfish, finetooth, Atlantic sharpnose and a minimum size of 83" for shortfin mako as of January 1, 2020; possession limit of one shark/person/day and maximum of two sharks/vessel on any vessel with two or more persons on board; finning, removing heads and tails, and filleting prohibited (gutting allowed); state waters close to commercial harvest when adjacent federal waters close; federal permit required for commercial harvest (i.e. federal regulations apply in state waters unless state regulations are more restrictive); direct and continuous transit through state waters to place of landing for spiny dogfish, lemon, sandbar, silky, tiger, great hammerhead, smooth hammerhead, and scalloped hammerhead sharks legally caught in federal waters is allowed; a no-cost, annual shore-based shark fishing permit is mandatory for all shore-based shark fishing anglers ages 16 and up; shore anglers are prohibited from chumming and delaying the release of prohibited sharks; all shore-and vessel-based shark fishermen are required to keep prohibited sharks in the waters, use circle hooks in state waters, and possess/use appropriate cutters.	Florida Fish and Wildlife Conservation Commission Martha Guyas Phone: (850) 487-0554 Fax: (850) 487-4847

State	Tuna	Swordfish	Billfishes	Shark Reg	Citation Reference	Regulatory Details	Contact Information
Alabama	X	X	X	X	Tunas/Swordfish/Billfish: AL Administrative Code r.220-3-.30 Sharks: AL Administrative Code r.220-3-.30, r.220-3-.37, and r.220-3-.77	All HMS: Reference to federal landing form regulations; any vessel or individual required to possess federal permit to harvest or retain marine aquatic species must have such permit to possess or land such marine aquatic species in Alabama. Tuna: Recreational and commercial fishermen must have federal permit to fish for tunas; minimum size of 27" CFL for yellowfin and bigeye. Sharks: Prohibited species are 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), and silky (unless fisherman possess a federal Atlantic shark permit). *Recreational*: Bag limit of one sharpnose/person/day and one bonnethead/person/day with no minimum size; great, smooth, scalloped hammerheads bag limit of one/person/day with 78" FL minimum size; male shortfin mako bag limit of one/person/day with 71" FL minimum size; female shortfin mako bag limit of one/person/day with 83" FL minimum size; all other sharks bag limit of one/person/day with minimum size of 54" FL or 30" dressed. *Commercial*: No minimum size or possession limit on non-prohibited species; restrictions of chumming and shore-based angling if creating unsafe conditions for beach goers, sun bathers, swimmers, or any other person; commercial-state waters close when federal season closes; no commercial shark fishing on weekends, Memorial Day, Independence Day, or Labor Day; regardless of open or closed season, gillnet fishermen targeting other fish may retain sharks with dw not exceeding 10 percent of total catch; anglers fishing for, retaining, possessing, or landing sharks must use non-offset non-stainless-steel circle hooks when using natural bait.	Alabama Department of Conservation and Natural Resources, Marine Resources Division Director Scott Bannon Phone: (251) 861-2882 www.outdooralabama.com

State	Tuna	Swordfish	Billfishes	Shark Reg	Citation Reference	Regulatory Details	Contact Information
Mississippi	X		X	X	Tunas: MS ADC 43 000 040 Billfish: MS Code Title-22 part 7 Sharks: MS Code Title-22 part 7	Tunas: No directed bluefin tuna fishing; recreational anglers can retain incidentally caught bluefin tuna up to one/boat/week; recreational and commercial minimum size of 27" CFL for yellowfin and bigeye; recreational retention (possession) limit for yellowfin is three/person. Billfish: Unlawful to sell blue and white marlin and sailfish without proper federal documentation; recreational LJFL minimum size of 99" for blue marlin, 66" for white marlin, and 63" for sailfish; no possession for longbill spearfish; no limit for recreational take. Sharks: Recreational TL minimum size of 37" for LCS and 25" for SCS; possession limit for LCS and pelagics one/person up to three/vessel; possession limit for SCS is four/person; unlawful for commercial and/or recreational fishermen to possess sandbar, silky, or dusky sharks; prohibition on finning.	Mississippi Department of Marine Resources Matt Hill Phone: (228) 374-5000

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

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

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2 Status of the Stocks

2.1 Status Determination Thresholds

The term "stock of fish" means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit. "Stock" may also refer to a multispecies complex managed as a single unit due to the occurrence of two or more species being harvested together. Stock assessments measure the impact of fishing on stocks and project harvest levels that maximize the number of fish that can be caught while preventing overfishing and, where necessary, rebuilding depleted stocks.

The thresholds NOAA Fisheries uses to determine the status of Atlantic HMS are presented in Figure 2.1. These thresholds are fully described in Chapter 3 of the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks and in Amendment 1 to the Billfish FMP. The thresholds were also carried over in full to the 2006 Consolidated HMS FMP. They are based on those described in a paper providing the initial technical guidance for implementing National Standard 1 of the Magnuson-Stevens Act (Restrepo et al. 1998).

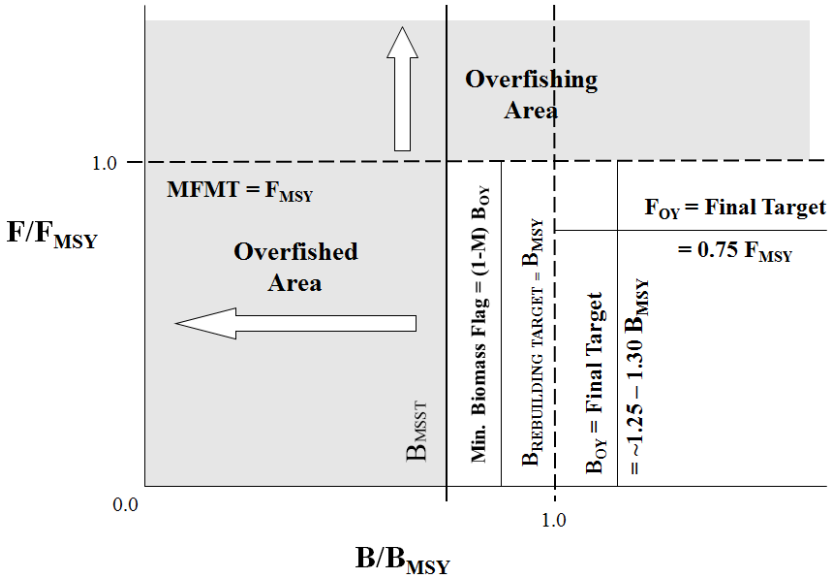

Figure 2.1 Illustration of the Status Determination Criteria and Rebuilding Terms

Images like Figure 2.1, often called a Kobe plot, are frequently used by stock assessment scientists to summarize the results of various stock assessment models. Generally, model results in the white portion of the figure represent a healthy stock with a status of "not overfished" and "overfishing is not occurring." Similarly, model results in the gray portions of the figure are not desirable, generally representing a stock with a status of "overfished," "overfishing is occurring," or both.

Domestically, a stock is considered overfished when the current biomass (represented by a "B" in the above figure and in stock modeling equations) is less than the biomass for the

minimum stock size threshold (MSST). Thus, an overfished stock would be represented mathematically as $B < B_{MSST}$. MSST is determined based on the biomass at maximum sustainable yield (B_{MSY}) and the natural mortality of the stock. Maximum sustainable yield (MSY) is the maximum long-term average yield that can be produced by a stock on a continuing basis. The biomass, or B, can fall below B_{MSY} without causing the stock to be declared overfished as long as it still remains above B_{MSST}.

If a stock is declared overfished, action to rebuild the stock is required by law. A stock is considered rebuilt once the biomass in a given year, or B_{year}, is greater than B_{MSY}, as defined by ICCAT. It is important to note that the ICCAT definition is different than the domestic definition for an overfished stock status. ICCAT defines an overfished status as B_{year} relative to B_{MSY}, while the domestic definition of an overfished status is B_{year} relative to B_{MSST}.

In the case of fishing mortality (F), the maximum fishing mortality threshold is represented by F_{MSY}. If current fishing mortality exceeds the maximum sustainable fishing threshold ($F > F_{MSY}$) it may be determined that overfishing is occurring for that stock. That determination legally requires actions to end overfishing and improve the fishery status. For HMS, the status determination criteria for overfishing are the same for ICCAT and NOAA Fisheries.

A stock is considered healthy when B is greater than or equal to the biomass at optimum yield (B_{OY}) and F is less than or equal to the fishing mortality at optimum yield (F_{OY}). This situation is represented in the white portion of the Kobe plot above.

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

- Maximum fishing mortality threshold = $F_{limit} = F_{MSY}$.
- Overfishing is occurring when $F_{year} > F_{MSY}$.
- MSST = $B_{limit} = (1\text{-}M)B_{MSY}$ when $M < 0.5$ or MSST = $0.5B_{MSY}$ when $M \geq 0.5$, M = natural mortality (M = Natural mortality). Formula exceptions include blue marlin ($0.9B_{MSY}$), white marlin ($0.85B_{MSY}$), and West Atlantic sailfish ($0.75B_{MSY}$). In many cases, an average M across age classes or sensitivity runs from a stock assessment model is used to calculate MSST. Domestically, an overfished status is defined as B_{year} relative to $B_{MSST.}$
- Biomass target during rebuilding = B_{MSY}.
- Fishing mortality during rebuilding < F_{MSY}.
- Fishing mortality for healthy stocks = $0.75F_{MSY}$ (final target = F_{OY}).
- Biomass for healthy stocks = $B_{OY} \approx 1.25$ to $1.30B_{MSY}$.
- Minimum biomass flag = $(1\text{-}M)B_{OY}$.
- Level of certainty of *at least* 50 percent but depends on species and circumstances.
- For some stocks (e.g., bluefin and albacore tuna), spawning stock biomass is used as a proxy for biomass.
- For sharks, in some cases, spawning stock fecundity (SSF) or number of fish 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.

2.2 Stock Assessment Determinations

Table 2.1 and Table 2.2 present the stock assessment information and the current stock statuses of Atlantic HMS as of November 2019 under the domestic and, when applicable, international thresholds. In some cases, these statuses are preliminary as NOAA Fisheries is still reviewing the most recent stock assessment results and has not yet issued formal stock status determinations. NOAA Fisheries updates all U.S. fisheries' stock statuses each quarter and provides an annual Status of U.S. Fisheries Report to Congress (www.fisheries.noaa.gov/national/2018-report-congress-status-us-fisheries).

Table 2.1 Domestic and International Stock Statuses for Overfished and Not Overfished Atlantic Highly Migratory Species

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*[1],*[3]	B_{MSY}	0.86 SSB_{MSY}	Unspecified*	Unknown*		
Atlantic bigeye tuna	B_{2017}/B_{MSY} = 0.59 (0.42–0.80)	Unspecified*[3]	B_{MSY}	0.6 B_{MSY}	Overfished	Overfished	Not available*[4]	1/1/1999
Atlantic yellowfin tuna	B_{2018}/B_{MSY} = 1.17 (0.75–1.62)	Unspecified*[3]	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	*[2]		
Blue marlin	SSB_{2016}/SSB_{MSY} = 0.69 (0.52–0.91)	Unspecified*[3]	B_{MSY}	0.9 B_{MSY}	Overfished	*[10]	Not available*[4]	6/1/2001
White marlin (and roundscale spearfish)	B_{2017}/B_{MSY} = 0.58 (0.27–0.87)	Unspecified*[3]	B_{MSY}	0.85 B_{MSY}	Overfished	Overfished	Not available*[4]	6/1/2001
West Atlantic sailfish	SSB_{2014}/SSB_{MSY} = 1.81 (0.51–2.57) *[6] SSB_{2014}/SSB_{MSY} = 1.16 (0.18–1.69)*[7]	1,438–1,636 mt*[6],*[7]	B_{MSY}	0.75 B_{MSY}	Not likely overfished	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} *[8]	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*[3]	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*[5]	B_{MSY}	(1-M)B_{MSY}*[8]	Overfished	Overfished	*[9]	*[9]
Sandbar sharks	SSF_{2015}/SSF_{MSY} = 0.77	SSF_{MSY} = 681,000 (numbers of sharks)	NA	595,000 (1-M)SSF_{MSY}	NA	Overfished	66	1/1/2005 (2070)
Gulf of Mexico blacktip sharks	SSF_{2016}/SSF_{MSY} = 2.73	SSF_{MSY} = 14,400,000 (numbers of sharks)	NA	12,200,000 (1-M)SSF_{MSY}	NA	Not overfished		
Atlantic blacktip sharks	Unknown	Unknown	NA	(1-M)B_{MSY}	NA	Unknown		
Dusky sharks	SSF_{2015}/SSF_{MSY} = 0.41–0.64	Unknown*[3]	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		

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—Atlantic stock	SSF_{2009}/SSF_{MSY} = 0.43–0.64	SSF_{MSY} = 77,577–288,360 (numbers of sharks)	NA	62,294–231,553 (1-M)SSF_{MSY}	NA	Overfished	30	7/3/2013 (2043)
Atlantic blacknose sharks—Gulf of Mexico stock	Unknown	Unknown	NA	(1-M)B_{MSY}	NA	Unknown		
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		

B = Biomass. MSY = Maximum sustainable yield. SSB = Spawning stock biomass. SSF = Spawning stock fecundity. N = Number of fish. M = Natural mortality. NA = Not assessed internationally. mt = Metric ton.

*1In the 2017 stock assessment, the Standing Committee on Research and Statistics indicated that it is not possible to calculate biomass-based reference points (e.g., BMSY) absent additional knowledge or a basis for assumptions regarding how future recruitment potential relates to spawning stock biomass.

*2South Atlantic swordfish are managed by the International Commission for the Conservation of Atlantic Tunas, and domestic stock status is not determined or reported in the U.S. stock status report.

*3A value for BMSY (or its proxy) was not provided in the stock assessment.

*4There is insufficient information to estimate how many years it will take this stock to rebuild.

*5Only the BSP2-JAGS and JABBA models provided BMSY values in biomass. The BMSY range encompasses the eight scenarios run of the BSP2-JAGS and JABBA models. The SS3 model provided BMSY values in numbers.

*6Stock synthesis estimate based on increasing catch per unit effort trends, with approximate 95 percent confidence intervals.

*7Stock synthesis estimate based on decreasing CPUE trends, with approximate 95 percent confidence intervals.

*8M is unknown.

*9ICCAT will reconsider in 2020.

*10A new assessment has been completed and domestic status has yet to be determined at the time of publication.

Source: Standing Committee on Research and Statistics reports (SCRS 2007, 2008, 2009a, 2009b, 2010, 2011, 2012a, 2012b, 2013, 2014, 2015, 2016, 2017, 2018, 2019); Gibson and Campana 2005; NOAA Fisheries 2006, 2007; Hayes et al. 2009; Southeast Data, Assessment, and Review 2011a, 2011b, 2011c, 2011d, 2013a, 2013b, 2015a, 2015b, 2016, 2018a, 2018b.

Table 2.2 Domestic and International Stock Statuses for Atlantic Highly Migratory Species Stocks Declared as "Overfishing is Occurring" and "Overfishing is Not Occurring"

Species	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Threshold	International Stock Status	Domestic Stock Status
West Atlantic bluefin tuna	$F_{current(2012-2014)}$ = 0.05 (0.04–0.10) $F_{0.1}$ = 0.09 (0.08–0.12) $F_{current}$ /$F_{0.1}$ = 0.59 (0.44–0.79)	F_{MSY} = *1,*2	Overfishing is not occurring*1	Overfishing is not occurring*1
Atlantic bigeye tuna	F_{2017}/F_{MSY} = 1.63 (1.14–2.12)	F_{MSY} = *2	Overfishing is occurring	Overfishing is occurring
Atlantic yellowfin tuna	F_{2018}/F_{MSY}= 0.96 (0.56–1.50)	F_{MSY} = *2	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	*3
Blue marlin	F_{2016}/F_{MSY} = 1.03 (0.74–1.50)	F_{MSY} = *2	Overfishing is occurring	Overfishing is occurring
White marlin (and roundscale spearfish)	F_{2017}/F_{MSY} = 0.65 (0.45-0.93)	F_{MSY} = *2	Overfishing is not occurring	Overfishing is not occurring
West Atlantic sailfish	F_{2014}/F_{MSY} =0.33 (0.25–0.57)*5 F_{2014}/F_{MSY} =0.63 (0.42–2.02)*6	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*4	Overfishing is occurring	Overfishing is occurring
Sandbar	F_{2015}/F_{MSY} = 0.58	F_{MSY} = 0.07	NA	Overfishing is not occurring
Gulf of Mexico blacktip	F_{2016}/F_{MSY} = 0.023	F_{MSY} = 0.087	NA	Overfishing is not occurring
Atlantic blacktip	Unknown	Unknown	NA	Unknown
Dusky shark	F_{2015}/F_{MSY} = 1.08–2.92	F_{MSY} = 0.015–0.046	NA	Overfishing is occurring

Species	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Threshold	International Stock Status	Domestic Stock Status
Scalloped hammerhead shark	F_{2005}/F_{MSY} =1.29	F_{MSY} = 0.11	NA	Overfishing is occurring
Bonnethead shark—Atlantic stock	Unknown	Unknown	NA	Unknown
Bonnethead shark—Gulf of Mexico stock	Unknown	Unknown	NA	Unknown
Atlantic sharpnose shark—Atlantic stock	F_{2011}/F_{MSY} = 0.23	F_{MSY} = 0.184	NA	Overfishing is not occurring
Atlantic sharpnose shark—Gulf of Mexico stock	F_{2011}/F_{MSY} = 0.57	F_{MSY} = 0.331	NA	Overfishing is not occurring
Atlantic blacknose shark—Atlantic stock	F_{2009}/F_{MSY} = 3.26–22.53	F_{MSY} = 0.01–0.15	NA	Overfishing is occurring
Atlantic blacknose shark—Gulf of Mexico stock	Unknown	Unknown	NA	Unknown
Finetooth shark	F_{2005}/F_{MSY} = 0.17	F_{MSY} = 0.03	NA	Overfishing is not occurring
Atlantic smooth dogfish	F_{2012}/F_{MSY} = 0.61–0.99	F_{MSY} = 0.129	NA	Overfishing is not occurring
Gulf of Mexico smoothhound shark complex	F_{2012}/F_{MSY} = 0.07–0.35	F_{MSY} = 0.106	NA	Overfishing is not occurring

F = Fishing mortality. MSY = Maximum sustainable yield. NA = Not assessed internationally.

*[1]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 Standing Committee on Research and Statistics indicated that it is not possible to calculate biomass-based reference points (e.g., F_{MSY}). In the absence of such knowledge, SCRS considers F0.1 to be a reasonable proxy for the western stock. F0.1 is the fishing mortality rate where the slope of the yield per recruit curve is 10 percent 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.

*[2]A value for F_{MSY} was not provided in the stock assessment.

*[3]South Atlantic swordfish are managed by the International Commission for the Conservation of Atlantic Tunas, and domestic stock status is not determined or reported in the U.S. stock status report.

*[4]Range is derived from eight Bayesian production and one SS3 model runs. The value from SS3 is spawning stock fecundity at MSY. The low value is the lowest value from four production model (JABBA and BSP2JAGS) runs and the high value is from the SS3 base run.

*[5]Stock synthesis estimates are based on increasing catch per unit effort trends, with approximate 95 percent confidence intervals.

*[6]Stock synthesis estimates are based on decreasing CPUE trends, with approximate 95 percent confidence intervals.

Source: Standing Committee on Research and Statistics reports (SCRS 2007, 2008, 2009a, 2009b, 2010, 2011, 2012a, 2012b, 2013, 2014, 2015, 2016, 2017; 2018; 2019); Gibson and Campana 2005; NOAA Fisheries 2006, 2007; Hayes et al., 2009; Southeast Data, Assessment, and Review 2011a, 2011b, 2011c, 2011d, 2013a, 2013b, 2015a, 2015b, 2016, 2018a, 2018b.

With the exception of many Atlantic shark stocks, stock assessments for Atlantic HMS are conducted by ICCAT's SCRS. Information on these assessments is available at www.iccat.int/en/assess.html.

In 2019, the SCRS completed assessments for Atlantic yellowfin tuna and Atlantic white marlin. SCRS did not reassess shortfin mako sharks in 2019; however, it updated projections of a future shortfin mako shark stock status based on the 2017 stock assessment. A history of Atlantic HMS stock assessments conducted by SCRS is shown in Table 2.3.

Table 2.3 International Highly Migratory Species Stock Assessments Conducted by Standing Committee on Research and Statistics

Stock	Last Assessment Year	Upcoming Assessment	Notes
Western Atlantic bluefin tuna	2017	2020	Next assessment will involve an update assessment rather than a full assessment.
Atlantic bigeye tuna	2018	2023	
Atlantic yellowfin tuna	2019	TBD	
North Atlantic albacore tuna	2016	2020	
Western Atlantic skipjack tuna	2014	2021	
North Atlantic swordfish	2017	TBD	
South Atlantic swordfish	2017	TBD	
Blue marlin	2018	TBD	
White marlin (and roundscale spearfish)	2019	TBD	
West Atlantic sailfish	2016	TBD	
Longbill spearfish	1997	TBD	
Porbeagle	2009	TBD	Next assessment will be a combination ICES and ICCAT assessment.
Shortfin mako	2017	TBD	In 2019, SCRS updated projections from the 2017 assessment.
Blue shark	2015	2021	

TBD = To be determined. ICES = International Council for the Exploration of the Sea. ICCAT = International Commission for the Conservation of Atlantic Tunas.

Atlantic shark stock assessments for large coastal, small coastal, and smoothhound sharks are generally completed through the Southeast Data, Assessment, and Review (SEDAR) process. SEDAR uses several different approaches in assessing stocks. The benchmark approach has been used to develop first-time assessments for stocks and to incorporate

new datasets or new analytical methods into existing assessments. This is the most time-consuming and intensive approach for developing assessments. SEDAR is now moving away from benchmark assessments to research track assessments. Although still time consuming, research track assessments allow scientists to select the best approach to assess the stocks or species groupings under review. Within the research track assessment, SEDAR may use a standard approach to incorporate recent information into existing assessments. For this approach, existing input datasets are updated, and new information and changes in model configuration may be considered for incorporation as well. Alternatively, the update approach, the most rapid of the three approaches, can be used; however, this is strictly to incorporate the most recent information into existing assessment analyses. With regard to stocks/species group management, the results from research track assessments cannot be directly used for management as these assessments require significant time and may not use the most recent data. Instead, management recommendations would result from the stock being assessed secondarily via an update using the methods determined appropriate during the research track assessment. The first HMS stocks to be assessed using this approach will be the hammerhead shark complex in 2020. More information on how SEDAR assessments are conducted can be found at sedarweb.org/sedar-process.

A benchmark assessment for Atlantic blacktip sharks (SEDAR 65) began in 2019 and is anticipated to be completed in late 2020. In some cases, NOAA Fisheries looks to other available resources, such as peer reviewed literature, for external assessments that, if deemed appropriate, could be used to determine stock status. NOAA Fisheries followed this process in determining the stock status of scalloped hammerhead sharks based on an assessment for this species completed by Hayes et al. (2009). A history of domestic HMS stock assessments is shown in Table 2.4–Table 2.7.

Table 2.4 Domestic Small Coastal Shark Stock Assessments

Shark Stock	Last Assessment Year	Last Assessment Type	Upcoming Assessment	Upcoming Assessment Type	Notes
Small coastal sharks complex	2007	Benchmark	N/A	N/A	Future assessments will focus on each individual stocks within the complex due to life history differences.
Finetooth	2007	Benchmark	TBD	Research	Next assessment is expected to split this species into two stocks.
Blacknose—Atlantic	2011	Benchmark	TBD	Research	
Blacknose—Gulf of Mexico	2011	Benchmark	TBD	Research	Most recent assessment rejected by NOAA Fisheries.
Bonnethead—Atlantic	2013	Standard	TBD	Research	Last assessment assessed at the species level and not the stock level. Plan to assess each stock individually.
Bonnethead—Gulf of Mexico	2013	Standard	TBD	Research	
Atlantic Sharpnose—Atlantic	2013	Standard	TBD	Research	Last assessment focused on the species. Plan to assess next at stock levels.
Atlantic Sharpnose—Gulf of Mexico	2013	Standard	TBD	Research	

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

Table 2.5 Domestic Large Coastal Shark Stock Assessments

Shark Stock	Last Assessment Year	Last Assessment Type	Upcoming Assessment	Upcoming Assessment Type	Notes
Large coastal sharks complex	2006	Benchmark	N/A	N/A	Future assessments will focus on individual stocks due to life history differences.
Blacktip—Atlantic	2006	Benchmark	2019-2020	Benchmark	Previous assessment was not accepted. Upcoming assessment will start late in 2019 and is expected to be finalized in 2020.
Scalloped hammerhead	2009	Outside SEDAR	2020	Research	
Sandbar	2018	Standard	TBD	Update	
Blacktip—Gulf of Mexico	2018	Update	TBD	Update	
Great hammerhead	N/A	N/A	2020	Research	Individual species have not been assessed, although these species were included in the original large coastal shark complex assessment.
Smooth hammerhead	N/A	N/A	2020	Research	
Bull	N/A	N/A	TBD	Benchmark	
Lemon	N/A	N/A	TBD	Benchmark	
Nurse	N/A	N/A	TBD	Benchmark	
Silky	N/A	N/A	TBD	Benchmark	
Spinner	N/A	N/A	TBD	Benchmark	
Tiger	N/A	N/A	TBD	Benchmark	

TBD = To be determined. N/A = None available. SEDAR = Southeast Data, Assessment, and Review.

Table 2.6 Domestic Smoothhound and Pelagic Shark Stock Assessments

Shark Stock	Last Assessment Year	Last Assessment Type	Upcoming Assessment	Upcoming Assessment Type	Notes
Smoothhounds—Atlantic	2015	Benchmark	TBD	Update	
Smoothhounds—Gulf of Mexico	2015	Benchmark	TBD	Update	
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.

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

Table 2.7 Domestic Prohibited Shark Stock Assessments

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

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

2.3 Stock Assessment Report References

SCRS reports are available online at www.iccat.int/en/assess.html. All SEDAR reports are available online at 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: www.iccat.int/Documents/SCRS/DetRep/BFT_SA_ENG.pdf
- North Atlantic albacore tuna: www.iccat.int/Documents/Meetings/Docs/2016_ALB_REPORT_ENG.pdf
- Atlantic bigeye tuna: www.iccat.int/Documents/SCRS/DetRep/BET_SA_ENG.pdf
- West Atlantic skipjack tuna: www.iccat.int/Documents/SCRS/DetRep/SKJ_SA_ENG.pdf
- Atlantic yellowfin tuna: www.iccat.int/Documents/SCRS/DetRep/YFT_SA_ENG.pdf
- Blacknose shark, Atlantic and Gulf of Mexico: sedarweb.org/sedar-21
- Atlantic blacktip shark: sedarweb.org/sedar-11
- Gulf of Mexico blacktip shark: sedarweb.org/sedar-29u
- North Atlantic blue sharks www.iccat.int/Documents/SCRS/DetRep/BSH_SA_ENG.PDF
- Bonnethead shark, Atlantic and Gulf of Mexico: sedarweb.org/sedar-34
- Dusky shark: sedarweb.org/sedar-21u
- Finetooth shark: sedarweb.org/sedar-13
- Scalloped hammerhead shark: Assessed in Hayes et al. (2009).
- North Atlantic shortfin mako shark: www.iccat.int/Documents/Meetings/Docs/2017_SMA_ASS_REP_ENG.pdf; www.iccat.int/Documents/SCRS/DetRep/SMA_SA_ENG.pdf (update)
- Northwest Atlantic porbeagle shark: www.iccat.int/Documents/SCRS/DetRep/POR_SA_ENG.pdf
- Sandbar shark: sedarweb.org/sedar-54
- Atlantic sharpnose shark, Atlantic and Gulf of Mexico: sedarweb.org/sedar-34
- Smoothhound shark, Atlantic and Gulf of Mexico: sedarweb.org/sedar-39
- Swordfish, North Atlantic and South Atlantic: www.iccat.int/Documents/Meetings/Docs/2017_ATL_SWO_ASS_REP_ENG.pdf
- West Atlantic sailfish: www.iccat.int/Documents/Meetings/Docs/2016_SAI_REPORT_ENG.pdf
- Longbill spearfish: www.iccat.int/Documents/SCRS/DetRep/DET-SAI.pdf
- Blue marlin: www.iccat.int/Documents/SCRS/DetRep/BUM_SA_ENG.pdf
- White marlin and roundscale spearfish: www.iccat.int/Documents/SCRS/DetRep/WHM_SA_ENG.pdf

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SEDAR. 2011b. SEDAR 21 Stock Assessment Report: HMS dusky sharks. North Charleston (SC): SEDAR.

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

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

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

3 Essential Fish Habitat

3.1 Current Essential Fish Habitat Boundary Data Sources

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

3.2 Essential Fish Habitat Designations in the 2006 Consolidated Atlantic HMS Fishery Management Plan and Its Amendments

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

On September 7, 2017, NOAA Fisheries published Final Amendment 10 (82 FR 42329). This amendment revised EFH boundary designations based on new observer, survey, and tag/recapture data collected by the agency and the public, new literature, and public comments filed since 2009 in response to requests for information. It also modified the Habitat Areas of Particular Concern (HAPC) for bluefin tuna and sandbar shark, and created new HAPCs for juvenile and adult lemon sharks and sand tiger sharks. The final rule for Amendment 10 and supporting documents are available at www.fisheries.noaa.gov/action/amendment-10-2006-consolidated-hms-fishery-management-plan-essential-fish-habitat.

A summary of the management history of HMS EFH is provided in Table 3.1.

Table 3.1 Management History for Atlantic Highly Migratory Species Essential Fish Habitat

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

HAPC = Habitat Areas of Particular Concern.

3.3 Shark Nursery Grounds and Essential Fish Habitat Studies

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

area over an extended period of time; and 3) the same area is repeatedly utilized across years compared to other areas.

3.3.1 Cooperative Atlantic States Shark Pupping and Nursery Survey Results

The COASTSPAN program, administered by the NOAA Fisheries Northeast Fisheries Science Center Narragansett, Rhode Island laboratory, has been collecting information on shark nursery areas along the U.S. Atlantic coast since 1998. It involves NOAA Fisheries scientists, along with state and university researchers in New Jersey, Delaware, Virginia, South Carolina, Georgia, and Florida. Areas sampled during the 2018 COASTSPAN survey are shown in Figure 3.1. Results by region from this survey (McCandless, pers comm) are described below, and shark species found by sampling location are summarized in Table 3.2.

Figure 3.1 Regions Sampled During the 2018 COASTSPAN Survey

Regions include, from north to south, New Jersey and Delaware, Virginia, South Carolina, Georgia, and the Atlantic coast of Florida.

3.3.1.1 New Jersey and Delaware

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 sharks, which constituted 83 percent of the catch, continue to be the dominate species in 2018, followed by sand tigers and smooth dogfish. Additionally, nine adult male

Atlantic sharpnose sharks were caught in Delaware Bay near Brandywine Shoal, with one caught on the Delaware side of the bay between Fowler Beach and the Broadkill Slough. Two young-of-the-year spinner sharks were caught just north of Roosevelt Inlet. As in previous years, the majority (96 percent) of sandbar sharks were immature, with 12 percent of the juveniles being young-of-the-year. The remaining sandbar sharks were considered mature females based on length and girth measurements, with the exception of one adult male (157 centimeters fork length, claspers calcified). This is the first adult male caught in the bay as part of the survey. Most smooth dogfish caught were immature in 2018, with young-of-the-year dominating the catch. Only two mature female smooth dogfish were caught. Fifty-five percent of sand tigers caught were immature sharks, with the remaining considered mature based on clasper calcification for males and length and girth measurements for females.

Delaware Bay continues to provide important nursery habitat for sandbar sharks, smooth dogfish, and sand tigers. The extensive use of the bay by all life stages of sand tigers continues to highlight the seasonal importance of this essential shark habitat.

3.3.1.2 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.

Sandbar sharks dominated the catch in the bay, lagoon, and inlet habitats. All sandbar sharks caught were juveniles. The majority of sandbar sharks caught were young-of-the-year: 98 percent along the Eastern Shore and 88 percent within Chesapeake Bay. Total catches were similar between regions, although over 70 percent of the catch in the bay was at depths of at least 30 feet, which is greater than the depths for the majority of sampling locations along the Eastern Shore. In addition to sandbar sharks, there was one mature female blacktip shark, one juvenile Atlantic sharpnose shark, and one young-of-the-year smooth dogfish caught along the Eastern Shore of Virginia in 2018. Within Chesapeake Bay, nine young-of-the-year spinner sharks, one young-of-the-year blacktip shark, and one adult male Atlantic sharpnose shark were also caught. Virginia's estuarine waters continue to provide important nursery habitat for sandbar sharks.

3.3.1.3 South Carolina

COASTSPAN sampling, conducted by the South Carolina Department of Natural Resources, in 2018 took place in both nearshore and estuarine waters along the South Carolina coast: Bulls Bay, Charleston Harbor, North Edisto, Port Royal Sound, St. Helena Sound, and Winyah Bay.

Fourteen species of sharks were captured; the most abundant, at 34 percent of the total catch, was Atlantic sharpnose. Other sharks captured, in order of abundance, were finetooth, sandbar, bonnethead, blacktip, scalloped hammerhead, blacknose, Carolina hammerhead, spinner, bull, lemon, tiger, hybrid scalloped/Carolina hammerhead, and great hammerhead sharks. There were also one each of smooth dogfish (juvenile), sand tiger (mature), and nurse (large juvenile) sharks. Bulls Bay had the greatest species diversity; all fourteen species were encountered in 2018. All South Carolina estuaries sampled provided nursery habitat for Atlantic sharpnose, sandbar, and blacktip sharks.

Finetooth sharks were found in all estuaries sampled, but the northernmost estuary, Winyah Bay, only contained mature finetooth sharks caught near the bay entrance. Scalloped hammerheads were also found in all regions sampled but in much lower numbers and in higher salinity areas primarily outside of the estuaries. The exception was Five Fathom Creek in Bulls Bay, which has a higher salinity (>33 parts per thousand) and accounted for 94 percent of the juvenile scalloped hammerheads caught. The majority of sharks captured in all locations were immature, but the following species primarily consisted of mature individuals: Atlantic sharpnose, bonnethead, and blacknose sharks. An ultrasound was used to determine that two sandbar sharks and one blacknose shark were pregnant when captured, respectively, in St. Helena Sound in May and just outside of Winyah Bay in September.

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.

3.3.1.4 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 nine species of shark captured, bonnethead and sandbar sharks were the most abundant, each accounting for 30 percent of the catch. Other sharks, in order of abundance, were blacktip, Atlantic sharpnose, scalloped hammerhead, finetooth, and blacknose. There was also one spinner and one lemon shark. Both sound systems provided nursery habitat for bonnethead, sandbar, Atlantic sharpnose, scalloped hammerhead, and finetooth sharks. The majority of sharks captured were immature, highlighting the importance of these areas as nursery habitat for both small and large coastal shark species. As in previous years, many of the bonnethead sharks captured were mature and all blacknose sharks were mature, indicating these areas continue to provide important adult habitat for these small coastal shark species.

3.3.1.5 Atlantic Coast of Florida

COASTSPAN sampling conducted by the University of North Florida occurred within Cumberland Sound, Nassau Sound, and the Tolomato River. Species in the 2018 catch included, in order of abundance, sandbar, Atlantic sharpnose, bonnethead, blacknose, finetooth, blacktip, scalloped hammerhead, bull, lemon, and one young-of-the-year spinner shark. Nassau and Cumberland Sounds continue to provide nursery habitat for juvenile sandbar and blacktip sharks. Cumberland Sound also provided nursery habitat for Atlantic sharpnose, bonnethead, and finetooth sharks and at least one young-of-the-year spinner shark and scalloped hammerhead. Additionally, Nassau Sound provided nursey habitat for juvenile bull sharks and young-of-the-year finetooth and scalloped hammerhead sharks. Limited sampling was conducted in the Tolomato River during 2018, but seven young-of-the-year blacktip sharks were caught during the survey in June. Eighty percent of the sharks caught in 2018 were juveniles, but adult bonnethead and blacknose sharks were still numerous. These findings highlight the importance of these estuarine waters as nursery habitat for several small and large coastal shark species and note the continued use of these areas by adult small coastal sharks.

Florida Atlantic University surveyed the Indian River Lagoon from Sebastian Inlet to Saint Lucie Inlet and the nearshore waters along the Atlantic coast in this region. Species encountered in the 2018 survey in this area include bull, bonnethead, sandbar, Atlantic sharpnose, lemon, finetooth, nurse, tiger, blacktip, and blacknose sharks. Of the 10 shark species caught, bull and bonnetheads were the most commonly encountered at 61 and 11 percent of the catch, respectively. Captured bull sharks were all juveniles, with 54 percent of those being young-of-the-year. Seventy-nine percent of bonnetheads were mature-sized fish. Both species were only caught within the Indian River Lagoon, primarily over mud bottom. Five other species were caught in the lagoon system over mud bottom as juveniles: sandbar, Atlantic sharpnose, lemon, finetooth, and nurse sharks. All sandbar sharks were caught during the winter and early spring as juveniles that were pupped during the previous year, except one that was caught in the fall. Lemon and nurse sharks caught in the lagoon were large juveniles and mature-sized animals. One large juvenile tiger shark as well as one mature blacktip and blacknose shark were caught in the nearshore coastal waters over sand bottom. Atlantic sharpnose and finetooth juveniles were also caught in nearshore ocean waters. Continued monitoring of this region will help to refine EFH for species encountered here.

Table 3.2 Shark Species and Sampling Locations in the 2018 Cooperative Atlantic States Shark Pupping and Nursery Survey

Sampling Region	Shark Species	Sampling Locations
Delaware/New Jersey	Atlantic sharpnose, sandbar shark, sand tiger, smooth dogfish, and spinner sharks	Entire bay from the mouth of the Delaware River to the mouth of the Delaware Bay
Virginia	Atlantic sharpnose, blacktip, sandbar, smooth dogfish, and spinner sharks	Main stem of the lower Chesapeake Bay and the coastal inlets and lagoons of the Eastern Shore
South Carolina	Atlantic sharpnose, blacknose, blacktip, bonnethead, bull, finetooth, Carolina hammerhead, great hammerhead, hybrid scalloped/Carolina hammerhead, scalloped hammerhead, lemon, nurse, sand tiger, sandbar, smooth dogfish, spinner, and tiger	Nearshore and estuarine waters, including Bulls Bay, Charleston Harbor, North Edisto, Port Royal Sound, St. Helena Sound, and Winyah Bay.
Georgia	Atlantic sharpnose, blacknose, blacktip, bonnethead, finetooth, lemon, sandbar, scalloped hammerhead, and spinner	Estuarine waters of the St. Simon and St. Andrew Sound systems
Florida (Atlantic Coast)	Atlantic sharpnose, blacknose, blacktip, bonnethead, bull, finetooth, scalloped hammerhead, lemon, nurse, sandbar, spinner, and tiger sharks	Nearshore and estuarine waters, including Cumberland Sound, Nassau Sound, Tolomato River, and Indian River Lagoon from Sebastian Inlet to Saint Lucie Inlet

Source: Northeast Fisheries Science Center (C. McCandless, pers comm).

3.3.2 Gulf of Mexico States Shark Pupping and Nursery Survey Results

NOAA Fisheries initiated the GULFSPAN program in 2003 to expand upon the COASTSPAN survey. The GULFSPAN survey examines the distribution and abundance of juvenile sharks

in coastal areas of the Gulf of Mexico to continue to describe and further refine shark EFH. This cooperative program, which is administered by the NOAA Southeast Fisheries Science Center (SEFSC) Panama City Laboratory, includes NOAA Fisheries scientists, the University of Southern Mississippi Gulf Coast Research Laboratory, the Florida State University Coastal and Marine Laboratory, and New College of Florida. GULFSPAN sampling in 2018 covered four areas (Figure 3.2):

- Mississippi Sound
- St. Andrew Bay to St. Vincent Island, Florida
- St. George Sound to Anclote Keys, Florida, known as the Big Bend of Florida
- Southern Tampa Bay and Sarasota Bay, Florida

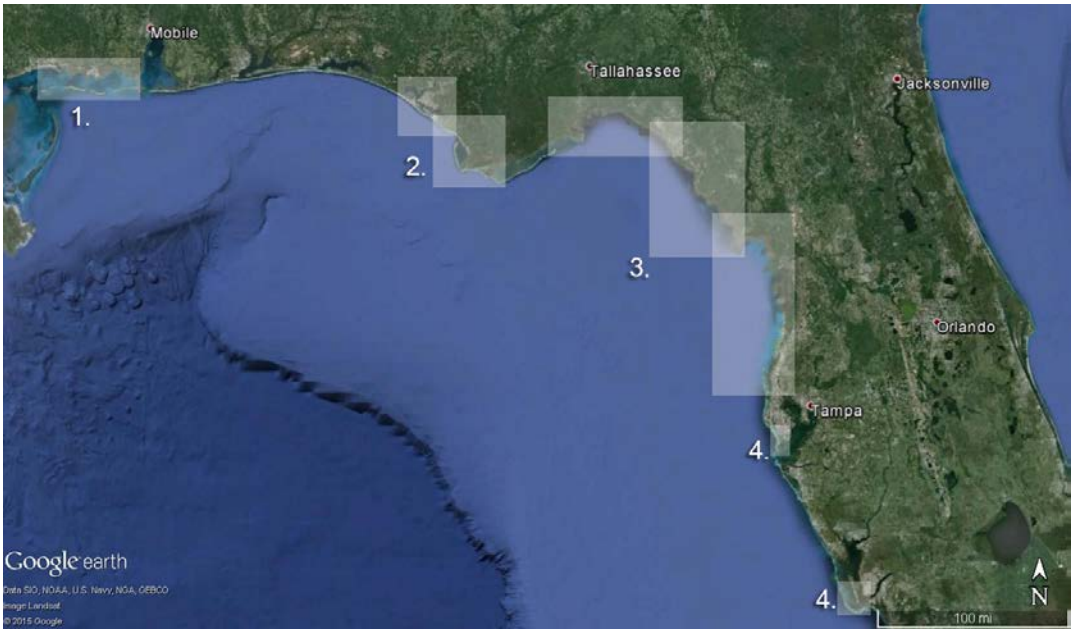

Figure 3.2 Regions Sampled During the 2018 GULFSPAN Survey

1 = Mississippi Sound. 2 = St. Andrew Bay to St. Vincent Island, Florida. 3 = St. George Sound to Anclote Keys, Florida, known as the Big Bend of Florida. 4 = Southern Tampa Bay and Sarasota Bay, Florida.

The following is a summary of the 2018 GULFSPAN catch and noted habitat associations (Deacy et al. 2017) and results from the 2018 COASTSPAN survey (McCandless, pers comm). Shark species found by sampling locations are summarized in Table 3.3.

3.3.2.1 Mississippi Sound

In 2018, GULFSPAN sampling by the University of Southern Mississippi Gulf Coast Research Laboratory divided the coastal waters into eastern, central, and western regions that were allotted seven randomly generated stations inshore (depths of 2.0–2.9 meters) or offshore (depths of 3.0–10.0 meters). Three stations from at least two regions were sampled monthly between April and October.

A total of 21 gillnet sets were made, capturing 168 elasmobranchs representing nine species. Five shark species (Atlantic sharpnose, finetooth, blacktip, spinner, and bull) and 142 individual sharks were captured. The survey team also captured four species of rays

(bluntnose stingray, Brazilian cownose ray, Atlantic cownose ray, and Atlantic stingray) totaling 26 individuals. Approximately 68 percent of the elasmobranchs encountered were juvenile or young-of-the-year.

The Atlantic sharpnose shark was the most abundant shark caught. Adults and juveniles made up 73.4 percent of the Atlantic sharpnose catch. The remainder consisted of young-of-the-year individuals and one unknown life stage. Atlantic sharpnose sharks were primarily caught in the offshore depth strata and no individuals were caught in the western region of the sampling area. Juvenile and mature individuals were found at depths that ranged 2.9–3.7 meters.

Blacktip sharks made up 25.4 percent of the total shark catch and primarily consisted of young-of-the-year. The majority of the catch occurred in the inshore depth strata. Juveniles were collected across a range of temperatures, depths, and dissolved oxygen concentrations that overlapped with sites where young-of-the-year were caught.

Finetooth sharks were found across the sound and in inshore and offshore waters; however, the highest catch rate was inshore. No finetooth sharks were encountered in the inshore strata of the western region. The vast majority of the finetooth shark catch consisted of juveniles. In previous surveys, young-of-the-year finetooth sharks were commonly encountered in the Mississippi Sound, but none were caught during the 2018 survey. Environmental conditions where finetooth sharks were caught overlapped with blacktip sharks, and it was not uncommon to catch immature blacktip and immature finetooth sharks on the same set.

Catches of bull sharks were confined to the western and central regions, with this species occurring both inshore and offshore. Young-of-the-year and juveniles were the only life stages encountered. In previous surveys, bull sharks were typically caught in lower salinity areas than other species; however, they were present in salinity ranges comparable to other species during the 2018 survey.

The only other shark species encountered was the spinner shark. One individual juvenile female was caught offshore of the central region. Salinity and temperature range at the site was typical of areas where blacktip and finetooth sharks are caught.

Rays constituted approximately 15 percent of the elasmobranch catch. The Atlantic cownose ray was the most abundant species encountered, with only juvenile and adult life stages observed. Atlantic cownose rays were present in both depth strata and in the eastern and western regions. One station sampled during August in the western region yielded 18 Atlantic cownose rays, which drove the high catch per unit effort of this species in comparison to other rays. Three adult Brazilian cownose rays were encountered from two stations over mud bottoms. Two bluntnose rays (one juvenile, one adult) and one juvenile Atlantic stingray were also encountered. The low abundance of these ray species prohibits any proven generalizations to be made about these habitat profiles.

Overall, the dominance of juvenile and young-of-the-year elasmobranchs (68 percent of the catch) suggests the Mississippi Sound may act as a nursery area for several species. When young-of-the-year for a species were encountered, it was often in numbers greater than one, which could point to a recent pupping event or a maintained affiliation by a recently pupped cohort.

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

3.3.2.2 St. Andrew Bay to St. Vincent Island, Florida

Sampling by NOAA Fisheries SEFSC Panama City Laboratory typically covers four major areas along the panhandle of Florida: St. Andrew Bay, Crooked Island Sound, St. Joseph Bay, and the Gulf of Mexico side of St. Vincent Island. However, due to the severe impact of Hurricane Michael in this region, the sampling season was reduced to the month of October and the sampling site limited to St. Andrews Bay.

A total of 90 gillnet sets were made, capturing eight species of shark (Atlantic sharpnose, bonnethead, scalloped hammerhead, blacktip, finetooth, spinner, blacknose, and bull) and three species of batoid (cownose ray, southern stingray, and Atlantic stingray). Atlantic sharpnose was the most abundant species caught at 54.2 percent of the total catch. Bonnethead shark was the second-most encountered species (16.1 percent), followed by scalloped hammerhead shark (12.5 percent) and blacktip shark (7.6 percent). Finetooth, spinner, and blacknose sharks comprised between 1.1 and 1.8 percent of the total catch. The most abundant batoid captured was the cownose ray, making up 4.7 percent of the total catch. Elasmobranch species that made up less than 1 percent of the total catch included bull shark, southern stingray, and Atlantic stingray.

Important habitats in these sampling areas include seagrass (*Thallassia testudinum* and *Halodule wrightii)*, sand, and mud, as well as a mix of the three. Atlantic sharpnose were associated with the widest range of abiotic factors and depths and were captured over all bottom types across all areas. Bonnethead sharks were also associated with a wide range of each abiotic factor in all areas, with adults found more often over sandy, muddy habitat. The majority of immature blacktip sharks were collected in Crooked Island Sound and St. Vincent Island over muddy, sandy habitat. Immature scalloped hammerhead were captured across all water depths at a high mid-water temperature and salinity; however, water clarity values varied greatly. Finetooth sharks were caught in waters with high salinity and low water clarity. Immature blacknose sharks were captured in Crooked Island Sound and St. Joseph Bay, while adults were captured exclusively in St. Joseph Bay. Despite this location difference, habitat conditions were similar across all life stages. Young-of-the-year spinner sharks were caught across similar temperature and salinity but at a wide range of water depth at Crooked Island Sound, St. Joseph Bay, and St. Vincent Island. Two additional species of ray were encountered, the southern stingray and the Atlantic stingray, in St. Andrews Bay. The adult southern stingray occurred in deeper water and the juvenile Atlantic stingray occurred in shallow, fresher water in St. Andrews Bay. One juvenile female bull shark was captured in St. Andrews Bay in low salinity, shallow water.

3.3.2.3 Big Bend of Florida

Sampling by Florida State University Coastal and Marine Laboratory covered more than 300 km of Florida's coastline from St. George Sound to Anclote Keys. A total of 789 elasmobranchs comprising 14 species were caught. Shark species included blacknose, spinner, finetooth, bull, blacktip, tiger, nurse, Florida smoothhound, lemon, Atlantic

sharpnose, great hammerhead, and bonnethead. Batoid species included southern stingray and cownose ray.

Of the 780 sharks, 319 individuals were tagged and released. Atlantic sharpnose and bonnethead sharks were a combined 77.3 percent of the shark catch in the gillnets. Blacktip sharks were the third most common species caught in the gillnets. Eight batoids (three southern stingrays and five cownose rays) were captured in the gillnets and one southern stingray was captured on the longlines.

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

Sampling in St. George Sound occurred from April 24 to October 30, 2018. Water temperatures ranged from 21.9 to 30.1°C and salinity ranged from 29.2 to 33.7 parts per thousand. Sampling from Apalachee Bay to Anclote Key occurred over July and August, when water temperatures were high. Salinity ranged from 15.2 to 35.9 parts per thousand. Salinity at most stations was above 20.0. No environmental associations were noted for the dominantly caught species; however, blacknose sharks were most frequently captured in salinities above 30.0 parts per thousand. Atlantic sharpnose sharks, bonnethead sharks, and blacktip sharks were captured across nearly the full range of temperatures and salinities sampled.

3.3.2.4 Southern Tampa Bay, Florida

In 2018, New College of Florida conducted GULFSPAN sampling in two coastal embayments, Terra Ceia Bay and Sarasota Bay, and in the estuarine portion of the Manatee River. Sampling was conducted monthly from April to October in all areas.

A total of 130 sets were made (109 gillnet sets and 21 longline sets) capturing 513 elasmobranchs from 13 species. Of these, seven shark species (bonnethead, blacktip, Atlantic sharpnose, blacknose, great hammerhead, scalloped hammerhead, and bull) and six batoid species (cownose ray, bluntnose ray, spotted eagle ray, southern stingray, roughtail stingray, and Atlantic stingray) were represented. Immature animals made up 68 percent of the total catch, with 65 percent of these being young-of-the-year and 35 percent over a year old. Twenty neonates caught comprised of 11 blacktip sharks, five bonnethead sharks, three bull sharks, and one bluntnose ray. Less than 7 percent of the catch was not assigned a life stage.

Abundance and size trends differed slightly by area. The bonnethead was the most abundant species encountered, comprising 55 percent of the total catch. Catch of this species was composed of adults of both sexes and primarily female adults and juveniles.

The cownose ray, comprising 22 percent of the total elasmobranch catch, was the second most abundant species encountered overall. Catch of this species was primarily adult males and young-of-the-year animals of both sexes. The blacktip shark, at 9 percent of the total elasmobranch catch, was the third most abundant species encountered overall. Only young-of-the-year and juvenile blacktip sharks were captured. The Atlantic sharpnose shark, at 6 percent of the catch, was the fourth most abundant species.

The three systems differed in abiotic profiles. Temperature and salinity were consistently higher in Sarasota Bay than Terra Ceia Bay or the Manatee River. Salinity in the Manatee River was highly dynamic, particularly in the eastern portion of the river. These data suggest that these systems serve as primary and secondary nursery areas for several species of sharks and rays. Habitats sampled included seagrass-, sand-, and mud-dominated bottom types, as well as a mix of all three. A few areas included patchy oyster beds.

Bonnetheads were captured in all moderate- to high-salinity habitats sampled, and habitat profiles were similar across all life stages. Atlantic sharpnose sharks were also encountered across a broad range abiotic factors and water depths, though they were associated only with sandy to muddy bottom habitat. Young-of-the-year Atlantic sharpnose sharks were associated with lower salinity than juveniles, while adults were encountered across a broader range of salinity. Immature blacktip sharks were associated with a similarly broad range abiotic factors and water depths. Juvenile blacknose sharks were associated with similar abiotic factors but deeper depths. Young-of-the-year bull sharks were only associated with a narrow range of low salinity.

Table 3.3 Shark Species and Sampling Locations in the 2018 Cooperative Gulf of Mexico States Shark Pupping and Nursery Survey

Sampling Region	Shark Species	Sampling Locations
Mississippi	Atlantic sharpnose, blacktip, bull, finetooth, and spinner	Mississippi Sound
Florida—St. Andrew Bay to St. Vincent Island	Atlantic sharpnose, blacknose, blacktip, bonnethead, bull, finetooth, scalloped hammerhead, and spinner	St. Andrew Bay (Note: Sampling not possible at Crooked Island Sound, St. Joseph Bay or the Gulf of Mexico side of St. Vincent Island due to Hurricane Michael)
Florida—Big Bend	Atlantic sharpnose, blacknose, blacktip, bonnethead, bull, finetooth, Florida smoothhound, great hammerhead, lemon, nurse, tiger, and spinner	St. George Sound, Apalachee Bay, Suwanee Sound, Waccasassa Bay, Anclote Keys
Florida—Southern Tampa Bay	Atlantic sharpnose, blacknose, blacktip, bonnethead, bull, great hammerhead, and scalloped hammerhead	Sarasota Bay and Terra Ceia Bay

Source: Deacy et al. 2018.

3.3.3 Conclusion

The COASTSPAN and GULFSPAN surveys provide comprehensive information that is incorporated into the HMS EFH five-year review and associated amendments (i.e., Amendment 1 and Amendment 10). These surveys continue to provide data needed to

identify new EFH areas and to further refine areas already designated as EFH by determining specific habitat characteristics associated with these habitats for shark nurseries and pupping. Time series data from both surveys are useful in the stock assessments for large and small coastal shark species, essential for monitoring these populations and their habitat use, and needed for habitat consultations completed by NOAA Fisheries' Office of Habitat Conservation.

Chapter 3 References

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4 Permits and Tournaments

Atlantic HMS permits are issued for vessels, dealers, scientific research, and aquarium displays. Types of HMS permits, the numbers issued, and the distribution of these permits are presented in this chapter. Detailed information about HMS permits and associated regulations are available in the most recent HMS recreational, commercial, and dealer compliance guides at www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-compliance-guides.

Information summarizing the regulations for HMS tournaments and number of registered HMS tournaments is included in Section 4.4.

4.1 HMS Vessel Permits

4.1.1 Limited Access Permits

HMS limited access permits can only be obtained by transferring an existing permit from a current permit holder. New permits are not issued. The HMS limited access permit program is made up of the following:

- Swordfish Directed permit
- Swordfish Incidental permit
- Swordfish Handgear permit
- Shark Directed permit
- Shark Incidental permit
- Atlantic Tunas Longline category permit
- Atlantic Tunas Purse Seine category permit

To reduce bycatch in the pelagic longline fishery, several of these permits were designed to be held in combination. Requiring a combination allows for limited retention of species that might otherwise have to be discarded due to regulations not allowing fishermen to retain the fish. For example, tunas and sharks are commonly caught when pelagic longline fishing for swordfish; if only a swordfish permit was maintained, then discarding tunas and sharks would be required. Therefore, Swordfish Directed and Swordfish Incidental permits are valid only if the permit holder also holds both an Atlantic Tunas Longline category and a Shark Directed or Incidental permit. This minimizes tuna and shark regulatory discards.

As of November 2019, approximately 183 Swordfish Directed, 71 Swordfish Incidental, 218 Shark Directed, and 263 Shark Incidental limited access permits have been issued. In addition, approximately 82 Swordfish Handgear permits and 280 Atlantic Tunas Longline category permits have been issued.

Because the purse seine fishery is managed under a limited entry system with transferable individual vessel quotas and new entrants are excluded from the Atlantic Tunas Purse Seine category, there were no active vessels permitted for this category in 2019.

The number of limited access permits issued over the last five years is presented by permit type in Table 4.1 and the number of limited access permits issued in 2019 are tabulated by state in Table 4.2. Maps showing the distribution of these permits are presented in Figure 4.1 through Figure 4.6.

Table 4.1 Annual Numbers of Limited Access Shark, Swordfish, and Atlantic Tunas Longline Vessel Permits and Permit Holders in 2014–2019

Year	Swordfish Directed	Swordfish Incidental	Swordfish Handgear	Shark Directed	Shark Incidental	Atlantic Tunas Longline Category	Permit Holders (Permits Issued)
2019*	183	71	82	218	263	280	527 (1,097)
2018	185	72	83	220	268	280	537 (1,108)
2017	185	72	83	221	269	280	588 (1,110)
2016	186	72	83	223	271	280	540 (1,115)
2015	188	72	83	224	275	280	540 (1,122)
2014	183	66	77	206	258	246	536 (1,036)

Note: Number of permits and permit holders in each category subject to change as permits are renewed or expire. *As of November 2019. Source: Southeast Regional Office; Greater Atlantic Regional Fisheries Office.

Table 4.2 Numbers of Limited Access Shark, Swordfish, and Atlantic Tunas Longline Category Vessel Permits and Permit Holders by State in 2019*

State	Swordfish Directed	Swordfish Incidental	Swordfish Handgear	Shark Directed	Shark Incidental	Atlantic Tunas Longline Category	Permit Holders (Permits)
Maine	3	1	1	1	6	4	8 (16)
Massachusetts	9	2	5	5	11	14	24 (46)
Rhode Island	-	-	12	-	3	1	11 (16)
Connecticut	1	2	1	-	3	3	4 (10)
New York	10	3	3	6	12	14	22 (48)
Pennsylvania	1	-	-	1	1	1	2 (4)
New Jersey	27	10	3	23	26	42	52 (131)
Delaware	2	-	1	2	2	2	5 (9)
Maryland	4	-	-	2	2	4	2 (12)
Virginia	1	-	-	1	2	3	5 (7)
North Carolina	9	6	-	20	8	15	28 (58)
South Carolina	4	1	-	6	9	5	15 (25)
Georgia	-	1	-	3	3	1	6 (8)
Florida	78	34	55	119	124	119	262 (529)
Alabama	1	-	-	3	3	1	5 (8)
Mississippi	-	-	-	-	1	-	1 (1)
Louisiana	27	4	1	21	31	35	55 (119)
Texas	1	7	-	3	12	10	13 (33)
California	-	-	-	-	-	1	1 (1)
Oregon	-	-	-	-	1	-	1 (1)
Washington	2	-	-	1	1	2	1 (6)
Hawaii	1	-	-	-	1	1	1 (3)
Trinidad/ Tobago	1	-	-	1	-	1	1 (3)
Dominican Republic	1	-	-	-	1	1	1 (3)

Note: Number of permits and permit holders in each category, state, and year are subject to change as permits are renewed or expire. *As of November 2019. Source: Southeast Regional Office; Greater Atlantic Regional Fisheries Office.

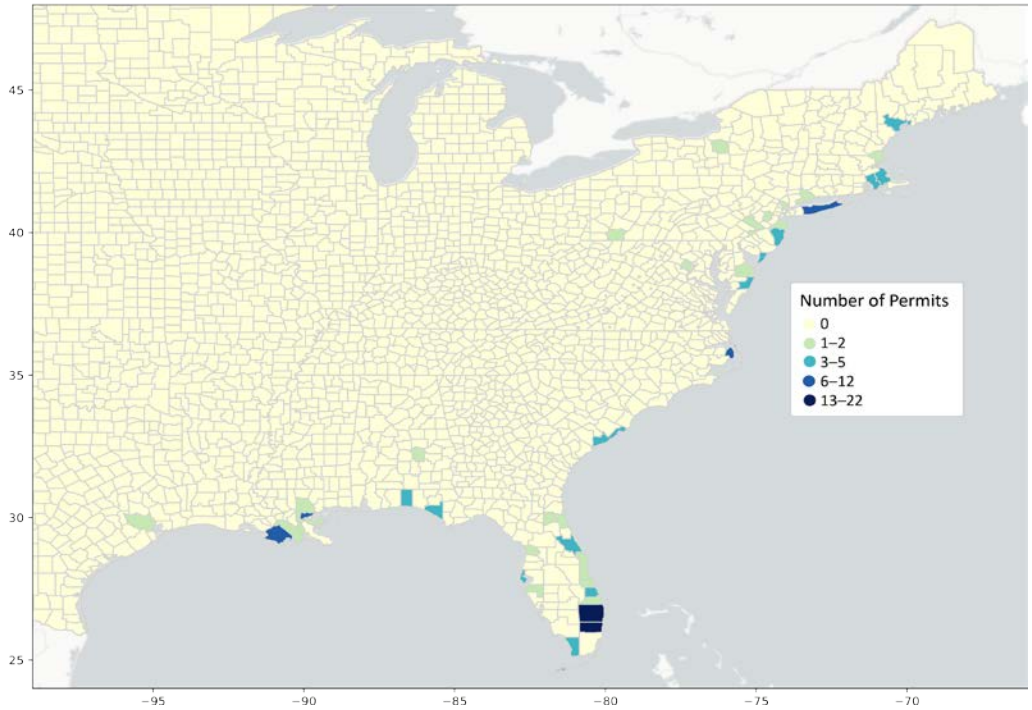

Figure 4.1 Distribution of Swordfish Directed Permits as of November 2019

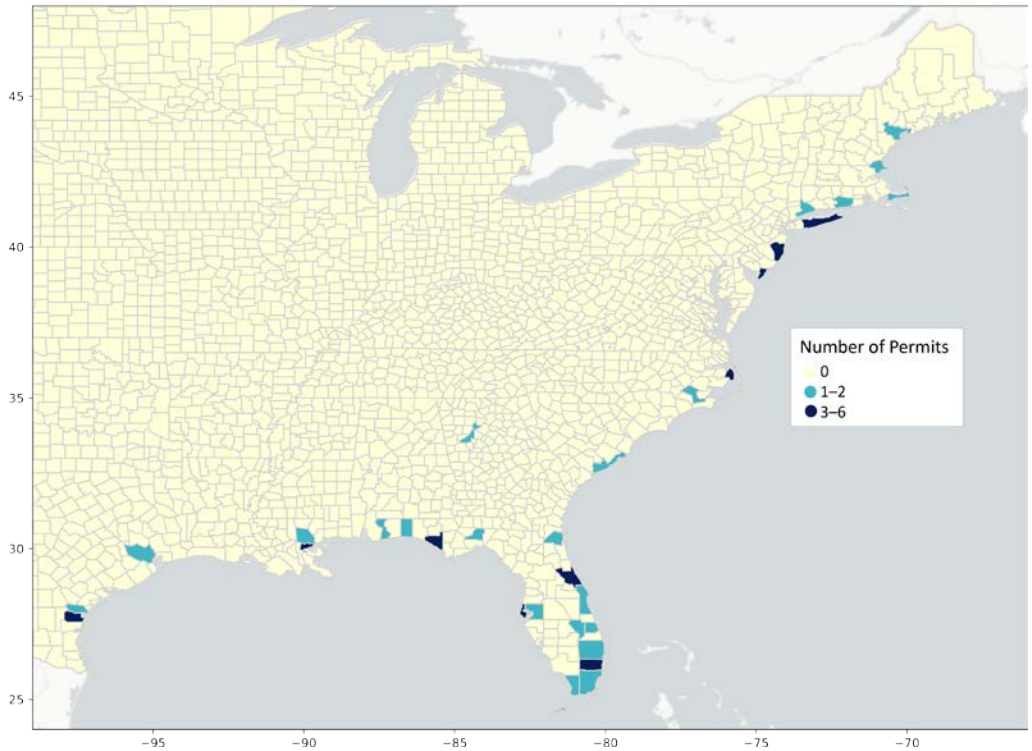

Figure 4.2 Distribution of Swordfish Incidental Permits as of November 2019

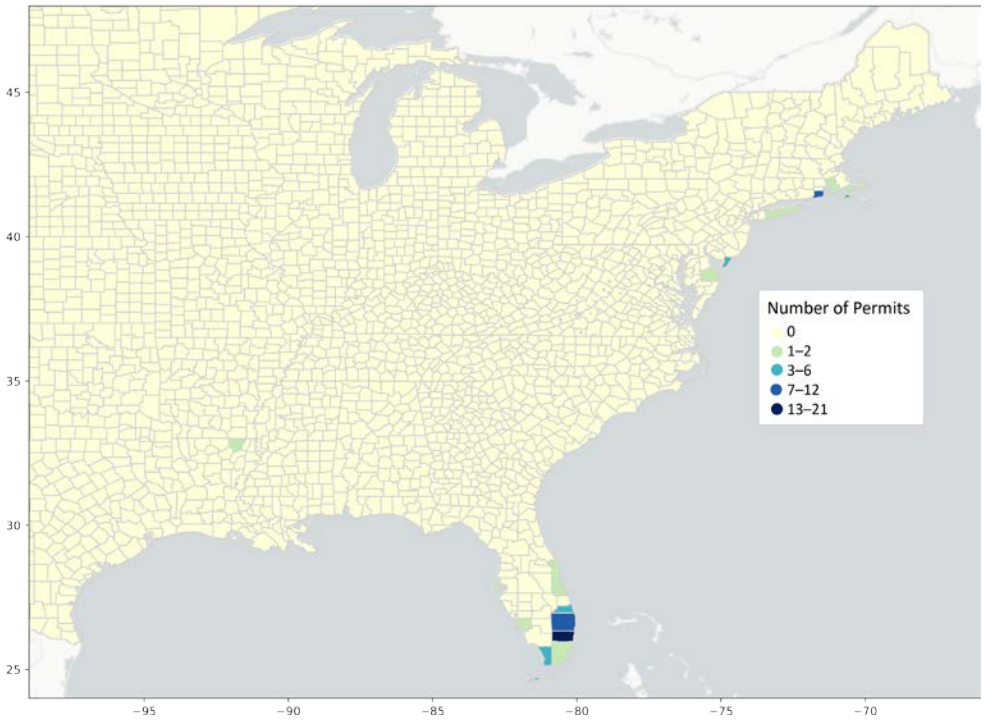

Figure 4.3 Distribution of Swordfish Handgear Permits as of November 2019

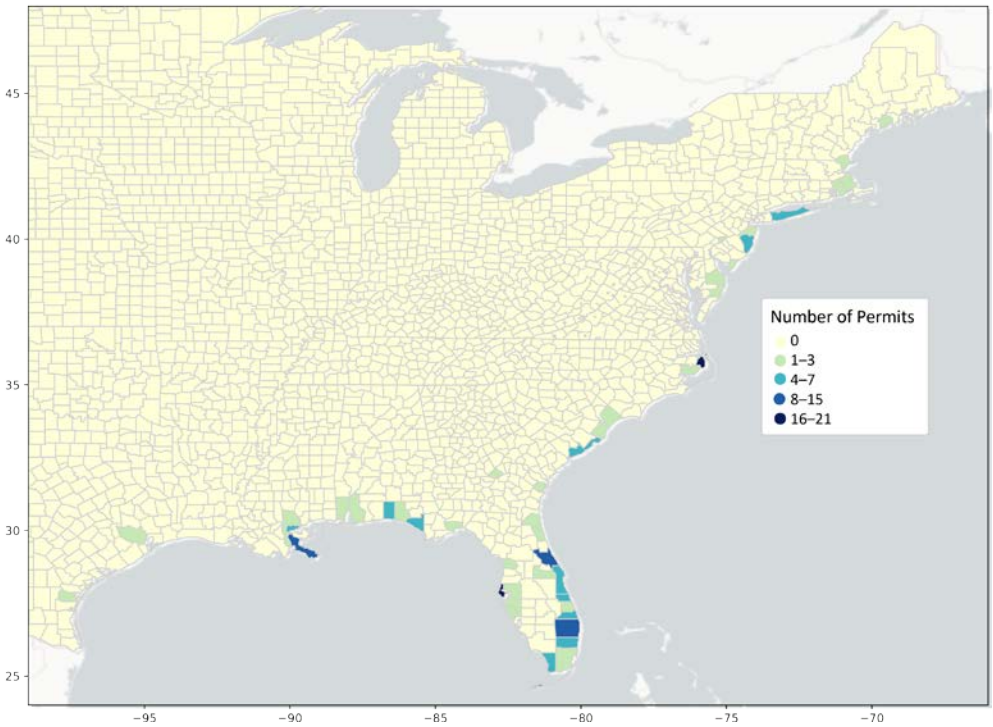

Figure 4.4 Distribution of Shark Directed Permits as of November 2019

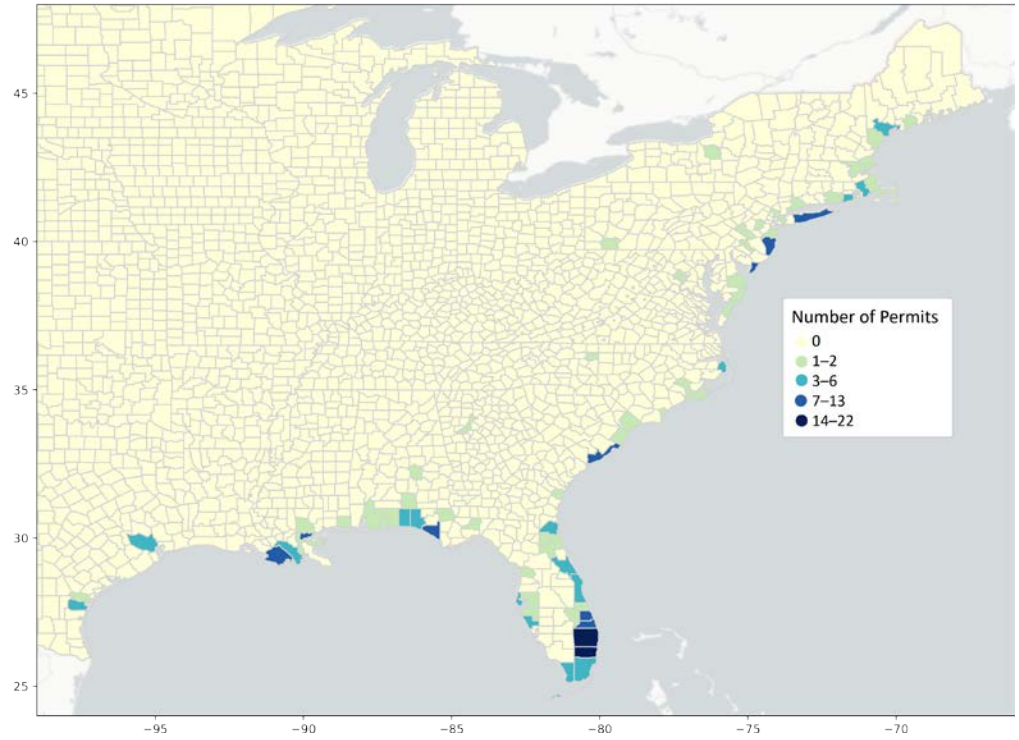

Figure 4.5 Distribution of Shark Incidental Permits as of November 2019

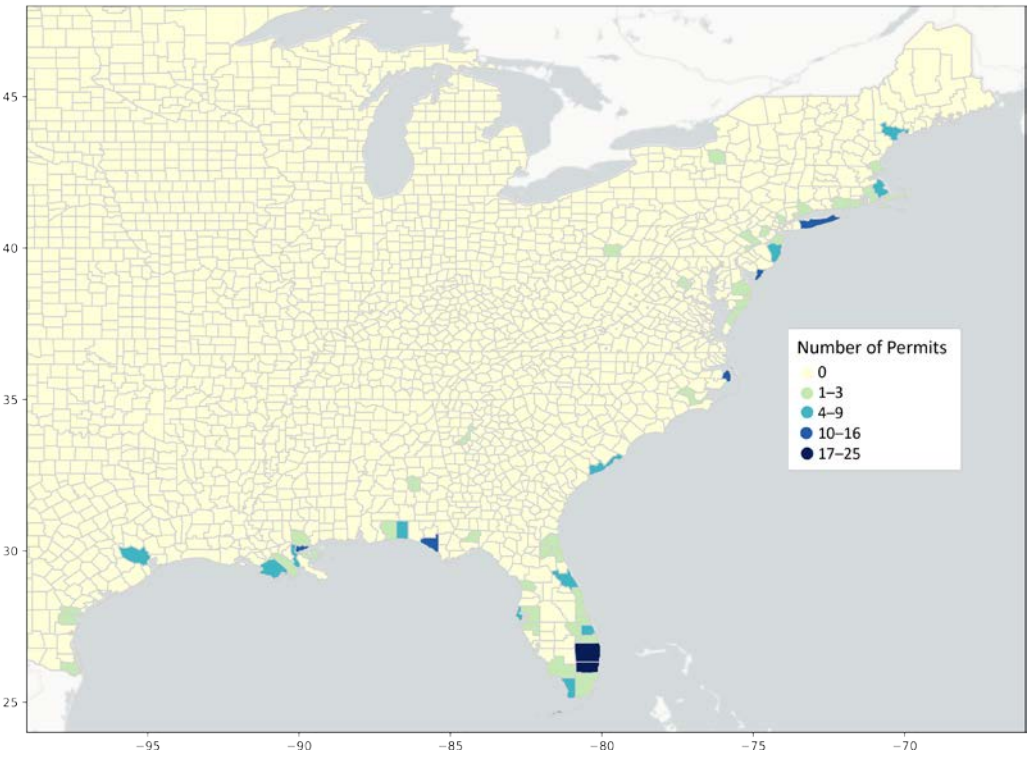

Figure 4.6 Distribution of Atlantic Tunas Longline Permits as of November 2019

4.1.2 Incidental HMS Squid Trawl Permit

The Incidental HMS Squid Trawl permit is a commercial permit available only to valid *Illex* squid moratorium permit holders (August 10, 2011; 76 FR 49368). The permit authorizes the retention of up to 15 North Atlantic swordfish caught incidentally using trawl gear per trip, as long as squid constitutes at least 75 percent of the total weight of catch on board. The distribution of Incidental HMS Squid Trawl permits among Atlantic states is presented in Table 4.3.

Table 4.3 Number of Incidental Highly Migratory Species Squid Trawl Permits by State in 2019*

State	Issued Permits
Maine	1
Massachusetts	8
Rhode Island	16
Connecticut	3
New York	4
New Jersey	28
Virginia	5
North Carolina	4
2019 total*	69
2018 total	66

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of November 2019. Source: Greater Atlantic Regional Fisheries Office.

4.1.3 Open Access Permits

Unlike limited access permits, open access permits are not limited in the number issued, can be issued new, and may not be transferred from another permit holder. The HMS open access permit program includes the following:

- Commercial Caribbean Small Boat permit
- Swordfish General Commercial permit
- Smoothhound Shark permit
- Atlantic Tunas General category permit
- Atlantic Tunas Harpoon category permit
- Atlantic Tunas Trap category permit
- Atlantic HMS Charter/Headboat permit
- Atlantic HMS Angling permit

4.1.3.1 Commercial Caribbean Small Boat Permit

The Commercial Caribbean Small Boat permit is 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 is 10 fish and the retention limit for North Atlantic swordfish is two fish. The shark retention limit is zero; however, if the

retention limit were increased, permit holders would be allowed to retain and sell non-prohibited species of sharks.

The distribution of these permits among the states and territories is presented in Table 4.4.

Table 4.4 Number of Commercial Caribbean Small Boat Permits By State in 2019*

State	Issued Permits
South Carolina	2
Florida	27
Louisiana	1
Puerto Rico	4
U.S. Virgin Islands	1
2019 total*	35
2018 total	40

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of November 2019. Source: Southeast Regional Office.

4.1.3.2 Swordfish General Commercial Permit

The Swordfish General Commercial permit (August 21, 2013; 78 FR 52012) authorizes holders to retain and sell a limited number of swordfish caught on rod and reel, handline, harpoon, green-stick, or bandit gear. This permit can be held in conjunction with the Atlantic Tunas Harpoon and General category permits. It also authorizes vessel occupants to fish recreationally for any HMS when participating in a registered Atlantic HMS tournament.

The swordfish retention limit under this permit may be set between zero and six fish per vessel per trip. The default retention limits for North Atlantic swordfish are three in the northwest Atlantic and Gulf of Mexico, two in the U.S. Caribbean, and zero in the Florida Swordfish Management Area. The swordfish retention limits were maintained at six fish throughout 2019 by two inseason actions published in December 2018 (83 FR 65571) and June 2019 (84 FR 29088). The distribution of Swordfish General Commercial permits is presented in Table 4.5 and mapped in Figure 4.7.

Table 4.5 Number of Swordfish General Commercial Permits By State in 2019*

State	Issued Permits
Maine	145
New Hampshire	36
Massachusetts	165
Rhode Island	33
Connecticut	11
New York	42
Pennsylvania	2
New Jersey	21
Delaware	3
Maryland	6
Virginia	11
North Carolina	82
South Carolina	3
Florida	69
Alabama	7
Mississippi	2
Louisiana	11
Puerto Rico	9
Texas	6
California	2
Hawaii	1
2019 total*	667
2018 total	723

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of November 2019. Source: Southeast Regional Office.

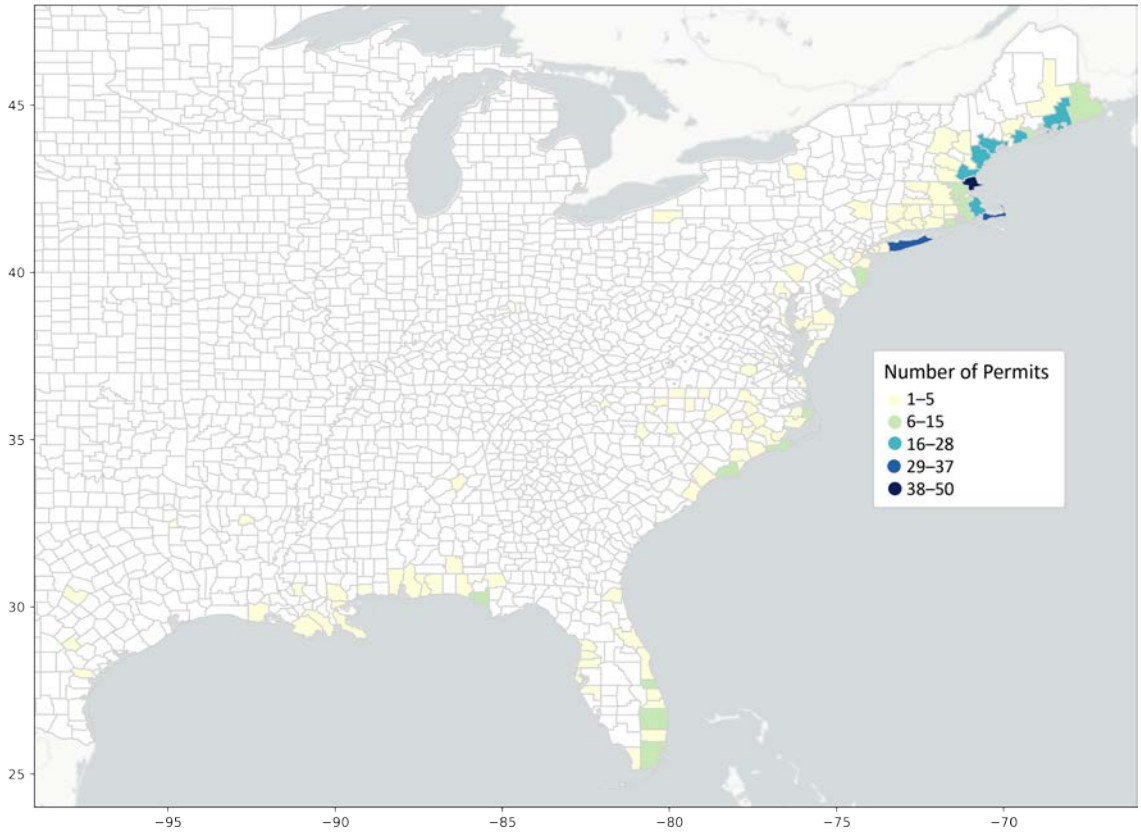

Figure 4.7 Distribution of Swordfish General Commercial Permits as of November 2019

4.1.3.3 Smoothhound Shark Permit

The commercial Smoothhound Shark permit has been required since March 15, 2016 (November 24, 2015, 80 FR 73128) in order to land and sell smoothhound sharks, including smooth dogfish, Florida smoothhound, and Gulf smoothhound. Table 4.6 provides the number of permit holders by state. The distribution of Smoothhound Shark permits are mapped in Figure 4.8.

Table 4.6 Number of Smoothhound Shark Permits By State in 2019*

State	Issued Permits
Maine	1
Rhode Island	6
New York	13
New Jersey	30
Delaware	2
Maryland	4
Virginia	18
North Carolina	61
South Carolina	6
Florida	16
Louisiana	1
2019 total*	159
2018 total	163

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of November 2019. Source: Southeast Regional Office.

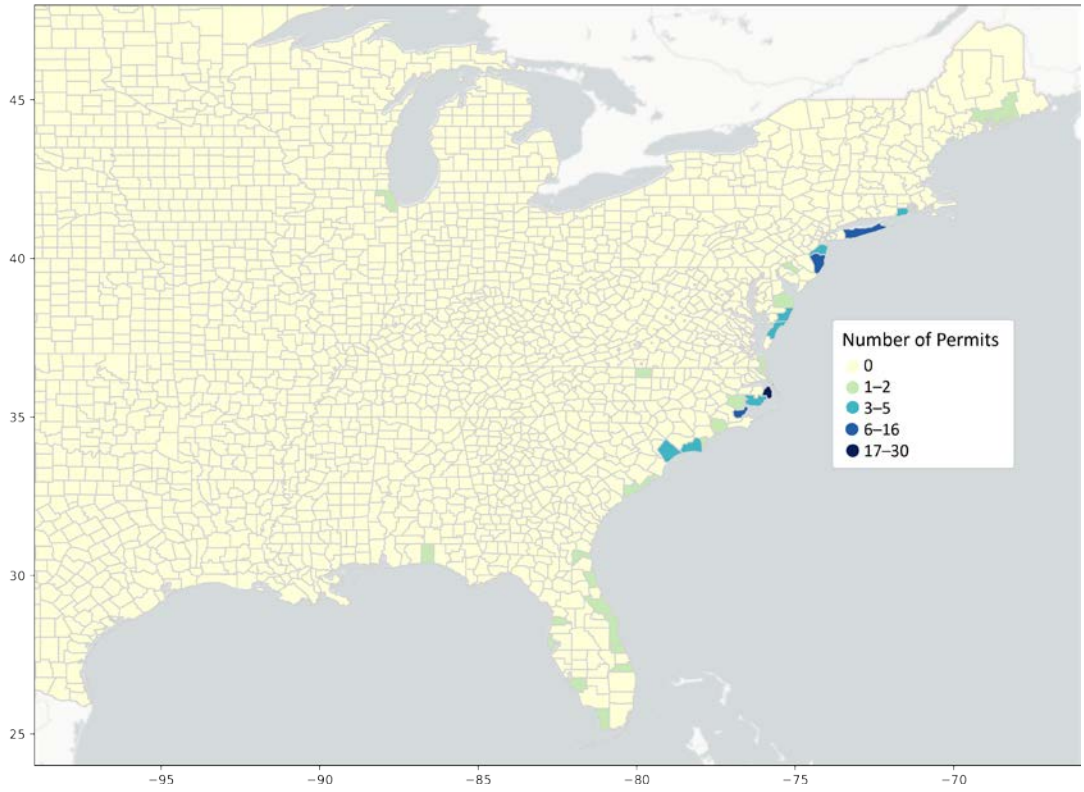

Figure 4.8 Distribution of Smoothhound Shark Permits as of November 2019

4.1.3.4 Atlantic Tunas Permit

Background

Commercial fisheries targeting U.S. Atlantic tuna are currently managed through an open access vessel permit program constituted by the Atlantic Tunas permit and the Atlantic HMS Charter/Headboat permit with a commercial sales endorsement (see Section 4.1.3.5). Vessels that wish to sell their landings under the Atlantic Tunas permit must obtain a permit in one of the following categories:

- **General:** Authorizes the use of handgear, including rod and reel, harpoon, handline, bandit gear, and green-stick. This permit also authorizes individuals on a permitted vessel to fish for all HMS when participating in a registered Atlantic HMS tournament.
- **Harpoon:** Authorizes the use of harpoon gear only.
- **Trap:** Authorizes the use of pound net and fish weir for incidentally caught bluefin tuna.

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 dealer.

The full distribution of Atlantic Tunas permits, including limited access categories, from 2014 to 2019 are listed by category in Table 4.7. For more information on the limited access Longline and Purse Seine categories, see Section 4.1.1.

Table 4.7 Number of Commercial Atlantic Tunas Permits By Category in 2014–2019

Category	2014	2015	2016	2017	2018	2019*
Longline**	246	280	280	280	280	280
Harpoon	14	23	9	11	21	20
Trap	3	4	-	1	-	2
General	3,396	3,230	2,910	2,940	2,942	2,721
Purse Seine**†	5	5	5	5	5	5
Total	3,664	3,542	3,204	3,237	3,248	3,023

Notes: The General and Harpoon categories listed include those held in conjunction with a Swordfish General Commercial permit. The actual number of 2019 permit holders in each category is subject to change as individuals renew their permits or allow them to expire. *As of November 2019. **Limited access categories. †Number of available permits. Source: Southeast Regional Office.

NOAA Fisheries manages a bluefin tuna quota for each of these categories. In addition, there is a Reserve category quota that can be used for research or for inseason or annual quota adjustments (i.e., transfers to other quota categories).

General Category

Vessels with this permit fish under the General category rules and regulations. For instance, vessels with this permit can retain an agency-specified daily bag limit of 1–5 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 General category bluefin tuna fishery opens on January 1 of each year and remains open until March 31 or until the General category quota allocation has been caught, whichever comes first. The fishery then reopens on June 1 and remains open until December 31 or the quota is filled.

The bluefin tuna quota for the General category is divided into multiple subquotas associated with specific periods of the year. NOAA Fisheries has the authority to transfer quota from one subquota period to another, including earlier in the calendar year. In accordance with the 2006 Atlantic HMS Consolidated FMP, the General category receives approximately 47 percent of the U.S. bluefin tuna quota.

The number of General category permits by state can be found in Table 4.8 and illustrated in Figure 4.9.

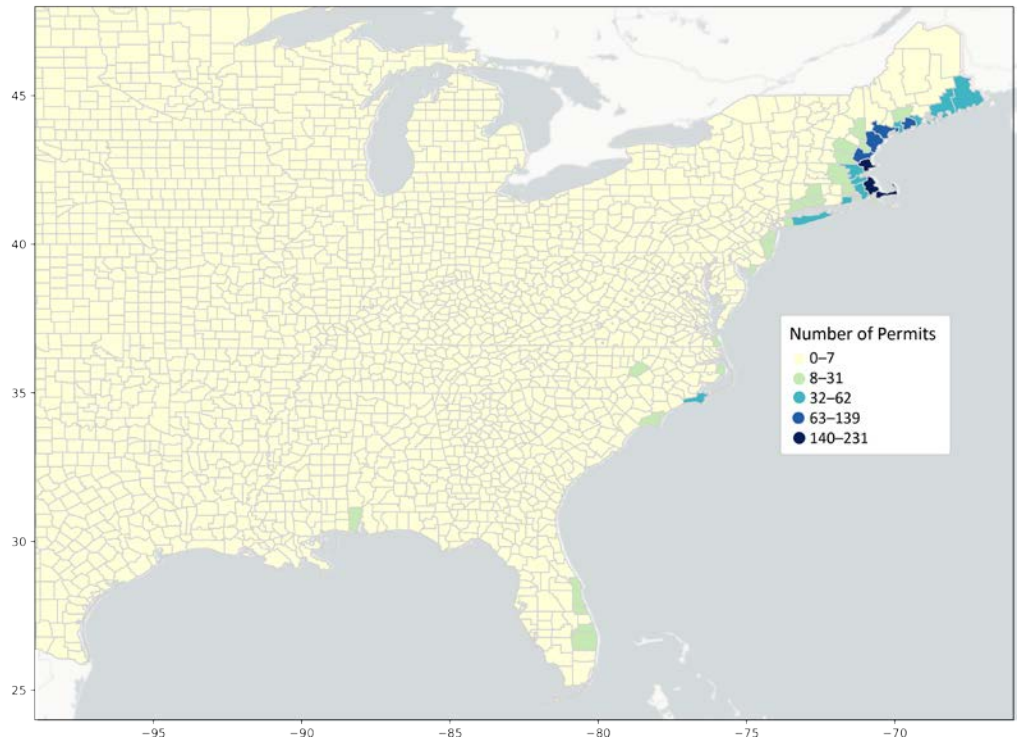

Figure 4.9 Distribution of Atlantic Tunas General Category Permits as of November 2019

Table 4.8 Number of Atlantic Tunas General Category Permits By State/Territory in 2019*

State	Issued Permits
Maine	648
New Hampshire	198
Vermont	1
Massachusetts	961
Rhode Island	99
Connecticut	44
New York	102
Pennsylvania	6
Ohio	1
New Jersey	82
Delaware	14
Maryland	16
West Virginia	1
Virginia	35
Tennessee	1
North Carolina	255
South Carolina	12
Georgia	1
Florida	123
Alabama	16
Mississippi	15
Louisiana	16
Texas	9
Puerto Rico	58
U.S. Virgin Island	3
California	1
Oregon	1
Washington	1
Hawaii	1
2019 total*	2,721
2018 total	2,942

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of November 2019. Source: Greater Atlantic Regional Fisheries Office.

Harpoon Category

The Harpoon category provides different rules and regulations for vessels fishing exclusively with Harpoon gear than for vessels fishing with harpoon gear under the General category. For instance, the default retention limit under this permit for bluefin tuna measuring 73 inches to less than 81 inches CFL is two fish per vessel trip per day, and NOAA Fisheries has the authority to set the limit in the 2–4 fish range. There is no limit on the number of bluefin tuna that can be retained measuring longer than 81 inches CFL as long as the Harpoon category season is open. The season opens on June 1 of each year and

closes November 15 if the quota has not already been filled. The Harpoon category bluefin tuna quota is approximately 3.9 percent of the U.S. quota.

The homeport states for the 20 Atlantic Tunas Harpoon category permits issued in 2019 were Maine (11 vessels) and Massachusetts (nine vessels). A map showing the distribution of Harpoon category permits is illustrated in Figure 4.10.

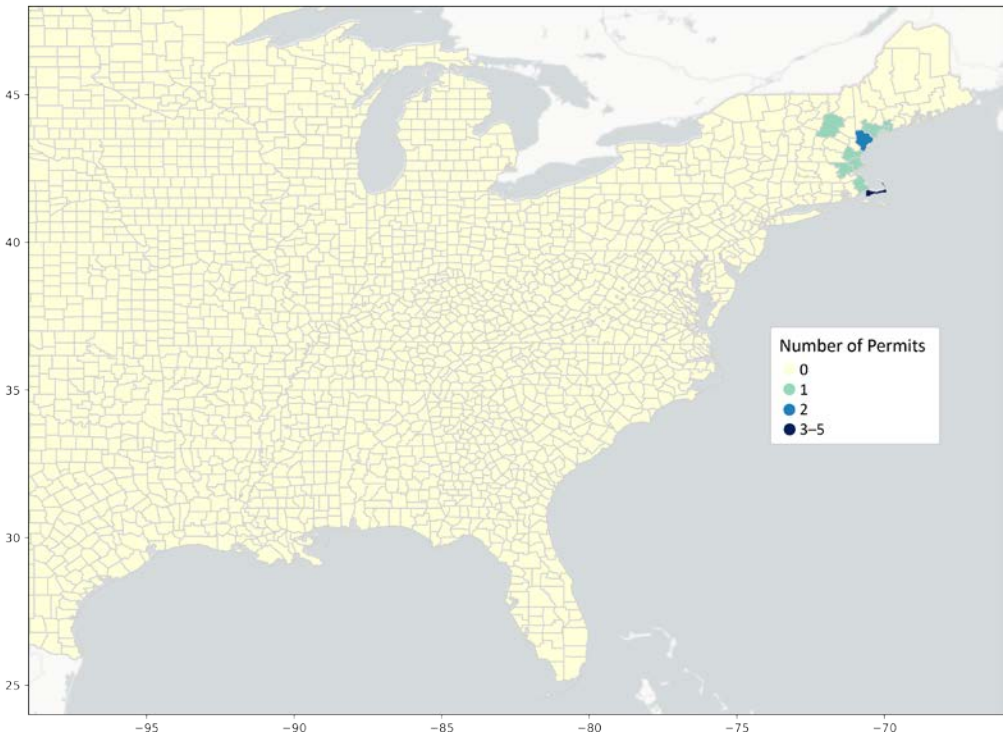

Figure 4.10 Distribution of Atlantic Tunas Harpoon Category Permits as of November 2019

4.1.3.5 Atlantic HMS Charter/Headboat Permit

The Atlantic HMS Charter/Headboat permit authorizes recreational fishing for all Atlantic HMS. It also allows for the 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 endorsement (82 FR 57543). Those vessels are required to abide by the U.S. Coast Guard commercial fishing vessel safety requirements.

Starting in 2018, vessel owners issued an HMS Charter/Headboat permit who intend to fish for sharks are also required to obtain a shark endorsement (82 FR 16478). See Section 4.1.4 for information on issued endorsements.

The distribution of 2019 Atlantic HMS Charter/Headboat permits is presented in Table 4.9 and in Figure 4.11.

Table 4.9 Number of Atlantic Highly Migratory Species Charter/Headboat Permits By State in 2019*

State/Territory	Issued Permits
Maine	138
New Hampshire	92
Massachusetts	699
Rhode Island	128
Connecticut	68
New York	314
Pennsylvania	10
Ohio	2
New Jersey	471
Delaware	98
Maryland	123
West Virginia	1
Virginia	75
North Carolina	356
South Carolina	130
Georgia	26
Florida	723
Alabama	64
Mississippi	17
Louisiana	91
Texas	100
Puerto Rico	19
U.S. Virgin Island	16
Oklahoma	1
New Mexico	1
California	1
Idaho	1
Wisconsin	2
Illinois	1
Michigan	1
2019 total *	3,769
2018 total	3,635

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of November 2019. Source: Southeast Regional Office.

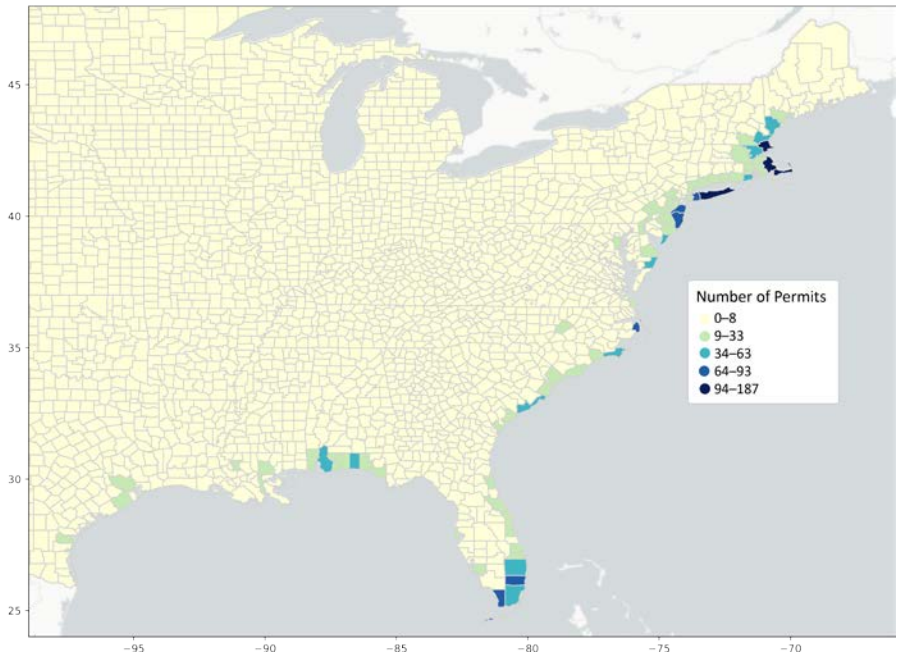

Figure 4.11 Distribution of Atlantic Highly Migratory Species Charter/Headboat Category Permits as of November 2019

4.1.3.6 Atlantic HMS Angling Permit

The Atlantic HMS Angling permit is required to recreationally fish for, retain, or possess any federally regulated HMS. This requirement extends to catch-and-release fishing. The permit does not authorize the sale or transfer of HMS to any person for a commercial purpose. Starting in 2018, vessel owners issued an Atlantic HMS Angling permit intending to fish for sharks are required to obtain a shark endorsement.

Atlantic HMS Angling permit distribution is reported in Table 4.10.

Table 4.10 Number of Atlantic Highly Migratory Species Angling Permits By State or Country in 2019†

State/Country	Permits by Home Port*	Permits by Residence**
Alaska	3	2
Alabama	414	366
Arkansas	8	12
Arizona	1	6
California	4	13
Colorado	4	9
Connecticut	708	791
District of Columbia	1	5
Delaware	863	566
Florida	4,330	4,014
Georgia	98	178
Hawaii	2	-

State/Country	Permits by Home Port*	Permits by Residence**
Iowa	-	2
Idaho	-	2
Illinois	12	27
Indiana	5	15
Kansas	3	5
Kentucky	3	10
Louisiana	540	544
Massachusetts	2,397	2,389
Maryland	1,127	1,066
Maine	436	370
Michigan	25	31
Minnesota	2	7
Missouri	9	19
Mississippi	178	206
Montana	1	3
North Carolina	1,342	1,236
North Dakota	1	2
New Hampshire	245	290
New Jersey	3,344	2,906
New Mexico	-	2
Nevada	3	4
New York	2,137	2,206
Ohio	18	32
Oklahoma	8	16
Pennsylvania	176	1083
Puerto Rico	402	410
Rhode Island	544	370
South Carolina	471	461
South Dakota	-	3
Tennessee	22	45
Texas	627	669
Utah	3	4
Virginia	822	912
U.S. Virgin Islands	28	15
Vermont	18	31
Washington	5	12
Wisconsin	4	9
West Virginia	6	13
Wyoming	-	3
British Virgin Islands	-	1
Canada†	7	7
Not reported	-	7
2019 totals, by port and by residence*	21,407	21,407
2018 totals, by port and by residence	20,086	20,086

†As of November 2019. *The vessel port or other storage location. **The permit holder's billing address.
Source: Southeast Regional Office.

4.1.4 HMS Permit Endorsements

Two permit endorsements are available for the Atlantic HMS Angling and Atlantic HMS Charter/Headboat permits. A shark endorsement is required for all vessel owners who have been issued an Atlantic HMS Angling permit or an Atlantic HMS Charter/Headboat permit and intend to fish for sharks (82 FR 16478). A commercial sale endorsement, when combined with the Atlantic HMS Charter/Headboat permit, allows for the sale of Atlantic tunas and swordfish in certain situations (Section 4.1.3.5).

Table 4.11 summarizes the number of permits issued and the number of commercial and shark endorsements for each permit category.

Table 4.11 Summary of Permit Endorsements Issued in 2019*

Permit Category	Total Permits Issued	Shark Endorsements	Commercial Sale Endorsement
Atlantic HMS Charter/Headboat	3,769	2,732	1,549
Atlantic HMS Angling	21,407	11,740	-
Atlantic Tunas General	2,088	913	-
Swordfish General Commercial	34	11	-
Atlantic Tunas General and Swordfish General Commercial	633	354	-

*As of November 2019. Source: Southeast Regional Office.

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

Exempted fishing permits, scientific research permits, and display permits authorize the collection 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. Exempted fishing permits are issued to individuals for the purpose of conducting research or other fishing activities aboard vessels that are not affiliated with NOAA Fisheries, whereas scientific research permits are issued to agency scientists conducting research aboard NOAA vessels. Letters of Acknowledgement are issued to acknowledge activity as "scientific research" but do not authorize any particular activity. These are issued to individuals conducting research from "bona fide" research vessels on species that are only regulated by the Magnuson-Stevens Act and not the Atlantic Tunas Convention Act; these laws differ on the treatment of scientific research activity. Display permits are issued to individuals who are fishing for, catching, and then transporting HMS to certified aquariums for public display.

The number of exempted fishing permits, display permits, and scientific research permits issued from 2014 to 2019 by category and species are listed in Table 4.12. In 2019, NOAA Fisheries received 11 applications for the shark research fishery permit. Based on the qualification criteria and random selection process, five permits were issued.

Table 4.12 Number of Atlantic Highly Migratory Species Exempted Fishing Permits, Display Permits, Letters of Acknowledgement, and Scientific Research Permits in 2014–2019

Permit Type	Reason for Permit	2014	2015	2016	2017	2018	2019*
Exempted fishing permit	Sharks for display	3	3	3	5	6	5
	HMS** for display	3	1	0	2	2	2
	Tunas for display	0	0	0	0	0	0
	Shark research, non-scientific vessel	10	11	12	4	4	4
	Tuna research, non-scientific vessel	2	2	4	2	2	1
	HMS** research, non-scientific vessel	3	4	4	4	2	8
	Billfish research, non-scientific vessel	0	0	0	0	0	0
	Shark fishing	0	0	0	0	0	0
	Tuna fishing	1	1	0	0	0	1
Total EFPs issued		22	22	23	17	16	21
Scientific research permit	Shark research	2	4	5	1	1	1
	Tuna research	2	1	1	0	1	0
	Billfish research	0	0	0	0	0	0
	HMS** research	3	1	1	3	6	4
Total SRPs issued		7	6	7	4	8	5
Letters of acknowledgement	Shark research	8	8	9	12	15	15
Total LOAs issued	Total	8	8	9	12	15	15

*As of November 2019. **Multiple species. Source: Atlantic HMS Management Division.

4.3 Dealer Permits for Atlantic Tunas, Swordfish, and Shark

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

Annual totals of Atlantic tunas, swordfish, and shark dealer permits are reported in Table 4.13. Totals by state for 2019 are in Table 4.14. The distribution of Atlantic swordfish dealer permits (Figure 4.12) and Atlantic shark dealer permits (Figure 4.13) issued in 2019 are mapped below.

Table 4.13 Number of Domestic Atlantic Dealer Permits for Tunas, Swordfish, and Sharks in 2014–2019

Year	Bluefin Only	BAYS Only	Bluefin and BAYS	Atlantic Swordfish	Atlantic Sharks	Total
2019*	34	65	278	200	104	681
2018	30	70	287	193	108	698
2017	32	70	291	189	113	695
2016	29	74	291	182	111	687
2015	33	79	289	184	102	687
2014	32	79	308	195	96	710

Note: The actual number of permits per state may change as permit holders move or sell their businesses. BAYS = Bigeye, albacore, yellowfin, and skipjack tunas. *As of November 2019. Source: Southeast Regional Office; Greater Atlantic Regional Fisheries Office.

Table 4.14 Number of Domestic Dealer Permits for Atlantic Tunas, Swordfish, and Sharks by State in 2019*

State/Territory	Bluefin Only	BAYS Only	Bluefin and BAYS	Atlantic Swordfish	Atlantic Sharks	Total
Maine	13	-	18	1	1	33
New Hampshire	2	-	7	2	-	11
Vermont	-	-	1	-	-	1
Massachusetts	6	11	77	17	6	117
Rhode Island	-	2	18	5	2	27
Connecticut	-	1	3	-	-	4
New York	4	18	35	11	17	85
Pennsylvania	-	-	1	1	-	2
New Jersey	1	19	37	9	9	75
Delaware	-	-	5	1	-	6
Maryland	-	-	5	3	2	10
Virginia	-	5	11	2	1	19
North Carolina	3	2	26	22	18	71
South Carolina	-	2	4	12	8	26
Georgia	1	-	1	1	1	4
Florida	1	7	15	91	31	145
Alabama	-	2	2	7	2	13
Louisiana	-	1	5	7	4	17
Texas	-	2	2	3	2	9
Puerto Rico	-	2	1	1	-	4
U.S. Virgin Islands	-	1	1	-	-	2
Missouri	-	-	-	1	-	1
Illinois	-	-	-	1	-	1
California	2	-	1	2	-	5
Hawaii	-	-	2	-	-	2

Note: The actual number of permits per state may change as permit holders move or sell their businesses. BAYS = Bigeye, albacore, yellowfin, and skipjack tunas. *As of November 2019. Source: Southeast Regional Office; Greater Atlantic Regional Fisheries Office.

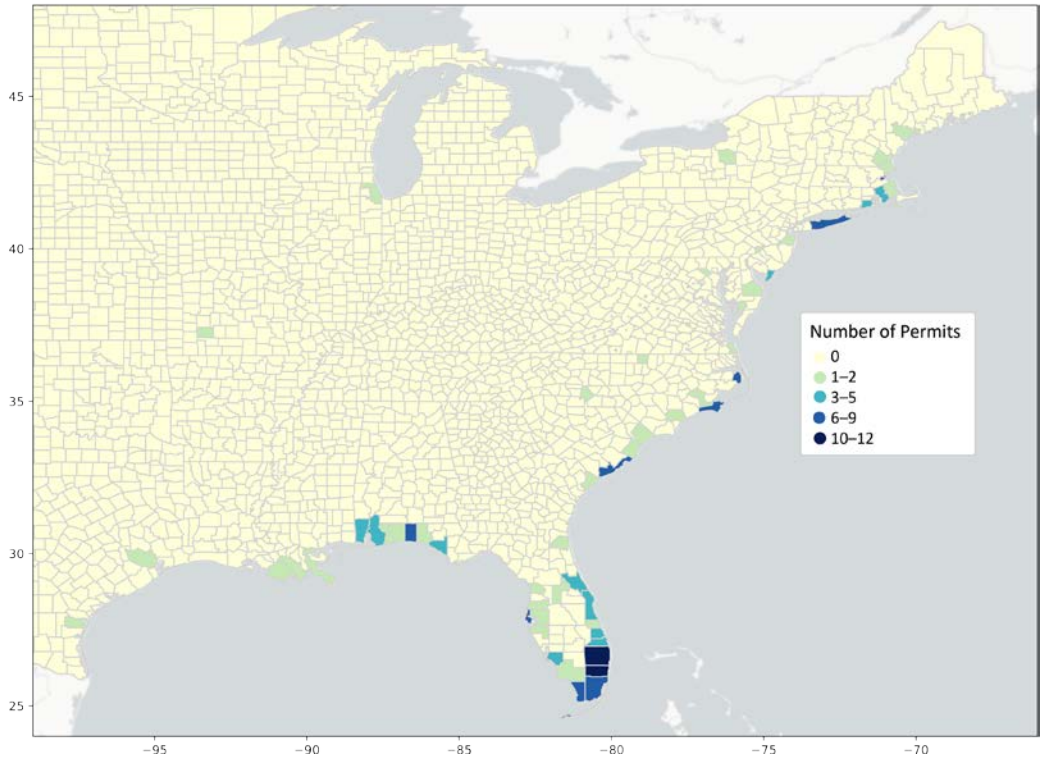

Figure 4.12 Distribution of Swordfish Dealer Permits as of November 2019

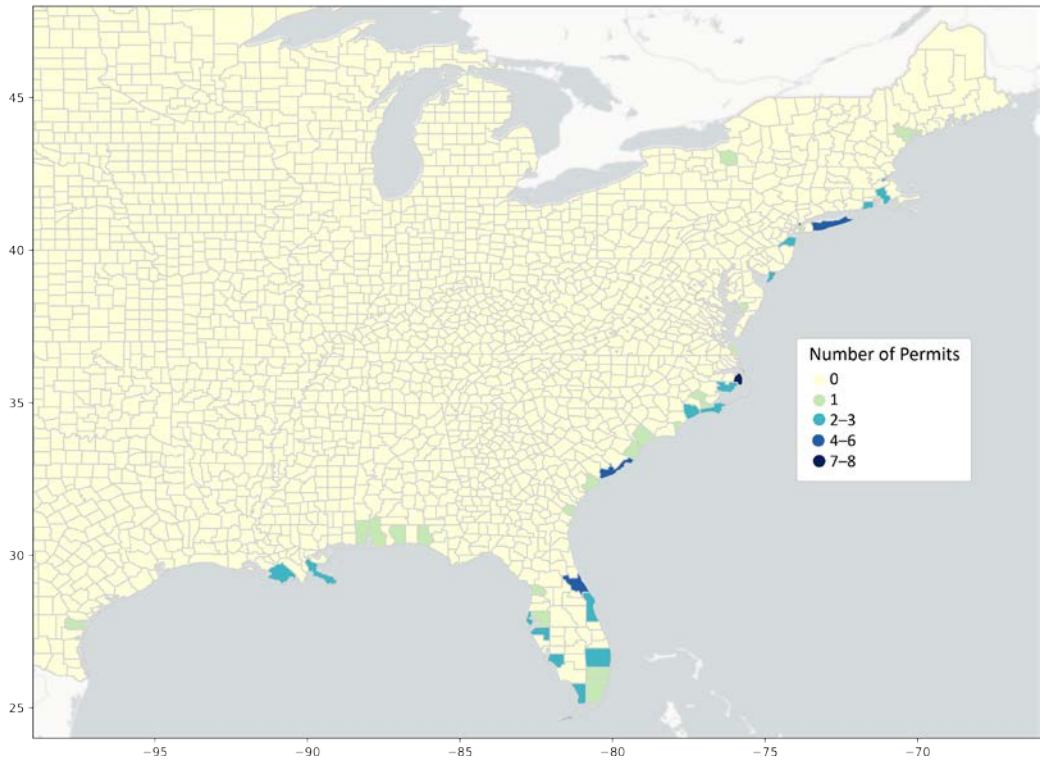

Figure 4.13 Distribution of Shark Dealer Permits as of November 2019

4.4 Atlantic HMS Tournaments

4.4.1 Background

An Atlantic HMS tournament is defined as any fishing competition involving Atlantic HMS wherein participants must register or otherwise enter or in which a prize or award is offered for catching or landing Atlantic HMS. Atlantic HMS tournaments vary by size and are conducted from ports along the U.S. Atlantic coast, Gulf of Mexico, and U.S. Caribbean. They may range from relatively small "members-only" club events with as few as 10 participating boats (40–60 anglers) to larger, statewide tournaments with 250 or more participating vessels (1,000–1,500 anglers). Larger tournaments often involve corporate sponsorship from tackle manufacturers, marinas, boat dealers, marine suppliers, beverage distributors, resorts, radio stations, publications, chambers of commerce, restaurants, and other local businesses. It is estimated that Atlantic HMS tournaments support approximately 1,000 jobs and over $130 million in total economic output, according to data from the Atlantic HMS Tournament Economic Study (2016).

Since 1999, federal regulations have required that tournaments register with NOAA Fisheries at least four weeks prior to the start of tournament fishing activities. Some foreign tournaments (e.g., those held in the Bahamas, Bermuda, and the Turks and Caicos) voluntarily register with NOAA Fisheries because many of their participants are U.S. citizens. Tournament registration information and forms are available at www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-highly-migratory-species-tournaments.

On January 1, 2019, NOAA Fisheries announced that all Atlantic HMS tournaments are required to report tournament catch and effort data to NOAA Fisheries within seven days of the tournament's conclusion. Prior to that announcement, only Atlantic billfish and swordfish tournaments were required to report due to limited resources for data collection. The data collected are used to estimate the total annual catch of HMS and the impact of tournament operations in relation to other types of fishing activities.

Selecting all HMS tournaments for reporting provides NOAA Fisheries with additional information that will improve domestic fishery management decision making and augment data reporting for species managed by ICCAT. Improved tournament data on recreational tuna fisheries is especially important when the United States negotiates catch limits and quota shares internationally. Improved data on recreational shortfin mako shark fisheries can be provided to ICCAT in response to Recommendation 17-08, which requires member nations to strengthen their data collection efforts to monitor the future status of this stock.

Anglers fishing from an HMS-permitted vessel in any tournament awarding points or prizes for Atlantic billfish are required to deploy only non-offset circle hooks when using natural bait or natural bait/artificial lure combinations. The use of non-offset circle hooks increases the likelihood of post-release survival for billfish. For more information on studies of post-release survival on other HMS with this gear, as well as brochures and videos provided by NOAA Fisheries describing benefits and safe-handling-and-release procedures, consult Section 6.3.5 of this report.

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

4.4.2 Registration Data

The number of HMS tournaments registered from 2009 to 2019 is reported in Figure 4.14, and the average distribution of HMS fishing tournaments across the U.S. Caribbean and along Atlantic and Gulf of Mexico coastal states is represented in Figure 4.15. Since 2009, an average of 259 HMS tournaments have registered each year. The number of HMS tournaments registered as of December 18, 2019, is below that average at 244 tournaments. The largest number of HMS tournament registrations for a given year (287) was in 2017. This was possibly due to an increase in outreach and compliance monitoring and may have been influenced by an improving U.S. economy and lower fuel prices.

Summary data from the HMS Atlantic Tournament Registration and Reporting (ATR) database are presented in Figure 4.14–Figure 4.18 and in Table 4.15. Tournament landings of billfishes and swordfish are presented in Section 5.3.5.2.

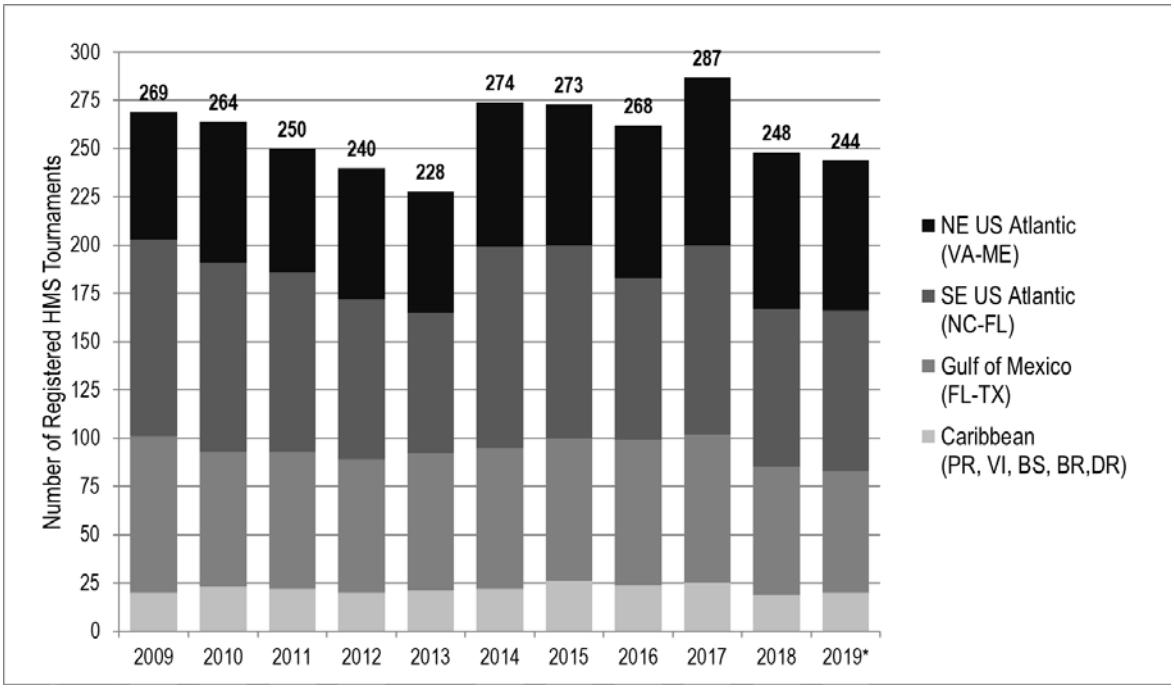

Figure 4.14 Annual Number of Registered Atlantic Highly Migratory Species Tournaments by Region in 2009–2019*

*As of mid-December 2019. 2019 data are considered preliminary and do not represent a complete year.
Source: Atlantic Tournament Registration and Reporting database.

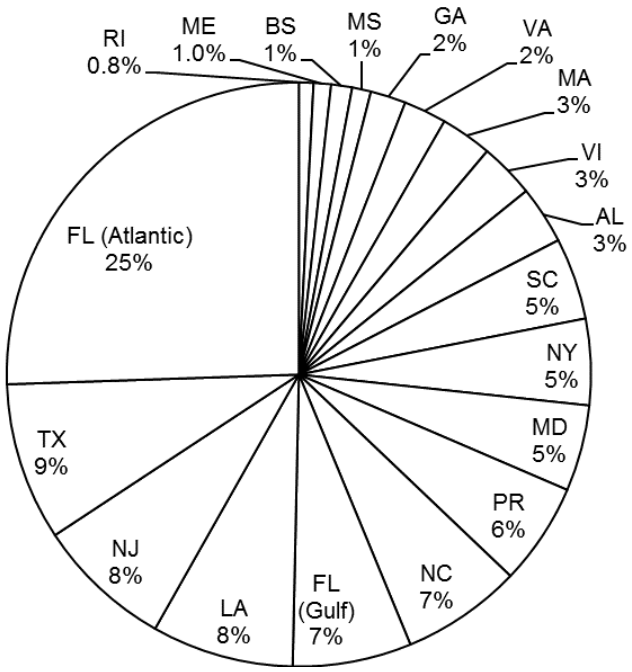

Figure 4.15 Percent of Atlantic Highly Migratory Species Tournaments Held in Each State in 2009–2018

Note: Total number of tournaments is 2,974; areas excluded are Connecticut (0.13 percent) and Delaware (0.37 percent). Source: Atlantic Tournament Registration and Reporting database.

Participants may target one or more HMS in a tournament. Most tournaments register to catch multiple HMS. In 2018, 60 percent of the Atlantic HMS tournament registrations indicated multiple HMS. Tuna and billfish, followed by sharks and swordfish, were listed most frequently as the target species in the 40 percent of tournaments that registered for only one species group. Often, a tournament targets a primary species, and other species are caught for entry in separate categories. The secondary species vary by region as these species are ones present during the local fishing season at the time of the tournament. Figure 4.16 gives a breakdown of the percent of tournaments in each state registered for billfish, sharks, swordfish, or tuna species in 2018.

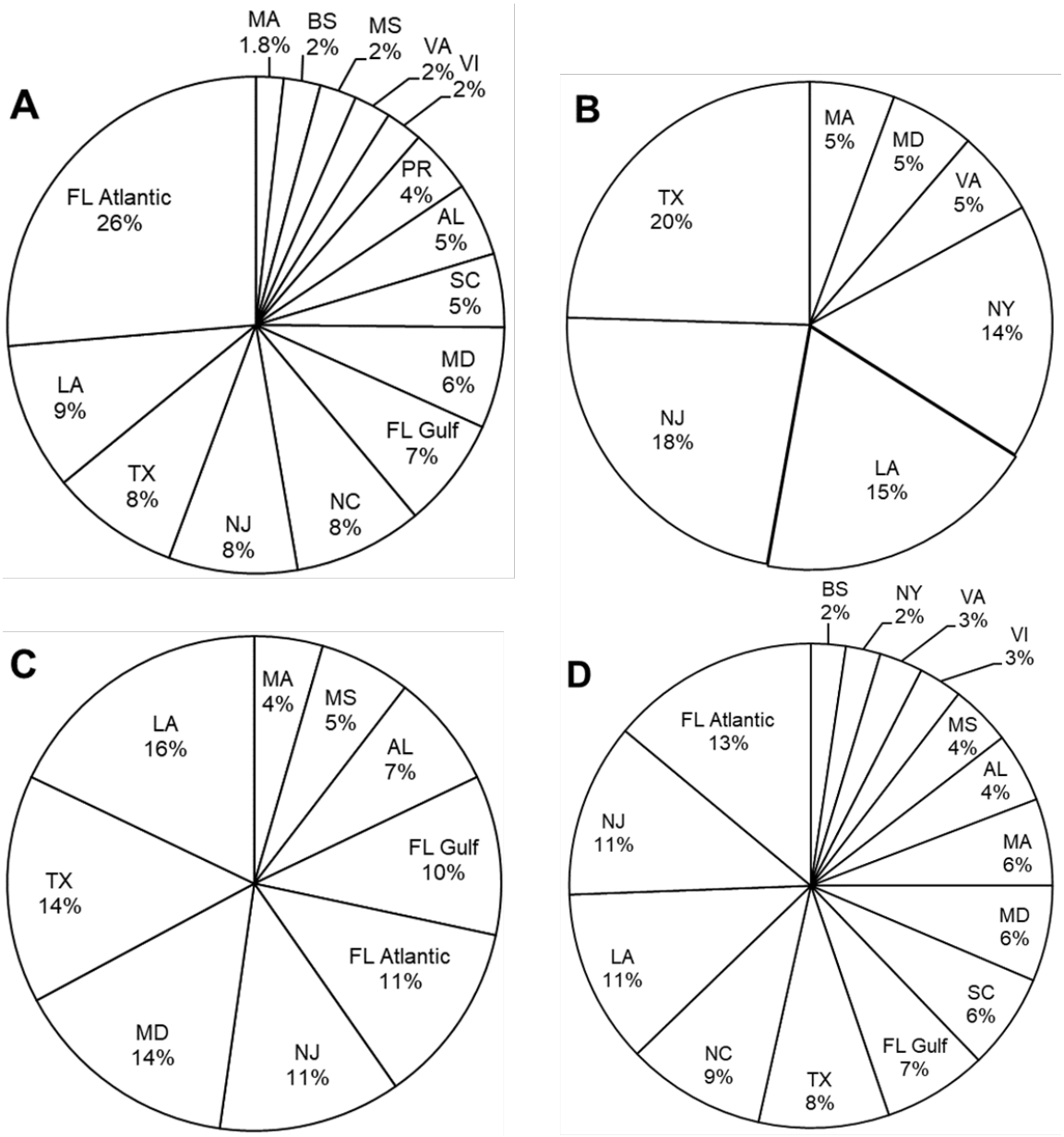

Figure 4.16 Percent of Atlantic Highly Migratory Species Tournaments in Each State* that Registered for (A) Billfish, (B) Shark, (C) Swordfish, or (D) Tuna Species in 2018

The total numbers of tournaments by state in 2018 for each species group were 171 for billfish (A), 66 for shark (B), 73 for swordfish (C), and 180 for tuna species (D). *Some states/areas with few tournaments were excluded due to confidentiality of the fisheries data. These areas include, by species, (A) four areas representing less than 1 percent of total: Connecticut, Delaware, Georgia, and Dominican Republic; (B) nine areas representing less than 19 percent of total: Alabama, Connecticut, Delaware, Florida (Gulf-side), South Carolina, Florida (Atlantic-side), Maine, Mississippi, and Rhode Island; (C) four areas representing less than 9 percent of total: Connecticut, South Carolina, North Carolina, and Virginia; and (D) six areas representing less than 4 percent of total: Connecticut, Georgia, Puerto Rico, Rhode Island, Delaware, and Maine. Source: Atlantic Tournament Registration and Reporting database.

Table 4.15 provides the total numbers of HMS tournaments from 2016 to 2019 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 4.17.

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

Figure 4.18 depicts the time of year that billfish tournaments are most prevalent in regions of the U.S. Atlantic, Gulf of Mexico, and Caribbean. In 2018, it is interesting to note that all of the billfish tournaments occurring from January through February targeted sailfish along the Atlantic coast of Florida.

Table 4.15 Number of Atlantic Highly Migratory Species Tournaments by Targeted Species in 2016–2019

Species	2016	2017	2018	2019*
Blue marlin	158	174	160	144
White marlin	144	165	148	130
Longbill spearfish	55	65	42	40
Roundscale spearfish	45	102	77	61
Sailfish	155	175	155	143
Swordfish	89	71	81	77
Bluefin tuna	98	87	117	88
Bigeye tuna	78	96	108	96
Albacore tuna	41	57	55	49
Yellowfin tuna	172	183	173	156
Skipjack tuna	41	56	59	54
Smoothhounds†	0	0	8	10
Small coastal sharks	12	17	20	10
Large coastal sharks	27	23	30	31
Pelagic sharks	72	75	68	55

Note: Tournaments may be represented more than once if registration included more than one highly migratory species. *As of December 2019. †Smoothhounds includes smooth dogfish, Florida smoothhound, and Gulf smoothhound. Source: Atlantic Tournament Registration and Reporting database.

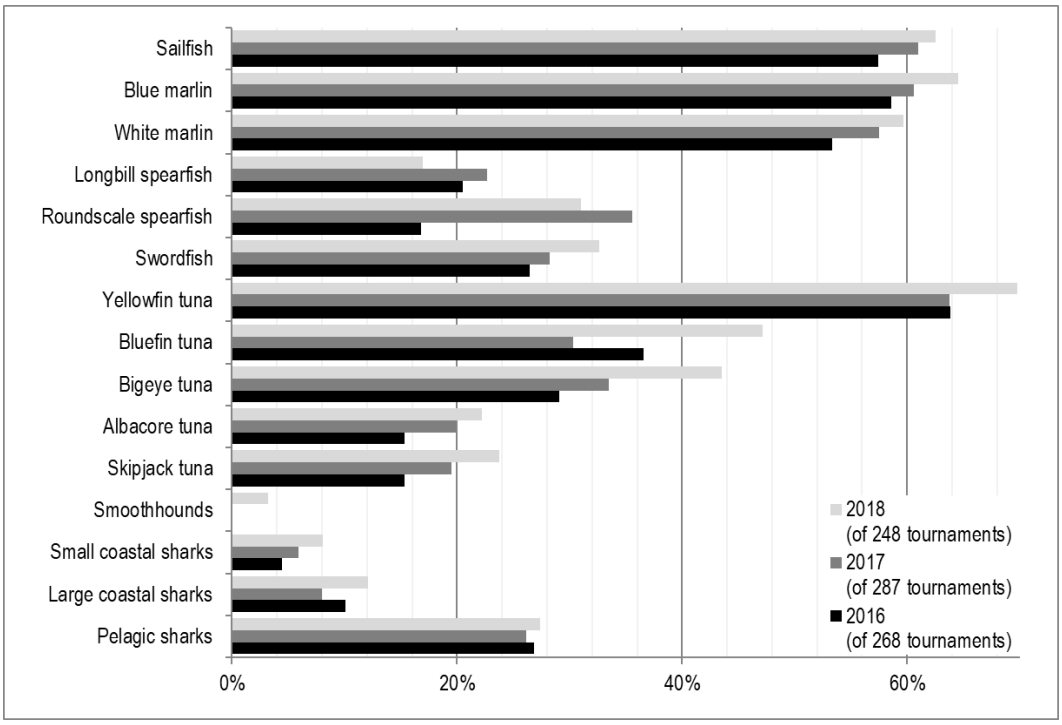

Figure 4.17 Percent of Highly Migratory Species Tournaments Registered for Each Species or Group in 2016–2018

Source: Atlantic Tournament Registration and Reporting database.

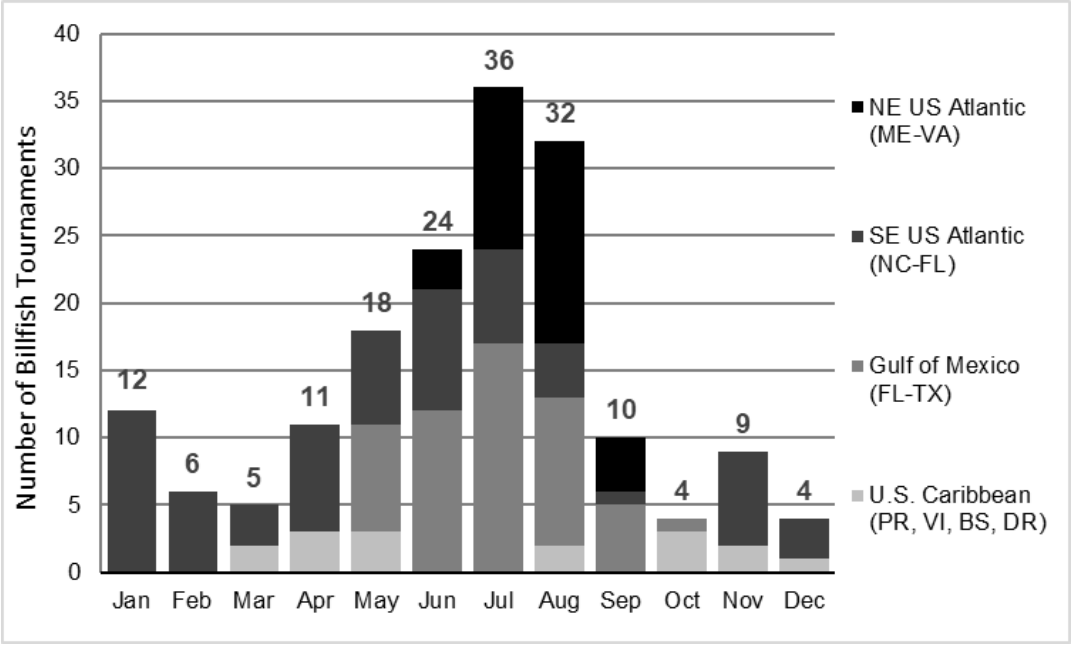

Figure 4.18 Number of Billfish Tournaments by Region and Month in 2018

Source: Atlantic Tournament Registration and Reporting database.

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5 Fishery Landings Data

5.1 Background

Information on trips, fishing effort, catch, and landings are presented both by species, in Section 5.2, and by gear, in Section 5.3. Note that landings data are presented in metric tons (mt) or pounds (lb) for whole weight (ww) or dressed weight (dw), as appropriate.

Data and regulations pertaining to the safety of fishermen at sea are included in Section 5.4. Details on bycatch, incidental catch, and protected resource interactions by these gears are provided in Chapter 6.

5.2 Data by Species

5.2.1 Total Allowable Catch and Annual Catch Limits for Atlantic HMS Management Groups

ICCAT has established total allowable catches (TACs) for certain Atlantic tunas, billfishes, and swordfish. The Standing Committee on Research and Statistics (SCRS) of ICCAT conducts international stock assessments of these species (Table 2.3). After reviewing the SCRS stock assessment, ICCAT often establishes an appropriate Atlantic-wide TAC for each species and, if needed, allocates that TAC among Contracting Parties, Non-Contracting Parties, Entities, or Fishing Entities.

Section 104(b)(1) of the Magnuson-Stevens Act included an exception to the requirements in Section 303(a)(15) for annual catch limits (ACLs) where stocks are managed under international agreements in which the United States participates. The 2016 updated National Standard 1 Guidelines (84 FR 71858, October 18, 2016) stated that the exception, "applies to stocks or stock complexes subject to management under an international agreement, which is defined as 'any bilateral or multilateral treaty, convention, or agreement which relates to fishing and to which the United States is a party.'" The guidelines also state that status determination criteria, maximum sustainable yield, and optimum yield still need to be specified for such stocks (see 50 CFR § 600.310 (h)(1)(ii)). Thus, for species managed by ICCAT, NOAA Fisheries has not specified ACLs as defined under the Magnuson-Stevens Act. Total TACs negotiated by ICCAT and the portion allocated to the U.S. are delineated by year in Table 5.1.

Table 5.1 International Commission for the Conservation of Atlantic Tunas-Negotiated Atlantic-Wide Total Allowable Catch and U.S. Allocation (mt) for Highly Migratory Species Other Than Sharks in 2014–2018

Species	2014 Atlantic TAC	2014 U.S. Allocation	2015 Atlantic TAC	2015 U.S. Allocation	2016 Atlantic TAC	2016 U.S. Allocation	2017 Atlantic TAC	2017 U.S. Allocation	2018 Atlantic TAC	2018 U.S. Allocation
Bluefin tuna	1,750	923.7†	2,000	1,058.8†	2,000	1,058.8†	2,000	1,058.8†	2,350	1,247.9†
Bigeye tuna	85,000	--	85,000	--	65,000	--	65,000	--	65,000	--
Albacore tuna	28,000	527.0	28,000	527.0	28,000	527.0	28,000	527.0	33,600	632.4
Yellowfin tuna	110,000	--	110,000	--	110,000	--	110,000	--	110,000	--
Skipjack tuna	--	--	--	--	--	--	--	--	--	--
Swordfish	13,700	3,907.0	13,700	3,907.0	13,700	3,907.0	13,700	3,907.0	13,700	3,907.0
Blue marlin	2,000	250 fish, combined*	2,000	250 fish, combined*	2,000	250 fish, combined*	2,000	250 fish, combined*	2,000	250 fish, combined*
White marlin & spearfish	400	250 fish, combined*	400	250 fish, combined*	400	250 fish, combined*	400	250 fish, combined*	400	250 fish, combined*
Sailfish	--	--	--	--	--	--	1,030	--	1,030	--

Note: Species without entries don't have established TACs or the U.S. does not have a specified limit. Information provided in metric tons unless indicated otherwise. mt = Metric tons. †NOAA Fisheries implements 25 mt be set aside by ICCAT to account for bycatch of bluefin tuna in pelagic longline fisheries in the Northeast Distant Waters. This 25 mt is not included in these totals. *Blue marlin, white marlin, and spearfish have a combined annual U.S. allocation of 250 fish.

Directed fisheries for Atlantic highly migratory shark species currently are not managed by ICCAT, although ICCAT has conservation and management measures for some species caught in association with ICCAT fisheries. NOAA Fisheries establishes TACs and ACLs for shark species consistent with Section 303(a)(15) of the Magnuson-Stevens Act. These TACs and ACLs are generated from information provided through stock assessments.

For sharks assessed through the Southeast Data, Assessment, and Review (SEDAR) process, NOAA Fisheries establishes an overfishing limit equal to the TAC. Discard, recreational, and research catch estimates are deducted from the TAC and constitute their respective sector ACLs. The remaining TAC is considered the commercial quota or the commercial sector ACL. More details on these calculations and the establishment of TACs and ACLs can be found in amendments to the 2006 Consolidated HMS FMP that focus on shark management: Amendment 2 (2008), Amendment 3 (2010), Amendment 5a (2013a), Amendment 6 (2015), Amendment 9 (2015), and Amendment 5b (2017).

A proposed amendment to the 2006 Consolidated HMS FMP (Amendment 14) is expected to be available for public comment in 2020. This amendment will consider changes to the management thresholds for shark species, including consideration of an allowable biological catch control rule and other means of establishing the overfishing limits, allowable catches, and ACLs. Specific ACLs for sharks are in Table 5.2.

Table 5.2 Total Allowable Catches and Annual Catch Limits of Current Shark Management Groups (mt dw)

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

Fishery	TAC = ACL	Commercial Sector ACL	Recreational Sector ACL	Dead Discard Sector ACL
Smoothhound—Atlantic	1,430.6	1,201.7	188.4	39.1
Smoothhound—Gulf of Mexico	509.6	336.4	0.6	169.8

Note: Data include major mortality and do not include other mortality such as exempted fishing permits or estimated post-release mortality. mt dw = Metric tons dressed weight. LCS = Large coastal sharks. SCS = Small coastal sharks. [1]Allocated in ACL for recreational fishery. [2]Prohibited species are measured in individuals, not mt dw. [3]Blue shark and pelagic shark TAC are not allocated between commercial, recreational, or discards. Source: NOAA Fisheries 2008b, 2013, 2015b, 2015c.

5.2.2 U.S. Landings by Species

5.2.2.1 Tuna Landings

Atlantic tunas landings through 2018 (Table 5.3–Table 5.7) are taken from the 2019 National Report of the United States to ICCAT (NOAA Fisheries 2019).

Table 5.3 U.S. Landings (mt ww) of Atlantic Bluefin Tuna by Area and Gear in 2014–2018

Area	Gear	2014	2015	2016	2017	2018
Northwest Atlantic	Longline *	171.7	70.1	82.4	70.8	90.9
	Handline	0.0	0.0	1.1	5.0	1.4
	Purse seine	41.8	38.8	0.0	0.0	0.0
	Harpoon	67.5	77.1	52.9	81.7	43.6
	Commercial rod and reel	378.9	581.4	722.1	652.8	765.7
	Recreational rod and reel	99.6	112.9	143.7	140.1	112.5
Gulf of Mexico	Longline	41.3	9.3	10.7	11.7	8.0
	Recreational rod and reel	0.0	0.0	1.7	1.7	1.6
North Central Atlantic**	Longline	8.9	8.3	12.0	32.9	4.0
Caribbean	Longline	0.0	0.0	0.2	0.0	0.0
All areas	All gears	810.0	898.8	1,026.8	996.8	1,027.8

mt ww = Metric tons whole weight. *Includes landings and estimated discards from scientific observer and logbook sampling programs. **Referenced as “NCA Area 94a” in International Commission for the Conservation of Atlantic Tunas report. Source: NOAA Fisheries 2019.

Table 5.4 U.S. Landings (mt ww) of Atlantic Yellowfin Tuna by Area and Gear in 2014–2018

Area	Gear	2014	2015	2016	2017	2018
Northwest Atlantic	Longline	671.0	438.9	480.4	731.4	398.2
	Rod and reel*	1,263.9	976.1	1,936.2	2,427.4	1,463.9
	Troll	28.7	25.6	16.6	35.5	31.2
	Gillnet	1.3	0.8	2.3	0.5	0.3
	Handline	82.1	64.3	31.4	32.4	15.4
	Unclassified	7.7	2.5	2.5	28.6	11.0
Gulf of Mexico	Longline	704.5	490.8	695.2	595.0	367.9
	Rod and reel*	341.9	678.7	776.2	463.8	306.3
	Troll	0.0	0.0	1.3	5.9	31.1
	Handline	0.0	1.9	5.6	5.8	4.0
	Unclassified	0.0	0.0	0.03	0.0	0.0
Caribbean	Longline	80.7	109.9	123.6	103.2	70.1
	Handline	0.6	0.6	1.3	<0.1	<0.1
	Rod and reel*	14.6	5.7	30.3	13.2	0.0
North Central Atlantic**	Longline	0.0	1.8	1.0	1.1	0.5
All areas	All gears	3,197.0	2,797.6	4,103.9	4,443.9	2,700.4

mt ww = Metric tons whole weight. *Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. **Referenced as "NCA Area 94a" in International Commission for the Conservation of Atlantic Tunas report. Source: NOAA Fisheries 2019.

Table 5.5 U.S. Landings (mt ww) of Atlantic Skipjack Tuna by Area and Gear in 2014–2018

Area	Gear	2014	2015	2016	2017	2018
Northwest Atlantic	Longline	0.3	0.2	0.9	0.3	0.2
	Rod and reel*	148.6	49.9	130.1	80.9	63.5
	Gillnet	6.7	0.2	0.7	<0.1	0.1
	Trawl	0.0	1.1	0.0	<0.1	<0.1
	Handline	1.3	0.2	0.8	1.6	0.8
	Unclassified	2.7	<0.1	0.2	1.0	0.2
Gulf of Mexico	Longline	<0.1	0.0	0.2	0.3	0.2
	Rod and reel*	14.3	34.3	34.0	113.2	12.6
	Handline	<0.1	0.0	0.0	0.0	<0.1
Caribbean	Rod and reel*	9.1	7.6	11.4	1.0	0.0
	Handline	0.7	0.5	0.9	0.2	0.5
All areas	All gears	183.7	94.6	179.2	198.6	77.9

mt ww = Metric tons whole weight. *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: NOAA Fisheries 2019.

Table 5.6 U.S. Landings (mt ww) of Atlantic Bigeye Tuna by Area and Gear in 2014–2018

Area	Gear	2014	2015	2016	2017	2018
Northwest and North Central Atlantic	Longline	574.5	557.7	360.2	540.4	380.5
	Gillnet	<0.1	0.5	0.2	0.0	0.0
	Rod and reel*	283.6	448.5	170.5	259.7	493.9
	Troll	4.5	6.4	1.0	1.7	4.9
	Handline	16.4	51.3	9.4	4.0	24.3
	Trawl	0.0	0.1	0.1	0.0	0.9
	Unclassified	3.5	0.5	0.4	2.9	2.8
Gulf of Mexico	Longline	6.8	9.2	6.6	10.5	8.0
	Rod and reel*	<0.1	<0.1	0.2	0.0	0.7
	Unclassified	0.0	0.0	0.0	0.0	2.6
Caribbean	Longline	5.4	7.5	5.6	7.7	0.8
	Rod and reel*	1.4	0.5	0.0	0.0	0.0
	Handline	0.0	0.0	0.2	0.0	0.0
Southwest Atlantic	Longline	<0.1	0.0	13.8	9.4	1.2
All areas	All gears	896.3	1,082.2	568.2	836.3	920.8

mt ww = Metric tons whole weight. *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: NOAA Fisheries 2019.

Table 5.7 U.S. Landings (mt ww) of Atlantic Albacore Tuna by Area and Gear in 2014–2018

Area	Gear	2014	2015	2016	2017	2018
Northwest Atlantic	Longline	187.0	83.9	59.9	94.0	44.9
	Gillnet	3.7	0.5	3.3	0.2	0.5
	Handline	2.3	2.7	0.7	0.1	0.2
	Trawl	0.0	1.7	0.5	1.7	<0.1
	Troll	0.2	0.0	<0.1	0.0	0.0
	Rod and reel*	136.7	120.5	41.4	27.5	8.9
	Unclassified	6.8	0.0	0.0	0.0	0.0
Gulf of Mexico and Caribbean	Longline	122.6	145.0	143.1	114.7	48.1
	Rod and reel*	0.0	<0.1	1.2	0.0	0.0
	Handline	<0.1	0.0	0.1	0.0	0.0
All areas	All gears	459.4	354.4	250.2	238.3	102.6

mt ww = Metric tons whole weight. *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: NOAA Fisheries 2019.

5.2.2.2 Swordfish Landings

Swordfish landings through 2018 (Table 5.8) are taken from the 2019 National Report of the United States to ICCAT (NOAA Fisheries 2019).

Table 5.8 U.S. Catches and Landings (mt ww) of Atlantic Swordfish by Area and Gear in 2014–2018

Area	Gear	2014	2015	2016	2017	2018
Northwest Atlantic	Longline*	1,200.4	1,088.6	835.4	774.8	838.9
	Handline	86.9	70.7	71.2	59.5	127.6
	Trawl	5.3	2.8	6.0	6.8	1.0
	Harpoon	0.0	0.0	0.0	0.3	0.1
	Rod and reel**	35.1	45.1	22.5	22.6	24.4
	Unclassified	0.4	0.0	0.0	<0.1	0.1
Gulf of Mexico	Longline*	307.4	127.4	175.8	250.6	186.6
	Handline	0.3	5.5	3.5	2.7	4.8
	Rod and reel**	1.5	1.0	4.8	10.6	11.4
Caribbean	Longline*	16.5	8.8	72.4	88.4	3.2
	Rod and reel**	<0.1	0.0	0.0	0.7	0.4
	Handline	0.3	0.2	0.9	0.0	0.0
North Central Atlantic***	Longline*	308.0	367.9	304.9	187.7	76.2
Southwest Atlantic	Longline*	0.0	0.0-	0.0	0.0	0.0
All areas	All gears	1,962.2	1,718.4	1,497.5	1,377.2	1,274.9

mt ww = Metric tons whole weight. *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. ***Referenced as “NCA Area 94a” in International Commission for the Conservation of Atlantic Tunas report. Source: NOAA Fisheries 2019.

5.2.2.3 Shark Landings

Atlantic shark landings through 2018 (Table 5.9–Table 5.16) are summarized from the NOAA Fisheries' electronic dealer reporting program, known as eDealer.

Table 5.9 Commercial Landings (lb dw) of Large Coastal Sharks in Atlantic Region in 2014–2018

Management Group	Large Coastal Shark	2014	2015	2016	2017	2018
Aggregated LCS	Blacktip	282,009	176,136	248,470	205,138	125,129
	Bull	32,372	49,927	31,417	23,802	16,707
	Lemon	13,047	45,448	19,205	12,005	8,910
	Nurse	0	0	0	0	0
	Silky	289	992	446	702	175
	Spinner	25,716	4,113	55,610	62,314	58,347
	Tiger	29,062	36,425	14,896	6,324	4,073
Total aggregated LCS		464,803	313,041	370,045	310,286	213,341
Hammerhead	Great	13,538	36,892	20,454	17,646	22,881
	Scalloped	24,652	13,197	12,329	4,919	5,927
	Smooth	601	304	125	1,193	530
Total hammerhead		38,791	50,393	32,908	23,758	29,338
Sandbar—shark research fishery	Sandbar*	82,308	112,610	62,984	47,023	70,846
Unclassified, assigned to SCS	Unclassified	0	0	0	0	0
Total LCS carcass weight		585,887	620,028	465,937	381,067	313,525

lb dw = Pounds dressed weight. SCS = Small coastal shark. *Some unauthorized non-shark research fishery sandbar shark landings exist. Source: eDealer.

Table 5.10 Commercial Landings (lb dw) of Large Coastal Sharks in the Gulf of Mexico Region in 2014–2018

Management Group	Large Coastal Shark	2014	2015	2016	2017	2018
Blacktip	Blacktip	444,812	644,058	413,414	530,037	815,763
Aggregated LCS	Bull	259,825	274,195	154,820	171,298	176,763
	Lemon	5,259	13,023	32,034	25,039	37,593
	Nurse	0	62	95	C	C
	Silky	7	612	111	C	C
	Spinner	61,607	43,185	65,578	46,870	126,249
	Tiger	16,796	18,536	38,534	51,688	44,591
	Unclassified, assigned to LCS	0	0	2,221	0	0
Total aggregated LCS		343,494	349,613	293,393	295,677	384,890
Hammerhead	Great	29,783	33,439	30,474	18,136	31,425
	Scalloped	5,299	6,290	26,503	15,151	26,303
	Smooth	0	0	0	0	0
Total hammerhead		35,082	39,729	56,977	33,287	57,728
Sandbar—shark research fishery	Sandbar*	38,036	53,250	52,244	C	63,624
Total LCS carcass weight		661,424	1,086,650	816,028	934,534	1,321,705

lb dw = Pounds dressed weight. C = landings are not disclosed due to reasons of confidentiality.
*Unauthorized non-shark research fishery sandbar shark landings are included. Source: eDealer.

Table 5.11 Commercial Landings (lb dw) of Small Coastal Sharks in Atlantic Region in 2014–2018

Management Group	Small Coastal Shark	2014	2015	2016	2017	2018
Blacknose	Blacknose	38,437	45,405	26,842	17,241	11,335
Non-blacknose	Bonnethead	13,221	5,885	1,688	6,077	4,240
	Finetooth	19,026	8,712	5,647	19,874	17,071
	Sharpnose, Atlantic	198,568	293,128	175,890	251,289	268,395
Total non-blacknose SCS		230,815	307,725	183,225	277,240	289,706
Unclassified, assigned to SCS	Unclassified	0	0	0	0	0
Total SCS carcass weight		269,252	353,130	210,067	294,481	301,041

lb dw = Pounds dressed weight. Source: eDealer.

Table 5.12 Commercial Landings (lb dw) of Small Coastal Sharks in the Gulf of Mexico Region in 2014–2018

Management Group	Small Coastal Sharks	2014	2015	2016	2017	2018
Blacknose	Blacknose	3,160	2,096	5	0	C
Non-blacknose SCS	Bonnethead	8,391	968	9	588	729
	Finetooth	64,023	60,169	33,431	54,511	54,436
	Sharpnose, Atlantic	89,674	137,121	126,626	88,454	90,848
Total non-blacknose SCS		162,088	198,258	160,066	143,553	146,013
Unclassified, assigned to SCS	Unclassified	0	0	2,719	344	C
Total SCS carcass weight		165,248	200,354	162,790	143,887	146,013

lb dw = Pounds dressed weight. C = landings are not disclosed due to reasons of confidentiality. Source: eDealer.

Table 5.13 Commercial Landings (lb dw) of Smoothhound Sharks in Gulf of Mexico and Atlantic Regions in 2016–2018*

Region	2016	2017	2018
Atlantic**	701,727	831,761	908,072
Gulf of Mexico***	0	0	C
Total smoothhound carcass weight	701,727	831,761	908,072

lb dw = Pounds dressed weight. C = Landings are not disclosed due to reasons of confidentiality. *Smoothhound shark quota effective March 15, 2016 (80 FR 73128; November 25, 2015). **In the U.S. Atlantic region, smoothhound sharks are smooth dogfish. ***In the Gulf of Mexico region, smoothhound sharks are smooth dogfish, Florida smoothhound, and Gulf smoothhound. Source: eDealer.

Table 5.14 Commercial Landings (lb dw) of U.S. Atlantic Pelagic Sharks in 2014–2018

Management Group	Pelagic Shark	2014	2015	2016	2017	2018
Blue sharks	Blue	17,806	1,114	607	4,272	C
Porbeagle sharks	Porbeagle	6,414	0	0	C	811
Other pelagic sharks	Mako, shortfin	218,295	141,720	160,829	184,993	57,719
	Mako, unclassified	0	0	0	0	0
	Oceanic whitetip	22	0	0	0	0
	Thresher	116,012	72,463	78,219	61,990	63,805
Total other pelagic sharks		334,329	214,183	239,048	246,983	121,524
Unclassified, assigned to pelagic	Unclassified	0	0	0	0	0
Total pelagic carcass weight		358,549	215,297	239,655	251,375	122,335

lb dw = Pounds dressed weight. C = Landings are not disclosed due to reasons of confidentiality. Source: eDealer.

Table 5.15 Commercial Landings (lb dw) of Shark Fins in 2014–2018

Region and Management Group	Fins Reported	2014	2015	2016	2017	2018
Atlantic LCS and SCS	Blacktip	288	177	274	192	12
	Bull	120	14	256	41	0
	Hammerhead, great	518	272	387	70	626
	Hammerhead, scalloped	0	6	0	0	22
	Hammerhead, smooth	0	11	0	0	0
	Lemon	0	0	0	0	0
	Spinner	0	0	0	0	117
	Tiger	5	3	0	0	0
	Blacknose	4	15	0	0	0
	Bonnethead	1	14	0	0	0
	Finetooth	0	0	0	0	0
	Sharpnose, Atlantic	2	6	7	40	27
	Smoothhound*	NA	NA	25,107	28,316	59,912
	Not reported to species**	19,868	20,824	15,603	14,731	10,889
Total Atlantic LCS and SCS		20,806	21,342	41,634	43,395	71,605
Gulf of Mexico LCS and SCS	Blacktip	16,141	23,819	12,917	17,660	28,698
	Bull	10,132	12,996	3,677	4,934	4,732
	Hammerhead, great	351	729	585	408	641
	Hammerhead, scalloped	44	45	757	214	787
	Lemon	23	110	0	106	65
	Silky	0	0	0	0	C
	Spinner	1,833	1,015	1,344	1,676	3,892
	Tiger	150	40	46	490	56
	Bonnethead	196	28	0	0	14
	Finetooth	2,092	1,593	870	1,451	1,623
	Sharpnose, Atlantic	10	249	242	64	223
	Not reported to species**	6,209	8,955	13,213	14,538	13,960
Total Gulf of Mexico LCS and SCS		37,256	49,579	33,651	41,541	54,690
Pelagic	Blue	0	0	0	109	C
	Mako, shortfin	451	1,119	299	447	164
	Porbeagle	0	0	0	0	0
	Thresher	512	405	448	625	566
Total pelagic		963	1,524	747	1,181	730
All regions	Unclassified sharks	0	0	0	0	0
Total landed fin weight		59,025	72,445	76,032	86,117	127,025

lb dw = Pounds dressed weight. LCS = Large coastal shark. SCS = Small coastal shark. C = landings are not disclosed due to reasons of confidentiality. *Smoothhound shark quota effective March 15, 2016 (80 FR 73128; November 24, 2015). **Shark fins not required to be reported to the species level. Source: eDealer.

Table 5.16 Commercial Landings (lb dw) Reported of Prohibited Shark Species in 2014–2018

Management Group and Region	Prohibited Sharks	2014	2015	2016	2017	2018
LCS and SCS—Gulf of Mexico	Caribbean reef*	0	0	272	335	0
	Atlantic angel*	0	0	0	0	C
Pelagic—Atlantic and Gulf of Mexico	Mako, longfin*	147	0	0	0	0
	Sevengill*	0	0	0	60	0
Total prohibited shark weight		147	0	272	394	C

Note: Prohibited sharks with no recorded landings from 2014 to 2018 are not included in the table. For a list of commercially prohibited sharks, visit www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-highly-migratory-species-fishery-compliance-guides. lb dw = Pounds dressed weight. LCS = Large coastal shark. SCS = Small coastal shark. C = landings are not disclosed due to reasons of confidentiality. *Prohibited in the commercial fishery as of June 21, 2000. Source: eDealer.

5.2.3 U.S. Catch Comparison to International Catch

U.S. catch levels relative to other nations/entities can be compared for many Atlantic HMS. International- and U.S.-reported catches for all HMS, other than sharks, are available in the 2019 Report of the Standing Committee on Research and Statistics at www.iccat.int/Documents/Meetings/Docs/2019/REPORTS/2019_SCRS_ENG.pdf (SCRS 2019). Three species of shark—blue, shortfin mako, and porbeagle—are also assessed by SCRS, and their international catches are available in the report.

The U.S. percentage of regional and total catch of HMS species assessed by SCRS is presented in Table 5.17. Catch is broken down to landings and dead discards, where possible. U.S. billfish catch includes recreational landings and commercial dead discards. The bluefin tuna and swordfish catch includes recreational landings, commercial landings, and dead discards.

The data from SCRS are reported by species rather than gear type. International catch and landings reported specifically from the pelagic longline and purse seine fisheries, however, are available. These landings are included in Sections 5.3.2.4 and 5.3.3.3, respectively.

Table 5.17 U.S. vs. Total International Catch (mt ww) of Atlantic Highly Migratory Species Reported to the International Commission for the Conservation of Atlantic Tunas in 2018

Species	Region	U.S. Landed (Total Int.)	U.S. Discarded Dead (Total Int.)	U.S. Total Catch (Total Int.)	U.S. % of Total Int. Catch
Swordfish	North Atlantic	1,137 (8,708)	138 (150)	1,275 (8,858)	14.4
	South Atlantic	-- (10,377)	-- (27)	-- (10,404)	---
	Total	1,137 (19,085)	138 (177)	1,275 (19,262)	6.6
Bluefin tuna	West Atlantic	1,014 (2,009)	15 (18)	1,029 (2,027)	50.8
	East Atlantic and Mediterranean	-- (27,744)	-- (13)	-- (27,757)	---
	Total	1,014 (29,753)	15 (31)	1,029 (29,784)	3.5
Bigeye tuna	Atlantic and Mediterranean total	73,337	29	73,366	1.3

Species	Region	U.S. Landed (Total Int.)	U.S. Discarded Dead (Total Int.)	U.S. Total Catch (Total Int.)	U.S. % of Total Int. Catch
Yellowfin tuna	West Atlantic	2,700 (31,544)	0 (5)	2,700 (31,549)	8.6
	East Atlantic	-- (104,094)	-- (46)	-- (104,140)	---
	Total	2,700 (135,638)	0 (51)	2,700 (135,689)	2.0
Albacore tuna	North Atlantic	103 (29,363)	0 (0)	103 (29,363)	0.4
	South Atlantic and Mediterranean	-- (19,532)	-- (0)	-- (19,532)	---
	Total	103 (48,895)	0 (0)	103 (48,895)	0.2
Skipjack tuna	West Atlantic	78 (22,873)	0 (0)	78 (22,873)	0.3
	East Atlantic and Mediterranean	-- (282,371)	-- (56)	-- (284,427)	---
	Total	78 (305,244)	0 (56)	78 (305,300)	0.0
Blue marlin	Atlantic and Mediterranean total	20 (1,371)	22 (65)	42 (1,436)	2.9
White marlin	Atlantic and Mediterranean total	2 (296)	2 (8)	4 (304)	1.3
Sailfish	West Atlantic	3 (1,244)	6 (6)	9 (1,250)	0.7
	East Atlantic	-- (1,180)	-- (3)	-- (1,183)	---
	Total	3 (2,424)	6 (10)	9 (2,434)	0.4
Blue shark	North Atlantic	19 (33,741)	11 (112)	30 (33,853)	0.1
	South Atlantic and Mediterranean	-- (34,268)	-- (99)	-- (34,367)	---
	Total	19 (68,009)	11 (211)	30 (68,220)	0.0
Porbeagle shark	North Atlantic	3 (8)	1 (4)	4 (12)	33.3
	South Atlantic and Mediterranean	-- (4)	-- (0)	-- (4)	---
	Total	3 (13)	1 (4)	4 (17)	23.5
Shortfin mako shark	North Atlantic	165 (2,359)	1 (29)	166 (2,388)	7.0
	South Atlantic and Mediterranean	-- (3,156)	-- (3)	-- (3,159)	---
	Total	165 (5,515)	1 (32)	166 (5,547)	3.0

Note: U.S. catch is reported outside the parentheses and included with the total international catch shown within the parentheses. Catch amounts are as reported by ICCAT member nations and totals are subject to rounding error. mt ww = Metric tons whole weight. A dash indicates that the region does not include U.S. waters; therefore, no U.S. landings would exist for that region. Source: Standing Committee on Research and Statistics 2019.

5.3 Data by Gear

5.3.1 Background

More Information

- Gear: Section 9.1.1
- Management: Section 9.2
- Permits: Section 4.1
- Bycatch: Section 6.3.2

Participation in a fishery requires the use of an authorized gear type in an approved fishery. The approved list of fisheries and authorized gear types are provided in 50 CFR § 600.725(v). A fish may be retained only if it is taken within a listed fishery, with a gear authorized for that fishery, and following the applicable regulations. However, an individual fisherman may notify the appropriate council, or the director of the Office of Sustainable Fisheries in the case of Atlantic HMS, of their intent to use a gear or participate in a fishery not already on the list. The individual may use the gear or participate in that fishery ninety days after such notification unless regulatory action is taken to prohibit the use of the gear or participation in the fishery. A list of HMS fisheries and the authorized gear types are presented in Table 5.18.

Table 5.18 List of Highly Migratory Species Fisheries and Authorized Gear Types*

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 bigeye, albacore, yellowfin, and skipjack 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
Commercial Caribbean small boat	Rod and reel, handline, harpoon, bandit gear, green-stick, buoy gear

*(50 CFR § 600.725(v))

5.3.2 Pelagic Longline

5.3.2.1 Background

The pelagic longline fishery for Atlantic HMS primarily targets swordfish and bigeye, albacore, and yellowfin tunas in various areas and seasons. Secondary target species include dolphinfish and, to a lesser degree, sharks. Although gear can be modified (e.g., depth of set, hook type, hook size, and bait) to target swordfish or tunas, the pelagic longline fishery is generally a multispecies fishery.

The number of hooks per set varies with line configuration and target species, as shown in Table 5.19.

Table 5.19 Average Number of Hooks Per Pelagic Longline Set in 2014–2018

Target Species	2014	2015	2016	2017	2018
Swordfish	780	729	758	775	704
Bigeye tuna	811	641	619	708	640
Yellowfin tuna	608	571	641	542	550
Mix of tuna species	670	653	702	732	629
Shark	293	298	274	295	260
Dolphinfish	1,092	1,140	943	918	970
Other species	NA	150	NA	643	NA
Mix of species	718	715	758	729	715

Source: Unified Data Processing.

5.3.2.2 Pelagic Longline Observer Program

In 2018, NOAA Fisheries observers in the Pelagic Observer Program recorded 731 pelagic longline sets, which is an overall fishery coverage of 13 percent. The Pelagic Longline Take Reduction Plan (74 FR 23349; May 19, 2009) recommended that NOAA Fisheries increase observer coverage to 12–15 percent throughout all Atlantic pelagic longline fisheries that interact with pilot whales and Risso's dolphins to ensure representative sampling of fishing effort. If resources are not available to provide such observer coverage for all fisheries, regions, and seasons, the Pelagic Longline Take Reduction Team recommended that NOAA Fisheries allocate observer coverage to fisheries, regions, and seasons with the highest observed or reported bycatch rates of pilot whales. The team recommended that additional coverage be achieved either by increasing the number of NOAA Fisheries observers who have been specially trained to collect additional information supporting marine mammal research or by designating and training special "marine mammal observers" to supplement traditional observer coverage.

Table 5.20 details the amount of observer coverage in past years for this fleet.

Table 5.20 Observer Coverage of the U.S. Atlantic Pelagic Longline Fishery in 2014–2018

Year	Total Observed Sets	Percentage of Total Number of Sets
2014	1,247	12.5
2015	1,144	14.0
2016	1,230	17.9
2017	897	12.2
2018	731	13.0

Source: Garrison and Stokes 2016; unpublished Pelagic Observer Program data 2017, 2018, 2019.

NOAA Fisheries continued an increased rate of mandatory observer coverage in the Gulf of Mexico during the 2019 fishing season (March 15–June 15, 2019). The increased coverage obtains additional data on bluefin tuna during the spawning season in the Gulf of Mexico. Preliminary 2019 estimates for the Gulf of Mexico indicate a coverage rate of approximately 37 percent.

5.3.2.3 Recent Catch and Landings

U.S. Atlantic pelagic longline catch, including bycatch, incidental catch, and target catch, whether kept or discarded, is largely related to vessel characteristics and gear configuration. The reported catch, in numbers of fish, is summarized in Table 5.21 for the whole pelagic longline fishery. Table 5.22 provides a summary of U.S. Atlantic pelagic longline landings as reported to ICCAT. Detailed information on bycatch for this fishery is provided in Section 6.3.2.

Table 5.21 Reported Numbers of Catch and Hooks in the U.S. Atlantic Pelagic Longline Fishery in 2014–2018

Species and Hooks	2014	2015	2016	2017	2018
Swordfish kept	35,157	29,758	26,388	24,865	28,500
Swordfish discarded	5,217	5,797	4,681	7,596	8,764
Blue marlin discarded	718	993	1,051	1,566	858
White marlin discarded	1,580	2,862	2,156	2,223	1,587
Sailfish discarded	445	715	855	658	810
Spearfish discarded	306	837	745	687	459
Bluefin tuna kept	379	320	411	475	465
Bluefin tuna discarded	383	210	582	229	310
BAYS tunas kept	73,683	54,759	57,123	68,709	38,086
Pelagic sharks kept	3,822	2,219	2,190	2,564	875
Pelagic sharks discarded	38,174	44,680	27,471	25,155	14,656
Large coastal sharks kept	48	50	50	79	36
Large coastal sharks discarded	5,292	8,116	8,675	11,042	8,104
Dolphinfish kept	63,916	53,670	46,530	29,300	27,515
Wahoo kept	3,238	1,583	1,769	1,479	1,275
Sea turtle interactions	93	357	229	162	86
Number of hooks (× 1000)	7,125	5,856	5,219	5,328	4,031

BAYS = Bigeye, albacore, yellowfin, and skipjack. Source: Unified Data Processing.

Table 5.22 Reported Landings (mt ww) in the U.S. Atlantic Pelagic Longline Fishery in 2014–2018

Species	2014	2015	2016	2017	2018
Yellowfin tuna	1,456.2	1,041.4	1,300.2	1,430.7	836.7
Skipjack tuna	0.3	0.2	1.1	0.6	0.4
Bigeye tuna	586.7	574.4	386.2	568.0	390.5
Bluefin tuna*	221.9	87.7	105.3	115.4	102.9
Albacore tuna	309.6	228.9	203.0	208.7	93.0
North Atlantic swordfish*	1,832.3	1,592.7	1,388.5	1,301.5	1,104.9
South Atlantic swordfish*	0.0	0.0	0.0	0.0	0.0
Total	4,407.0	3,525.3	3,384.3	3,624.9	2,528.4

mt ww = Metric tons whole weight. *Includes landings and estimated discards from scientific observer and logbook sampling programs as reported to the International Commission for the Advancement of Atlantic Tunas. Source: NOAA Fisheries 2019.

5.3.2.4 International Issues and Catch

Tuna, Billfish, and Swordfish

The U.S. pelagic longline fleet represents a small fraction of the international pelagic longline fleet competing on the high seas for catches of tunas and swordfish. In recent years, the proportion of U.S. pelagic longline landings of HMS has remained relatively stable in proportion to international landings for the fisheries in which the United States participates. Historically, the U.S. fleet has accounted for less than 0.5 percent of the landings of swordfish and tuna from the Atlantic Ocean south of 5° N. latitude, referred to as the South Atlantic area. The U.S. fleet also does not operate in the Mediterranean Sea. Foreign fleet landings of tuna and swordfish operating in the tropical Atlantic and Mediterranean are higher than the landings of these species by the U.S. fleet in the North Atlantic area. The retention of billfish is prohibited in the U.S. Atlantic pelagic longline fishery.

Within the area where the U.S. pelagic longline fleet operates, U.S. pelagic longline landings still represent a limited fraction of total landings. From 2014 to 2018, U.S. pelagic longline landings have averaged 4.3 percent of total Atlantic pelagic longline landings, ranging from a high of 5.4 percent in 2014 to a low of 3.8 percent in 2016 and remaining steady at 4.3 percent in 2018. Table 5.23 contains aggregate pelagic longline landings of Atlantic tunas and swordfish and pelagic longline landings and discards of billfish for all countries in the Atlantic for the period of 2014–2018.

Table 5.23 Estimated International Pelagic Longline Landings (mt ww) of Tuna, Billfish, and Swordfish for All Countries Fishing in the Atlantic in 2014–2018

Species	Region	2014	2015	2016	2017	2018
Swordfish	North and South Atlantic	19,795	20,168	20,032	19,541	18,694
Yellowfin tuna	West Atlantic[1]	8,939	8,803	11,465	10,407	10,107
Bigeye tuna	Atlantic and Mediterranean	36,769	40,362	36,321	35,156	32,032
Bluefin tuna	West Atlantic[1]	498	553	562	559	664
Albacore tuna	North and South Atlantic	11,981	14,562	16,637	16,625	18,072
Skipjack tuna	West Atlantic[1]	1,194	464	804	291	319
Blue marlin	Atlantic and Mediterranean[2]	1,588	1,264	1,281	1,446	998
White marlin	Atlantic and Mediterranean[2]	368	443	405	376	254
Sailfish	West Atlantic[3]	741	891	1,191	1,059	1,238
Total international[4]		81,873	87,510	88,698	85,460	82,378
Total U.S.[5]		4,407	3,525	3,384	3,630	3,528
U.S. as percent of total international		5.4%	4.0%	3.8%	4.2%	4.3%

mt ww = Metric tons whole weight. [1]Note that the United States has not reported participation in the East Atlantic yellowfin tuna fishery since 1983 and has not participated in the East Atlantic bluefin or the East Atlantic skipjack tuna fishery since 1982. [2]Includes U.S. and foreign discards. [3]Includes U.S. dead discards. [4]From Standing Committee on Research and Statistics, 2019. [5]From U.S. National Reports to the International Commission for the Conservation of Atlantic Tunas, 2015-2019. Includes swordfish, blue marlin, white marlin, and sailfish longline discards. Source: U.S. ICCAT National Reports 2015–2019 (NOAA Fisheries 2015a, 2016, 2017,2018, 2019); Standing Committee on Research and Statistics 2019.

Atlantic Sharks

Stock assessments and data collection for international shark fisheries have improved in recent years due to increased reporting requirements adopted by ICCAT. Since 2004, there have been several shark-related recommendations and resolutions (e.g., 04-10, 06-10, 07-06, 08-07, 08-08, 09-07, 10-06, 10-07, 11-08, 12-05, 13-10, 14-6, 15-6, 17-08, 18-06, 19-06, 19-07, and 19-08). Additionally, SCRS has assessed several species of sharks, including blue, shortfin mako, and porbeagle sharks. For more information on ICCAT shark actions, see previous SAFE Reports (www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-highly-migratory-species-stock-assessment-and-fisheries-evaluation-reports) and the ICCAT webpage (www.iccat.int/en).

Table 5.24 provides the most recent catch totals for blue, shortfin mako, and porbeagle sharks.

Table 5.24 Estimated International Pelagic Longline Landings (mt ww) of Pelagic Sharks for All Countries in the Atlantic in 2014–2018 Compared to U.S. Catch.

Species	2014	2015	2016	2017	2018
Total international[1] blue shark	60,638	61,177	68,230	66,247	66,254
Total international[1] shortfin mako	5,817	5,398	5,866	5,333	5,139
Total international[1] porbeagle	21	12	5	2	5
Total International[1] longline landings	66,476	66,587	74,101	71,582	71,398
U.S. blue shark catches[2]	166	114	74	66	30
U.S. shortfin mako catches[2]	356	263	268	303	166
U.S. porbeagle catches[2]	13	42	5	17	4
Total U.S. catches[2]	535	419	347	386	200
U.S. catches[2] as percent of total international catch	0.8%	0.6%	0.5%	0.5%	0.3%

mt ww = Metric tons whole weight. [1]International totals include landings from North Atlantic, South Atlantic, and the Mediterranean Sea regions for all countries. [2]U.S. totals includes both landings and discards. Source: Standing Committee on Research and Statistics 2019.

5.3.3 Purse Seine

5.3.3.1 Background

NOAA Fisheries has not opened the Atlantic tunas purse seine fishery in recent years because there were no active vessels permitted to fish for bluefin tuna with purse seine gear. Continuation of the purse seine fishery will likely be up for consideration in an upcoming rulemaking.

More Information

- Gear: Section 9.1.2
- Management: Section 9.2 (See Amendment 7)
- Permits: Section 4.1.1
- Bycatch: Section 6.3.3

5.3.3.2 Recent Catch and Landings

In the 1980s and early 1990s, purse seine landings of yellowfin tuna were often over several hundred metric tons, with over 4,000 mt ww of yellowfin landings in 1985. Historic purse seine U.S. bluefin tuna landings made up approximately 20 percent of the total annual U.S. bluefin tuna landings and about 25 percent of total commercial landings. Over the past 30 years, the U.S. purse seine fleet, when active, directed effort only on bluefin tuna and not on other HMS; Table 5.25, therefore, includes only bluefin tuna.

These numbers have dropped significantly over the past 20 years, and in the last five years, purse seine landings have ranged between 0 and 6 percent of the total annual U.S. bluefin tuna landings. Purse seine catch, including landings and dead discards, was last recorded in 2015. Between 2012 and 2015, catch totals ranged from 1.7 mt to 38.8 mt. The bluefin tuna baseline percentage quota share for the Purse Seine category is 18.6 percent of the U.S. quota. NOAA Fisheries redistributes 75 percent of that quota to the Reserve category, as outlined in Amendment 7, for those years when there are no purse seine catch. Purse seine fishery participants may lease their quota allocations to vessels fishing in the pelagic longline fishery through the Individual Bluefin Quota Program.

5.3.3.3 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 5.25 shows that since 2010, 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 16-14, ICCAT established a minimum standard for scientific fishing vessel observer programs and adopted a minimum 5 percent observer coverage of fishing effort in the purse seine fishery, as measured in number of sets or trips.

Table 5.25 Estimated International Atlantic Tuna Catches (mt ww) for the Purse Seine Fishery in the Atlantic and Mediterranean in 2010–2018

Species	2010	2011	2012	2013	2014	2015	2016	2017	2018
Bluefin	4,987	4,306	6,186	8,036	8,237	10,034	11,361	14,520	17,136
Yellowfin	83,693	77,152	78,537	71,043	75,785	89,222	101,996	89,194	93,258
Skipjack	122,067	144,951	166,604	187,027	178,368	197,061	206,118	216,902	247,027
Bigeye	25,203	25,044	24,903	22,754	24,574	25,184	29,605	27,848	28,800
Albacore	434	1,077	672	184	91	491	88	254	72
Total	236,383	252,517	276,890	289,033	287,044	321,990	349,122	348,664	386,276
U.S. total	0.0	0.0	1.7	42.5	41.8	38.8	0.0	0.0	0.0
U.S. %	0	0	< 0.01	< 0.01	< 0.01	< 0.01	0	0	0

mt ww = Metric tons whole weight. Source: Standing Committee on Research and Statistics 2019.

5.3.4 Commercial Handgear

5.3.4.1 Background

More Information

- Gear: Section 9.1
- Management: Section 9.2
- Permits: Sections 4.1
- Bycatch: Section 6.3.4

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. Permits that authorize the use of commercial handgear include the Atlantic Tunas General category permit, Atlantic Tunas Harpoon category permit, Swordfish Handgear limited access permit, Swordfish General Commercial permit, Commercial Caribbean Small Boat permit, and HMS Charter/Headboat permit with a commercial endorsement. Fishing usually takes place 5–125 miles from shore. Those vessels using bait typically use herring, mackerel, whiting, mullet, menhaden, ballyhoo, butterfish, and squid.

Fishermen with Atlantic Tunas General and Harpoon category permits, the HMS Charter/Headboat permit, and combination swordfish/tuna permits are required to report all swordfish and billfish landings, as well as bluefin tuna landings and dead discards, within 24 hours of the landings or end of each trip through an online catch reporting system, a smartphone app, or a phone number. More information is available at hmspermits.noaa.gov/catchReports. These reports are in addition to any information submitted by federally permitted dealers.

5.3.4.2 Trip Estimates

Table 5.26 displays the estimated number of rod and reel and handline trips targeting large pelagic species like tunas, billfishes, swordfish, sharks, wahoo, dolphinfish, and amberjacks from Maine through Virginia in 2014–2018. The trips include commercial and recreational trips and are not specific to any particular species. The 2018 estimates are preliminary and subject to change.

Table 5.26 Estimated Number of Rod and Reel and Handline Trips Targeting Atlantic Large Pelagic Species by State in the Northeast Between 2014 and 2018

Vessel Type	Year	NH/ME	MA	CT/RI	NY	North NJ	South NJ/MD/DE	VA	Total
Private	2014	4,289	12,758	3,502	6,777	4,426	11,413	1,972	45,559
	2015	4,074	12,130	3,336	7,068	3,166	11,741	2,522	44,037
	2016	4,224	10,511	3,802	6,481	3,337	11,193	2,754	42,302
	2017	5,397	12,088	2,909	9,060	3,843	10,316	2,082	45,695
	2018	4,115	9,943	3,507	8,470	3,983	14,448	1,879	46,345
Charter	2014	836	3,294	592	1,220	1,199	2,172	345	9,658
	2015	1,264	3.835	619	1,458	1,167	1,730	499	10,572
	2016	669	3,756	552	1,423	1,439	2,798	263	10,900
	2017	998	3,934	329	1,866	1,554	2,657	822	12,160
	2018	1,344	3,925	386	1,452	798	2,975	344	11,224

Source: Large Pelagics Survey.

Buoy gear effort, as reported by the fishery, is presented from 2014 to 2018 in Table 5.27.

Table 5.27 Reported Buoy Gear Effort in 2014–2018

Specifications	2014	2015	2016	2017	2018
Number of vessels	39	37	42	36	44
Number of trips	466	358	338	253	582
Average buoy gears deployed per trip	20.9	21.1	23.6	23.3	23.1
Total number of set hooks	10,743	8,267	8,588	6,282	13,572
Average number hooks per gear	1.1	1.1	1.1	1.1	1.0

Source: Unified Data Processing.

5.3.4.3 Recent Catch and Landings

By Region

The handgear fisheries for all HMS are typically most active during the summer and fall, although fishing also occurs in the South Atlantic and Gulf of Mexico during the winter months. The commercial handgear fishery for bluefin tuna occurs mainly in New England and to a lesser degree off the coast of southern Atlantic states, such as Virginia, North Carolina, and South Carolina, with vessels targeting large medium and giant bluefin tuna. Targeting bluefin tuna in the Gulf of Mexico is prohibited. The majority of U.S. commercial handgear fishing activities for bigeye, albacore, yellowfin, and skipjack tunas take place in the northwest Atlantic.

Figure 5.1 shows bluefin tuna commercial landings, which are predominately handgear landings, by geographic region. The South Atlantic region ends at Cape Hatteras, North Carolina, and the Mid-Atlantic region ends at eastern Long Island, New York. Commercial landings in the Mid-Atlantic region have increased notably starting in 2017. Beyond these general patterns, the availability of Atlantic tunas at a specific location and time is highly dependent on environmental variables that fluctuate from year to year.

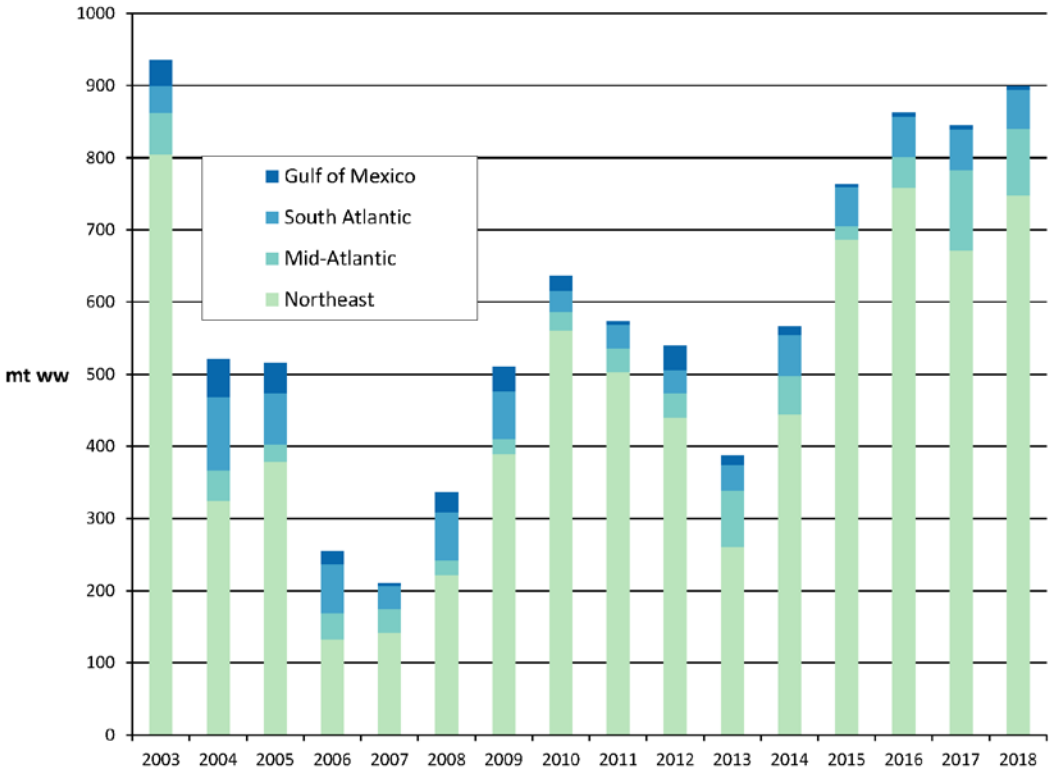

Figure 5.1 Commercial Landings (mt ww) of North Atlantic Bluefin Tuna by U.S. Geographic Region in 2003–2018

mt ww = Metric tons whole weight. Source: eBFT.

By Species

The proportion of domestic HMS landings harvested with commercial handgear varies by species, with Atlantic tunas comprising the majority of commercial landings. In 2018, bluefin tuna commercial handgear landings accounted for approximately 80 percent of the total U.S. bluefin tuna landings and 90 percent of international commercial bluefin tuna landings. Figure 5.2 shows the U.S. Atlantic bluefin tuna landings by category since 2003. The commercial handgear landings are comprised of bluefin tuna landed by both the General and Harpoon categories.

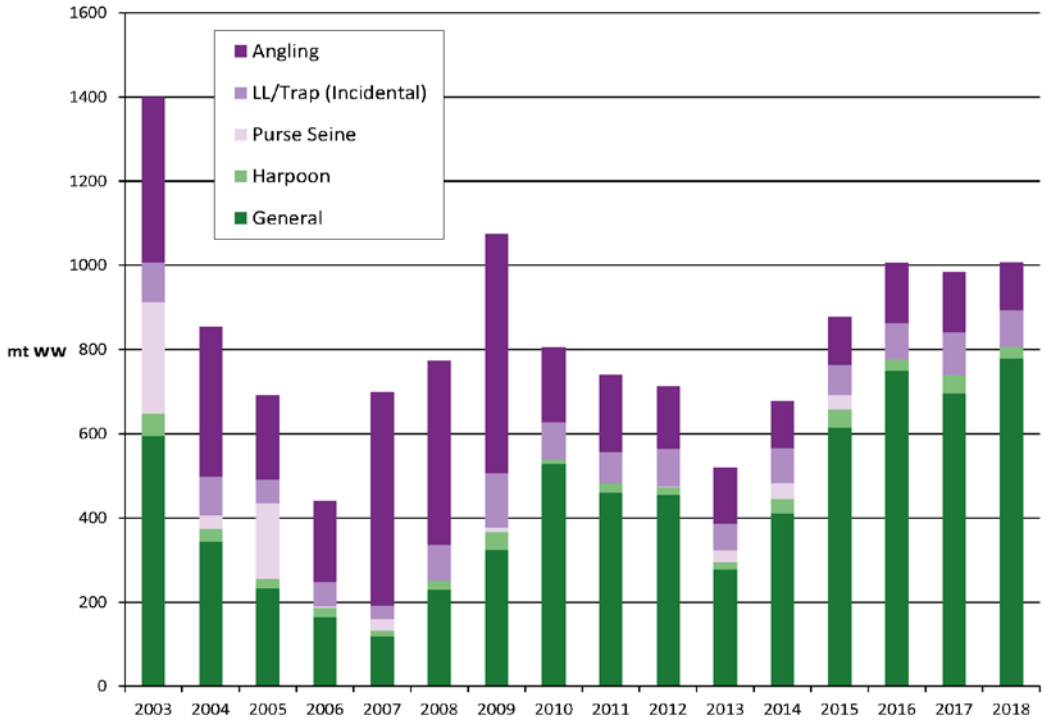

Figure 5.2 Domestic Landings of Bluefin Tuna (mt ww) by Fishing Category in 2003–2018

LL = Pelagic longline gear. mt ww = Metric tons whole weight. Source: eBFT.

Commercial handgear landings of Atlantic highly migratory tuna species and swordfish in the United States by gear and area are shown in Table 5.28 and Table 5.29. Commercial handgear landings for 2018 of yellowfin, skipjack, bigeye and albacore tunas (Table 5.28) were compared to total U.S. recreational and commercial landings presented in Section 5.2.2.1 (Table 5.4, Table 5.5, Table 5.6, and Table 5.7). In 2018, yellowfin tuna commercial handgear landings (81.8 mt ww) account for 3 percent of the total U.S. yellowfin landings and almost 9 percent of U.S. yellowfin commercial landings (930.2 mt ww). Commercial handgear landings of skipjack in 2018 account for less than 2 percent of total U.S. landings (1.3 mt ww) and about 73 percent of total commercial skipjack landings (1.8 mt ww). Bigeye tuna commercial handgear landings account for 3.5 percent of total bigeye landings (31.8 mt ww) and close to 8 percent of total commercial bigeye landings (426.8 mt ww). For albacore, 2018 commercial handgear landings (0.2 mt ww) account for less than 1 percent of total albacore landings and less than 1 percent of total commercial albacore landings (93.7 mt ww).

Numbers of caught and discarded fish by buoy gear are presented in Table 5.30 and Table 5.31. Landings attributed to commercial buoy gear are presented in Table 5.32.

Table 5.28 U.S. Atlantic Commercial Handgear Landings of Tunas and Swordfish (mt ww) by Gear Type in 2014–2018

Species	Gear	2014	2015	2016	2017	2018
Bluefin tuna	Rod and reel	378.9	581.4	722.1	652.8	765.7
	Handline	0.0	0.0	1.1	5.0	1.4
	Harpoon	67.5	77.1	52.9	81.7	43.6
Total bluefin tuna		446.4	658.5	776.1	739.5	810.7
Bigeye tuna	Troll	4.5	6.4	1.0	1.3	7.5
	Handline	16.4	51.3	9.6	3.5	24.3
Total bigeye tuna		20.9	57.7	10.6	4.8	31.8
Albacore tuna	Troll	0.2	0.0	<0.1	0.0	0.0
	Handline	2.4	2.7	0.5	0.1	0.2
Total albacore tuna		2.6	2.7	0.5	0.1	0.2
Yellowfin tuna	Troll	28.7	25.6	17.9	34.3	62.3
	Handline	82.7	66.8	38.4	33.0	19.5
Total yellowfin tuna		111.4	92.4	56.3	67.3	81.8
Skipjack tuna	Troll	0.0	0.0	0.0	0.0	0.0
	Handline	2.0	0.7	1.2	0.6	1.3
Total skipjack tuna		2.0	0.7	1.2	0.6	1.3
Swordfish	Handline	87.2	76.4	75.7	58.2	132.4
	Harpoon	0.0	0.0	0.0	0.3	0.1
Total swordfish		87.2	76.4	75.7	58.5	132.5

mt ww = Metric tons whole weight. Source: NOAA Fisheries 2019.

Table 5.29 U.S. Atlantic Commercial Handgear Landings of Tunas and Swordfish (mt ww) by Region in 2014–2018

Species	Region	2014	2015	2016	2017	2018
Bluefin tuna	Northwest Atlantic	446.4	658.5	776.1	739.5	810.7
Bigeye tuna	Northwest Atlantic	16.4	51.3	10.4	4.8	29.2
	Gulf of Mexico	0.0	0.0	0.0	0.0	2.6
	Caribbean	0.0	0.0	0.2	0.0	0.0
Albacore tuna	Northwest Atlantic	2.3	2.7	0.4	0.1	0.2
	Gulf of Mexico/Caribbean	<0.1	0.0	0.1	0.0	0.0
Yellowfin tuna	Northwest Atlantic	82.1	64.3	48.1	55.4	46.6
	Gulf of Mexico	0.0	1.9	6.9	11.8	35.0
	Caribbean	0.6	0.6	1.3	<0.1	<0.1
Skipjack tuna	Northwest Atlantic	1.3	0.2	0.3	0.5	0.8
	Gulf of Mexico	<0.1	0.0	0.0	0	<0.1
	Caribbean	0.7	0.5	0.9	0.1	0.5
Swordfish	Northwest Atlantic	86.9	70.7	71.3	58.5	127.7
	Gulf of Mexico	0.3	5.5	3.5	2.7	4.8
	Caribbean	0.3	0.2	0.9	0.0	0.0

mt ww = Metric tons whole weight. Source: NOAA Fisheries 2019.

Table 5.30 Reported Buoy Gear Landings (lb dw) in 2014–2018

Species	2014	2015	2016	2017	2018
Swordfish	112,000	84,340	93,360	77,243	186,182
Dolphinfish	996	216	733	298	265
Oilfish	362	490	121	109	0
Shortfin mako shark	1,117	932	1,709	1,304	0
Wahoo	35	45	58	26	0
Bigeye tuna	0	0	0	207	92
Blacktip shark	13	0	0	0	0
King mackerel	143	29	323	60	35
Yellowfin tuna	0	0	0	0	350
Hammerhead shark	0	0	0	0	0
Silky shark	0	0	0	0	0
Greater amberjack	0	0	0	0	0
Bonito	0	0	0	60	14
Blackfin tuna	84	189	96	86	276

lb dw = Pounds dressed weight. Source: Unified Data Processing.

Table 5.31 Reported Buoy Gear* Landings and Discards in Numbers of Fish in 2014–2018

Catch Status	Species	2014	2015	2016	2017	2018
Landed	Swordfish	1,856	1,561	1,558	1,297	3,231
	Dolphinfish	182	18	48	28	28
	Oilfish	8	12	3	2	0
	Bigeye tuna	0	0	0	1	1
	Blackfin tuna	10	16	13	9	27
	Wahoo	1	1	2	2	0
	Bonito	0	0	0	8	2
	King mackerel	5	4	43	6	4
	Shortfin mako	9	6	11	10	0
	Blacktip shark	1	0	0	0	0
Released alive	Swordfish	447	311	223	439	697
	Dolphinfish	15	0	0	0	1
	Blue marlin	0	0	0	0	0
	Hammerhead shark	32	23	22	27	46
	Thresher shark	0	0	0	1	0
	Dusky shark	1	2	1	11	2
	Night shark	79	83	58	23	9
	Oceanic whitetip shark	3	7	1	0	2
	Bigeye thresher shark	0	1	0	4	2
	Tiger shark	3	0	0	2	8
	Sandbar shark	0	0	1	0	0
	Longfin mako shark	2	0	1	1	1
	Shortfin mako shark	6	1	0	1	5
	Blacktip shark	4	0	0	0	34
	Silky shark	8	18	6	3	11
	Oilfish	0	0	0	1	3
	Blackfin tuna	0	0	0	2	2
	Bignose shark	0	1	0	0	1
Released dead	Swordfish	76	45	13	29	50
	Hammerhead shark	0	1	0	0	6
	Blackfin tuna	0	0	0	2	0
	Night shark	1	14	2	0	1
	Sailfish	0	0	0	1	0

*Buoy gear is not an authorized gear for sharks. Source: Unified Data Processing.

The shark commercial handgear fishery plays a very minor role in contributing to overall shark landings. For information regarding the shark fishery, refer to Sections 5.3.5.2 and 5.3.6.3. Economic and social aspects of all the domestic handgear fisheries are described in Chapter 7.

5.3.5 Recreational Handgear

More Information

- Gear: Section 9.1
- Management: Section 9.2
- Permits: Section 4.1 (4.1.1, 4.1.2)
- Bycatch: Section 6.3.5
- Tournaments: Section 4.4

5.3.5.1 Background

Recreational fishermen target various HMS using a variety of handgear: rod and reel, handline, and speargun. Atlantic HMS Angling and Atlantic HMS Charter/Headboat permit holders are required to report all non-tournament recreational swordfish and billfish landings, as well as bluefin tuna landings and dead discards, within 24 hours of the landings or end of each trip through an online catch reporting system, a smartphone app, or phone number. 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. More information is available at hmspermits.noaa.gov/catchReports. These reports are in addition to any information submitted by federally permitted dealers.

5.3.5.2 Recent Catch and Landings

The landings in this section, like the 2018 SAFE Report, reflect the re-estimation of recreational effort, catch, and harvest conducted in 2018 with results from the new Fishing Effort Survey (FES) and redesigned Access Point Angler Intercept Survey (APAIS) (Table 5.32–Table 5.42). FES fully replaced the historically used Coastal Household Telephone Survey in 2018, while the redesigned APAIS was fully implemented in 2014.

The new survey methods resulted in significantly higher estimates of recreational fishing effort, catch, and harvest. On average, estimates of private boat effort and catch were found to have doubled, and shore-based fishing effort and catch estimates increased sixfold. The new Marine Recreational Information Program (MRIP) catch and harvest estimates will be incorporated into new stock assessments to estimate updated annual catch limits. More information on the current survey methods, reasons for the survey redesigns, how they have affected catch and effort estimates, and implications for management can be found at www.fisheries.noaa.gov/recreational-fishing-data/effort-survey-improvements#transition-process.

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

Recreational Tuna Fishery

Tuna and swordfish landings for HMS recreational rod and reel fisheries from 2014 through 2018 are presented in Table 5.32.

Table 5.32 Domestic Landings (mt ww) for the Atlantic Tunas and Swordfish Recreational Rod and Reel Fishery in 2014–2018

Species	Region	2014	2015	2016	2017	2018
Bluefin tuna*	Northwest Atlantic	99.6	112.9	143.7	140.1	112.5
	Gulf of Mexico	0	0	1.7	1.7	1.6
	Total	99.6	112.9	145.4	141.8	114.1
Bigeye tuna**	Northwest Atlantic	283.6	448.5	170.5	259.7	493.9
	Gulf of Mexico	<0.1	<0.1	0.2	0	0.7
	Caribbean	1.4	0.5	0	0	0
	Total	285.1	449.0	170.7	259.7	494.6
Albacore**	Northwest Atlantic	136.7	120.5	41.4	27.5	8.9
	Gulf of Mexico and Caribbean	0	<0.1	1.2	0	0
	Total	136.7	120.6	42.6	27.5	8.9
Yellowfin tuna**	Northwest Atlantic	1,263.9	976.1	1,936.2	2,427.4	1,463.9
	Gulf of Mexico	341.9	678.7	776.2	463.8	306.3
	Caribbean	14.6	5.7	30.3	13.2	0.0
	Total	1,620.4	1,660.5	2,742.7	2,904.4	1,770.2
Skipjack tuna**	Northwest Atlantic	148.6	49.9	130.1	80.9	63.5
	Gulf of Mexico	14.3	34.3	34.0	113.2	12.6
	Caribbean	9.1	7.6	11.4	1.0	0
	Total	172.0	91.8	175.5	195.1	76.1
Swordfish	Total	36.7	46.0	45.8	33.8	36.2

mt ww = Metric tons whole weight. *Rod and reel catch and landings estimates of bluefin tuna < 73 inches curved fork length are based on statistical surveys of the U.S. recreational harvesting sector. Rod and reel catch of bluefin tuna > 73 inches CFL are commercial landings and may also include a few metric tons of recreational "trophy" bluefin (recreational bluefin ≥ 73 inches CFL). **Rod and reel catches and landings for Atlantic tunas represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. Source: NOAA Fisheries 2015a, 2016, 2017, 2018, 2019.

Recreational Billfish Fishery

Table 5.33 provides a summary of reported billfish and swordfish landings from 2014 through 2018. Due to the rare nature of billfish encounters and the difficulty of monitoring landings outside of tournament events, reports of recreational billfish landings are sparse. However, ATR provides a preliminary source for analyzing recreational billfish tournament landings. Recreational report totals are developed from analysis of multiple datasets, including an automated landings reporting system, LPS, Maryland and North Carolina catch cards, ATR, and MRIP. These datasets include tournament data, non-tournament data, or both.

In 2012, NOAA Fisheries established a new accounting protocol that analyzes tournament and non-tournament landings reports of billfishes using all available programs (see sources in Table 5.33). The “Total landings of marlin and roundscale spearfish” by year and “Balance remaining from 250 limit” rows reflect the U.S. landings limits established at ICCAT. Under ICCAT Recommendation 06-09, and as specified in Section 635.27(d)(1), the United States recreational marlin fishery is limited to a maximum of 250 combined Atlantic blue and white marlin landings per year. Roundscale spearfish is included in this

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

Table 5.33 Atlantic Highly Migratory Species Recreational Swordfish and Billfish Landings in Numbers in 2014–2018

Species	Reporting	2014	2015	2016	2017	2018
Swordfish	Tournament[1]	23	17	42	50	42
	Non-tournament[2]	281	315	458	518	619
Total swordfish		304	332	500	568	661
Sailfish	Tournament[1]	5	1	0	1	4
	Non-tournament[2]	113	113	114	104	94
Total sailfish		118	114	114	105	98
Blue marlin	Tournament[1]	49	40	63	45	75
	Non-tournament[2]	5	23	17	17	15
Total blue marlin		54	63	80	62	90
White marlin	Tournament[1]	36	46	46	50	51
	Non-tournament[2]	6	20	14	11	27
Total white marlin		42	66	60	61	78
Roundscale spearfish	Tournament[1]	2	10	21	6	20
	Non-tournament[2]	0	0	1	0	0
Total roundscale spearfish		2	10	22	6	20
Total marlin and roundscale spearfish		98	139	162	129	188
Balance remaining from 250 marlin and roundscale spearfish limit		152	111	88	121	62

Source: [1]Atlantic Tournament Registration and Reporting, Maryland and North Carolina HMS catch cards, Large Pelagics Survey, and Marine Recreational Information Program; [2]Automated Landings Reporting System, Maryland and North Carolina HMS catch cards, LPS, and MRIP.

The number of registered tournaments and reported tournament landings by state are shown in Table 5.34.

Table 5.34 Tournaments and Numbers of Billfishes and Swordfish Kept by State/Territory in 2018

State	Tournaments	White Marlin	Blue Marlin	Sailfish	Roundscale Spearfish	Swordfish
New York	10	0	0	0	0	0
New Jersey	10	27	6	0	0	2
Maryland	8	20	5	0	0	3
Virginia	4	0	0	0	0	0
North Carolina	7	0	14	0	0	0
South Carolina	7	0	1	0	0	0
Florida	38	0	5	4	0	21
Mississippi	3	0	4	0	0	5
Louisiana	13	0	9	0	0	8
Texas	3	0	5	0	0	0
Puerto Rico	4	0	0	0	0	0

Notes: Some states have been excluded to protect tournament reporting privacy. These states include Massachusetts, Connecticut, Georgia, and Alabama, as well as the U.S. Virgin Islands. Four registered tournaments were held outside the United States (data not shown). Source: Atlantic Tournament Registration and Reporting.

Recreational Shark Fishery

Recreational shark landings must be reported to NOAA Fisheries when an angler is required to participate in LPS or MRIP. Vessel owners in Maryland and North Carolina must also report shark landings on catch cards at state-operated landings stations. This requirement was enacted in 2013 in Maryland and 2014 in North Carolina.

Maryland recreational shark landings in 2014–2018 are summarized by species in Table 5.35. North Carolina catch cards from 2014 to 2018 indicate two shortfin mako sharks were reported in both 2014 and 2015, and two bull sharks were reported in 2016. No sharks were reported in 2017 or 2018 via the North Carolina catch card program.

Table 5.35 Recreational Shark Landings Reported From the Maryland Catch Card Program in 2014–2018

Species	2014	2015	2016	2017	2018
Atlantic sharpnose	13	13	31	40	76
Blue	7	2	2	4	0
Common thresher	12	10	8	10	6
Scalloped hammerhead	1	0	1	0	0
Shortfin mako	53	55	55	61	3
Spinner	0	0	0	0	0
Smoothhound	1	0	2	0	0
Tiger	0	0	0	1	0
Total	87	80	99	116	85

Source: Maryland Department of Natural Resources.

The following tables, which provide estimated shark recreational landings, have undergone changes from previous SAFE Reports. First, as introduced in the 2018 SAFE

Report, these tables contain fully calibrated re-estimates to reflect the new FES and APAIS re-design discussed earlier in this section. Second, given the rare nature of catching some of these shark species, missing values are to be expected. Hence, starting in the 2017 SAFE Report, these tables were updated to distinguish between zero harvests of a species and missing data values (displayed with dashes). Third, beginning in this report, recreational harvest data from the new Louisiana Recreational Creel survey have been included. The creel survey was implemented by the state of Louisiana in 2014 to replace the NOAA Fisheries MRIP data collection. Finally, all MRIP data collections in Puerto Rico have been suspended since September 2017, following the impact of Hurricane Maria. As such, MRIP surveys were not conducted in 2018 as the island continued to recover.

With these updates, estimated recreational landings are provided by region for each of the three groups of shark species: large coastal sharks (Table 5.36, Table 5.37, and Table 5.38), pelagic sharks (Table 5.39), and small coastal sharks (Table 5.40 and Table 5.41). Estimated recreational landings for smoothhound (smooth dogfish) sharks are in Table 5.42. Observed and estimated recreational harvest of prohibited shark species are in Table 6.25.

Table 5.36 Estimated Recreational Harvest of Large Coastal Sharks in the U.S. Atlantic Region in 2014–2018 in Number of Fish Per Species

Species	2014	2015	2016	2017	2018
Blacktip	2,278	5,306	6,520	1,527	500
Bull	3	2	26	3,750	32
Hammerhead, great	.	1	.	.	.
Hammerhead, scalloped	11,118	.	.	.	.
Hammerhead, smooth	.	.	.	.	.
Hammerhead, unclassified	.	.	799	.	.
Lemon	.	119	1,207	764	.
Nurse	1,064	318	21	2	5
Spinner	1,493	396	761	623	153
Tiger	866	1,481	2,061	.	1
Requiem shark, unclassified	19,076	594	732	625	7,544
Total	35,598	8,217	12,127	7,291	8,235

Note: For information on prohibited shark species, see Table 6.25. A dash indicates that species were not reported. Source: Southeast Region Headboat Survey and Marine Recreational Information Program (Fishing Effort Survey/Access Point Angler Intercept Survey calibrated).

Table 5.37 Estimated Recreational Harvest of Large Coastal Sharks in the Gulf of Mexico Region in 2014–2018 in Number of Fish Per Species

Species	2014	2015	2016	2017	2018
Blacktip	22,478	23798	26,107	21,844	17,777
Bull	8,727	767	532	3,373	5,945
Hammerhead, great	2	49	2	.	.
Hammerhead, scalloped	79	28	22	58	30
Hammerhead, smooth	.	.	.	.	.
Hammerhead, unclassified	.	.	.	.	.
Lemon	95	15	1,581	.	47
Nurse	.	1	1	2,282	1
Spinner	1,654	4,829	1,730	4,804	6,054
Tiger	4	2	1	3	1
Requiem shark, unclassified	6,118	9,831	15,431	13,504	1,136
Total	39,157	39,320	45,407	45,868	30,991

Note: For information on prohibited shark species, see Table 6.25. A dash indicates that species were not reported. Source: Texas Parks & Wildlife Department; Marine Recreational Information Program (Fishing Effort Survey/Access Point Angler Intercept Survey calibrated); Southeast Region Headboat Survey; Louisiana Recreational Creel.

Table 5.38 Estimated Recreational Harvest of Large Coastal Sharks in Puerto Rico in 2014–2018 in Numbers of Fish Per Species

Species	2014	2015	2016	2017[1]	2018[1]
Lemon	12	.	.	.	.
Hammerhead, scalloped	.	.	.	.	.
Nurse	.	.	201	.	.
Total	12	.	201	.	.

Note: For information on prohibited shark species, see Table 6.25. A dash indicates that species were not reported. [1]Marine Recreational Information Program data collection in Puerto Rico was suspended in September 2017 and was not resumed for the 2018 season as the island continued to recover following Hurricane Maria. Source: MRIP (Fishing Effort Survey/Access Point Angler Intercept Survey calibrated); Southeast Region Headboat Survey.

Table 5.39 Estimated Recreational Harvest of Pelagic Sharks in the U.S. Atlantic, Gulf of Mexico, and U.S. Caribbean in 2014–2018 in Number of Fish Per Species

Species	2014	2015	2016	2017	2018
Blue shark	3,639	34,363	.	179	3,368
Mako, shortfin	43,061	37,805	25,881	46,441	3,098
Mako, unclassified	5	34	13	3	1
Lamnidae (mackerel sharks)	.	251	.	.	.
Oceanic whitetip	.	132*	.	.	.
Porbeagle	.	.	.	358	.
Thresher	9,626	41,826	11,114	11,280	4,474
Total	56,331	114,411	37,008	58,261	10,941

*Includes 132 individuals caught in Puerto Rico. Source: Texas Parks & Wildlife Department; Marine Recreational Information Program (Fishing Effort Survey/Access Point Angler Intercept Survey calibrated); Southeast Region Headboat Survey; Louisiana Recreational Creel.

Table 5.40 Estimated Recreational Harvest of Small Coastal Sharks in the U.S. Atlantic Region in 2014–2018 in Number of Fish Per Species

Species	2014	2015	2016	2017	2018
Blacknose	7,200	3,782	225	13	13
Bonnethead	172,494	10,346	37,832	18,239	37,168
Finetooth	2,856	5,221	.	1,219	.
Atlantic sharpnose	123,370	41,172	155,023	38,784	24,468
Total	305,920	60,522	193,080	58,255	61,649

Source: Marine Recreational Information Program (Fishing Effort Survey/Access Point Angler Intercept Survey calibrated); Southeast Headboat Survey.

Table 5.41 Estimated Recreational Harvest of Small Coastal Sharks in the Gulf of Mexico Region in 2014–2018 in Number of Fish Per Species

Species	2014	2015	2016	2017	2018
Blacknose	5,688	1,256	40	2,484	17,371
Bonnethead	50,875	18,006	18,236	20,649	118,148
Finetooth	138	203	351	2,565	3,884
Atlantic sharpnose	34,118	39,761	74,379	71,904	51,176
Total	90,819	59,226	93,008	97,601	190,579

Source: Texas Parks & Wildlife Department; Marine Recreational Information Program (Fishing Effort Survey/Access Point Angler Intercept Survey calibrated); Southeast Region Headboat Survey; Louisiana Recreational Creel.

Table 5.42 Estimated Recreational Harvest of Smoothhound Sharks* in the Gulf of Mexico and U.S. Atlantic Regions in 2014–2018 in Number of Fish Per Species

Region	2014	2015	2016	2017	2018
Atlantic	55,792	88,316	145,689	58,446	40,736
Gulf of Mexico	7	3	3	.	.
Total	55,799	88,319	145,692	58,446	40,736

*Atlantic stock includes smooth dogfish. Gulf of Mexico stock includes smooth dogfish, Florida smoothhound, and Gulf smoothhound. Source: Texas Parks & Wildlife Department; Marine Recreational Information Program (Fishing Effort Survey/Access Point Angler Intercept Survey calibrated); Southeast Region Headboat Survey; Louisiana Recreational Creel.

5.3.6 Bottom Longline

5.3.6.1 Background

Bottom longline is the primary commercial gear employed for targeting large and small coastal sharks throughout the Atlantic Ocean. The bottom longline fishery includes the shark research fishery. Section 6.2.1.1, under the standardized bycatch reporting methodology for bottom longline, provides a description of the shark research fishery.

More Information

- Gear: Section 9.1
- Management: Section 9.2 (See Amendment 6, Amendment 5b)
- Permits: Section 4.1
- Bycatch: Section 6.3.6

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.

5.3.6.2 Trips and Fishing Effort

The reported bottom longline effort for fishermen targeting sharks by region from 2012 through 2018 is provided in Table 5.43. A targeted shark trip is defined as a trip where 75 percent of the landings by weight were sharks. The number of trips targeting sharks in the Gulf of Mexico region surpassed the number in the Atlantic region for most years but fell below the number of Atlantic trips in 2016 and remained fairly even in 2017.

Table 5.43 Reported Bottom Longline Effort Targeting Sharks in 2014–2018

Specifications	Region	2014	2015	2016	2017	2018
Number of vessels	Gulf of Mexico	20	18	16	13	13
	Atlantic	19	14	61	18	14
Number of trips	Gulf of Mexico	604	527	25	322	340
	Atlantic	369	330	282	325	212
Average sets per trip	Gulf of Mexico	1.1	1.1	1.2	1.2	1.3
	Atlantic	1.7	1.8	1.4	1.4	1.5
Total number of set hooks	Gulf of Mexico	139,894	140,356	89,723	112,295	121,992
	Atlantic	194,161	170,232	104,665	109,851	85,307
Average number of hooks per set	Gulf of Mexico	206.1	236.1	272.3	292.8	275.9
	Atlantic	276.7	294.9	269.6	260.0	276.1
Total soak time (hours)	Gulf of Mexico	3,018	2,920	1,416	2,140	2,058
	Atlantic	2,694	2,295	2,041	3,054	1,410
Average mainline length (miles)	Gulf of Mexico	1.9	2.1	2.6	2.9	3.0
	Atlantic	3.4	3.8	3.6	3.6	3.7

Source: Unified Data Processing.

5.3.6.3 Recent Catch and Landings

This section provides information on shark landings and species composition and discards as reported in the Bottom Longline Observer Program. Since 2002, shark bottom longline vessels have been required to take an observer if selected. Participants in the shark research fishery are required to take an observer on all shark research fishery trips. Outside the research fishery, and depending on the time of year and fishing season, vessels that target sharks, possess a current valid Shark Directed permit, and reported fishing with longline gear in the previous year were randomly selected for observer coverage. The target observer coverage level is 5–10 percent (Mathers et al. 2019a, unpublished).

In 2018, the Bottom Longline Observer Program placed observers on 11 vessels for the entire fishing season—all six of the vessels within the shark research fishery and five selected in the non-research shark bottom longline fishery. These vessels were observed for a total of 159 bottom longline sets (defined as setting gear, soaking gear for some duration of time, and retrieving gear) and a total of 97 trips (defined as from the time a vessel leaves the port until the vessel returns to port and lands catch, including multiple hauls therein). Gear characteristics of trips varied by area (Gulf of Mexico or the U.S. Atlantic Ocean) and target species (non-sandbar large coastal sharks or sandbar shark) (Mathers et al. 2019a, unpublished).

In the non-research shark fishery, the program observed trips from North Carolina to Florida and the Gulf of Mexico region targeting coastal shark species. These trips caught mostly Atlantic sharpnose sharks, with blacktip, blacknose, and tiger sharks being the next most caught species (Table 5.44). There were 51 bottom longline sets on 32 observed trips targeting large coastal sharks. These sets used a bottom longline that was between 0.2 and 9.8 km (0.1– 6.0 miles) long with 23–441 hooks attached. The 16.0 circle hook was the most common hook used (42.3 percent). The average soak duration was 10.5 hours.

Table 5.44 Shark Species Caught on Observed Bottom Longline Trips in the Non-Shark Research Fishery Targeting Sharks in the South Atlantic and Gulf of Mexico in 2018

Species	Total Caught	Kept (%)	Discarded Dead (%)	Discarded Alive (%)	Disposition Unknown (%)
Blacktip shark	691	86.1	8.8	4.8	0.3
Atlantic sharpnose shark	351	87.5	12.3	0.0	0.3
Bull shark	157	89.2	0.6	6.4	3.8
Spinner shark	127	92.1	2.4	5.5	0.0
Sandbar shark	115	0.0	3.5	96.5	0.0
Blacknose shark	112	0.9	58.9	40.2	0.0
Nurse shark	104	1.0	0.0	99.0	0.0
Lemon shark	90	86.7	1.1	4.4	7.8
Tiger shark	81	35.8	0.0	63.0	1.2
Scalloped hammerhead shark	52	30.8	25.0	40.4	3.9
Great hammerhead shark	49	63.3	20.4	14.3	2.0
Smooth dogfish	19	94.7	5.3	0.0	0.0
Bonnethead shark	2	0.0	100.0	0.0	0.0
Sharks, unclassified	2	0.0	0.0	0.0	100.0
Finetooth shark	1	100.0	0.0	0.0	0.0
Dusky shark	1	0.0	0.0	100.0	0.0
Total	1,954				

Source: Mathers et al. 2019a, unpublished.

Fishermen in the 2018 shark research fishery targeted sandbar sharks in the Gulf of Mexico, southern Atlantic, and northern Atlantic regions. There were 108 sets on 65 trips, all of which were observed, that caught mostly sandbar sharks, with blacktip, tiger, and Atlantic sharpnose sharks being the next most-caught species (Table 5.45). Dusky sharks were mainly observed on trips targeting sandbar sharks. Trips in the shark research fishery used a bottom longline that was an average of 4.5 km (2.7 miles) long with 80–300 hooks attached. The average soak duration was 5.3 hours. Fishermen targeting sandbar sharks with bottom longline gear most commonly used the 20.0 circle hook (53.7 percent of the time) (Mathers et al. 2019a, unpublished).

Table 5.45 Shark Species Caught on Observed Bottom Longline Trips in the Shark Research Fishery in the Gulf of Mexico and Southern Atlantic in 2018

Species	Total Caught	Kept (%)	Discarded Dead (%)	Discarded Alive (%)	Disposition Unknown (%)
Sandbar shark	2,975	98.5	0.3	0.3	0.9
Blacktip shark	383	99.2	0.3	0.0	0.5
Tiger shark	344	30.2	0.9	68.0	0.9
Atlantic sharpnose shark	271	69.7	28.4	1.5	0.4
Spinner shark	173	100.0	0.0	0.0	0.0
Dusky shark	149	0.0	39.6	59.1	1.3
Bull shark	111	91.0	0.0	7.2	1.8
Lemon shark	62	98.4	0.0	0.0	1.6
Scalloped hammerhead shark	60	68.3	6.7	21.7	3.3
Nurse shark	59	1.7	0.0	98.3	0.0
Sand tiger shark	55	0.0	0.0	100.0	0.0
Great hammerhead shark	52	92.3	0.0	7.7	0.0
Blacknose shark	42	28.6	28.6	42.9	0.0
Finetooth shark	5	100.0	0.0	0.0	0.0
White shark	4	0.0	0.0	100.0	0.0
Silky shark	2	0.0	50.0	50.0	0.0
Sharks, unclassified	2	0.0	50.0	0.0	50.0
Smooth hammerhead shark	1	0.0	0.0	100.0	0.0
Total	4,750				

Source: Mathers et al. 2019a, unpublished.

5.3.7 Gillnet

5.3.7.1 Background

Gillnet gear is the primary gear for vessels landing small coastal sharks and smooth dogfish, although such vessels can also catch other shark species. Vessels participating in the shark gillnet fishery typically possess permits for other council or state managed fisheries in addition to their federal permit. Many of the commercial regulations for the Atlantic shark fishery are the same for both the bottom longline and gillnet fishery, including seasons, quotas, species complexes, permit requirements, authorized/prohibited species, and retention limits.

More Information

- Gear: Section 9.1
- Management: Section 9.2 (See Amendment 6 and Amendment 5b)
- Permits: Section 4.1 (4.1.1, 4.1.2)
- Bycatch: Section 6.3.7

The data presented in this section focus on gillnet fisheries in the Southeast and Gulf of Mexico regions landing small coastal sharks or finfish, as well as gillnet fisheries in the Northeast region landing smooth dogfish sharks or finfish.

5.3.7.2 Trips and Fishing Effort

The overall gillnet effort for fishermen catching sharks in the Southeast and North Atlantic are available from 2014 through 2018 (Table 5.46 and Table 5.47). The majority of the vessels and trips catching and landing sharks, other than smooth dogfish, occur in the southern portion of the Atlantic region. In addition to small coastal sharks, these Southeast trips catch and retain king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), and bluefish (*Pomatomus saltatrix*). Most of the data from the Gulf of Mexico region cannot be released consistent with Magnuson-Stevens Act confidentiality requirements since fewer than three vessels use gillnet gear to target sharks in the region and the data cannot be appropriately aggregated to maintain confidentiality (Table 5.46).

Table 5.46 Gillnet Gear Effort in the U.S. South Atlantic and Gulf of Mexico Regions Targeting Sharks in 2014–2018

Specifications	Region	2014	2015	2016	2017	2018
Number of vessels	Gulf of Mexico	C	C	0	3	C
	Atlantic	24	19	21	20	26
Number of trips	Gulf of Mexico	C	C	0	15	C
	Atlantic	354	161	206	127	202
Average sets per trip	Gulf of Mexico	C	C	N/A	1.7	C
	Atlantic	1.2	2.1	1.8	1.4	1.5
Total soak time (hours)	Gulf of Mexico	C	C	N/A	128.0	C
	Atlantic	1,220.5	539.8	852.5	490.7	562.5
Average gillnet length (yards)	Gulf of Mexico	C	C	N/A	696.7	C
	Atlantic	771.8	726.7	1,155.1	1,030.0	1,169.4
Average mesh size (inches stretched)	Gulf of Mexico	C	C	N/A	8.5	C
	Atlantic	5.2	5.2	5.2	4.7	4.6

C = Due to confidentiality requirements under the Magnuson-Stevens Act, some of the data are not presented. N/A = No data reported. Source: Unified Data Processing.

In the Northeast and Mid-Atlantic regions, gillnet gear is the predominant gear type used in the smooth dogfish shark fishery. The smooth dogfish gillnet fishery is a mixed fishery with a large portion of trips catching and retaining a variety of additional species dominated by bluefish, Atlantic croaker (*Micropogonias undulatus*), and spiny dogfish.

In 2018, the Northeast Fisheries Observer Program observed 50 trips targeting smooth dogfish and recorded smooth dogfish caught on a total of 180 sets. Summary information on those 50 trips is presented in Table 5.47.

Table 5.47 Smooth Dogfish Caught on Observed Northeast Gillnet Gear Trips in 2018

Specifications	Species Observed on Trip	2017	2018
Number of trips	All species	1,295	1,011
	Smooth dogfish	65	50
Number of sets	All species	4,040	3,101
	Smooth dogfish	219	180
Total caught (lb dw)	All species	363,465	334,605
	Smooth dogfish	99,233	110,616
Kept (%)	All species	75.0%	47.6%
	Smooth dogfish	98.4%	99.4%
Discarded (%)	All species	25.0%	52.4%
	Smooth dogfish	1.6%	0.0%

lb dw = Pounds dressed weight. Source: Northeast Fisheries Observer Program.

5.3.7.3 Recent Catch and Landings

In 2018, a total of 87 sets comprised of various southeast gillnet fisheries were observed by the Southeast Gillnet Observer Program. No gillnet trips targeting sharks were observed in 2018. Four vessels in the strike gillnet fishery were observed making nine strike sets on eight trips. Observed strike gillnet trips exclusively targeted king mackerel. One gillnet vessel was observed making 23 drift gillnet sets on three trips. Due to data confidentiality requirements under the Magnuson-Stevens Act, these drift gillnet trips cannot be further described. Four vessels in the sink gillnet fishery were observed making 55 sink net sets on 12 trips in 2017. Observed sink gillnet trips exclusively targeted Spanish mackerel.

Table 5.48 and Table 5.49 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 2018 (Mathers et al. 2019b, unpublished).

Table 5.48 Shark Species Caught on Observed Southeast Sink Gillnet Trips Targeting Spanish Mackerel in 2018

Species	Total Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose shark	266	3.76	47.37	48.87
Bonnethead shark	175	1.71	61.71	36.57
Scalloped hammerhead shark	30	0.0	60.0	40.0
Spinner shark	20	55.0	35.0	10.0
Blacktip shark	5	20.0	60.0	20.0
Blacknose shark	4	25.0	50.0	25.0
Great hammerhead shark	2	0.0	100.0	0.0
Tiger shark	1	0.0	100.0	0.0
Total	503			

Source: Mathers et al. 2019b, unpublished.

Table 5.49 Shark Species Caught on Observed Southeast Sink Gillnet Trips Targeting King Mackerel in 2018

Species	Total Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Blacktip shark	6	0.0	83.3	16.6
Requeim (genus) shark	2	0.0	100.0	0.0
Atlantic sharpnose shark	2	0.0	100.0	0.0
Sharks, unclassified	1	0.0	100.0	0.0
Total	11			

Source: Mathers et al. 2019b, unpublished.

Table 5.50 of this section outlines shark species composition, disposition, and summary information for sharks caught during Northeast Fisheries Observer Program-observed trips targeting smooth dogfish across all gear types.

Table 5.50 Shark Species Caught on Observed Smooth Dogfish-Targeted Trips Across All Gear Types in 2018

Species	Total Caught (lb)	Kept (%)	Discarded (%)
Smooth dogfish	110,616	99.4	0.0
Total	110,616		

Note: Due to data access limitations, 2018 summary only includes smooth dogfish, but future reports are expected to include other shark species observed in the directed smooth dogfish fishery. Source: Northeast Fisheries Observer Program.

5.3.8 Green-Stick

More Information

- Gear: Section 9.1
- Management: Section 9.2 (See Amendment 8)
- Permits: Section 4.1 (4.1.3.2, 4.1.3.4)
- Bycatch: Section 6.3.8

5.3.8.1 Background

Green-stick gear may be used to harvest bigeye, albacore, yellowfin, skipjack, and bluefin tunas aboard vessels with Atlantic Tunas General category, Atlantic HMS Charter/Headboat, and Atlantic Tunas Longline category permits.

5.3.8.2 Recent Catch and Landings

Recent Atlantic tuna catches are presented earlier in Section 5.2.2.1. Green-stick gear has been used in the U.S. Atlantic tuna fisheries since the mid-1990s. Determining historical landings attributed to this gear, however, was not easily quantifiable due to the lack of reporting mechanisms available in fisheries data collection programs in the past.

Limited data did allow NOAA Fisheries to characterize and present the catch in the 2008 SAFE Report (NOAA Fisheries 2008a). That year, a green-stick gear code was designated for use in existing reporting systems, such as trip tickets in the Southeast and electronic reporting programs in the Northeast. Following this, NOAA Fisheries has, with some success, encouraged states to utilize the green-stick gear code in their trip ticket programs. With these gear code additions, data on landings specific to green-stick gear are expected to improve.

Table 5.51 presents green-stick landings data from this system.

Table 5.51 Select Landings With Green-Stick Gear (lb ww) in 2014–2018

Species	Region	2014	2015	2016	2017	2018
Yellowfin tuna	Atlantic	57,329	44,673	34,801	77,753	68,750
	Gulf of Mexico	C	-	C	10,540	67,832
Bigeye tuna	Atlantic	9,285	11,399	1,243	C	10,885
	Gulf of Mexico	-	-	C	-	C
Skipjack	Atlantic	1,933	C	C	C	C
	Gulf of Mexico	-	-	-	-	-

Note: Additional landings of other HMS have occurred but cannot be displayed due to confidentiality requirements. lb ww = Pounds whole weight. Source: eDealer.

5.4 Safety Data

5.4.1 Background

National Standard 10 of the Magnuson-Stevens Act requires that conservation and management measures taken under the act promote the safety of human life at sea to the extent practicable. Safety considerations that should be considered include the operating environment, gear and vessel loading requirements, limited season and area fisheries, and mitigation measures. NOAA Fisheries considers these and other factors when evaluating or developing management measures

The National Standard 10 guidelines are the primary source of guidance for the consideration of safety issues in fishery regulations. A NOAA Fisheries technical memorandum, Guidance on Fishing Vessel Risk Assessments and Accounting for Safety at Sea in Fishery Management Design (Lambert et al. 2015), promotes the evaluation and consideration of safety issues within fisheries management. Two specific tools that can be used by fishery managers to evaluate safety within fisheries, determine if proposed management measures create a safety concern, and develop solutions for reducing risk and improving safety are described: a safety checklist and a risk assessment methodology. Additionally, the U.S. Coast Guard maintains websites for each of its regions (www.uscg.mil/Units/Organization) that communicate regulatory and safety information and region-specific statistics. They also maintain a blog, the Coast Guard Maritime Commons (mariners.coastguard.blog), which reports on safety alerts, news bulletins, and regulatory information helpful for commercial and recreational fleets.

5.4.2 Commercial Fisheries Safety Data

Commercial fishing is one of the most dangerous occupations in the United States (Lambert et al. 2015). The Bureau of Labor Statistics data indicates that there were 30 fatalities in the fishing industry in 2018 (www.bls.gov/news.release/pdf/cfoi.pdf). This is equivalent to a work-related fatality rate of 77.4 deaths per 100,000 full-time equivalent workers. The all-worker rate is 3.5 fatalities per 100,000 full-time equivalent workers.

Between 2000 and 2014, 164 and 225 commercial fishing deaths occurred in Gulf of Mexico and Atlantic East Coast fisheries, respectively; the majority of fatalities were due to vessel disasters (e.g., sinking, capsizing, fires, groundings) and falls overboard (as a result of losing balance, tripping or slipping, or becoming entangled in gear). Two of these incidents occurred in Gulf of Mexico shark fisheries. In all fatal falls, none of the victims wore personal floatation devices (Case et al. 2018). The Commercial Fishing Safety Research and Design Program of the National Institute for Occupational Safety and Health recommends prioritizing the use of floatation devices when on deck. Gear entanglements are still a concern and recommended prevention strategies include the use of line bins and rope lockers. Man-overboard alarms and reboarding ladders are encouraged to help in the event of a fall overboard, particularly when fishermen are working alone. Fatality summary information for commercial fisheries between 2010 and 2014 along the East Coast and the Gulf of Mexico are found at www.cdc.gov/niosh/docs/2017-173/pdf/2017-173.pdf?id=10.26616/NIOSHPUB2017173 and www.cdc.gov/niosh/docs/2017-174/pdf/2017-174.pdf?id=10.26616/NIOSHPUB2017174, respectively.

The Coast Guard Authorization Act of 2010, which elevated maritime safety with that of other U.S. Coast Guard responsibilities, and the U.S. Coast Guard and Maritime Transportation Act of 2012 included several safety regulations implemented between 2013 and 2016 (www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/MSIB/2014/018_14_12-1-2014.pdf). Dockside safety examinations increase safety of persons aboard vessels and are required to be fully compliant with existing fishing vessel safety regulations (46 CFR 41–47, Subchapter E, Load Lines). These safety examinations are also required if a commercial vessel must carry a NOAA Fisheries observer. In order to assist fishing vessel owners/operators with preparing their fishing vessel prior to examination by the Coast Guard, a customized checklist of items specifically tailored to fishing vessels can be created through the "Commercial Fishing Vessel Checklist Generator" at www.fishsafewest.info/test/1ChecklistCover.html.

In 2016, NOAA Fisheries published a final rule that removed vessel upgrade restrictions for Swordfish Directed and Atlantic Tunas Longline category permits (81 FR 84501). The action, which went into effect December 26, 2016, allowed fishermen to buy, sell, or transfer these permits without concerns of exceeding the maximum upgrade limit. It also allowed vessel owners to transfer permits to newer vessels. The removal of upgrade restrictions for these vessels provided an avenue for vessel owners to address safety issues that exist with older vessels through the transfer of their permits to newer vessels and to facilitate improvements while onboard without restrictions.

In 2019, the Coast Guard released a Work Instruction to provide guidance on applying statutory and regulatory requirements to the commercial fishing industry, the Coast Guard, and third parties. The Work Instruction clarifies and consolidates existing Commercial Fishing Vessel Safety Program requirements related to dockside safety examinations and third-party organizations that conduct them. Additional information is available at www.fishsafewest.info/PDFs/3rdParty_WI.pdf.

5.4.3 Recreational Fisheries Safety Data

Safety at sea is not just an issue for commercial fisheries. Recreational boating statistics are published annually by the U.S. Coast Guard Office of Auxiliary and Boating Safety (www.uscgboating.org/library/accident-statistics/Recreational-Boating-Statistics-2018.pdf). The following summarizes recreational boating statistics, inclusive of recreational fishing activities for 2018 (USCG 2019):

- There were 11,852,969 recreational vessels registered by states.
- The Coast Guard reported 4,145 accidents involving 633 deaths, approximately 46 million dollars in damages, and 2,511 injuries as a result of recreational boating accidents.
- The fatality rate for 2018 was 5.3 deaths per 100,000 registered recreational vessels. Where cause was known, most fatalities (77 percent) were associated with drowning. Approximately 84 percent of drowning victims were not wearing a life jacket at the time of fatality.
- Alcohol use was a leading known contributing factor in fatal boating accidents. Where the primary cause is known, it was listed as the principal factor in 19 percent of deaths.

- Accidents were attributed to several factors, the top five of which included operator inattention, improper lookout, operator inexperience, machinery failure, and excessive speed.
- From a summary of accident reports, approximately 659 vessels were engaged in fishing activities at the time of accidents, which resulted in 196 deaths and 266 injuries.

Regulations for recreational boaters, including recreational fishermen, are summarized at 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.

Chapter 5 References

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6 Bycatch, Incidental Catch, and Protected Species

6.1 Background

"Bycatch" in fisheries is a term that generally refers to discarded fish or interactions between fishing operations and protected species. Under the Magnuson-Stevens Act, bycatch is defined as fish that are harvested in a fishery, but that are not sold or kept for personal use, and includes both economic and regulatory discards. Economic discards are fish that are discarded because they are of undesirable size, sex, or quality, or for other economic reasons. Regulatory discards are fish that are caught but discarded because regulations do not allow fishermen to retain the fish; for example, fishermen may be required to discard fish under a certain size or of a specific species for conservation reasons. The National Bycatch Reduction Strategy was completed in 2016 and defines bycatch as discarded catch of marine species and unobserved mortality due to a direct encounter with fishing vessels and gear. More information about the strategy may be found at www.fisheries.noaa.gov/national/bycatch/national-bycatch-reduction-strategy.

Some relevant examples of fish caught in HMS fisheries as bycatch or incidental catch are:

- Marlin, undersized swordfish, and undersized 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.
- Prohibited species, such as longbill spearfish and those in the prohibited shark complex.

National Standard 9 of the Magnuson-Stevens Act requires that fishery management measures minimize bycatch and bycatch mortality to the extent practicable. Very few legal fishing gears are perfectly selective for the target species of each fishing operation; thus, expecting to eliminate bycatch of all non-target species in Atlantic HMS fisheries would be impracticable. Methods employed to reduce bycatch in the Atlantic HMS fisheries are listed in Table 6.1. Final Amendment 5b and Amendment 11 to the 2006 Consolidated HMS FMP expanded the use of several of these methods in HMS fisheries.

Table 6.1 Bycatch Reduction Methods in the Atlantic Highly Migratory Species Fisheries

Commercial Fisheries	Recreational Fisheries
• Gear modifications (including hook and bait types) • Circle hooks • Weak hooks • Time/area closures • Performance standards • Education/outreach • Effort reductions (i.e., limited access permits) • De-hooking devices (mortality reduction only) • Prohibiting retention of fish • Gear modifications (including hook and bait types)	• Circle hooks (mortality reduction only) • Formal voluntary or mandatory catch-and-release program for all fish or certain species • Prohibiting retention of fish • Education/outreach • De-hooking devices (mortality reduction only)

6.2 Laws and Determinations Related to Bycatch in HMS Fisheries

The major legal requirements pertaining to bycatch are in four acts:

- Magnuson-Stevens Act
- Marine Mammal Protection Act (MMPA)
- Endangered Species Act (ESA)
- Migratory Bird Treaty Act

This section reviews the laws related to bycatch and the ways in which NOAA Fisheries is abiding by these laws, including requirements for standardized bycatch reporting methodology. Laws related to endangered and protected species, and measures to address protected species concerns, are available on the NOAA Fisheries Office of Protected Resources website (www.fisheries.noaa.gov/about/office-protected-resources) and discussed in the 2011 SAFE Report (NOAA Fisheries 2011).

6.2.1 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 are 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.

6.2.1.1 Standardized Bycatch Reporting Methodology

Section 303(a)(11) of the Magnuson-Stevens Act requires all fishery management plans 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 requirements pertaining to the

collection, reporting, and recording of bycatch data are established in the 2006 Consolidated HMS FMP, its amendments, and the implementing regulations.

While the 2006 Consolidated HMS FMP and subsequent amendments have established the standardized bycatch reporting methodologies (SBRM) for most HMS fisheries, NOAA Fisheries summarizes and reviews these SBRMs annually in its SAFE Report, specifying the required procedures that constitute the standardized reporting methodology for each HMS fishery. Assessment of bycatch, while not a part of the standardized reporting methodology, must be considered to evaluate the amount and type of bycatch occurring in the fishery. This facilitates the development of conservation and management measures that, to the extent practicable, minimize bycatch and bycatch mortality as required by National Standard 9 of the Magnuson-Stevens Act (16 U.S.C. § 1851(a)(9)).

On January 19, 2017, NOAA Fisheries published final guidance on the requirements and implementation of standardized bycatch reporting methodologies in all fisheries managed under the Magnuson-Stevens Act (82 FR 6317). Regulations implemented through that rule require that standardized reporting methodologies meet specific purposes (50 C.F.R. 600.1610)), may be different for different fisheries, and must address specified factors to ensure the SBRM satisfies Magnuson-Stevens Act requirements. These factors include: information about characteristics of bycatch in the fishery, feasibility, data uncertainty, and data use (§ 600.1610(a)(2)). Under the regulations, "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 (50 C.F.R 600.1605).

The SBRM final rule also requires that all FMPs must ensure consistency with the requirements related to establishing and reviewing SBRMs by February 21, 2022. (§ 600.1610(b)). Thereafter, a review of SBRM should be conducted at least once every five years to verify continued compliance with the Magnuson-Stevens Act and SBRM regulations. For HMS fisheries, NOAA Fisheries is undertaking this review through Amendment 12 to the 2006 Consolidated HMS FMP. Amendment 12 will review each fishery's SBRM within the context of the factors now set out in the regulations, will update the descriptions of existing SBRMs, and will establish SBRMs for Atlantic HMS fisheries for which SBRMs have not yet been established. On September 3, 2019, NOAA Fisheries published a Notice of Intent (84 FR 45941) to prepare this amendment. Public comment ended on the scoping document ended November 26, 2019, and Draft Amendment 12 is anticipated in 2020.

NOAA Fisheries scientists and managers continue to consult as necessary on reporting methodology design considerations for the collection of bycatch assessment data. These considerations include changes in monitoring and reporting technology and methods for improving the quality of target and non-target catch estimates while considering cost, technical, and operational feasibilities. 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.

Pelagic Longline

NOAA Fisheries utilizes both self-reported logbook data and observer data to monitor bycatch in the pelagic longline fishery. The incidental catch of bluefin tuna in the pelagic longline fishery is also monitored via electronic monitoring. Since 2018, NOAA Fisheries has used electronic monitoring to verify that only those shortfin mako sharks that were dead at haulback are retained.

Logbook reporting is conducted via trip summary and trip set forms for Atlantic HMS. These data are maintained in the Southeast Fisheries Science Center (SEFSC) United Data Processing (UDP) database. Detailed information on this reporting program is included in the Appendix (9.3.1). Reporting on these forms is mandatory for pelagic longline vessels, and reporting rates are generally high (Garrison and Stokes 2016). NOAA Fisheries closely monitors 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.

Observer data are collected through the Pelagic Observer Program. The program has been in place since 1992 to document finfish bycatch, characterize fishery behavior, and quantify interactions with protected species (Beerkircher et al. 2002). Data collection priorities have been to collect catch and effort data of the U.S. Atlantic pelagic longline fleet on HMS, although information is also collected on interactions with protected species. The program is mandatory for those vessels selected, and all vessels with Swordfish Directed and Incidental permits are selected. Additional information on this program is in 9.3.2.6.

The Pelagic Observer Program has an established minimum coverage level of 5 percent of the U.S. pelagic longline fleet within the North Atlantic waters north of 5° N. latitude, as was agreed to by ICCAT (currently included in Rec. 16-14). The program began requiring an 8 percent observer coverage rate due to the requirements of the 2004 biological opinion (BiOp) for the Atlantic pelagic longline fishery for HMS (NOAA Fisheries 2004a). Actual observer coverage in 2005–2007 ranged from 7.5 to 10.8 percent.

For 2007–2010, NOAA Fisheries increased the observed coverage for the pelagic longline fleet operating in the Gulf of Mexico during March/April through June to monitor bluefin tuna interactions. The goal was to have 100 percent observer coverage from 2007 to 2009 and 50 percent for subsequent years beginning in 2010.

NOAA Fisheries increased mandatory observer coverage for pelagic longline vessels in the Mid-Atlantic Bight, including the Cape Hatteras Gear Restricted Area, 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 rebuilding the stock. The general increasing trend in observer coverage has reduced data uncertainty.

Fishery observer effort in the pelagic longline fishery is allocated among 11 large geographic areas and by calendar quarter based upon the historical fishing range of the fleet (Fairfield-Walsh and Garrison 2006). The target annual coverage, as required by the 2004 BiOp, is 8 percent of the total reported sets, and observer coverage is randomly allocated based upon reported fishing effort during the previous fishing year/quarter/statistical reporting area (Beerkircher et al. 2002). Bycatch rates of

protected species (catch per 1,000 hooks) are quantified based upon observer data by year, fishing area, and quarter (Garrison 2005). The estimated bycatch rate is then multiplied by the fishing effort (number of hooks) in each area and quarter, as reported in the UDP database, 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 implemented regulations requiring vessels fishing with pelagic longline gear to report the following information through a vessel monitoring system within 12 hours of completing each pelagic longline set: date the set was made, area in which the set was made, number of hooks in the set, and approximate length of all bluefin tuna retained, discarded dead, or released alive (by standardized size ranges). Permit holders must also submit a landing notification at least three hours, but no more than 12 hours, prior to any landing. These requirements went into effect January 1, 2015.

Purse Seine

There have been no active purse seine vessels permitted to fish for bluefin tuna since 2015, thus no effort or catch has been reported. In Recommendation 16-14, 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 a vessel monitoring system and submit a set report within 12 hours of completing each purse seine set. Specifically, the report must include the date the set was made, the 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 zero bluefin on a set. These requirements went into effect January 1, 2015.

Commercial Handgear

Commercial handgear fishermen, including those in the harpoon fishery, are required to report bluefin tuna dead discards online. This requirement became effective in January 2015. Vessels in the buoy gear fishery are also selected for mandatory logbook reporting of catch and effort.

The commercial handgear fishery is not currently selected for observer coverage. Selection is not feasible from a cost perspective given the size of the fleet, the variability in trips that are made, and the expense of additional observer capacity.

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

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 survey, LPS, Southeast Region Headboat Survey, and Texas Headboat Survey; tournament data submitted through the HMS Atlantic Tournament Registration and Reporting system; and the HMS recreational reporting program for non-tournament swordfish, billfishes, and bluefin tuna collected via hmspermits.noaa.gov. Descriptions of these surveys, the geographic areas they include, and their limitations are discussed in the 2006 Consolidated HMS FMP (NOAA Fisheries 2006) and in the Appendix (Section 9.3.3).

Historically, fishery survey strategies have not captured all landings of recreationally caught swordfish. Although some swordfish handgear fishermen have commercial permits, many others land swordfish strictly for personal consumption. Therefore, NOAA Fisheries has implemented regulations to improve recreational swordfish and billfish monitoring and conservation. These regulations stipulate that all non-tournament recreational landings of swordfish and billfish must be reported by phone at (800) 894-5528 or online at hmspermits.noaa.gov. All reported recreational swordfish landings are counted toward the incidental swordfish quota.

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.

Bottom Longline

NOAA Fisheries utilizes both self-reported logbook data and observer data to monitor bycatch in the shark bottom longline fishery. Since 2002, shark bottom longline vessels have been required to take an observer if selected. The bottom longline fishery includes the shark research fishery, which allows vessels issued a valid shark research permit to target sandbar sharks. As a condition of participation in the shark research fishery, vessels are subject to 100 percent observer coverage of shark research fishery trips. 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 to 10 percent for shark directed trips. These coverage rates are feasible and provide a reasonable level of data certainty.

Logbook reporting is mandatory in the shark bottom longline fishery. Most fishermen use the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook form supplied by SEFSC and maintained in UDP. Reporting rates using this logbook and the supplemental discard report form are generally high (Garrison and Stokes, 2016).

Gillnet

NOAA Fisheries utilizes both self-reported logbook data and observer data to monitor bycatch in the shark gillnet fishery. Various southeast gillnet fisheries, including strike, sink, and trammel gillnet fisheries, are observed at varying rates by the Southeast Gillnet Observer Program or Northeast Fisheries Observer Program, which specifically interacts with Mid-Atlantic smooth dogfish fisheries. The coverage rates provide a reasonable level

of data certainty considering the feasibility of observed trips from a cost and operational perspective.

Logbooks, and the supplemental discard report form in the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook program (supplied by SEFSC and maintained in UDP) and Northeast vessel trip reporting, are mandatory. Reporting rates using SEFSC logbooks are generally high (Garrison and Stokes 2016). Disposition of discards is recorded by observers and can be used to estimate discard mortality.

Green-Stick

Standardized bycatch reporting methodology for the commercial green-stick fishery is identical to that described for the commercial handgear fishery above. It is listed under its own subheading because it is not considered a handgear.

6.2.2 Marine Mammal Protection Act

The MMPA 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 and zero serious injury rate goal within seven years of enactment. 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, and the preparation and implementation of take reduction plans.

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

Under MMPA requirements, NOAA Fisheries produces an annual list of fisheries that identifies species with which Atlantic HMS fisheries interact and classifies domestic commercial fisheries by gear type relative to their rates of incidental mortality or serious injury to marine mammals. The final MMPA list of fisheries for 2019 became effective May 16, 2019 (October 23, 2018; 83 FR 53422). Additional information and references to current and historical lists of fisheries can be found at www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries.

Table 6.2 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 6.2 Atlantic and Gulf Coast Marine Mammal Species Potentially of Concern in Highly Migratory Species Fisheries Interactions in 2019

Common Name	Scientific Name
Atlantic spotted dolphin	*Stenella frontalis*
Beaked whales, mesoplodon	*Mesoplodon spp.*
Bottlenose dolphin	*Tursiops truncatus*
Common dolphin	*Delphinis delphis*
Cuvier's beaked whale	*Ziphius cavirostris*
Dwarf sperm whale	*Kogia sima*
Harbor porpoise	*Phocoena phocoena*
Humpback whale	*Megaptera novaeangliae*
False killer whale	*Pseudorca crassidens*
Long-finned pilot whale	*Globicephela melas*
Minke whale	*Balaenoptera acutorostrata*
North Atlantic right whale	*Eubalaena glacialis*
Pantropical spotted dolphin	*Stenella attenuate*
Pygmy sperm whale	*Kogia breviceps*
Risso's dolphin	*Grampus griseus*
Rough-toothed dolphin	*Steno bredanensis*
Short-finned pilot whale	*Globicephela macrorhynchus*
Sperm whale	*Physeter macrocephalus*

Source: NOAA Fisheries 2019 List of Fisheries.

Three classifications exist in the list of fisheries:

- Category I fisheries are those with frequent serious injury or mortality to marine mammals.
- Category II fisheries are those with occasional serious injury or mortality.
- Category III fisheries are those with a remote likelihood of serious injury or mortality to marine mammals.

The Atlantic Ocean, Caribbean, and Gulf of Mexico pelagic longline fishery is classified as Category I, and the southeastern Atlantic shark gillnet fishery is classified as Category II. The following Atlantic HMS fisheries are classified as Category III:

- Atlantic tuna purse seine
- Gulf of Maine and Mid-Atlantic tuna, shark, and swordfish hook-and-line/harpoon
- Southeastern Mid-Atlantic and Gulf of Mexico shark bottom longline
- Mid-Atlantic, southeastern Atlantic, and Gulf of Mexico pelagic hook-and-line/harpoon fisheries
- Commercial passenger fishing vessel (charter/headboat) fisheries

Recreational vessels are not categorized since they are not considered commercial fishing vessels.

Owners of vessels or gear engaging in a Category I or II fishery are required under MMPA to register with NOAA Fisheries and accommodate an observer aboard their vessels if requested. Vessel owners or operators or fishermen in Category I, II, and III fisheries must report all incidental mortalities and serious injuries of marine mammals during the course

of commercial fishing operations to NOAA Fisheries' Office of Protected Resources on the Mortality/Injury Reporting Form.

There are currently no regulations requiring recreational fishermen to report marine mammal interactions; however, voluntary reporting of injured, entangled, or stranded marine mammals to (877) 942-5343 is encouraged. Incidental take of marine mammals by recreational fishermen is illegal.

Numbers of marine mammal interactions, observed and estimated, are summarized by HMS fishery in Section 6.3. NOAA Fisheries continues to monitor observed interactions with marine mammals on a quarterly basis and reviews data for appropriate action, as necessary.

6.2.2.1 Pelagic Longline Take Reduction Team and Plan

Under Section 118 of MMPA, the Pelagic Longline Take Reduction Team is charged with developing a take reduction plan to reduce bycatch of pilot whales in the Atlantic pelagic longline fishery to a level approaching a zero mortality rate within five years of implementation. A final plan (74 FR 23349) became effective June 18, 2009. A suite of management strategies were implemented to reduce mortality and serious injury of pilot whales and Risso's dolphins in the Atlantic pelagic longline fishery. These include:

- The Cape Hatteras Special Research Area, with specific observer and research participation requirements for fishermen operating in that area.
- A 20 nautical mile (nmi) upper limit established on the mainline length for all pelagic longline sets within the Mid-Atlantic Bight.
- Informational placards on the handling and release of marine mammals to be displayed both in the wheelhouse and on the working deck of all active pelagic longline vessels in the Atlantic fishery.

NOAA Fisheries also took the following non-regulatory measures:

- Increased observer coverage in the Mid-Atlantic Bight to 12–15 percent to ensure representative sampling of pilot whales and Risso's dolphins
- Encouraged vessel operators to maintain daily communication with other local vessel operators regarding protected species interactions throughout the pelagic longline fishery with the goal of identifying and exchanging information relevant to avoiding protected species bycatch.
- Recommended that NOAA Fisheries update the guidelines for handling and releasing marine mammals and work with industry to develop new technologies, equipment, and methods for safer and more effective handling and release of marine mammals
- Recommended that NOAA Fisheries pursue the research and data collection goals in the take reduction plan regarding pilot whales and Risso's dolphins

More information on the take reduction team can be found at www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-take-reduction-plans-and-teams and in the 2011 SAFE Report (NOAA Fisheries 2011).

6.2.2.2 Atlantic Large Whale Take Reduction Team and Plan

The Atlantic Large Whale Take Reduction Team was established to help develop plans that mitigate the risks to marine mammals posed by fishing gear. The Atlantic Large Whale Take Reduction Plan, established in 1997, was implemented to reduce injuries and deaths of large whales due to incidental entanglement in fishing gear. The reduction plan continues to evolve as more information becomes available on causes of whale entanglement and how fishing practices might be modified to reduce these risks. Major changes to the plan were implemented in a final rule that published on October 5, 2007 (72 FR 57104).

Regulations that affect HMS fisheries, specifically gillnet fisheries, include closed and restricted areas:

- A closed area for all gillnet fisheries from November 15 to April 15 from 29° 00' N to 32° 00' N from shore eastward to 80° 00'W and off South Carolina, within 35 nmi of the coast (Southeast U.S. Restricted Area North)
- A restricted area from December 1 to March 31 from 27° 51'N to 29° 00'N from shore eastward to 80° 00'W (Southeast U.S. Restricted Area South)
- Additional seasonal boundaries for Exclusive Economic Zone waters east of 80° 00'W from 26° 46.50'N to 32° 00'N (Other Southeast Gillnet Waters)
- A monitoring area specific to the Atlantic shark gillnet fishery effective December 1–March 31 that extends from the area along the coast from 27° 51'N south to 26° 46.50'N eastward to 80° 00'W (Southeast U.S. Monitoring Area)

Specific compliance requirements for fishing in these areas vary and are summarized in the Guide to the Atlantic Large Whale Take Reduction Plan, available at www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp.

Pursuant to Atlantic Large Whale Take Reduction Plan requirements, Amendment 9 to the 2006 Consolidated HMS FMP requires federal Directed Shark permit holders with gillnet gear on board to use a vessel monitoring system only in the Southeast U.S. Monitoring Area. The Amendment 9 measures became effective on March 15, 2016.

The Atlantic Large Whale Take Reduction Team last met in April 2019 in Providence, Rhode Island. The objectives of this meeting were to develop consensus management recommendations to achieve a 60–80 percent reduction in mortalities and serious injuries of North Atlantic right whales in Northeast trap/pot commercial fisheries. A meeting in 2020 is anticipated to address risk reduction measures in other gear groups and for other marine mammals (e.g., humpback whales). More information on the take reduction team and plan is at www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-large-whale-take-reduction-plan.

6.2.2.3 Harbor Porpoise Take Reduction Plan

The goal of the Harbor Porpoise Take Reduction Plan, implemented in 1998, is to reduce interactions between harbor porpoises and commercial gillnet gear capable of catching multispecies in both New England and Mid-Atlantic areas.

The team last met December 12, 2018, via webinar to review 2017 abundance and bycatch estimates for the harbor porpoise. Compliance with closed areas, gear modifications, and

use of pingers was also examined. The agenda and presentations can be accessed from the Harbor Porpoise Take Reduction Plan website at www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/harbor-porpoise-take-reduction-plan.

6.2.2.4 Bottlenose Dolphin Take Reduction Plan

The goal of the Bottlenose Dolphin Take Reduction Plan is to reduce deaths and serious injuries of Atlantic coastal bottlenose dolphins incidental to commercial fishing. NOAA Fisheries published a final rule on April 26, 2006, to implement the Bottlenose Dolphin Take Reduction Plan (71 FR 24775). Included in the final rule are:

- Effort reduction measures.
- Gear proximity requirements.
- Gear or gear deployment modifications.
- 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 gillnet fisheries in portions of the Mid-Atlantic Exclusive Economic Zone to reduce incidental takes of endangered and threatened sea turtles, as well as to reduce dolphin bycatch. These restrictions were continued through the final rule on January 20, 2009 (73 FR 77531). Permanent night fishing restrictions on medium mesh gillnets operating in North Carolina coastal state waters from November 1 through April 30 became effective August 30, 2012 (77 FR 45268). Maps, amendments, and assessments from this plan are available at www.fisheries.noaa.gov/national/marine-mammal-protection/bottlenose-dolphin-take-reduction-plan.

6.2.3 Endangered Species Act

The ESA 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 if no action is taken to stop the decline of the species [16 U.S.C. § 1532(20)]. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. § 1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NOAA Fisheries, is authorized to list marine and anadromous fish species, marine mammals (except for walruses and sea otters), marine reptiles, and marine plants. In total, NOAA Fisheries has jurisdiction over 165 threatened and endangered marine species (www.fisheries.noaa.gov/national/endangered-species-conservation/esa-threatened-endangered-species). The Secretary of the Interior, acting through the U.S. Fish and Wildlife Service, is authorized to list walruses and sea otters, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species.

A list of species under the ESA that are encountered in Atlantic HMS fisheries is provided in Table 6.3.

Table 6.3 Species Under the Endangered Species Act Encountered in Atlantic Highly Migratory Species Fisheries

Species	Status
Blue whale *(Balaenoptera musculus)*	Endangered
Fin whale *(Balaenoptera physalus)*	Endangered
Northern Atlantic right whale *(Eubalaena glacialis)*	Endangered
Sei whale *(Balaenoptera borealis*	Endangered
Sperm whale *(Physeter macrocephalus)*	Endangered
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
Northern Atlantic right whale	Endangered
Smalltooth sawfish *(Pristis pectinata)*	Endangered
Atlantic Sturgeon, Gulf Subspecies (*Acipenser oxyrinchus desotoi*)	Threatened
Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)	Endangered/Threatened**
Oceanic whitetip shark (*Carcharhinus longimanus*)	Threatened
Scalloped hammerhead shark (*Sphyrna lewini*)	Threatened***

*Green sea turtles in the Florida breeding population were changed from endangered to threatened on April 6, 2016 (81 FR 20057). **Atlantic sturgeon have five distinct population segments. The population in the Gulf of Maine is considered threatened. The other DPSs—New York bight, Chesapeake Bay, Carolina, and South Atlantic—are all considered endangered. ***Scalloped hammerhead sharks have two DPSs. The populations in Central and Southwest Atlantic are considered threatened. The other populations in the Northwest Atlantic and Gulf of Mexico DPSs are not considered threatened.

In addition to listing species under the ESA, NOAA Fisheries or the U.S. Fish and Wildlife Service 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.

6.2.3.1 Biological Opinion for Sea Turtles

NOAA Fisheries has taken numerous steps to reduce sea turtle bycatch and bycatch mortality in domestic longline fisheries. On March 30, 2001, NOAA Fisheries implemented requirements for U.S.-flagged vessels with pelagic longline gear on board to have line clippers and dipnets that enable them to remove gear on incidentally captured sea turtles (66 FR 17370). Specific handling and release guidelines designed to minimize injury to sea turtles were also implemented. NOAA Fisheries published a final report, which provides the detailed guidelines and protocols. A copy can be found at www.fisheries.noaa.gov/webdam/download/91747637.

A BiOp completed on June 14, 2001, found that the actions of the pelagic longline fishery as proposed would jeopardize the continued existence of loggerhead and leatherback sea turtles. This document reported that the pelagic longline fishery interacted with an estimated 991 loggerhead and 1,012 leatherback sea turtles in 1999. The estimated take levels for 2000 were 1,256 loggerhead and 769 leatherback sea turtles (Yeung 2001).

On July 13, 2001 (66 FR 36711), NOAA Fisheries published an emergency rule that closed the Northeast Distant Waters area (see Figure 6.4 in Section 6.3.2.1) to pelagic longline fishing effective July 15, 2001, modified how pelagic longline gear may be deployed effective August 1, 2001, and required that all pelagic and bottom longline vessels post safe handling guidelines for sea turtles in the wheelhouse. On December 13, 2001 (66 FR 64378), NOAA Fisheries extended the emergency rule for 180 days through July 8, 2002. On July 9, 2002, NOAA Fisheries published a final rule (67 FR 45393) that closed the Northeast Distant Waters area to pelagic longline fishing. As part of the reasonable and prudent alternative, the BiOp required NOAA Fisheries to conduct an experiment with commercial fishing vessels to test fishery-specific gear modifications that could 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, required gillnet vessel operators and observers to report any whale sightings, and required gillnets to be checked every 30–120 minutes.

The experimental program required in the BiOp was initiated in the Northeast Distant Waters area in 2001 in cooperation with the U.S. pelagic longline fleet that historically fished in the Grand Banks fishing grounds. The goal of the experiment was to test and develop gear modifications that might prove useful in reducing the incidental catch and post-release mortality of sea turtles captured by pelagic longline gear while striving to minimize the loss of target catch. The experimental fishery had a three-year duration and utilized 100 percent observer coverage to assess the effectiveness of the measures. The gear modifications tested in 2001 included using blue-dyed squid and moving gangions away from floatlines. In 2002, the Northeast Distant Waters area experimental fishery examined the effectiveness of whole mackerel bait, squid bait, circle and "J" hooks, and reduced daylight soak time. 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 Northeast Distant Waters area experiment and preliminary data that indicated that the Atlantic pelagic longline fishery may have exceeded the Incidental Take Statement in the June 14, 2001, BiOp, NOAA Fisheries published a Notice of Intent to prepare a supplemental environmental impact statement to assess the potential effects on the human environment of proposed alternatives and actions under a proposed rule to reduce sea turtle bycatch (68 FR 66783). A BiOp for the Atlantic pelagic longline fishery was completed on June 1, 2004 (NOAA Fisheries 2004a). The BiOp concluded that the long-term continued operation of the Atlantic pelagic longline fishery, authorized under the 1999 Atlantic Tunas, Swordfish, and Sharks FMP, 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.

On July 6, 2004, NOAA Fisheries implemented additional regulations for the Atlantic pelagic longline fishery to further reduce the mortality of incidentally caught sea turtles

(69 FR 40734). These measures included requirements on hook type, hook size, bait type, dipnets, line clippers, and safe handling guidelines for the release of incidentally caught sea turtles. These requirements were developed based on the results of the 2001–2003 Northeast Distant Waters area 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 (NOAA Fisheries 2004b). Post-release mortality rates were expected to decline due to a decrease in the number of turtles that swallow hooks that engage in the gut or throat, a decrease in the number of turtles that are foul-hooked, and improved handling and gear removal protocols. NOAA Fisheries is working to export this new technology to pelagic longline fleets of other nations to reduce global sea turtle bycatch and bycatch mortality. U.S. gear experts 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 (NOAA Fisheries 2005).

On February 7, 2007, NOAA Fisheries published a rule that required bottom longline vessels to carry the same dehooking equipment as the pelagic longline vessels. All bottom and pelagic longline vessels with commercial shark permits are required to have NOAA Fisheries-approved sea turtle dehooking equipment onboard (69 FR 40734 and 72 FR 5639).

A May 20, 2008, BiOp issued under Section 7 of the ESA for Amendment 2 to the HMS FMP 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 September 23, 2008, NOAA Fisheries published a final rule requiring the possession and use of an additional sea turtle control device as an addition to the existing requirements for sea turtle bycatch mitigation gear in pelagic and bottom longline fisheries. A revised list of approved equipment models for the careful release of sea turtles caught in hook and line fisheries was included. This rule became effective October 23, 2008 (73 FR 54721).

On March 31, 2014, NOAA Fisheries requested reinitiation of consultation on the pelagic longline BiOp due to new information on mortality rates and total mortality estimates for leatherback turtles that exceeded those specified in the reasonable and prudent alternative, changes in information about leatherback and loggerhead populations, and new information on sea turtle mortality. Despite sea turtle takes lower than what is specified in the incidental take statement, leatherback mortality rates and total mortality levels exceeded the level specified in the BiOp. While the mortality rate measure will be re-evaluated during consultation, the Atlantic HMS Management Division made a preliminary determination that the overall ability of the reasonable and prudent alternatives to avoid jeopardy was not affected, and NOAA Fisheries is continuing to comply with the terms and conditions of the reasonable and prudent alternatives and reasonable and prudent measures pending completion of consultation. NOAA Fisheries also has confirmed that there will be no irreversible or irretrievable commitment of resources that would foreclose the formulation or implementation of any reasonable and prudent alternative measures pending completion of consultation, consistent with Section 7(d) of the ESA. The reinitiation will also consider the effects of HMS fishery interactions

with the threatened Central and Southwest Atlantic distinct population segments of scalloped hammerhead shark, the threatened oceanic whitetip shark (January 2018), and the seven threatened coral species (July 2014). The BiOp is expected to be released in spring 2020.

NOAA Fisheries continues to monitor observed interactions with sea turtles on a quarterly basis and reviews data for appropriate action, as necessary.

6.2.3.2 Section 7 Consultation on Non-Pelagic Longline Gears

On October 30, 2014, NOAA Fisheries requested reinitiation of ESA Section 7 consultation on the continued operation and use of several HMS gear types (bandit gear, bottom longline, buoy gear, handline, and rod and reel) and associated fisheries management actions in the 2006 Consolidated Atlantic HMS FMP and its amendments. These management actions were previously consulted in the 2001 Atlantic HMS BiOp and the 2012 Shark and Smoothhound BiOp to assess potential adverse effects of these gear types on the threatened Central and Southwest Atlantic distinct population segments of scalloped hammerhead shark and the seven threatened coral species. The Atlantic HMS Management Division has preliminarily determined that the ongoing operation of the fisheries is consistent with existing BiOps and is not likely to jeopardize the continued existence of, or result in an irreversible or irretrievable commitment of resources that would foreclose formulation or implementation of any reasonable and prudent alternative measures on, the threatened coral species. With the listing of oceanic whitetip shark in 2018 (January 30, 2018, (83 FR 4153)), this consultation will also consider oceanic whitetip sharks. At the end of 2019, this BiOp was expected to be released by early 2020.

6.2.4 Migratory Bird Treaty Act and Seabird Interactions With Fisheries

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

The National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries was released in February 2001. It 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 plan can be downloaded from NOAA Fisheries at www.fisheries.noaa.gov/resource/document/national-plan-action-reduction-seabird-incidental-catch-longline-fisheries.

In 2014, NOAA Fisheries released the Implementation of the United States National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries report: www.st.nmfs.noaa.gov/Assets/nationalseabirdprogram/longline_fisheries.pdf. It highlighted advancements made by the United States toward the objectives of the 2001 U.S. National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries. Since 2001, the United States has improved research, outreach and education,

and domestic management of incidental seabird catch, resulting in a significant decrease in seabird incidental catch in its domestic fisheries.

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

6.3 Bycatch Reduction Measures and Data by HMS Fishery

6.3.1 Background

The reduction of bycatch and bycatch mortality is an important component of National Standard 9 of the Magnuson-Stevens Act. The NOAA Fisheries HMS bycatch reduction program includes an evaluation of current data collection programs, implementation of bycatch reduction measures such as gear modifications and time/area closures, and continued support of data collection and research relating to bycatch. Further details on bycatch and bycatch reduction measures can be found in Section 3.5 of the 1999 Atlantic Tunas, Swordfish and Sharks FMP (NOAA Fisheries 1999), Regulatory Amendment 1 to the 1999 FMP (NOAA Fisheries 2000), Regulatory Adjustment 2 to the 1999 FMP (NOAA Fisheries 2002), Amendment 1 to the 1999 FMP (NOAA Fisheries 2003), and the 2006 Consolidated HMS FMP (NOAA Fisheries 2006).

A summary of bycatch species, data collection methods, and management measures by fishery/gear type is found in Table 6.4.

Table 6.4 Summary of Bycatch Species, Marine Mammal Protection Act Category, Endangered Species Act Requirements, Data Collections, and Management Measures for Atlantic Highly Migratory Species Fisheries

LCS = Large coastal shark. ITS = Incidental Take Statement. RPM = Reasonable and prudent measures. RPA = Reasonable and prudent alternative. SWO = Swordfish. SHK = Shark. BFT = Bluefin tuna. EFP = Exempted fishing permit. VMS = Vessel monitoring system. EM = Electronic monitoring. nmi = Nautical mile. MAB = Mid-Atlantic Bight. GOM = Gulf of Mexico. NED = Northeast Distant Waters. PLL = Pelagic longline. IBQ = Individual bluefin quota. GRA = Gear restricted area. MRFSS = Marine Recreational Fishing Statistics Survey (now the Marine Recreational Information Program).

Fishery/Gear Type	Bycatch Species	MMPA Category	ESA Requirements	Bycatch Data Collection	Management Measures (Year Implemented)
Pelagic longline	Bluefin tuna; billfish; undersize target species; marine mammals; sea turtles; seabirds; non-target finfish; prohibited SHK; species; LCS species after closure	Category I	Jeopardy findings in 2000 & 2004; RPA implemented 2001–2004; ITS, terms and conditions, RPMs; consultation reinitiated in 2014	Permit requirement (1985); logbook requirement (SWO, 1985; SHK, 1993); observer requirement (1992); EFPs (2001–present); VMS reporting (2015); EM reporting	BFT target catch requirements (1981); quotas (SWO—1985; SHK—1993); prohibit possession of billfish (1988); minimum size (1995); gear marking (1999); line clippers, dipnets (2000); MAB closure (1999); limited access (1999); limit length of mainline (1996–1997 only); move 1 nmi after 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 (2001–2003); VMS (2003); circle hooks and bait requirements (2004); mandatory safe handling & release workshops (2006); sea turtle control device (2008); closed area research (2008–2010); marine mammal handling and release placard, 20 nm mainline restriction in MAB, observer and research requirements in Cape Hatteras Special Research Area, increased observer coverage in PLL fishery (2009), weak hook requirement in GOM (2011); IBQ, GRAs, EM, VMS reporting (2015); sharks released not retained by dehooker or cutting gangion < 3 ft from hook, shark identification course for vessel owners and operators, move 1 nmi after dusky shark interaction and notify other vessels (2017)

Fishery/Gear Type	Bycatch Species	MMPA Category	ESA Requirements	Bycatch Data Collection	Management Measures (Year Implemented)
Shark bottom longline	Prohibited shark species; target species after closure; sea turtles; smalltooth sawfish; non-target finfish	Category III	ITS, terms and 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 nmi after 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 nmi after dusky shark interaction and notify other vessels (2017); circle hooks (2018)
Northeast sink and Mid-Atlantic shark gillnet (smoothhound)	Marine mammals	Category I			Sink gillnet soak time limits and net check requirements for drift gillnets (2016)
Northeast, Southeast U.S. Atlantic, and Gulf of Mexico shark gillnet	Prohibited shark species; sea turtles; marine mammals; non-target finfish; smalltooth sawfish	Category II	ITS, terms and 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 nmi after dusky shark interaction and notify other vessels (2017)
Bluefin tuna purse seine	Undersize target species; non-target finfish	Category III	ITS, terms and 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)

Fishery/Gear Type	Bycatch Species	MMPA Category	ESA Requirements	Bycatch Data Collection	Management Measures (Year Implemented)
Bluefin tuna and swordfish harpoon	Undersize target species	Category III	ITS, terms and conditions	Permit requirement (BFT, 1982; SWO, 1987); SWO logbook requirement (1987); online catch reporting (2015)	Quotas (BFT,1982; SW0,1985); minimum size (BFT, 1982; SWO, 1985); online catch reporting (2015)
Handgear—commercial	Undersize target species; non-target finfish	Category II	ITS, terms and 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 and 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)

Domestic fishery landings and bycatch data are collected from many sources. They are taken from the U.S. Annual Report to ICCAT (which includes mortality estimates), directly from NOAA Fisheries program databases for commercial landings, observer programs, the electronic dealer reporting program, and from recreational landings. See Section 9.3 for details on data collection methods. Permits data are assembled from the NOAA Fisheries regional permits offices, the HMS Permit Shop, HMS exempted fishing permits, HMS display permits, HMS scientific research permits, the International Fisheries Trade Permit, and tournament registrations.

Bycatch reduction measures and fishery interactions data are presented by gear below. In addition to the gear-specific measures, 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. Ongoing research uses data on release techniques and from pop-up satellite tags to examine in situ mortality rates of Atlantic HMS. Information on bycatch mortality of these fish will continue to be collected and in the future may be used to estimate bycatch mortality in stock assessments.

6.3.2 Pelagic Longline

6.3.2.1 Reduction Measures

Pelagic longlines have been classified as a Category I fishery under the MMPA.

Pelagic longline vessels must comply with gear and deployment restrictions to minimize bycatch and bycatch mortality. Requirements that apply to vessels in the pelagic longline fishery include the following. Any finfish species that cannot be landed due to fishery regulations are required to be released, regardless of whether the catch is dead or alive.

- Gangions must be at least 10 percent longer than the length of floatlines if the two lengths combined are less than 100 meters, allowing hooked sea turtles enough length to breathe at the surface.
- Vessels may possess only corrodible (i.e., non-stainless)18/0 or larger circle hooks with an offset not to exceed 10 degrees when fishing in the Northeast Distant Waters. Vessels fishing outside this area are required to use corrodible 18/0 or larger circle hooks with an offset not to exceed 10 degrees or 16/0 non-offset corrodible circle hooks. All pelagic longline vessels 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 millimeters to increase the self-release and survival rate of spawning bluefin tuna that come into contact with the gear.
- Vessel owners and operators must carry NOAA Fisheries-approved dehooking devices onboard and must store and post careful handling and release protocols and guidelines in the wheelhouse to minimize injury to protected species when interactions occur.
- Vessel owners and operators must immediately release dusky sharks and protected

species that become entangled or hooked and retrieve gear immediately. For dusky sharks, marine mammals, turtles, and smalltooth sawfish, the vessel must move at least 1 nmi from that location before fishing is resumed to avoid interacting with the species again.

All owners and operators of vessels fishing with pelagic longline gear must also attend a Safe Handling, Release, and Identification Workshop every three years. The curriculum of the required Safe Handling, Release, and Identification Workshop is compliant with the Right Whale Ship Strike Reduction Rule and the Pelagic Longline Take Reduction Plan, the Atlantic Large Whale Take Reduction Plan, the Harbor Porpoise Take Reduction Plan, and the Bottlenose Dolphin Take Reduction Plan. See Section 6.2.2 for details on those plans.

Shark Measures

Bycatch reduction measures for sharks associated with pelagic longline gear are often adopted by recommendation from ICCAT. For example, consistent with ICCAT Recommendations 09-07, 10-07, 10-08, and 11-08, the United States has prohibited the retention of bigeye thresher sharks 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 caught in association with ICCAT fisheries since 2012.

Consistent with ICCAT Recommendation 15-06, the United States in 2016 began requiring pelagic longline vessels to release unharmed, to the extent practicable, porbeagle sharks that are alive at the time of haulback and if tunas, swordfish, or billfish are onboard vessels. Additionally, in 2018, the United States began requiring pelagic longline vessels to release any shortfin mako that are alive at haulback, consistent with ICCAT Recommendation 17-08. In response, NOAA Fisheries began using the electronic monitoring system to verify that only those shortfin mako sharks that were dead at haulback are retained.

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

Individual Bluefin Quota Program

The Individual Bluefin Quota (IBQ) Program implemented by Amendment 7 to the 2006 Consolidated HMS FMP enhanced accountability for bluefin tuna at the individual vessel level and is supported by several reporting and monitoring requirements specifically for pelagic longline vessels.

IBQ allocations are distributed annually to permitted vessels with IBQ shares on January 1 of each year. A shareholder's share percentage is multiplied by the total pounds of Atlantic Tunas Longline category quota available to derive the amount of allocation in pounds. If an

IBQ shareholder's Atlantic Tunas Longline category permit is not associated with a vessel, the relevant annual allocations of IBQ are not released to the shareholder's IBQ account until the permit is associated with a vessel.

Throughout the year, NOAA Fisheries may transfer bluefin quota from the Reserve category to the Longline category, as well as other categories. These inseason transfers are based on consideration of regulatory determination criteria relating to the current circumstances in the fishery and the goals and objectives of the 2006 Consolidated HMS FMP, as amended. The regulations and processes pertaining to inseason transfers from the Reserve category to other categories are distinct from those regulations and processes that determine annual IBQ distributions to shareholders.

Since Amendment 7 was implemented in 2015, NOAA Fisheries has performed a few quota transfers into the Longline category inseason in order to achieve specific objectives, including:

- Reducing quota debt.
- Encouraging full accounting of bluefin catch by vessels who may be in debt.
- Fostering conditions in which permit holders become more willing to lease IBQ shares to other vessel owners.
- Reducing uncertainty in the fishery as a whole.

NOAA Fisheries may distribute bluefin quota inseason either to all IBQ share recipients or to only active vessels in the fishery, regardless of whether the vessels are IBQ share recipients. This option provides flexibility with respect to which vessels receive IBQ inseason transfers and allows NOAA Fisheries to achieve the objectives of the IBQ Program, such as accounting for bluefin during longline operations and optimizing fishing opportunity for target species. Active vessels, in this context, are those with any fishing activity using pelagic longline gear over the course of the previous and current year. Fishing activity is quantified using logbook, vessel monitoring system, and electronic monitoring data.

Table 6.5 includes data on the annual, inseason, and combined distributions of IBQ by shareholder tier.

Table 6.5 Individual Bluefin Quota Allocations (mt) to the Pelagic Longline Category by Share Tier (lb) in 2015–2019

Year	Quota Distribution	Date	IBQ (mt)	High Tier (~1.2%)	Medium Tier (~0.6%)	Low Tier (~0.37%)
2015	Annual allocation	January 1, 2015	137.3	3,616	1,808	1,124
	Transfer from reserve category	July 28, 2015	34.0	551	551	551
	ICCAT baseline quota increase	August 28, 2015	11.0	292	146	90
2015 total			182.3	4,459	2,505	1,765
2016	Annual allocation	January 1, 2016	148.3	3,913	1,956	1,206
	Transfer from reserve category	January 4, 2016	34.0	551	551	551
2016 total			182.3	4,464	2,507	1,757
2017	Annual allocation	January 1, 2017	148.3	3,913	1,956	1,206
	Transfer from reserve category*	March 2, 2017	45.0	1,102	1,102	1,102
2017 total			193.3	5,015	3,058	2,308
2018	Annual allocation	January 1, 2018	148.3	3,913	1,956	1,206
	Transfer from reserve category*	April 13, 2018	44.5	1,102	1,102	1,102
	ICCAT baseline quota increase	October 5, 2018	15.3	404	202	124
2018 total			208.1	5,419	3,260	2,432
2019	Annual allocation	January 1, 2019	163.6	4,317	2,157	1,330
2019 total			163.6	4,317	2,157	1,330

mt = Metric tons. ICCAT = International Commission for the Conservation of Atlantic Tunas. *Transfer from Reserve category to vessels with recent fishing activity only.

Area Closures and Gear Restrictions

Since 2000, NOAA Fisheries has implemented a number of time/area closures and gear restrictions in the Atlantic Ocean and Gulf of Mexico to reduce discards and bycatch of a number of species (e.g., juvenile swordfish, bluefin tuna, billfish, sharks, and sea turtles) in

the pelagic longline fishery. The locations of Atlantic HMS time/area closures and gear restricted areas are provided in Figure 6.1.

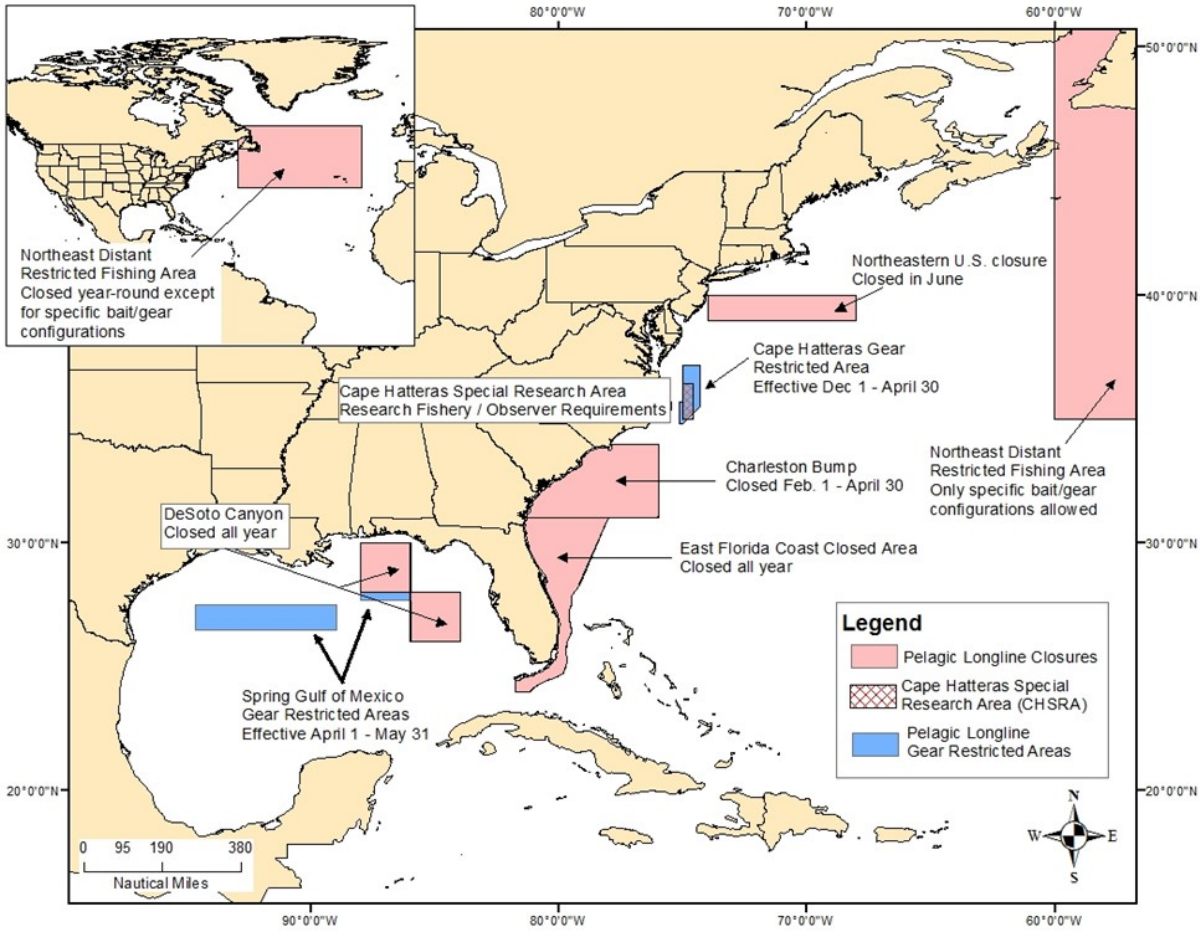

Figure 6.1 Areas Closed/Restricted To Pelagic Longline Fishing by U.S. Flagged Vessels

Weak Hook Requirement in Gulf of Mexico

A final rule to implement a requirement for the mandatory use of weak hooks in the Gulf of Mexico pelagic longline fishery published on April 5, 2011 (76 CFR 18653). A weak hook is a circle hook that meets NOAA Fisheries' current size and offset restrictions for the Gulf of Mexico pelagic longline fishery but is constructed of round wire stock that is thinner gauge than the circle hooks currently used and is no larger than 3.65 millimeters in diameter. These hooks may allow incidentally hooked bluefin tuna to escape capture because the hooks are more likely to straighten when a large fish is hooked. The intent of this requirement is to reduce the bycatch of bluefin tuna, allow the long-term beneficial socioeconomic benefits of normal operation of directed fisheries in the Gulf of Mexico with minimal short-term negative socio-economic impacts, and have both short- and long-term beneficial impacts on the stock status of Atlantic bluefin tuna.

NOAA Fisheries has published a proposed rule to examine existing area-based and weak hook management measures to achieve the current management objectives and allow for sufficient flexibility to adapt to future fishing needs. The Notice of Intent was published March 2 (83 FR 8969), and the proposed rule published on July 12, 2019 (84 FR 33205).

6.3.2.2 Bycatch Data

Reporting methods used for the pelagic longline fishery are described in Section 6.2.1.1. These data, which include information on the disposition of bycatch, are used in part to estimate post-release mortality of sea turtles and marine mammals based on guidelines for each (Angliss and DeMaster 1998, Ryder et al. 2006). Protected species interactions are reported in this section. See Table 6.15 for marine mammal interactions and starting at Table 6.16 for sea turtle interactions in the pelagic longline fishery.

Landings, including discards, for this fishery are reported in Section 5.3.2.

Sharks

The number of releases and the status of ICCAT-prohibited species from pelagic longline vessels in 2018 is presented in Table 6.6.

Table 6.6 International Commission for the Conservation of Atlantic Tunas-Designated Prohibited Shark Interactions and Dispositions in the Pelagic Longline Fishery in 2018

Species	Kept	Released Dead	Released Alive	Released Unknown	Lost at Surface
Bigeye thresher	0	26	66	0	0
Silky	1	338	660	0	10
Great hammerhead	0	8	12	0	0
Oceanic whitetip	0	26	237	0	0
Smooth hammerhead	0	4	15	0	0
Scalloped hammerhead	0	44	147	0	5
Unidentified hammerhead	0	134	267	0	10
Porbeagle*	3	46	15	0	0

*Vessels can keep porbeagle assuming they are dead at haulback. Source: Pelagic Observer Program.

Individual Bluefin Quota Program

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

In 2018, there was close correlation between the number of bluefin retained, as reported in the vessel monitoring system, and the number of bluefin landed, as reported on bluefin tuna dealer reports (Figure 6.2). Bluefin tuna dealer reports are maintained in the commercial bluefin tuna landings database, also referred to as the electronic bluefin tuna dealer landings database, and known as eBFT.

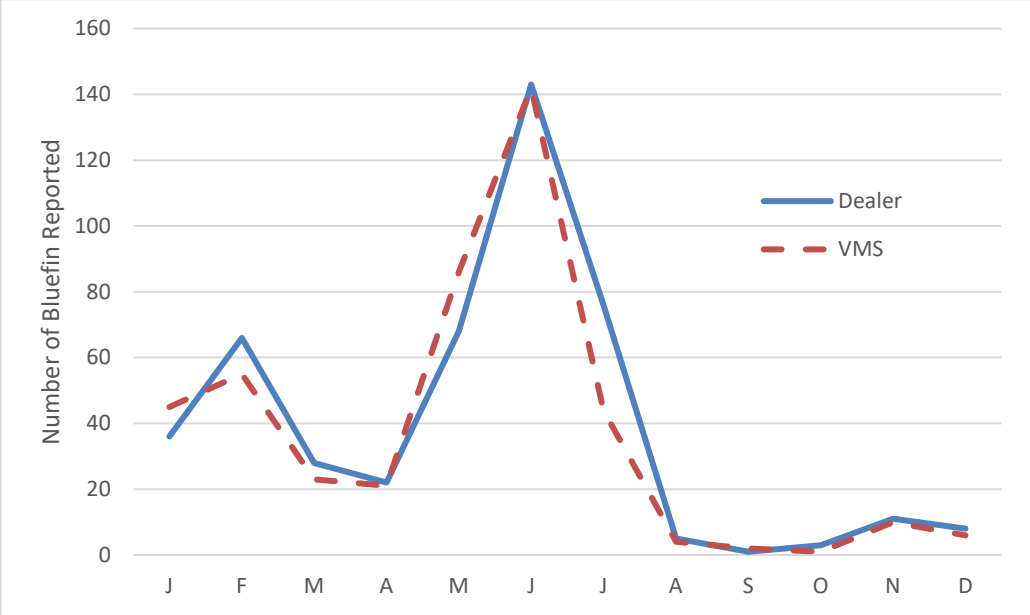

Figure 6.2 Comparisons Between the Reported Numbers of Incidentally Caught Bluefin Tuna Retained and Landed in in the Pelagic Longline Fishery in 2018

Source: Vessel monitoring system; eBFT.

Table 6.7 summarizes various IBQ Program metrics regarding allocation, catch, fishing effort, IBQ leasing, and reporting and monitoring.

Table 6.7 Bluefin Catch and Other Metrics of the Individual Bluefin Quota Program in 2016–2018

Metric	2016	2017	2018
Permits eligible for IBQ shares	136	136	136
Number vessels fished with pelagic longline gear	85	89	76
Number vessels landing bluefin tuna	55	58	50
Weight bluefin landed (lb ww)	196,142	229,396	193,969
Weight bluefin landed (mt ww)	89.0	104.1	88.0
Weight landed in Gulf of Mexico (mt ww)	3.5	5.7	3.3
Weight landed in Atlantic (mt ww)	85.5	98.1	81.0
Number of bluefin landed	447	501	467
Number of bluefin landed in Gulf of Mexico	13	21	12
Number of bluefin landed in Atlantic	424	480	455
Quota caught (mt, ww) in Northeast Distant Waters* (max. 25 mt quota)	17.3	25	4.0
Total bluefin dead discards (mt ww)	22.6	11.4	14.6
Discarded in Gulf of Mexico (mt ww)	7.1	6.5	3.6
Discarded in Atlantic (mt, ww)	14.8	3.7	11.0
Discarded in Northeast Distant Waters* (mt ww)	0.7	1.2	0
Number of trips with pelagic longline gear	1,025	1,078	921
Number of pelagic longline sets	6,885	7,305	5,635
Number of hooks	5,217,547	5,327,587	4,030,875
Number of IBQ leases	81	85	83
Number of participants leasing	63	52	55
Average amount leased per transaction (lb)	1,743	1,789	2,050
Total amount leased (lb)	141,183	152,050	170,160
Average price per pound (weighted average)	$ 2.52	$ 1.67	$ 2.02
Number of trips based on VMS prelanding declarations	990	793	936
Number sets based on VMS bluefin reports	5,921	6,507	5,479
Number vessels with installed EM systems	113	112	112
Number hard drives received	975	1,020	925
Number vessels submitting hard drives	85	86	77

lb ww = Pounds whole weight. mt ww = Metric tons whole weight. VMS = Vessel monitoring system. EM = Electronic monitoring. *A map with the location of the Northeast Distant Waters is found in Figure 6.4.
Source: Pelagic Observer Program (dead discard data); Unified Data Processing (landings, effort, dead discard data); IBQ Program (IBQ leasing data); VMS and EM data (via Saltwater, Inc., NOAA Fisheries contractor for installation and maintenance of systems and ERT Corp, NOAA Fisheries contractor for review and storage of data).

Table 6.8 provides data on the number of sets and vessels audited during three-month audit periods. The numbers of pelagic longline sets and vessels audited is variable due to the sample design. The sample design is referred as "two-stage stratified random sampling," with an underlying objective to maximize the opportunity of sampling trips/sets with bluefin interactions. The sample design targets specific geographic regions and seasons based on historical data. It also samples each vessel annually and samples

among vessels in proportion to their annual fishing effort.

Table 6.8 Numbers of Pelagic Longline Sets and Vessels Audited During Three-Month Audit Periods Within the Bluefin Tuna Electronic Monitoring Program in 2015–2019

Audit Period	Period Coverage	Sets Audited	Vessels Audited
1	Jun–Aug 2015	126	43
2	Sept–Nov 2015	70	25
3	Dec 2015–Feb 2016	155	48
4	Mar–May 2016	160	44
5	Jun–Aug 2016	85	28
6	Sep–Nov 2016	77	24
7*	Dec 2016	35	12
8	Jan–Mar 2017	179	48
9	Apr–Jun 2017	181	55
10	July–Sept 2017	52	17
11	Oct–Dec 2017	158	49
12	Jan–Mar 2018	102	29
13	Apr–Jun 2018	152	42
14	Jul–Sept 2018	51	17
15	Oct–Dec 2018	167	48
16	Jan–Mar 2019	91	27

*December 2016 was limited to a one-month audit period in order to transition alignment with calendar years. Source: Electronic monitoring program.

Area Closures and Gear Restrictions

Time/area closures and gear restrictions have been part of a successful strategy to reduce bycatch in the HMS pelagic longline fishery. Reported discards of all species of billfish except spearfish have declined. The reported number of turtles caught, swordfish discarded, and pelagic shark discards have declined, while the discards of large coastal sharks increased in 2018. The number of bluefin tuna kept increased in 2017 and retained that level in 2018. Bluefin tuna live and dead discards rose slightly in 2018, but they remain lower than baseline levels. It should be noted that other management measures discussed elsewhere in this report (e.g. the IBQ Program, weak hooks in the Gulf of Mexico, and bait restrictions) also play a role in bycatch reduction in this fishery.

The combined effects of the individual area closures and gear restrictions to the pelagic longline fishery were examined and presented for this report by comparing the reported catch and discards from 2005–2018 to the averages for 1997–1999 throughout the U.S. Atlantic fishery. Previous analyses on this topic attempted to examine the effectiveness of the time/area closures only by comparing the 2001–2003 reported catch and discards to the chosen base period (of 1997–1999) and are included here for reference. The percent changes in the reported numbers of fish caught and discarded are compared to the predicted changes from the analyses in Regulatory Amendment 1 to the 1999 FMP (NOAA Fisheries 2000). Summaries of these examinations are presented by species and area in Table 6.9, Table 6.10, and Table 6.11.

Overall effort, expressed as the number of hooks fished, declined by 28.5 percent during 2005–2018 from 1997–1999 (Table 6.9). Declines were noted for the numbers of kept and discarded fish of almost all species examined, including swordfish, tunas, pelagic sharks,

billfish, and sea turtles (Table 6.9 and Table 6.10). The only positive changes from the base period were observed in the numbers of bluefin tuna and dolphinfish kept and in spearfish and large coastal shark discards. The number of dolphinfish discarded show similar levels between the two time periods. The reported number of bluefin tuna kept increased by 62.6 percent for 2005–2018 compared to 1997–1999 (Table 6.9). The total number of reported discards (live and dead) of bluefin tuna decreased by 15 percent between the same time periods, which is less than the predicted 10.7 percent increase from the analyses in Regulatory Amendment 1. The number of bluefin tuna kept and discarded may be further influenced by the regulatory measures implemented through Amendment 7. The number of dolphinfish kept increased by 5.6 percent (Table 6.10). Reported billfish (blue marlin, white marlin, and sailfish) discards decreased by 33–59 percent from 1997–1999 to 2005–2018 (Table 6.10). The reported discards of spearfish increased by 65.8 percent, although the absolute number of discards were lower than the other billfish species. The reported number of turtle interactions decreased by 68.7 percent from 1997–1999 to 2005–2018.

The reported declines in swordfish kept and discarded; bluefin tuna discards; bigeye, albacore, yellowfin, and skipjack tunas kept (Table 6.9); and large coastal sharks kept (Table 6.10) decreased more than the predicted values developed for Regulatory Amendment 1. Reported kept fish and discards of pelagic sharks and billfish (with the exception of spearfish, for which no predicted change was developed in Regulatory Amendment 1), as well as turtle interactions, also declined more than the predicted values. The number of large coastal sharks increased by 14.6 percent from 1997–1999 to 2005–2018. The numbers of large coastal shark discards, bluefin tuna discards, and dolphinfish kept were higher than the predicted values.

The reported distribution of effort by area over the same time periods was also examined for changes in fishing behavior (Table 6.11). Overall, total reported effort decreased by 28.4 percent from 1997–1999 to 2005–2018. Increases in the number of hooks set were noted in three areas. The Sargasso Sea exhibited increases in reported effort more than seven-fold from the period of 1997 to 1999; however, this effort represents only 2.7 percent of the overall effort reported in the fishery. Also note that effort in the Sargasso Sea has decreased each year since 2014 until 2018, where a slight increase is reported. Effort increased in South Atlantic Bight by 10.5 percent and in the Florida East Coast area by 6.6 percent. Reported effort declined by 32–92 percent in all other areas. At 91.6 percent, the largest decline was reported in the North Central Atlantic. Other large declines of 76.4 percent in the Caribbean and 64.2 percent in Tuna North and Tuna South areas combined were reported. However, these three areas represent less than 4.5 percent of total reported effort. The Gulf of Mexico, representing 28.6 percent of the total reported effort, declined 37.8 percent compared to the 1997–1999 period. The Mid-Atlantic Bight, representing 28.2 percent of the total reported effort, decreased only 2.5 percent from the 1997–1999 baseline levels.

Concern over the status of bluefin tuna and the effects of the pelagic longline fishery on bluefin tuna led to a re-examination of a previous analysis that compared the reported catch and discards of select species or species groups from the Mid-Atlantic Bight and Northeast Coastal areas to that reported from the rest of the fishing areas (Table 6.12). While an increase was observed in 2016, discards remain low through 2018. The reported number of bluefin kept in these areas increased in 2016 to 245, dropped slightly, and then increased to 261 fish in 2018 (Table 6.12). The reported number of bluefin kept from

areas other than the Mid-Atlantic Bight/Northeast Coastal areas (Table 6.13) initially decreased from 275 in 2014 to 166 in 2016, peaked at 292 in 2017, and decreased to 204 in 2018. The number of bluefin discarded in other fishing areas are generally lower than those in the Mid-Atlantic Bight/Northeast Coastal areas, increasing from the lowest value of 64 in 2015 to 134 in 2016 and then decreasing to 87 in 2018. Changes in fishermen behavior when retaining bluefin tuna may have been influenced by the management measures implemented under Amendment 7. Reporting accuracy may also have improved with the implementation of electronic monitoring under Amendment 7.

On July 12, 2019, NOAA Fisheries published a proposed rule to adjust regulatory measures to manage Atlantic bluefin tuna bycatch in the pelagic longline fishery (84 FR 33205). This rule specifically addresses the weak hook requirement in the Gulf of Mexico and several closed or restricted areas. The public comment period ended September 30, 2019. Additional analyses on the effectiveness and continued need for of these measures will be published in 2020 as part of this rulemaking process.

Table 6.9 Number of Swordfish, Bluefin Tuna, Yellowfin Tuna, Bigeye Tuna, and Total Bigeye, Albacore, Yellowfin, and Skipjack Tunas Reported Landed or Discarded in the U.S. Atlantic Pelagic Longline Fishery (2014–2018) and Percent Changes Since 1997–1999

Year	Number Hooks Set (x1000)	Swordfish Kept	Swordfish Discards	Bluefin Kept	Bluefin Discards	Yellowfin Kept	Yellowfin Discards	Bigeye Kept	Bigeye Discards	Total BAYS Kept	Total BAYS Discards
1997–1999	8,533.1	69,131	21,519	238	877	72,342	2,489	21,308	1,133	101,477	4,224
(A) 2001–2003	7,364.1	50,838	13,240	212	607	55,166	1,827	13,524	395	76,116	3,069
2014	7,125.2	32,908	4,655	379	380	41,799	647	17,020	459	73,339	1,973
2015	5,855.9	27,730	5,382	320	210	28,346	1,412	16,236	519	54,734	3,117
2016	5,217.6	24,456	4,427	411	582	36,807	3,658	11,835	1,064	56,978	7,898
2017	5,237.6	23,332	7,116	464	229	43,030	2,839	15,907	757	68,329	6,558
2018	4,030.9	25,088	8,004	465	309	23,578	1,569	10,566	767	37,831	3,230
(B) 2005–2018	6,103.39	37,159	7,680	387	746	41,193	1,514	13,014	507	62,245	3,438
% 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)	-28.5	-46.2	-64.3	62.6	-15.0	-43.1	-39.2	-38.9	-55.3	-38.7	-18.6
Pred 1		-24.6	-41.5		-1.0					-5.2	
Pred 2		-13.0	-31.4		10.7					10.0	

Note: (A) and (B) are average values for the years indicated. Predicted values are from Amendment 1, where Pred 1 = Without redistribution of effort and Pred 2 = With redistribution of effort. BAYS = Bigeye, albacore, yellowfin, and skipjack tunas. Source: Unified Data Processing.

Table 6.10 Number of Pelagic Sharks, Large Coastal Sharks, Dolphinfish, and Wahoo Reported Landed or Discarded and Number of Billfish and Sea Turtles Reported Caught and Discarded in the U.S. Atlantic Pelagic Longline Fishery (2014–2018) and Percent Changes Since 1997–1999

Year	Pelagic Shark Kept	Pelagic Shark Discards	LCS Kept	LCS Discards	Dolphinfish Kept	Dolphinfish Discards	Wahoo Kept	Wahoo Discards	Blue Marlin Discards	White Marlin Discards	Sailfish Discards	Spearfish Discards	Sea Turtle Interactions
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) 2001–2003	3,237	23,017	5,306	4,581	29,361	322	3,776	74	815	1,045	341	139	429
2014	3,804	38,496	47	5,880	63,217	205	3,235	74	718	1,580	445	306	93
2015	2,208	45,082	50	8,839	53,526	1,413	1,563	163	990	2,855	715	837	253
2016	2,172	27,900	50	9,549	46,376	1,108	1,766	180	1,050	2,153	855	745	228
2017	2,542	25,567	79	11,533	29,141	936	1,459	170	1,562	2,221	657	686	162
2018	875	14,649	36	7,988	27,341	830	1,243	115	854	1,586	810	459	86
(B) 2005–2018	2,910	30,364	672	7,229	41,943	616	2,494	107	792	1,317	556	353	186
% 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)	-25.4	-41.7	-92.4	14.6	5.6	1.4	-51.8	-38.8	-51.1	-33.3	-58.6	65.8	-68.7
Pred 1	-9.5	-2.0	-32.1	-42.5	-29.3				-12.0	-6.4	-29.6		-1.9
Pred 2	4.1	8.4	-18.5	-33.3	-17.8				6.5	10.8	-14.0		7.1

Note: (A) and (B) are average values for the years indicated. Predicted values are from Amendment 1, where Pred 1 = Without redistribution of effort and Pred 2 = With redistribution of effort. Source: Unified Data Processing

Table 6.11 Reported Distribution of Hooks Set by Area in 2014–2018 and Percent Change Since 1997–1999

Year	CAR	GOM	FEC	SAB	MAB	NEC	NED	SAR	NCA	TUN+TUS	Total
1997–1999	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) 2001–2003	175,195	3,682,536	488,838	569,965	944,929	624,497	452,430	76,130	222,070	127,497	7,364,086
2014	21,390	2,219,684	1,171,402	1,132,640	1,221,587	507,525	343,220	367,598	10,530	117,377	7,112,953
2015	30,435	1,465,502	926,512	1,044,331	1,204,147	519,349	233,432	277,506	13,250	144,648	5,859,112
2016	158,319	1,618,290	625,484	946,327	979,965	378,990	214,486	116,920	17,650	161,116	5,217,547
2017	294,346	1,532,880	538,406	974,211	1,311,943	210,413	228,210	97,925	3,788	136,753	5,327,587
2018	57,299	1,151,327	348,737	926,182	1,138,541	54,107	122,701	106,906	3,040	122,035	4,030,875
(B) 2005–2018	77,544	2,081,204	770,420	898,528	1,236,311	460,543	241,502	166,482	16,012	156,597	6,107,857
% 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)	-76.4	-37.8	6.6	10.5	-2.5	-48.9	-52.8	1,063.2	-91.6	-64.2	-28.4

Note: (A) and (B) are average values for the years indicated. CAR = Caribbean. GOM = Gulf of Mexico. FEC = Florida East Coast. SAB = South Atlantic Bight. MAB = Mid-Atlantic Bight. NEC = Northeast Coastal. NED = Northeast Distant Waters. SAR = Sargasso Sea. NCA = North Central Atlantic. TUN+TUS = Tuna North and Tuna South areas. Source: Unified Data Processing.

Table 6.12 Number of Bluefin Tuna, Swordfish, Pelagic and Large Coastal Sharks, Billfish, and Sea Turtles Reported Kept and Discarded in the Mid-Atlantic Bight and Northeast Coastal Areas Combined in 2014–2018

Year	Hooks Set (x1000)	Bluefin Kept	Bluefin Discards	Swordfish Kept	Swordfish Discards	Pelagic Shark Kept	Pelagic Shark Discards	LCS Kept	LCS Discards	Billfish Discards	Sea Turtle Interactions
2014	1,729.1	104	122	5,004	1,015	3,110	16,231	6	1,000	5,278	18
2015	1,723.5	74	146	6,634	2,234	1,795	17,414	8	3,412	5,757	256
2016	1,359.0	245	448	4,692	1,464	1,796	14,802	19	3,744	4,218	97
2017	1,522.4	172	123	4,967	3,106	2,043	10,008	50	6,146	5,144	67
2018	1,192.6	261	222	4,638	2,371	675	7,883	18	3,335	4,089	18

Source: Unified Data Processing.

Table 6.13 Number of Bluefin Tuna, Swordfish, Pelagic and Large Coastal Sharks, Billfish, and Sea Turtles Reported Kept and Discarded in All Areas Other than the Mid-Atlantic Bight and Northeast Coastal in 2014–2018

Year	Hooks Set (x1000)	Bluefin Kept	Bluefin Discards	Swordfish Kept	Swordfish Discards	Pelagic Shark Kept	Pelagic Shark Discards	LCS Kept	LCS Discards	Billfish Discards	Sea Turtle Interactions
2014	5,396.1	275	258	27,904	3,640	694	21,932	41	4,244	2,342	75
2015	4,132.5	246	64	21,096	3,148	413	27,258	42	4,661	3,511	101
2016	3,858.6	166	134	19,764	2,963	376	12,667	31	4,896	3,780	131
2017	3,805.2	292	106	18,365	4,010	499	15,139	29	4,864	3,740	95
2018	2,838.2	204	87	20,450	5,633	200	6,766	18	4,653	3,007	68

Source: Unified Data Processing.

Weak Hook Requirement

To evaluate the impacts of the weak hook requirement discussed in Section 6.3.1, reported landings of major target species and marlin interactions from the Gulf of Mexico were examined for initial trends (Table 6.14). Reported landings prior to the implementation of the requirement (2007–2010) are compared here with reported landings post-implementation (2014–2018). Annual reported landings of swordfish and yellowfin tuna immediately following implementation of the weak hook requirement appeared to be on the rise (not shown). In 2018, the number of hooks fished, landings for these five target species, and discards of white marlin in the Gulf of Mexico are shown at their lowest levels for 2014–2018. Swordfish and blue marlin discards, at 1,315 and 233 fish, respectively, both dropped since 2017, with swordfish discards at their second highest levels and blue marlin discards at their second lowest. In 2018, 62 bluefin tuna were discarded. While higher than the 2017 level of 28 fish, the 2018 discards remain lower than the highest level of 84 fish, reported in 2016.

In order to remove interannual differences, the mean reported landings for each period were calculated and compared. The mean reported landings of bigeye and albacore tuna were greater following implementation of the weak hook requirement. The mean reported landings of swordfish, bluefin, yellowfin, and bigeye tuna were lower in the years following implementation of the weak hook requirement. Discards of swordfish and bluefin tuna were lower after implementation, while marlin discards were slightly higher.

Table 6.14 shows the landings and dead discards of major target species and marlin interactions in the Gulf of Mexico pelagic longline fishery for 2014–2018.

Nominal catch per unit efforts (CPUE) of HMS were examined before and after implementation of weak hook management measures (Figure 6.3). Dolphin and wahoo, while not managed by the Atlantic HMS Management Division, are frequently caught alongside HMS and are included. Numbers of kept and/or discarded (dead and alive discards) fish are expressed per 1,000 hooks reported. These numbers vary between the four graphs. CPUEs of yellowfin (kept), albacore tuna (kept), billfishes (discarded), and many sharks (discarded) are higher since weak hook implementation (2012–2018). CPUEs of swordfish (kept and discarded), bluefin tuna (kept and discarded), and hammerhead sharks (discarded) are lower following weak hook implementation. CPUEs of bigeye tuna and mako sharks are nearly unchanged before and after implementation. CPUE of bluefin tuna kept is 60 percent lower following weak hook implementation, and the CPUE of bluefin tuna discards is 56 percent lower since implementation. Blue marlin CPUE is 47 percent greater after the weak hook requirement went into effect, and white marlin CPUE is 103 percent greater after the weak hook requirement.

On July 12, 2019, NOAA Fisheries published a proposed rule to adjust regulatory measures to manage Atlantic bluefin tuna bycatch in the pelagic longline fishery (84 FR 33205). This rule specifically addresses the weak hook requirement in the Gulf of Mexico and several closed or restricted areas. The public comment period ended September 30, 2019. Additional analyses on the effectiveness and continued need for of these measures will be published in 2020 as part of this rulemaking process.

Table 6.14 Reported Number of Hooks Fished, Landings, Means, and Catch Per Unit Effort of Major Target Species and Marlin Interactions From the Gulf of Mexico in 2014–2018

Year	Hooks (x1000)	Swordfish	Bluefin	Yellowfin	Bigeye	Albacore	Swordfish Discards	Bluefin Discards	Blue Marlin Discards	White Marlin Discards
2014	2,204.9	4,539	54	15,236	296	531	1,309	70	217	405
2015	1,527.8	2,519	17	10,054	323	590	1,007	31	329	408
2016	1,754.1	4,331	15	16,096	250	919	1,205	84	453	518
2017	1,727.1	4,895	23	14,622	467	1,922	1,827	28	784	549
2018	1,089.6	1,892	13	6,899	158	243	1,315	62	233	221
2007–10 mean	2,331.5	6,419.3	99.3	16,775.0	282.3	387.0	2,954.0	198.0	273.8	208.0
2014–18 mean	1,660.8	3,635.2	24.4	12,581.4	298.8	841.0	1, 332.6	55.0	403.2	420.2
2007–10 CPUE		2.7533	0.0426	7.1951	0.1211	0.1660	1.2670	0.0849	0.1174	0.0892
2014–18 CPUE*		2.1888	0.0147	7.5753	0.1799	0.5064	0.8024	0.0331	0.2428	0.2530

Note: Weak hooks implemented in 2011. *Illustrated in Figure 6.3. Source: Unified Data Processing.

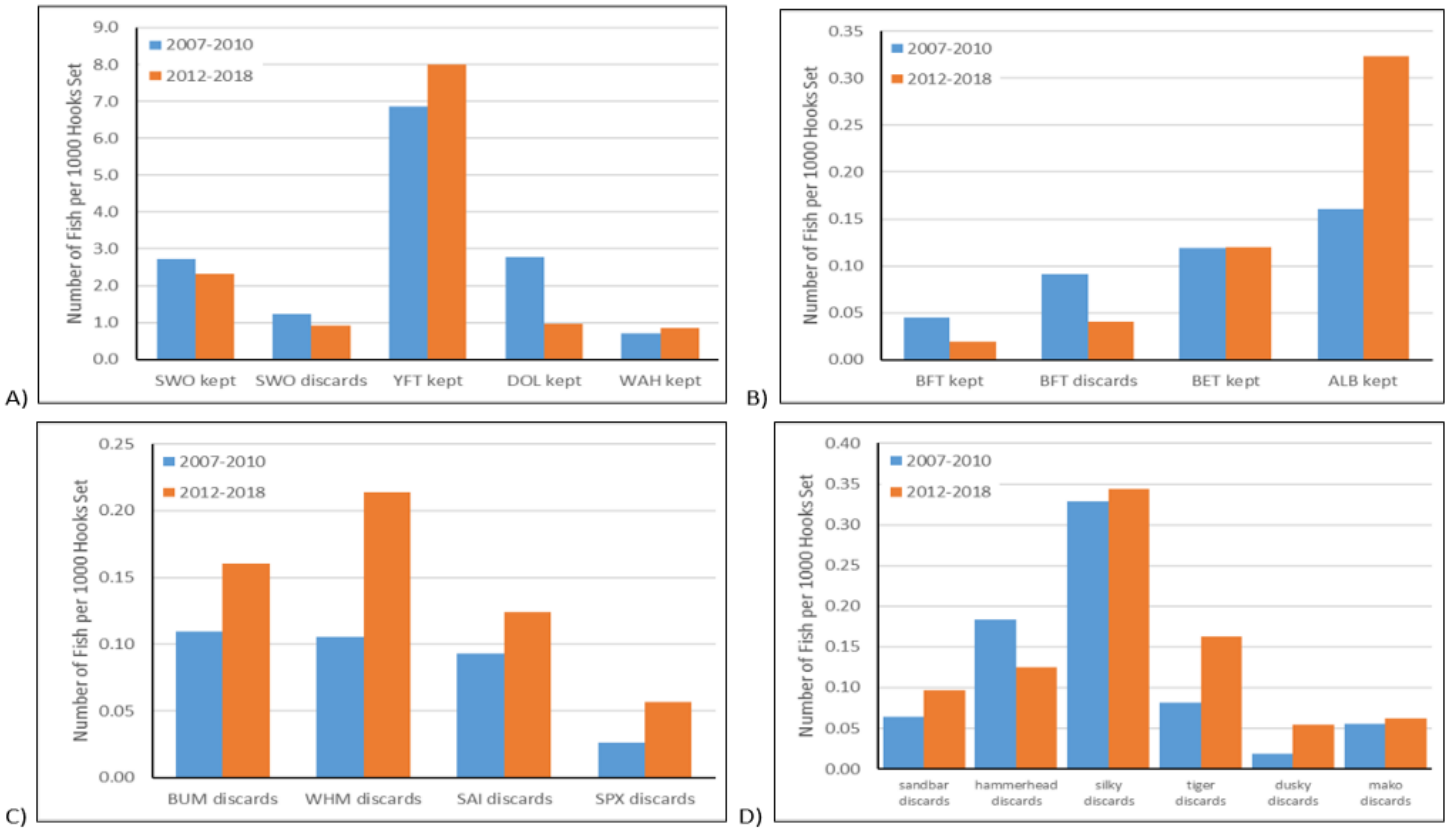

Figure 6.3 Catch Per Unit Effort Comparisons of Highly Migratory Species Prior to and Following 2011 Weak Hook Management Implementation in 2007–10 vs 2012–18

Notes: Number of fish kept and discarded (alive and dead) are presented per 1,000 hooks. Blue indicates numbers reported prior to implementation of weak hook management measures (2011); orange indicates numbers reported after implementation (2012-2018). A.) Kept and discarded swordfish (SWO), kept yellowfin tuna (YFT), kept dolphin, and kept wahoo (WAH); B) Kept and discarded bluefin tuna (BFT), kept bigeye tuna (BET), and kept albacore (ALB); C) Discarded billfish, including blue marlin (BUM), white marlin (WHM), sailfish (SAI), and spearfish (SPX); D) Shark discards, including sandbar, hammerhead, silky, tiger, dusky and mako sharks. The number of reported hooks presented on the y-axis vary between graphs. Source: Unified Data Processing.

Marine Mammals

NOAA Fisheries monitors observed interactions with protected marine mammals on a quarterly basis and reviews data for action, as necessary. Many of the marine mammals hooked by U.S. pelagic longline fishermen are released alive, although some animals suffer serious injuries and may die after being released. The observed and estimated marine mammal interactions for 2012–2018 are summarized in Table 6.15.

Marine mammals are caught primarily during the third and fourth quarters in the Mid-Atlantic Bight and during the second quarter in the South Atlantic Bight. These geographic areas are illustrated in Figure 6.4. In 2018, the majority of observed interactions continued to be with short-finned pilot whales (Garrison, unpublished data).

Table 6.15 Marine Mammal Interactions in the Atlantic Pelagic Longline Fishery in 2014–2018

Year	Species	Total Obs.	Total Est.	Mortality Obs.	Mortality Est.	Serious Injury* Obs.	Serious Injury* Est.	Alive* Obs.	Alive* Est.
2014	Beaked whale	1.0	10.0	-	-	-	-	1.0	10.0
	Minke whale	1.0	6.0	-	-	-	-	1.0	6.0
	Long-finned pilot whale	2.0	11.0	-	-	1.0	1.0	1.0	10.0
	Pantropical spotted dolphin	1.0	10.0	-	-	-	-	1.0	10.0
	Risso's dolphin	1.0	8.0	-	-	1.0	8.0	-	-
	Rough-toothed dolphin	2.0	4.0	-	-	2.0	4.0	-	-
	Short-finned pilot whale	22.0	275.0	-	-	19.0	234.0	3.0	41.0
	Unidentified dolphin	1.0	14.0	-	-	1.0	14.0	-	-
2015	Beaked whale	1.0	4.0	-	-	1.0	4.0	-	-
	Bottlenose dolphin	1.0	4.7	-	-	-	-	1.0	4.7
	Common dolphin	2.0	14.4	-	-	1.0	9.0	1.0	5.4
	Risso's dolphin	2.0	8.4	-	-	2.0	8.4	-	-
	Short-finned pilot whale	38.0	233.5	-	-	32.0	202.9	6.0	30.7
	Sperm whale	1.0	1.3	-	-	1.0	1.3	-	-
	Unidentified dolphin	2.0	8.5	-	-	-	-	2.0	8.5
	Unidentified marine mammal	2.0	10.5	-	-	1.0	5.8	1.0	4.7

Year	Species	Total Obs.	Total Est.	Mortality Obs.	Mortality Est.	Serious Injury* Obs.	Serious Injury* Est.	Alive* Obs.	Alive* Est.
2016	Long-finned pilot whale***	0.3	1.3	-	-	0.2	1.1	0.1	0.2
	Risso's dolphin	4.0	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	2.0	9.3	-	-	1.0	1.2	1.0	8.1
	Unidentified marine mammal	2.0	4.1	-	-	0.5	0.8	1.5	3.3
	Unidentified whale	1.0	9.2	-	-	0.5	4.7	0.5	4.5
2017	Common dolphin	1.0	4.9	-	-	1.0	4.9	-	-
	Long-finned pilot whale***	1.3	15.6	-	-	0.3	3.3	1.0	12.3
	Risso's dolphin	1.0	7.7	-	-	-	-	1.0	7.7
	Short-finned pilot whale***	29.7	340.3	-	-	14.0	132.9	15.7	207.4
	Unidentified dolphin	1.0	5.3	-	-	-	-	1.0	5.3
	Unidentified marine mammal	2.0	11.7	-	-	-	-	2.0	11.7
2018	Bottlenose dolphin	2.0	23.6	-	-	1.5	6.2	0.5	17.4
	Common dolphin	1.0	2.8	-	-	0.5	1.4	0.5	1.4
	Long-finned pilot whale***	0.1	0.4	-	-	0.1	0.4	-	-
	Short-finned pilot whale***	10.0	153.0	-	-	6.7	102.2	3.3	51.8
	Unidentified marine mammal	3.0	40.9	-	-	3.0	40.9	-	-

Note: A dash indicates there were no observations for the species. Obs. = Observed. Est. = Estimated. *Cases where serious injury cannot be determined from available data are partitioned based upon observed serious injury rates from past interactions. This results in proportional assignment of observed animals to the serious injury and alive categories. **Pantropical spotted dolphin was observed dead in an experimental set. ***Pilot whales are not identified to species at sea by observers. Observed interactions are partitioned between the two species based upon location, water depth, and sea surface temperature at the time of the interaction. Source: Garrison and Stokes 2016, 2017, 2019; Garrison 2019, unpublished data.

Sea Turtles

NOAA Fisheries monitors observed interactions with sea turtles on a quarterly basis and reviews data for action, as necessary. Sea turtle interactions are also analyzed in three-year periods in accordance with a BiOp released in June 2004 (NOAA Fisheries 2004a). Sea turtle takes are summarized by large geographic areas and are illustrated in Figure 6.4.

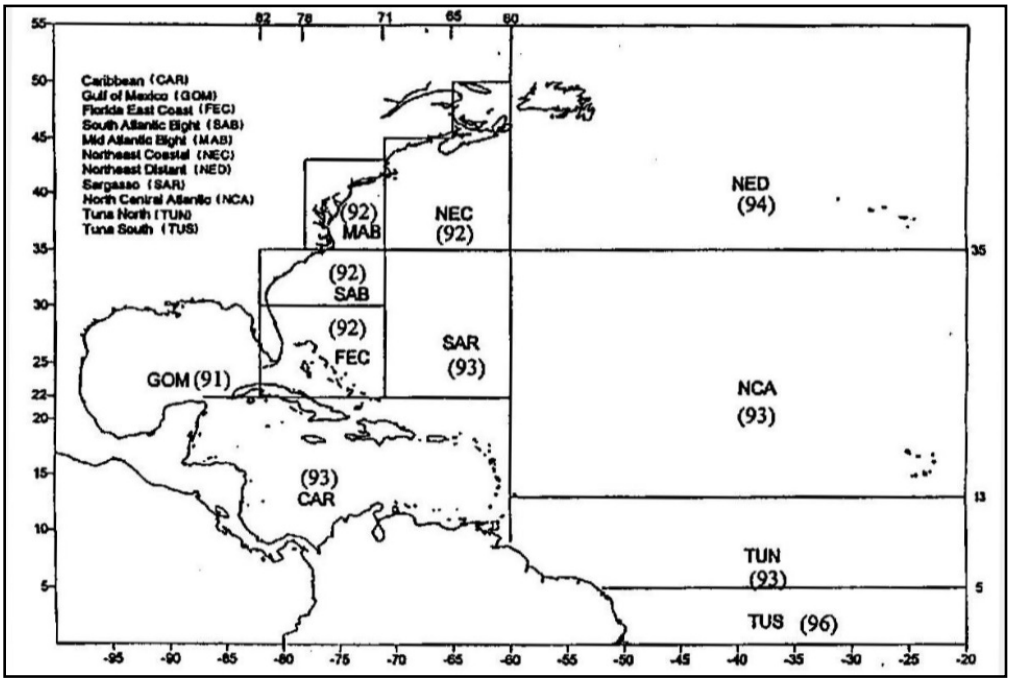

Figure 6.4 Geographic Areas Used in Summaries of Pelagic Logbook Data

CAR = Caribbean. GOM = Gulf of Mexico. FEC = Florida East Coast. SAB = South Atlantic Bight. MAB = Mid-Atlantic Bight. NEC = Northeast Coastal. NED = Northeast Distant Waters. SAR = Sargasso Sea. NCA = North Central Atlantic. TUN = Tuna North. TUS = Tuna South. Source: Cramer and Adams 2000.

The estimated sea turtle takes for regular fishing and experimental fishing effort for 2014–2018 are summarized for loggerhead sea turtles and leatherback sea turtles in Table 6.16 and Table 6.17, respectively. Sea turtle bycatch in the U.S. Atlantic pelagic longline fishery has decreased significantly in the last five years (Table 6.16, Table 6.17, and Table 6.18). In 2018, the majority of loggerhead sea turtle interactions occurred in the South Atlantic Bight, Sargasso Sea, and Gulf of Mexico areas (Table 6.16). Interactions with leatherback sea turtles were highest for 2018 in the Mid-Atlantic Bight, Northeast Distant Waters, and Gulf of Mexico (Table 6.17); however, fewer interactions occurred in the South Atlantic Bight and Gulf of Mexico areas compared to 2017. The total interactions for the 2016–2018 Incidental Take Statement, the most recent and complete three-year period, were below the level established in the 2004 BiOp for both loggerheads and leatherbacks (see Table 6.18).

Table 6.16 Estimated Number of Loggerhead Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery by Statistical Area in 2014–2018

Area	2014	2015	2016	2017	2018
Caribbean	3	1	6	4	0
Gulf of Mexico	23	1	4	18	10
Florida East Coast	83	90	49	0	9
South Atlantic Bight	19	18	63	41	17
Mid-Atlantic Bight	67	70	9	4	0
Northeast Coastal	10	52	17	1	6
Northeast Distant Waters	27	7	6	4	6
Sargasso Sea	27	4	0	1	13
North Central Atlantic	0	0	0	0	0
Tuna North	0	0	0	5	0
Tuna South	0	0	0	0	0
Total	259	243	154	78	61
Experimental fishery (2012–2014)	2	-	-	-	-
Total	261	243	154	78	61

Source: Garrison and Stokes 2016, 2017, 2019; Garrison 2018, 2019, unpublished data.

Table 6.17 Estimated Number of Leatherback Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery by Statistical Area in 2014–2018

Area	2014	2015	2016	2017	2018
Caribbean	2	0	0	0	0
Gulf of Mexico	235	99	80	57	20
Florida East Coast	20	30	31	0	5
South Atlantic Bight	11	8	21	67	16
Mid-Atlantic Bight	0	61	63	127	34
Northeast Coastal	9	60	56	8	5
Northeast Distant Waters	0	24	84	27	23
Sargasso Sea	2	12	0	5	13
North Central Atlantic	0	0	0	0	0
Tuna North	0	5	4	1	3
Tuna South	0	0	0	0	0
Total	279	299	339	292	119
Experimental fishery (2012–2014)	2	-	-	-	-
Total	281	299	339	292	119

Source: Garrison and Stokes 2016, 2017, 2019; Garrison 2018, 2019, unpublished data.

Table 6.18 Estimated Sea Turtle Interactions and Sea Turtle Incidental Take Levels in the U.S. Atlantic Pelagic Longline Fishery by Species in 2010–2018

Year	Leatherback	Loggerhead	Other/Unidentified Sea Turtles
Total 2010–2012	1,007	1,464	22
2013	366	378	0
2014	281	261	7
2015	300	243	16
Total 2013–2015	947	882	23
2016	340	155	13
2017	293	78	26
2018	120	61	4
Total 2016–2018	753	294	43
Total Three-Year ITS Level*	1,764	1,905	105

ITS = Incidental Take Statement. *Applies to all subsequent three-year incidental take statement periods (e.g.; 2010–12, 2013–15, 2016–18); 2017 data are preliminary estimates. Source: Garrison and Stokes 2016, 2017, 2019; Garrison 2018, 2019, unpublished data.

Seabirds

Observer data indicate that seabird bycatch is low in the U.S. Atlantic pelagic longline fishery. A cumulative total of reported seabird interactions with the U.S. Atlantic pelagic longline fishery from 1992 to 2018 is presented in Table 6.19.

Seabird species bycatch observed between 2012 and 2018 are listed in Table 6.20 by year, quarter, and the geographic area where they were encountered. In 2018, there were 76 U.S. pelagic longline vessels actively fishing in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea that reported setting approximately 4 million hooks. No interactions with seabirds were observed in 2018.

Table 6.19 Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery in 1992–2018

Species	Released Dead	Released Alive	Released Total	% Released Dead
Greater shearwater	26	1	27	96
Cory's shearwater	2	0	2	100
Unidentified shearwater	4	1	5	80
Herring gull	18	1	19	95
Great black-backed gull	9	1	10	90
Laughing gull	2	1	3	67
Unidentified gull	13	8	22	59
Northern gannet	4	14	18	22
Storm petrel	1	0	1	100
Unidentified seabird	38	16	54	70
Brown pelican	0	3	3	0
Parasitic jaeger	1	0	1	100
Northern fulmar	2	0	2	100
Total	120	46	167	72

Source: Pelagic Observer Program.

Table 6.20 Observed Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery in 2012–2018

Year	Quarter	Area	Type of Bird	Number Observed	Status
2012	4	GOM	Laughing gull	1	Dead
2013	2	GOM	Laughing gull	1	Dead
2013	4	GOM	Parasitic jaeger	1	Dead
2014	2	GOM	Brown pelican	1	Dead
2014	3	MAB	Corey's shearwater	1	Dead
2015	2	TUN	Unidentified shearwater	1	Dead
2015	4	MAB	Greater shearwater	1	Dead
2016	1	GOM	Greater shearwater	1	Dead
2016	1	GOM	Herring gull	1	Dead
2016	1	GOM	Northern gannet	1	Alive
2016	1	MAB	Northern gannets	3	Alive
2016	1	SAB	Northern gannet	1	Alive
2016	1	SAB	Unidentified gull	1	Alive
2016	1	GOM	Brown pelican	1	Alive
2016	4	NEC	Herring gull	3	Dead
2017	1	MAB	Herring gull	1	Dead
2017	1	MAB	Unidentified seabird	1	Dead
2017	1	SAB	Northern gannet	1	Live
2017	1	MAB	Herring gull	1	Live
2017	4	MAB	Northern fulmar	1	Dead
2017	4	MAB	Shearwater	2	Dead
2018*	-	-	-	0	-

NED = Northeast Distant Waters. GOM = Gulf of Mexico. MAB = Mid-Atlantic Bight. TUN = Tuna North. SAB = South Atlantic Bight. NEC = Northeast Coastal. *No seabird interactions occurred in 2018. Source: Pelagic Observer Program.

6.3.3 Purse Seine

6.3.3.1 Bycatch Data

Reporting methods used for the purse seine fishery are described in Section 6.2.1.1. Landings for this fishery are reported in Section 5.3.3.

There are no recorded instances of non-tuna finfish, other than minimal numbers of blue/basking 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.

6.3.4 Commercial Handgear

6.3.4.1 Bycatch Data

Reporting methods used for the commercial handgear fishery are described in Section 6.2.1.1. Landings, including dead discards, in this fishery are reported in Section 5.3.4.

Because of the deliberate nature of harpoon gear, bycatch for vessels targeting bluefin tuna or swordfish is expected to be low to non-existent, other than undersized fish. Bycatch mortality in those fisheries for non-directed species would, therefore, be near zero. However, for those directed species that may be undersized, mortality would be high.

6.3.5 Recreational Handgear

6.3.5.1 Reduction Measures

NOAA Fisheries developed a Code of Angling Ethics as part of implementing Executive Order 12962—Recreational Fisheries. NOAA Fisheries implemented a national plan to support, develop, and implement programs that were designed to enhance public awareness and understanding of marine conservation issues relevant to the wellbeing of fishery resources in the context of marine recreational fishing. This angling code is consistent with the requirement of National Standard 9 to minimize bycatch and bycatch mortality. These guidelines are discretionary, not mandatory, and are intended to inform the angling public of NOAA Fisheries' views regarding what constitutes ethical angling behavior. Part of the ethical angling code covers catch-and-release fishing and is directed towards minimizing bycatch mortality. For a detailed description of the Code of Angling Ethics, refer to Section 3.9.8.3 of the 2006 Consolidated Atlantic HMS FMP (NOAA Fisheries 2006).

NOAA Fisheries has initiated an outreach program to address bycatch and educate anglers on the benefits of circle hooks. In January 2011, NOAA Fisheries created a brochure that provides guidelines on how to increase the survival of large pelagic species caught with hook-and-line. This brochure was updated in 2017 and is available at www.fisheries.noaa.gov/resource/educational-materials/careful-catch-and-release-brochure. NOAA Fisheries distributes educational outreach materials on the careful catch and release of Atlantic HMS to recreational fishing tournaments, where a large audience of recreational fishermen can be reached.

Also in 2017, NOAA Fisheries finalized Amendment 5b to the 2006 Consolidated HMS FMP to end overfishing on and rebuild dusky shark stocks. Several measures were included to

educate anglers and reduce post-release mortality of dusky sharks caught as bycatch by recreational fishermen. Since dusky sharks are a prohibited species, recreational fishermen are not permitted to target or retain them. A video and quiz on the safe handling and release of prohibited Atlantic sharks is available for anyone to view and take on the HMS permits website (hmspermits.noaa.gov). Atlantic HMS Angling and Atlantic HMS Charter/Headboat permit holders must add a shark endorsement to 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 an HMS Angling or HMS Charter/Headboat permit have been required to use non-offset, non-stainless steel circle hooks when fishing south of 41° 43' N latitude (near Chatham, Massachusetts, which is the northern extent of the dusky shark's U.S. Atlantic range), except when fishing with flies or artificial lures. On March 2, 2018, NOAA Fisheries implemented an emergency interim final rule to adopt internationally recommended management measures for shortfin mako to address overfishing of the stock (83 FR 8950). Among other things, this interim rule encouraged anglers to continue catch-and-release practices for shortfin mako.

On March 3, 2019, NOAA Fisheries implemented Amendment 11 to the 2006 Atlantic HMS FMP to adopt longer-term management measures for shortfin mako (84 FR 5358). Amendment 11 maintained the 83-inch fork length minimum size for female shortfin makos and established a smaller 71-inch (180 cm) fork length minimum size for male shortfin mako sharks, which mature at a smaller size. This action was taken to reduce the proportion of female shortfin mako sharks in the recreational harvest (they accounted for nearly three-quarters of harvested sharks under the emergency measures) and allow fishermen to focus their harvest on smaller male sharks, which are less vital to the rebuilding of the stock.

Amendment 11 also extended the requirement to use circle hooks when fishing recreationally for sharks to all federal waters of the Atlantic.

6.3.5.2 Bycatch Data

Reporting methods used for the recreational handgear fishery are described in Section 6.2.1.1. Landings for this fishery are reported in Section 5.3.5.

Bycatch in the recreational rod and reel fishery is difficult to quantify because many fishermen may value the experience of fishing over the catch of a targeted species, thus making it difficult to distinguish between target species and bycatch species. 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).

Most evidence suggests that circle hooks reduce at-vessel and post-release mortality rates for many HMS compared to J-hooks without reducing the catch of target species, although this varies by species, gear configuration, bait, and other factors. By design, circle hooks tend to hook sharks in the jaw more frequently than in the throat or gut (a practice known as deep-hooking), thereby reducing injury and associated mortality compared to J-hooks (Godin et al. 2012, Campana et al. 2009). In a meta-analysis of 42 empirical studies, Reinhardt et al. (2017) compared the effects of hook type on catch rate and at-vessel

mortality of 43 and 31 species, respectively. Catch rates were statistically significantly higher for a number of sharks, tunas, and sailfish. This study also found statistically significant evidence that at-vessel mortality of fish caught on J-hooks was higher for a number of billfish, swordfish, tunas, and sharks. Willey et al. (2016) examined the frequencies of jaw, throat, gut, and foul hooking of sharks using recreational fishing gear with non-offset circle and J-hooks. Across all species, they found that sharks caught recreationally with circle hooks were deep hooked in 3 percent of the interactions, while sharks caught on J-hooks were deep hooked in 6 percent of the interactions. This equates to a 50 percent reduction in the frequency of deep-hooking with the use of circle hooks (N=624). Campana et al. (2009) observed that 96 percent of the deep hooked blue sharks were severely injured or dead, while 97 percent of sharks that were hooked superficially in the mouth or jaw were released healthy and with no apparent trauma. Therefore, assuming that deep hooking in sharks results in comparable post-release mortality rates (96-percent), converting recreational shark fisheries from J-hooks to circle hooks should reduce the mortality rate of hooked sharks by 63 percent ((17.5%-6.0%/17.5%)*96% = 63%).

Bycatch in the recreational bigeye, albacore, yellowfin, and skipjack tunas spearfishing fishery is expected to be virtually, if not totally, non-existent; therefore, bycatch mortality would be near zero.

The number of kept and released fish reported or observed through the LPS dockside intercepts for 2014–2018, including prohibited sandbar and dusky sharks, are presented in Table 6.21 and Table 6.22.

Table 6.21 Highly Migratory Species Retained by the Rod and Reel Fishery as Reported in the Large Pelagics Survey* Between May and October in 2014–2018

Species	2014	2015	2016	2017	2018
White marlin	8	13	10	7	16
Blue marlin	1	4	6	1	2
Sailfish	.	.	1	1	.
Swordfish	16	43	27	14	10
Giant bluefin tuna	56	119	132	194	252
Large medium bluefin tuna	7	29	63	56	20
Small medium bluefin tuna	26	33	28	33	21
Large school bluefin tuna	60	40	128	73	16
School bluefin tuna	147	141	147	224	272
Young school bluefin tuna	4	.	.	3	.
Bigeye tuna	215	240	99	28	469
Yellowfin tuna	2,072	1,942	2,968	2,358	2,328
Skipjack tuna	109	125	181	147	150
Albacore tuna	444	310	127	135	20
Common thresher shark	55	68	43	55	55
Shortfin mako shark	180	152	129	146	26
Sandbar shark[2]	.	1	.	.	.
Dusky shark[1]	.	.	.	.	.
Tiger shark	2	3	.	.	1
Porbeagle	3	3	5	6	5
Blacktip shark	.	.	.	.	.
Atlantic sharpnose shark	6	13	2	5	6
Blue shark	10	25	39	17	17
Hammerhead shark	.	.	.	.	.
Smooth hammerhead shark	.	.	.	.	.
Scalloped hammerhead shark	.	.	.	.	.
Unidentified hammerhead shark	.	.	.	1	.
Wahoo	59	135	102	78	32
Dolphinfish	5,904	9,814	6,222	5,080	9,155
King mackerel	2	.	8	5	14
Atlantic bonito	454	46	41	106	158
Little tunny	157	108	262	298	229
Amberjack	25	46	18	8	46
Spanish mackerel	44	165	20	8	3

*Covers the geographic region between Virginia and Maine. [1]Prohibited in the recreational fishery as of July 1, 1999. [2]Prohibited as of July 2008. Source: Large Pelagics Survey.

Table 6.22 Highly Migratory Species Released Alive and Dead by the Rod and Reel Fishery as Reported in the Large Pelagics Survey* Between May and October of 2014–2018

Species	2014	2015	2016	2017	2018
White marlin	1,281	1,528	1,705	735	1,557
Blue marlin	99	170	113	66	134
Sailfish	16	25	145	19	7
Swordfish	15	14	7	8	2
Giant bluefin tuna	.	.	.	21	13
Large medium bluefin tuna	.	3	2	4	4
Small medium bluefin tuna	35	51	30	29	30
Large school bluefin tuna	40	14	71	48	.
School bluefin tuna	84	277	70	273	158
Young school bluefin tuna	6	29	90	36	12
Bigeye tuna	102	14	12	4	161
Yellowfin tuna	480	920	2,061	558	354
Skipjack tuna	137	217	278	109	275
Albacore tuna	29	11	30	54	11
Common thresher shark	23	42	20	49	47
Shortfin mako shark	237	385	128	145	269
Sandbar shark[2]	62	50	90	71	58
Dusky shark[1]	57	102	49	88	57
Tiger shark	32	18	10	13	10
Porbeagle	21	42	29	96	57
Blacktip shark	33	13	.	4	.
Atlantic sharpnose shark	3	36	26	21	4
Blue shark	1,894	2,164	1,462	1,316	1,487
Hammerhead shark	1	7	4	1	3
Smooth hammerhead shark	6	2	3	1	1
Scalloped hammerhead shark	2	2	0	4	2
Unidentified hammerhead shark	23	28	33	30	21
Wahoo	.	2	.	.	1
Dolphinfish	213	508	314	215	729
King mackerel	.	.	.	.	6
Atlantic bonito	138	55	88	31	227
Little tunny	614	339	875	1,359	1,532
Amberjack	35	10	62	.	18
Spanish mackerel	.	2	.	2	.

*Covers the geographic region between Virginia and Maine. [1]Prohibited in the recreational fishery as of July 1, 1999. [2]Prohibited as of July 2008. Source: Large Pelagics Survey.

6.3.6 Bottom Longline

6.3.6.1 Reduction Measures

Vessel owners and operators of vessels with a commercial shark limited access permit must attend a Safe Handling, Release, and Identification Workshop every three years and must carry NOAA Fisheries-approved dehooking devices onboard and use them in the event of a protected species interaction. They must also store and post careful handling

release protocols and guidelines in the wheelhouse to minimize injury to protected species when interactions occur.

Any dusky shark, sea turtle, marine mammal, and smalltooth sawfish that becomes entangled or hooked must be immediately released, and the gear must be immediately retrieved. The vessel must move at least 1 nmi from that location before fishing is resumed to avoid interacting with those species again. Marine mammal entanglements must be reported to NOAA Fisheries under the Marine Mammal Authorization Program. Time and area closures are implemented in this fishery to reduce bycatch, and these measures require the proper stowage of gear if the vessel is within a closed area.

To prevent long-term injury of bycatch that cannot be released safely if the hook is removed, bottom longline gear must include only corrodible hooks. On January 1, 2018, circle hook requirements by all HMS Directed Shark permit holders using bottom longline gear became effective.

The bottom longline fishery also includes the shark research fishery, in which vessels are required to take an observer on all trips, and the limited access fishery, in which vessels are randomly selected for observer coverage and may be required to use a vessel monitoring system.

There were six participants in the 2018 shark research fishery. NOAA Fisheries changed the regulations for participating vessels in 2015 by modifying the regional dusky shark bycatch caps for this limited fishery and allowing observers to retain and land up to three whole sharks per trip. The resulting shark research fishery regions for 2018 are shown in Figure 6.5.

Figure 6.5 Dusky Shark Bycatch Cap Regions for the Shark Research Fishery

6.3.6.2 Bycatch Data

Reporting methods used for the bottom longline fishery are described in Section 6.2.1.1. Landings, included dead discards, for this fishery are reported in Section 5.3.6.

The shark bottom longline fishery has relatively low observed bycatch rates. Historically, finfish bycatch has averaged approximately 5 percent of the total observed catch in the bottom longline fishery. Observed protected species bycatch (e.g. sea turtles) has typically been much lower, less than 0.01 percent of the total observed catch.

Table 6.23 provides information on those observed interactions with protected resources for bottom longline vessels targeting sharks in the Gulf of Mexico and Atlantic regions. 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. In 2018, five loggerhead sea turtles were observed in the shark research fishery: four were released alive and one was released dead. No protected resources interactions were observed in the Gulf of Mexico and South Atlantic regions outside of the shark research fishery. Take levels for sea turtles, smalltooth sawfish, and Atlantic sturgeon have not exceeded levels authorized in the 2012 BiOp (NOAA Fisheries 2012) over any three-year period. Bycatch of seabirds in the shark bottom longline fishery has been virtually non-existent. A single pelican has been observed killed from 1994 through 2013. No expanded estimates of seabird bycatch or catch rates for the bottom longline fishery have been made due to the rarity of seabird interactions.

Table 6.23 Protected Species Interactions Observed on Bottom Longline Trips Targeting Sharks in the Gulf of Mexico and Atlantic Ocean in 2014–2018

Year	Sea Turtles	Sea Birds	Marine Mammals	Smalltooth Sawfish	Total
2014	7 (5A, 2D)	-	-	5 (A)	12
2015	4 (4A, 0D)	-	-	2 (A)	6
2016	9 (7A, 2D)	3 (U)	-	1 (A)	13
2017	3 (1A, 2D)	-	-	-	3
2018	5 (4A, 1D)	-	-	-	5
Total	28	3	0	8	39

Note: Letters in parentheses indicate whether the animal was released (A) alive, (D) dead, or (U) unknown. Source: Mathers et al. 2019a, unpublished.

6.3.7 Gillnet

6.3.7.1 Reduction Measures

Vessel owners and operators that hold a shark limited access permit, or those fishing with pelagic longline or gillnet gear, must attend a Safe Handling, Release, and Identification Workshop every three years. The workshop curriculum is compliant with the Right Whale Ship Strike Reduction Rule and the Pelagic Longline Take Reduction Plan, the Atlantic Large Whale Take Reduction Plan, the Harbor Porpoise Take Reduction Plan, and the Bottlenose Dolphin Take Reduction Plan. See Section 6.2.2 for details on those plans. Vessel owners, and operators that hold only a smoothhound shark permit are not required to attend the workshops.

Fishermen using gillnet gear must limit soak times to 24 hours when using sink gillnet gear and conduct a net check at least every two hours when using drift gillnet gear to look for and remove any sea turtles, marine mammals, or smalltooth sawfish. If a marine mammal is taken, the vessel operator must immediately cease fishing operations and contact NOAA Fisheries consistent with the Marine Mammal Authorization Program. Smalltooth sawfish must not be removed from the water while being removed from the net. Dusky sharks must be released immediately, and vessels must move 1 nmi after a dusky shark interaction and notify other vessels. Per Amendment 11, gillnet fishermen are allowed to land shortfin mako sharks as long as the shark is dead at haulback.

6.3.7.2 Bycatch Data

Reporting methods used for the gillnet fishery are described in Section 6.2.1.1. Landings, including dead discards, for this fishery are reported in Section 5.3.7.

There was a wider range of fish species caught in the southeastern Atlantic sink gillnet fisheries in 2018 compared to drift and strike gillnet fisheries due to the number of sets observed and gear deployment methods (Mathers et al. 2019b, unpublished). Predominant species caught in sink gillnets included Spanish mackerel, Atlantic bumper (*Chloroscombrus chrysurus*), blue runner jack (*Caranx crysos*), bluefish, and Atlantic sharpnose sharks.

Gillnet gear is the predominant gear type used in the smooth dogfish shark fishery in the Northeast and Mid-Atlantic regions. The gillnet fishery in these regions 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. Observed interactions with protected species for the Northeast and Mid-Atlantic smooth dogfish gillnet fishery are unavailable at this time.

Interactions with protected species between 2014 and 2018 in the observed southeastern Atlantic and Gulf of Mexico gillnet fisheries targeting mixed sharks are on Table 6.24. No gillnet trips targeting mixed sharks were observed in 2017 or 2018. One sea bird was observed caught in gillnet gear in 2018 on a trip targeting king mackerel (Mathers et al. 2019b, in press). No interactions with sea turtles, marine mammals, smalltooth sawfish, or Atlantic sturgeon were observed with gillnet gear in any of the gillnet fisheries.

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

Table 6.24 Observed Protected Species Interactions in the Shark Gillnet Fishery Targeting Mixed Sharks other than Smoothhounds in 2014–2018

Year	Sea Turtles	Sea Birds	Marine Mammals	Smalltooth Sawfish	Atlantic Sturgeon	Total
2014	0	0	1(D)	0	0	1
2015	0	0	0	0	0	0
2016	0	0	0	0	0	0
2017	N/A	N/A	N/A	N/A	N/A	N/A
2018	N/A	N/A	N/A	N/A	N/A	N/A
Total	0	0	1	0	0	1

Note: Letters in parentheses indicate whether the animal was released (A) alive or (D) dead. N/A = No data exists since, in 2017 and 2018, no trips that used gillnet and targeted mixed sharks were observed.
Source: Mathers et al. 2019b, unpublished.

6.3.8 Green-Stick

6.3.8.1 Bycatch Data

Reporting methods used for the green-stick fishery are described in Section 6.2.1.1. Landings for this fishery are reported in Section 5.3.8.

NOAA Fisheries and the Louisiana Department of Wildlife and Fisheries investigated the catch and bycatch of green-stick gear in 2012–2015 in the northern Gulf of Mexico through a study funded by the NOAA Bycatch Reduction Engineering Program. The final report from that study is available upon request from the NOAA Fisheries Atlantic HMS Management Division.

6.4 Bycatch in the Prohibited Shark Complex

The annual catch limit for prohibited sharks is zero, as clarified in Amendment 5b (NOAA 2017). Fisheries for those stocks are closed, although a small amount of bycatch does occur in other fisheries. NOAA Fisheries monitors that bycatch and ensures that the annual catch limit 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 6.25) 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 SEFSC observer programs, including bottom longline, gillnet, and pelagic observer programs, the Northeast Fisheries Observer Program, the HMS exempted fishing permit program, and recreational data, including the LPS and MRIP. The recreational data from LPS and MRIP include estimated landings, whereas observer program data include observed dead discards. More information about the data used can be found in Chapter 1 of Amendment 5b (NOAA Fisheries 2017), available at www.fisheries.noaa.gov/action/amendment-5b-2006-consolidated-hms-fishery-management-plan-atlantic-shark-management.

Table 6.25 Observed and Estimated Shark Mortality (Dead Discards and Kept in Numbers of Sharks) in the Prohibited Shark Complex in 2014–2018

Species	2014	2015	2016	2017	2018
Basking	40	13	8	4	8
Bigeye thresher	27	39	28	21	13
Bignose	0	1	1	0	0
Caribbean reef	1	0	0	0	1
Dusky	649	141	29	22	121
Galapagos	0	0	0	0	0
Longfin mako	7	8	15	14	4
Night	56	14	8	31	74
Sand tiger	21	16	26	9	48
Whale	0	0	0	0	0
White	3	5	0	10	5
Atlantic angel	67	52	113	98	31
Sevengill	0	1	0	0	0
Sixgill	0	0	0	1	0
Narrowtooth	0	0	0	0	0
Caribbean sharpnose	0	0	0	0	0
Bigeye sand tiger	0	0	0	0	0
Bigeye sixgill	0	0	0	0	0
Total	871	290	228	210	305

Source: Southeast Gillnet Observer Program; Pelagic Observer Program; Northeast Fisheries Observer Program; Large Pelagics Survey; Marine Recreational Information Program; Bottom Longline Observer Program; the exempted fishery permit program.

Prohibited species cannot be retained unless authorized with a specific permit, such as an exempted fishing permit. Given this, a very limited amount of data may be collected on prohibited sharks, and the data availability may be influenced by research or public display permits. As a result, the actual observed number of each species can change dramatically between years. This variability in catches can be observed in Table 6.25. Compared to 2017, catch increases were observed in 2018 for dusky, night, and sand tiger sharks and catch decreases were observed in bigeye thresher, longfin mako, and Atlantic angel sharks.

To account for these highly variable interannual observed catches, NOAA Fisheries uses three-year rolling averages to smooth the interannual variability, as is commonly done in time series with high variance. Table 6.26 presents the three-year rolling averages from 2014 through 2018 and identifies whether observed bycatch mortality in the most recent three-year average for each species has increased, decreased, or not changed since the previous three-year average. If there are significant increases in the observed three-year moving average mortality for a particular species or fishery, then NOAA Fisheries may consider additional management actions to address that mortality and ensure that bycatch remains small. For species with long-term mean observations of less than 10 individuals per year, NOAA Fisheries considers an order of magnitude (10x) to represent a significant increase. For species with long-term mean observations of 10 or greater, NOAA Fisheries considers an increase of more than two standard deviations from the mean to represent a significant increase.

Table 6.26 Three-Year Rolling Average Observed and Estimated Shark Mortality (Dead Discards and Kept in Numbers of Sharks) in the Prohibited Shark Complex in 2014–2018 and the Directional Change Between the Two Most Recent Three-Year Averages

Species	2014–2016	2015–2017	2016–2018	Increase (+)/Decrease (-)/No Change (0)
Basking	20	8	7	-
Bigeye thresher	31	29	21	-
Bignose	1	1	0	-
Caribbean reef	0	0	0	0
Dusky	273	64	57	-
Galapagos	0	0	0	0
Longfin mako	10	12	11	-
Night	26	18	38	+
Sand tiger	21	17	28	+
Whale	0	0	0	0
White	3	5	5	0
Atlantic angel	77	88	81	-
Sevengill	0	0	0	0
Sixgill	0	0	0	0
Narrowtooth	0	0	0	0
Caribbean Sharpnose	0	0	0	0
Bigeye sand tiger	0	0	0	0
Bigeye sixgill	0	0	0	0
Totals	462	242	248	

*Denotes significant change. Source: Southeast Gillnet Observer Program; Pelagic Observer Program; Northeast Fisheries Observer Program; Large Pelagics Survey; Marine Recreational Information Program; Bottom Longline Observer Program; the exempted fishery permit program.

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, logbook and other available data, 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, or an increase in the abundance of a rebuilding stock.

At this time, there are increases for Caribbean reef, night, and sand tiger sharks in numbers of observed and estimated shark mortality. However, the increase in Caribbean reef sharks is not greater than an order of magnitude of the long-term mean; nor is the increase in night or sand tiger 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.

6.5 HMS Bycatch in Other Fisheries

The following section summarizes the bycatch of HMS in any federal or state-managed fishery that captures them. NOAA Fisheries continues to solicit bycatch data on HMS from all state, interjurisdictional, and federal data collection programs.

6.5.1 Squid, Mackerel, and Butterfish Trawl Fisheries

HMS fishermen who maintain an *Illex* squid trawl moratorium permit may land swordfish and smoothhound incidentally if they hold an Incidental HMS Squid Trawl permit. The trawl permit allows squid trawl fishermen to land up to 15 swordfish per trip and smoothhound sharks up to 25 percent by weight of the total catch onboard or offloaded from a trawl vessel.

Swordfish and tuna landings by U.S. squid trawl fishermen using mid-water gear are reported to ICCAT. In 2018, 2 mt whole weight of yellowfin tuna, skipjack tuna, albacore tuna, bigeye tuna, and swordfish incidental to the squid, mackerel, and butterfish trawl fishery (Table 6.27) were reported. Bycatch of these species from other trawl fisheries may be included as a portion of the overall reported trawl landings. Swordfish landings remain low relative to the directed fishery landings.

Table 6.27 Atlantic Highly Migratory Species Landed (mt ww) Incidental to Trawl Fisheries in 2014–2018

Species	2014	2015	2016	2017	2018
Yellowfin tuna	0.3	0.0	0.0	0.5	0.0
Skipjack tuna	0.0	1.1	0.0	0.1	<0.1
Bigeye tuna	0.0	0.1	0.1	0.0	0.9
Albacore tuna	0.0	1.7	0.5	1.7	<0.1
Swordfish	5.3	2.8	6.0	6.8	1.0
Total	5.6	5.7	6.6	9.1	2.0

mt ww = Metric tons whole weight. Source: NOAA Fisheries 2019.

6.5.2 Shrimp Trawl Fishery

For a summary of shark bycatch in the shrimp trawl fishery, see the 2011 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 and SEDAR 34b).

Chapter 6 References

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7 Economics of HMS Fisheries

7.1 Background

The 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 chapter, NOAA Fisheries used the past five years of data to facilitate the analysis of trends.

It should be noted that all dollar figures in this chapter are reported in current dollars. If analysis of real dollar trends controlled for inflation is desired, price indexes for 2014–2018 are provided in Table 7.1. 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 7.1 Inflation Price Indexes in 2014–2018

Year	CPI-U	GDP Deflator	PPI Unprocessed Finfish
2014	236.7	103.6	525.6
2015	237.0	104.7	610.2
2016	240.0	105.8	690.4
2017	245.1	107.8	674.9
2018	251.1	110.4	653.9

Notes: CPI-U is the standard Consumer Price Index for All Urban Consumers (1982–1984=100) and the Producer Price Index (PPI) for unprocessed finfish (1982=100). The Gross Domestic Product (GDP) Implicit Price Deflator index is 2012=100. Source: U.S. Department of Labor Bureau of Labor Statistics (CPI-U and PPI); U.S. Department of Commerce Bureau of Economic Analysis (GDP).

7.2 Commercial Fisheries

In 2018, U.S. fishermen landed a total of 9.4 billion pounds of all fish species, valued at $5.6 billion at U.S. ports (Fisheries of the United States, 2018; NOAA Fisheries 2020). That represents a 5.3 percent decrease in landings from the 9.9 billion pounds landed in 2017. It is also a 2.8 percent increase in the value of the landings in 2018 compared to the year before.

The total value of commercial HMS landings in 2018 was $33.3 million. Revenues of HMS fisheries are further discussed in Section 7.2.2.

7.2.1 Ex-Vessel Prices

Ex-vessel prices are a measure of the monetary worth of commercial landings. 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. The average ex-vessel prices per pound dressed weight (dw) for 2014–2018 by species and area are summarized in Table 7.2.

Table 7.2 Average Ex-Vessel Price Per Pound for Atlantic Highly Migratory Species by Area in 2014–2018

Species	Area	2014 ($)	2015 ($)	2016 ($)	2017 ($)	2018 ($)
Bluefin tuna	Gulf of Mexico	6.49	5.75	5.88	5.20	5.71
	South Atlantic	8.06	7.27	6.79	6.15	6.80
	Mid-Atlantic	7.66	7.20	5.98	6.21	6.31
	North Atlantic	7.87	6.37	7.23	6.52	7.05
Albacore tuna	Gulf of Mexico	0.77	0.75	0.70	1.05	1.01
	South Atlantic	1.86	1.70	1.80	1.93	2.23
	Mid-Atlantic	1.27	1.34	1.38	1.35	1.98
	North Atlantic	1.20	1.34	1.93	1.49	1.96
Bigeye tuna	Gulf of Mexico	3.54	5.76	6.06	5.52	5.70
	South Atlantic	5.25	5.00	5.01	5.21	5.77
	Mid-Atlantic	6.66	5.88	5.64	5.47	6.22
	North Atlantic	5.25	4.79	5.45	4.53	4.77
Yellowfin tuna	Gulf of Mexico	3.86	4.27	3.49	3.76	4.36
	South Atlantic	3.69	3.46	3.18	3.34	3.83
	Mid-Atlantic	4.53	4.07	4.24	4.26	4.34
	North Atlantic	3.52	3.18	3.57	3.48	3.34
Skipjack tuna	Gulf of Mexico	-	-	-	0.71	1.24
	South Atlantic	0.75	0.68	0.88	0.87	0.90
	Mid-Atlantic	1.12	0.72	0.76	1.11	0.79
	North Atlantic	-	-	-	1.44	1.50
Swordfish	Gulf of Mexico	3.42	2.67	3.03	3.09	3.08
	South Atlantic	4.85	4.30	4.75	4.57	4.18
	Mid-Atlantic	4.66	3.86	4.31	3.96	3.93
	North Atlantic	4.43	3.25	4.67	4.37	4.21
Large coastal sharks	Gulf of Mexico	0.52	0.49	0.60	0.53	0.62
	South Atlantic	0.72	0.78	0.73	0.86	0.89
	Mid-Atlantic	0.78	0.74	0.70	0.95	0.71
	North Atlantic	-	-	-	-	-
Pelagic sharks	Gulf of Mexico	1.31	1.00	1.84	1.47	0.73
	South Atlantic	1.47	1.57	1.62	1.62	1.50
	Mid-Atlantic	1.37	1.19	1.31	1.18	1.33
	North Atlantic	2.00	1.68	1.93	2.03	1.64
Small coastal sharks	Gulf of Mexico	0.37	0.35	0.38	0.41	0.54
	South Atlantic	0.74	0.76	0.73	0.98	1.02
	Mid-Atlantic	0.80	0.81	0.89	0.93	0.77
	North Atlantic	-	-	-	-	-
Smoothhound*	Gulf of Mexico	*	-	-	-	0.65
	South Atlantic	*	0.71	0.84	0.94	0.93
	Mid-Atlantic	*	0.67	0.77	0.73	0.77
	North Atlantic	*	0.35	0.47	0.37	0.42
Shark fins	Gulf of Mexico	9.75	9.92	11.47	11.37	11.18
	South Atlantic	9.57	10.26	8.50	7.88	7.94

Species	Area	2014 ($)	2015 ($)	2016 ($)	2017 ($)	2018 ($)
	Mid-Atlantic	1.77	1.95	2.36	2.44	2.18
	North Atlantic	-	0.80	-	-	1.50

Notes: Gulf of Mexico is Texas, Louisiana, Mississippi, Alabama, and west coast of Florida. South Atlantic is east coast of Florida, Georgia, South Carolina, and North Carolina (except bluefin tuna). Mid-Atlantic is North Carolina (for bluefin tuna), Virginia, Maryland, Delaware, New Jersey, New York, and Connecticut. North Atlantic is Rhode Island, Massachusetts, New Hampshire, and Maine. *Smoothhound data were not collected until 2015. Source: eDealer; dealer weigh out slips from the Southeast Fisheries Science Center and Northeast Fisheries Science Center; eBFT.

The average 2018 ex-vessel prices for bluefin tuna have increased 8.4 percent since 2017. The ex-vessel prices for bluefin tuna can be influenced by many factors, including market supply and the Japanese yen/U.S. dollar (¥/$) exchange rate. Figure 7.1 shows the average ¥/$ exchange rate, plotted with average ex-vessel bluefin tuna prices, from 1971 to 2018.

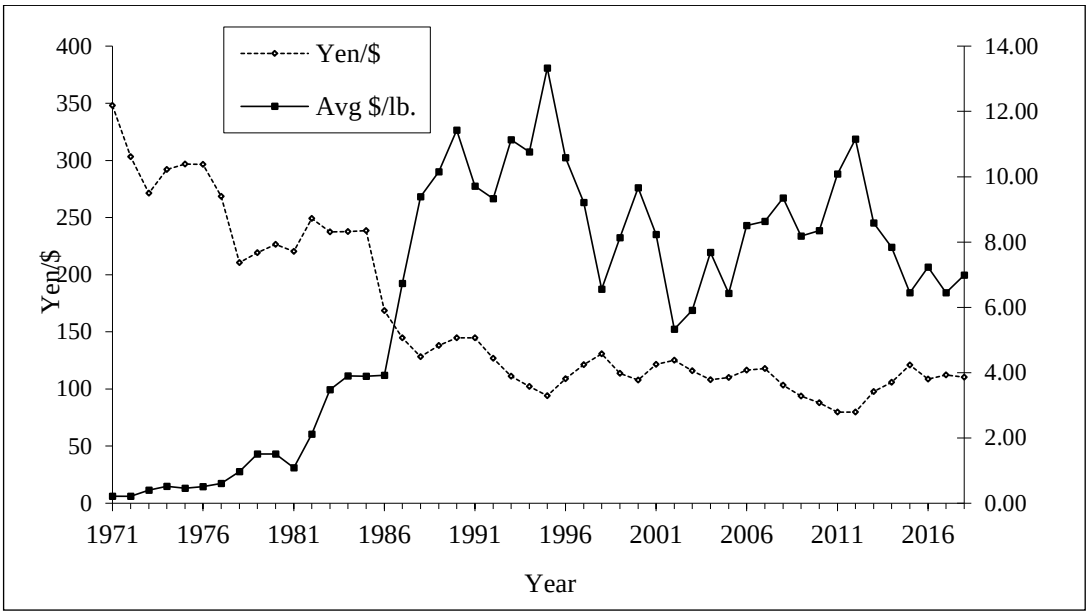

Figure 7.1 Average Annual Yen/$ Exchange Rate and Average U.S. Bluefin Tuna Ex-Vessel $/lb (dw) for All Gears in 1971–2018

dw = dressed weight. Source: Federal Reserve Bank (research.stlouisfed.org); NOAA Fisheries.

7.2.2 Revenues

Landings weight and price for most Atlantic HMS are collected from reports through NOAA Fisheries' electronic dealer reporting program, eDealer. For Atlantic bluefin tuna, landings weight and revenue are collected through the electronic bluefin tuna dealer landings reporting system, known as eBFT.

Table 7.3 summarizes the average annual revenues of Atlantic HMS fisheries based on average ex-vessel prices. These values indicate that the estimated total annual revenue of Atlantic HMS fisheries has decreased to $33.3 million for 2018 from $38.3 million in 2017. Changes in total revenue over the same time period for individual fisheries are as follows:

- Atlantic tuna: Decrease of $3.8 million (Table 7.4).
- Atlantic sharks: Increase of $0.2 million (Table 7.5).
- Atlantic swordfish: Decrease of $1.5 million (Table 7.6) due to a decrease in both landings weight and ex-vessel price.

Table 7.3 Estimates of the Total Ex-Vessel Annual Revenues of Atlantic Highly Migratory Species Fisheries in 2014–2018

Species	2014 ($)	2015 ($)	2016 ($)	2017 ($)	2018 ($)
Total tuna	26,175,746	23,262,035	24,654,371	26,531,264	22,751,128
Total swordfish	13,887,650	10,175,662	10,351,695	9,012,183	7,540,277
Total sharks	2,284,109	3,029,186	2,524,991	2,791,306	2,980,245
Total HMS	42,347,505	35,896,078	37,531,057	38,334,753	33,271,650

Source: eDealer for bigeye, albacore, yellowfin, and skipjack tunas, swordfish, and sharks; eBFT for bluefin tuna.

Table 7.4 Estimates of the Total Ex-Vessel Annual Revenues of Atlantic Tunas in 2014–2018

Species	Values	2014	2015	2016	2017	2018
Bluefin	Ex-vessel*	$7.84	$6.45	$7.23	$6.45	$6.99
	Weight**	1,002,549	1,347,920	1,522,634	1,490,321	1,587,794
	Fishery revenue	$7,810,287	$8,716,613	$11,008,644	$9,581,816	$11,010,617
Albacore	Ex-vessel*	$1.49	$1.46	$1.56	$1.63	$1.98
	Weight**	554,428	409,210	373,792	364,723	164,483
	Fishery revenue	$800,870	$593,911	$563,784	$652,948	$335,570
Bigeye	Ex-vessel*	$5.79	$5.35	$5.26	$5.33	$5.94
	Weight**	1,063,914	1,129,017	711,488	991,718	735,581
	Fishery revenue	$5,716,850	$5,454,461	$3,454,060	$5,371,772	$4,348,519
Skipjack	Ex-vessel*	$0.98	$0.72	$0.88	$0.92	$0.90
	Weight**	17,919	3,421	6,213	6,216	3,816
	Fishery revenue	$14,478	$2,269	$5,597	$6,633	$3,473
Yellowfin	Ex-vessel*	$3.96	$3.71	$3.53	$3.70	$4.03
	Weight**	2,779,487	1,965,050	2,351,936	2,637,684	1,543,898
	Fishery revenue	$11,833,261	$8,494,781	$9,622,286	$10,918,095	$7,052,949
Total tunas	Fishery revenue	$26,175,746	$23,262,035	$24,654,371	$26,531,264	$22,751,128
Total highly migratory species	Fishery revenue	$42,347,505	$35,896,078	$37,531,057	$38,334,753	$33,271,650

*Dollars per pounds dressed weight. **Pounds dressed weight. Source: eDealer for bigeye, albacore, yellowfin, and skipjack tunas; eBFT for bluefin tuna.

Table 7.5 Estimates of the Total Ex-Vessel Annual Revenues of Atlantic Swordfish in 2014–2018

Value	2014	2015	2016	2017	2018
Ex-vessel ($/lb dw)	$4.65	$4.07	$4.54	$4.32	$4.10
Weight (lb dw)	2,952,835	2,576,537	2,448,044	2,019,857	1,750,631
Total fishery revenue	$13,887,650	$10,175,662	$10,351,695	$9,012,183	$7,540,277
Total highly migratory species fishery revenue	$42,347,505	$35,896,078	$37,531,057	$38,334,753	$33,271,650

Source: eDealer.

Table 7.6 Estimates of the Total Ex-Vessel Annual Revenues of Atlantic Sharks in 2014–2018

Shark Group	Value	2014	2015	2016	2017	2018
Large coastal sharks	Ex-vessel*	$0.65	$0.66	$0.68	$0.72	$0.74
	Weight**	1,368,178	1,593,989	1,276,747	1,311,408	1,634,872
	Fishery revenue	$764,162	$885,305	$720,802	$746,642	$878,279
Pelagic sharks	Ex-vessel*	$1.48	$1.40	$1.54	$1.51	$1.42
	Weight**	353,623	215,298	239,850	251,153	129,885
	Fishery revenue	$504,860	$323,129	$387,688	$386,446	$160,772
Small coastal sharks	Ex-vessel*	$0.56	$0.57	$0.56	$0.74	$0.87
	Weight**	434,377	553,419	370,118	437,094	432,483
	Fishery revenue	$342,887	$410,305	$253,406	$364,181	$375,877
Smoothhound	Ex-vessel*	-	$0.65	$0.75	$0.70	$0.74
	Weight**	-	915,723	702,400	832,631	907,277
	Fishery revenue	-	$570,805	$502,717	$567,076	$678,309
Shark fins	Ex-vessel*	$7.71	$8.46	$8.36	$7.97	$8.71
	Weight**	110,560	105,189	76,048	85,877	97,813
	Fishery revenue	$672,200	$839,642	$660,378	$726,961	$887,008
Total sharks	Fishery revenue	$2,284,109	$3,029,186	$2,524,991	$2,791,306	$2,980,245
Total highly migratory species	Fishery revenue	$42,347,505	$35,896,078	$37,531,057	$38,334,753	$33,271,650

*Dollars per pound dressed weight. **Pounds dressed weight. Source: eDealer.

Figure 7.2 displays the percent composition of the $33.3 million ex-vessel annual revenues landed in 2018 by fishing gear category. Based on dealer reports, approximately 55 percent of 2018 total revenues in the fishery were landed by pelagic longline gear. In addition, 31 percent of landings by value were from vessels using commercial rod and reel gear, 3 percent were from bottom longline gear, 3 percent were from gillnet, and 6 percent were from other gear categories. These other gear categories include harpoon, purse seine, buoy gear, green-stick, hand line, and other miscellaneous gears.

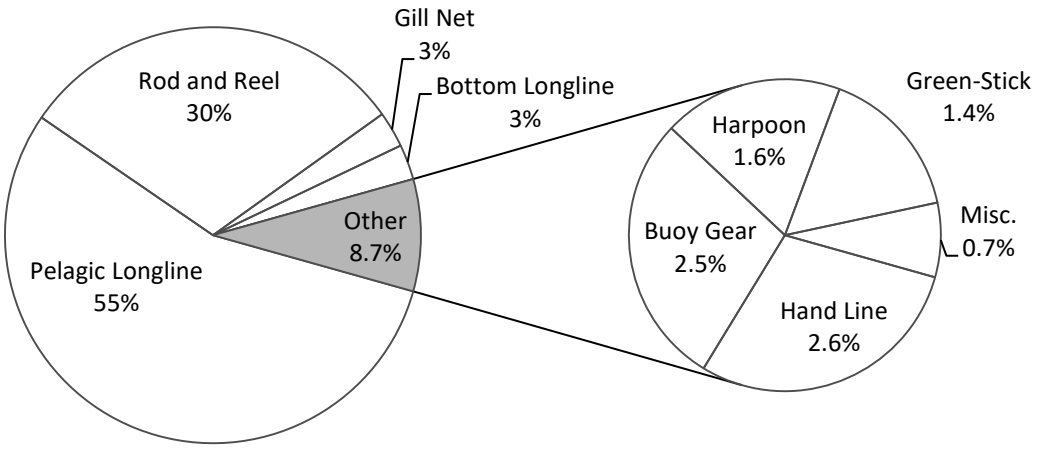

Figure 7.2 Percent of 2018 Total Ex-Vessel Revenues of Atlantic Highly Migratory Species Fisheries by Gear

Source: eDealer; eBFT.

7.2.3 Operating Costs

NOAA Fisheries collects 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 Southeast Coastal Fisheries Logbook submissions (see Section 9.3.1 for information on data collections). In addition, NOAA Fisheries also receives voluntary submissions of the trip expense and payment section of the logbook form from non-selected vessels. A majority of the operating cost information collected from these logbooks are from pelagic longline and bottom longline gears. As operating costs from other gear are limited, only pelagic longline and bottom longline gears are discussed below.

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.

7.2.3.1 Pelagic Longline Vessels

Primary expenses associated with operating an Atlantic HMS permitted pelagic longline commercial vessel include labor, fuel, bait, ice, groceries, and other gear, as well as light sticks for swordfish trips. Unit costs are collected on some of the primary variable inputs

associated with trips from vessel logbook data. The unit costs for fuel, bait, and light sticks are reported in Table 7.7.

Fuel costs increased 19 percent from 2017 to 2018, while the cost per pound for bait increased 10 percent. The unit cost per light stick remained unchanged from 2017 to 2018.

Table 7.7 Pelagic Longline Vessel Median Unit Costs for Fuel, Bait, and Light Sticks in 2014–2018

Input Unit Costs	2014	2015	2016	2017	2018
Fuel ($ per gallon)	3.25	2.20	1.81	2.10	2.50
Bait ($ per pound)	1.33	1.15	1.25	1.50	1.65
Light sticks ($ per stick)	0.30	0.30	0.35	0.35	0.35

Source: United Data Processing.

The median input costs per trip for the major variable inputs associated with Atlantic HMS trips taken by pelagic longline vessel are provided in Table 7.8. Fuel costs are one of the largest variable expenses. Total median pelagic longline vessel fuel costs per trip increased 12.7 percent from 2017 to 2018.

Table 7.8 Median Input Costs (Dollars) for Pelagic Longline Vessel Trips in 2014–2018

Input Costs	2014	2015	2016	2017	2018
Fuel	2,567	1,920	1,850	2,169	2,445
Bait	2,565	2,250	2,244	2,000	2,077
Light sticks	750	720	700	740	840
Ice costs	660	750	900	1,080	1.190
Grocery expenses	900	900	900	900	900
Other trip costs	500	603	800	880	1,000

Source: United Data Processing.

Labor costs are also an important component of operating costs for HMS pelagic longline vessels. Table 7.9 lists the number of crew on a typical pelagic longline trip. The median number of three crew members has been consistent from 2014 to 2018. 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 2018 received 25 percent on average. These shares are typically paid out after costs are netted from gross revenues. Median total shared costs per trip on pelagic longline vessels over the last five year ranged from a low of $6,033 in 2016 to a high of $6,889 in 2018.

Table 7.9 Median Labor Inputs for Pelagic Longline Vessel Trips in 2014–2018

Labor	2014	2015	2016	2017	2018
Number of crew	3	3	3	3	3
Owner share (%)	50	50	50	50	50
Captain share (%)	25	25	25	25	25
Crew share (%)	25	25	25	25	25
Total shared costs ($)	6,699	6,426	6,033	6,425	6,889

Source: United Data Processing.

In 2018, median reported total trip sales were $20,051. In 2017, median reported total trip sales were $19,638. After adjusting for operating costs, median net earnings per trip were $11,214 in 2017. Median net earnings per trip decreased to $9,913 in 2018.

7.2.3.2 Bottom Longline Vessels

The primary expenses associated with operating an Atlantic HMS-permitted bottom longline commercial vessel include labor, fuel, bait, ice, groceries, and other miscellaneous expenses. These expenses are reported in the Southeast Coastal Fisheries Logbook for vessels that have been selected for reporting economic information. Bottom longline trips primarily target shark species and are of short duration. Table 7.10 provides the median reported trip input costs from 2014 to 2018.

Table 7.10 Median Input Costs for Bottom Longline Vessel Trips in 2014–2018

Input Costs	2014	2015	2016	2017	2018
Fuel ($)	162	156	120	124	156
Bait ($)	85	50	61	60	50
Ice costs ($)	48	36	50	36	20
Grocery expenses ($)	50	40	40	20	20
Misc. trip costs ($)	24	54	20	20	0
Number of crew	2	2	2	2	2
Days at sea	1	1	1	1	1

Source: United Data Processing.

In 2018, median reported total trip sales were $976 for vessels using bottom longline gear. In 2017, median reported total trip sales were $1,110. After adjusting for operating costs, median net earnings per bottom longline trip were $801 in 2017. Median net earnings per trip decreased to $609 in 2018.

7.3 Fish Processing and Wholesale Sectors

Consumers spent an estimated $11.6 billion dollars on domestically processed fishery products from domestic and imported products. This includes $10.7 billion dollars on edible fishery products, including fresh, frozen, canned, and cured, and $889.3 million on industrial fishery products. Tuna are in the top five species processed at $384 million pounds valued at $836 million (NOAA Fisheries 2020).

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

Although NOAA Fisheries does not have specifics regarding HMS dealers, there is some information on the number of processors and wholesalers employees in the United States provided in Fisheries of the United States (NOAA Fisheries 2020). Table 7.11 provides a summary of available information.

Table 7.11 Processors and Wholesalers: Plants and Employment in 2018

Region	State	Processor[1] Plants	Processor[1] Employment	Wholesale[2] Plants	Wholesale[2] Employment	Total Plants	Total Employment
New England	ME	33	742	185	1,360	218	2,102
	NH	7	*	12	98	19	98
	MA	45	2,457	163	2,406	208	4,863
	RI	8	212	30	*	38	*
	CT	4	80	21	*	25	80
Total New England		97	3,491	411	3,864	508	7,143
Mid-Atlantic	NY	22	388	276	2,185	298	2,573
	NJ	18	496	82	1,074	100	1,570
	PA	4	84	29	703	33	787
	DE	4	*	8	24	12	24
	DC	-	-	3	*	3	*
	MD	19	321	44	809	63	1,130
	VA	36	1,329	64	522	100	1,851
Total Mid-Atlantic		103	2,618	506	5,317	609	7,935
South Atlantic	NC	26	680	69	796	47	1,476
	SC	4	17	23	169	27	186
	GA	7	717	31	801	38	1,518
	FL	42	1,579	321	2,706	363	4,285
Total South Atlantic		79	2,993	444	4,472	523	7,465
Gulf of Mexico	AL	34	1,451	13	255	47	1,706
	MS	23	2,432	22	123	45	2,555
	LA	61	1,592	106	758	167	2,350
	TX	48	1,542	153	1,414	201	2,956
Total Gulf of Mexico		166	7,017	294	2,550	460	9,567
Total inland states/other areas**		63	1,590	301	3,675	364	5,265

[1]Based on North American Industry Classification System 3117 as reported to the Bureau of Labor Statistics. [2]Based on North American Industry Classification System 42446 as reported to the Bureau of Labor Statistics. *Included with the category "Inland States/Other Areas." **Includes Puerto Rico and U.S. Virgin Islands. Source: NOAA Fisheries 2020.

7.4 International Trade

Several regional fishery management organizations, including ICCAT, collect international trade data used to estimate landings in international HMS fisheries and identify compliance problems using regional organizations management measures. The United States collects general trade data through the U.S. Customs and Border Protection's International Trade Data System, in collaboration with the U.S. Bureau of the Census (Census Bureau). NOAA Fisheries provides searchable Census Bureau trade data for marine fish products for the public at www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade.

Data on the amount and value of imports and exports are categorized under the Harmonized Tariff Schedule (HTS), which is the primary resource for determining tariff

classifications of goods imported to the United States. Many HMS have distinct HTS codes, and some species are further subdivided by the disposition of the product (e.g., fresh or frozen, fillets, and steaks). 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. Data may be further limited if the ocean area of origin for each product is not distinguished for species found globally. For example, the HTS code is the same for bigeye tuna from the Atlantic, Pacific, and Indian oceans.

This section describes general U.S. trade monitoring programs for HMS products and the relevant HMS trade monitoring programs of regional fishery management organizations. Statistics describing U.S. trade activity for HMS products between 2008 and 2018 are also provided.

7.4.1 The Use of Trade Data for Management Purposes

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

7.4.2 HMS Trade Documentation Programs

NOAA Fisheries implemented the HMS International Trade Program (ITP) in 2005 (69 FR 67268, November 17, 2004) to identify importers and exporters of bluefin tuna, swordfish, and frozen bigeye tuna products that require trade monitoring documentation. Under this program, traders in these species and shark fins were required to obtain the International Trade Permit. On August 3, 2016 (81 FR 514126), NOAA Fisheries replaced the 2005 program with the International Fisheries Trade Permit and expanded its scope to include dolphin-safe tuna imports covered by the Tuna Tracking and Verification Program (www.fisheries.noaa.gov/dolphin-safe) and the trade of Patagonia/Antarctic toothfish, also known as Chilean sea bass (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 Safety and Accountability For Every Port Act, also known as the SAFE Port Act, of 2006. On April 1, 2016 (81 FR 18796), NOAA Fisheries implemented the electronic version of the ICCAT Bluefin Tuna Catch Documentation program for Atlantic bluefin tuna, known as eBCD. On December 9, 2016 (81 FR 88975), NOAA Fisheries implemented the Seafood Import Monitoring Program, which added shark and tuna importers to the list of traders required to obtain the International Fisheries Trade Permit and report trade data to NOAA Fisheries via the International Trade Data System (effective January 1, 2018).

ICCAT trade monitoring programs are described in greater detail in the 2011 SAFE Report. Further information on NOAA Fisheries' International Fisheries Trade Permit and associated reporting requirements are available through www.fisheries.noaa.gov/permit/international-fisheries-trade-permit.

7.4.3 Convention on International Trade in Endangered Species of Wild Fauna and Flora

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement that regulates the global trade in plants and wildlife to ensure that international trade does not threaten their survival. International trade in Appendix II species is regulated in part through CITES export permits issued by the exporting country. Species listed on Appendix II are vulnerable to overexploitation but not at risk of extinction. To import an Appendix II species or specimen, a proper export permit must be included with the import. That permit may only be issued if the CITES authorities of the exporting country make a determination that the export will not be detrimental to the survival of the species, the specimen was legally acquired in accordance with national wildlife protection laws, and any live specimen will be shipped in a manner that will minimize injury, damage, or cruel treatment. Specimens of Appendix II species harvested on the high seas must be accompanied by an introduction from the sea certificate or an export permit, depending on where the specimen is landed. Specimens landed in the United States must be landed in a U.S. Fish and Wildlife-designated port. The re-export of any specimen of a species included in Appendix II requires a re-export certificate. In addition to Appendix II, CITES also has Appendix I, which includes species prohibited in international commercial trade, and Appendix III, which includes species for which a country has requested help with monitoring trade. The three appendices of CITES can be found at cites.org.

Any dealer who intends to import, export, or re-export HMS listed on CITES Appendix II, or any fisherman who lands these species from the high seas, must have the appropriate permits from the U.S. Fish and Wildlife Service. More information is available at www.fws.gov/international/permits/by-species/sharks-and-rays.html.

The Conference of the Parties to CITES met in August 2019 (CoP18) and adopted additional trade protections for shortfin and longfin mako sharks (among other species, including several species of guitarfish, wedgefish, and sea cucumbers) by adding them to the list of species on Appendix II. This means that, as of November 26, 2019, fishermen who catch shortfin or longfin mako sharks on the high seas, and dealers who import, export, or re-export mako sharks, must have specific permits from the U.S. Fish and Wildlife Service. These permits cover landing of mako sharks harvested by U.S. vessels on the high seas, exports, re-exports, and international trade of parts and products of these species that were in stock prior to November 26, 2019.

Shortfin and longfin mako sharks are not the first sharks to be listed on Appendix II of CITES. During CoP17 (2016), silky and thresher sharks were added, while three species of hammerhead shark (scalloped, smooth, and great), porbeagle shark, and oceanic whitetip shark were added during CoP16. Whale, basking, and white sharks have been listed on Appendix II since the early 2000s.

7.4.4 U.S. Exports of HMS

Exports may include merchandise of both domestic and foreign origin. The Census Bureau defines exports of domestic merchandise to include commodities that are grown, produced, or manufactured in the United States (e.g., fish caught by U.S. fishermen). For statistical purposes, domestic exports also include commodities of foreign origin that have been altered in the United States from the form in which they were imported or that have

been enhanced in value by further manufacture in the United States. The value of an export is 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.

The value of HMS exports is nationally dominated by tuna products, as evidenced in this section. In 2018, fresh and frozen tuna products accounted for 11,402 mt dw of the 1.2 million mt dw of principal fresh and frozen seafood products exported from the United States (NOAA Fisheries 2020). The value of these HMS tuna products accounted for $49.3 million out of a national total of $4.9 billion.

A majority of tuna and swordfish exports are caught in the Pacific Ocean. As such, international trade data of HMS historically provided more information specific to Pacific-harvested HMS products compared to Atlantic-harvested HMS. In response to the need for HMS trade information specific to harvests from the Atlantic Ocean, consignment documents and tracking programs of these documents were implemented. Through these consignment document trade tracking programs for bluefin tuna, swordfish, and bigeye tuna, more accurate and descriptive information of HMS from the Atlantic Ocean have been available. Data from these programs are analyzed by the Atlantic HMS Management Division.

7.4.4.1 Atlantic and Pacific Bluefin Tuna Exports

Table 7.12 gives bluefin tuna export data for exports from the United States since 2008 and includes NOAA Fisheries dealer data, ICCAT eBCD program data, and U.S. Census Bureau data. The Census Bureau usually reports a greater amount of bluefin tuna exported when compared to the amount reported by NOAA Fisheries. Additional quality control measures taken by NOAA Fisheries ensures data for other species (e.g., southern bluefin tuna) or other transaction types (e.g., re-exports) are removed from the NOAA Fisheries bluefin tuna export data. The effectiveness of the eBCD program, implemented in 2016, is demonstrated through increased timely data access and improved summary data accuracy. Bluefin tuna re-export data are listed separately in Section 7.4.5.

In Table 7.12 and depicted in Figure 7.3, U.S. exports of Atlantic bluefin tuna generally increased when commercial landings increased from 2008 to 2012. Exports of Pacific bluefin decreased dramatically in 2018 compared to the previous four years. For the first half of the time series, domestic consumption of U.S. landings remained fairly constant (i.e., between 100 and 200 mt); however, domestic landings consumption increased to approximately 400 mt per year after 2014. Most U.S. bluefin tuna exports are destined for the sushi markets in Japan. In Figure 7.3, U.S. domestic landings of Atlantic bluefin tuna that are exported are compared to those that are consumed in the United States from 2008 to 2018.

Table 7.12 U.S. Exports of Atlantic and Pacific Bluefin Tuna in 2008–2018

Year	Atlantic BFT Commercial Landings[1] (mt dw)	Atlantic BFT Exports[2] (mt dw)	Pacific BFT Exports[2] (mt dw)	Total U.S. Exports[2] (mt dw)	Total U.S. Exports[3] (mt)	Value of U.S. Exports[3] ($ MM)
2008	266.4	146.5	0.0	146.5	177	2.49
2009	408.5	236.2	0.0	236.2	300	4.05
2010	509.5	334.2	0.0	334.2	346	4.90
2011	453.6	329.5	0.8	330.5	293	4.03
2012	451.8	334.5	0.0	334.5	511	4.91
2013	283.0	139.0	0.0	139.0	296	2.92
2014	454.2	195.3	160.8	356.1	381	3.36
2015	763.8	265.4	150.4	415.8	527	5.52
2016	863.1	375.1	287.7	662.8	624	5.95
2017	676.4	284.2	212.8	497.0	473	5.65
2018	719.2	314.0	3.5	317.5	461	5.17

Note: Most Pacific exports were in whole weight form, although some exports were in product form as dressed or gilled/gutted fish. Atlantic exports were almost entirely dressed, but also included whole and other product forms. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. dw = Dressed weight. Source: [1]Atlantic HMS Management Division; [2]eBCD; [3]U.S. Census Bureau.

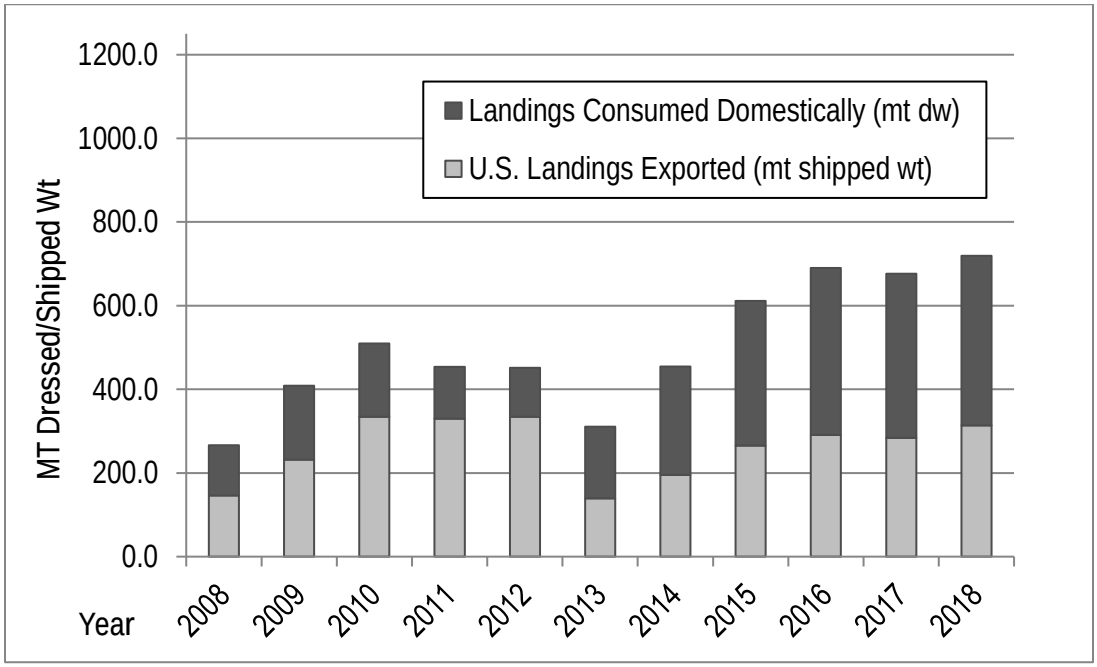

Figure 7.3 Annual U.S. Domestic Landings of Atlantic Bluefin Tuna Divided into U.S. Export and U.S. Domestic Consumption in 2008–2018

mt = Metric tons. dw = Dressed weight. Source: eBCD; U.S. Census Bureau.

Figure 7.4 demonstrates these landings as a percentage of the commercial U.S. bluefin tuna catch that was exported from 1996 to 2018. Exports were greatest at 89 percent in 1996, and have recently stabilized at just over 40 percent. The current stabilization follows a gradual decline to 40 percent in 2007 and a rise that peaked in 2012, at just above 70 percent.

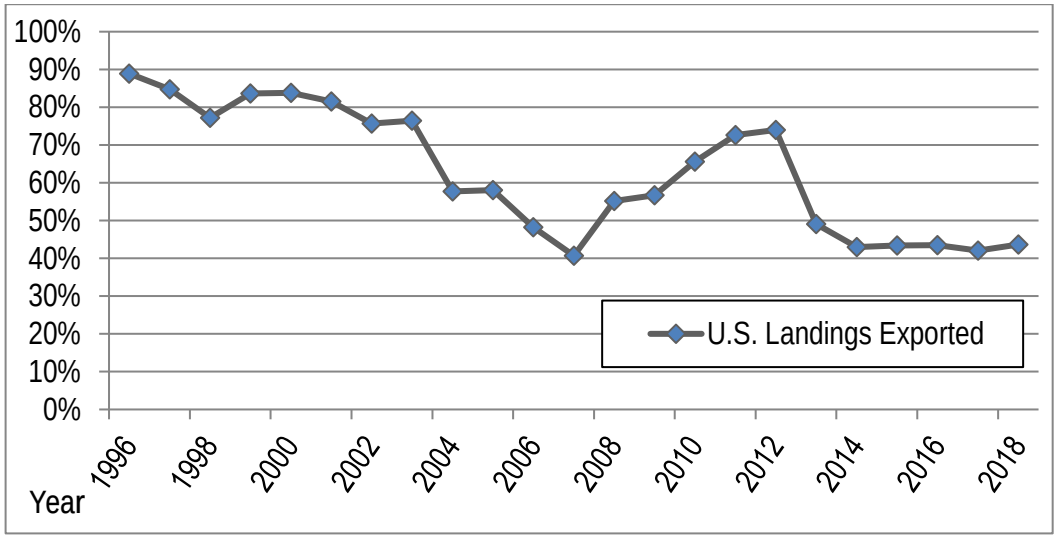

Figure 7.4 Annual Percentage by Weight of Commercially Landed U.S. Atlantic Bluefin Tuna Exported in 1996–2018

Source: eBCD; U.S. Census Bureau.

7.4.4.2 Other Tuna Exports

Export data for bigeye, albacore, yellowfin, and skipjack tunas gathered by the U.S. Census Bureau combines data from all ocean areas of origin. The value of annual albacore exports exceeded the value for any other tuna export since the beginning of the time series and has remained over $23 million and over 6,100 mt per year between 2008 and 2018 (Table 7.13). Atlantic albacore tuna landings ranged between 103 mt in 2018 and 599 mt in 2013, while total U.S. exports of albacore ranged between 6,154 mt in 2017 and 15,251 mt in 2013. This indicates that most albacore exports are Pacific in origin. Recently, lowest levels in total U.S. exports have been observed between 2017 and 2018 at 6,154 mt and 6,800 mt, respectively, where each of these years accounted for less than half of the highest quantity recorded in 2013 at 15,251 mt.

Table 7.13 U.S. Atlantic Landings and Total U.S. Exports of Albacore Tuna From All Ocean Areas in 2008–2018

Year	Atlantic Landings[1] (mt ww)	Fresh Exports[2] (mt)	Fresh Value[2] ($ MM)	Frozen Exports[2] (mt)	Frozen Value[2] ($ MM)	Total Exports[2] (mt)	Total Value[2] ($ MM)
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	459	2,970	8.56	8,905	27.52	11,875	36.09
2015	354	1,733	5.18	7,121	21.41	8,855	26.59
2016	250	983	2.83	13,749	37.61	14,732	40.44
2017	238	205	0.58	5,949	29.77	6,154	30.36
2018	103	568	1.70	6,231	27.11	6,800	28.80

Note: Landings include recreational catch and dead discard data from statistical surveys that were re-calibrated for 2014 and beyond. Exports may be in whole weight or product weight. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. ww = Whole weight. Source: [1]NOAA Fisheries 2019; [2]U.S. Census Bureau.

U.S. Atlantic landings and exports of yellowfin and skipjack tuna from all ocean areas are shown in Table 7.14 and Table 7.15, respectively. Annual yellowfin tuna exports were greater and more valuable than exports for skipjack or bigeye tuna (Table 7.16) and were unusually high in 2017 and 2018, reflecting a large increase in the export of frozen product. Total yellowfin tuna exports for 2012–2015 were consistent at about 850 mt per year, but decreased by almost half in 2016 before significantly increasing in 2017 and 2018 to levels over 1,400 mt.

Table 7.14 U.S. Atlantic Landings and Total U.S. Exports of Yellowfin Tuna From All Ocean Areas in 2008–2018

Year	Atlantic landings[1] (mt ww)	Fresh Exports[2] (mt)	Fresh Value[2] ($ MM)	Frozen Exports[2] (mt)	Frozen Value[2] ($ MM)	Total Exports[2] (mt)	Total Value[2] ($ MM)
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	3,197	332	2.46	554	1.33	886	3.78
2015	2,798	213	1.02	634	1.87	847	2.89
2016	4,104	82	0.84	401	1.44	483	2.29
2017	4,444	84	0.90	1,730	4.65	1,814	5.54
2018	2,700	40	0.53	1,434	3.35	1,474	3.88

Note: Landings include recreational catch and dead discard data from statistical surveys that were re-calibrated for 2014 and beyond. Exports may be in whole weight or product weight. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. ww = Whole weight. Source: [1]NOAA Fisheries 2019; [2]U.S. Census Bureau.

Table 7.15 shows variability in the amount and value of exported fresh and frozen skipjack tuna over the time series without any perceptible pattern. Atlantic landings have ranged between 54 mt in 2010 and 199 mt in 2017. Total value peaked at $3.4 million in 2013, while total exports peaked at 737 mt in 2009.

Table 7.15 U.S. Atlantic Landings and Total U.S. Exports of Skipjack Tuna in 2008–2018

Year	Atlantic landings[1] (mt ww)	Fresh Exports[2] (mt)	Fresh Value[2] ($ MM)	Frozen Exports[2] (mt)	Frozen Value[2] ($ MM)	Total Exports[2] (mt)	Total Value[2] ($ MM)
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	184	152	0.23	77	0.52	228	0.75
2015	97	23	0.09	116	0.18	139	0.27
2016	179	47	0.12	26	0.13	73	0.25
2017	199	31	0.08	148	0.38	180	0.46
2018	78	56	0.13	610	1.11	667	1.24

Note: Landings include recreational catch and dead discard data from statistical surveys that were re-calibrated for 2014 and beyond. Exports may be in whole weight or product weight. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. ww = Whole weight. Source: [1]NOAA Fisheries 2019; [2]U.S. Census Bureau.

Bigeye tuna exports and Atlantic landings are given in Table 7.16. Atlantic landings ranged from a low of 489 mt in 2008 to a high of 1,082 in 2015. Unlike most other products discussed, Atlantic landings for bigeye tuna exceed total U.S. exports annually. Bigeye tuna exports include more fresh than frozen product, except in 2008, 2012, and 2018, when exports of frozen product were greater. The total amount and value of exports peaked in 2012 at 679 mt and $3.52 million. They then dropped substantially, reaching the lowest levels for the time series in 2016 at 39 mt and $ 0.54 million. The total amount and value of exports increased in 2017 and 2018.

Table 7.16 U.S. Atlantic Landings and Total U.S. Exports of Bigeye Tuna in 2008–2018

Year	Atlantic landings[1] (mt ww)	Fresh Exports[2] (mt)	Fresh Value[2] ($ MM)	Frozen Exports[2] (mt)	Frozen Value[2] ($ MM)	Total Exports[2] (mt)	Total Value[2] ($ MM)
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	896	66	0.66	8	0.85	73	0.74
2015	1,082	26	0.27	13	0.10	39	0.36
2016	568	37	0.45	6	0.10	43	0.54
2017	836	316	1.85	15	0.12	331	1.98
2018	921	50	0.40	113	0.51	164	0.91

Note: Landings include recreational catch and dead discard data from statistical surveys that were re-calibrated for 2014 and beyond. Exports may be in whole weight or product weight. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. ww = Whole weight. Source: [1]NOAA Fisheries 2019; [2]U.S. Census Bureau.

7.4.4.3 Shark Exports

Export data for sharks gathered by the U.S. Census Bureau 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 a specific product code other than fresh meat, frozen meat, and, beginning in 1998, shark fins. The specific HTS code assigned to shark fins in 1998 distinguished the high relative value of the product compared to shark meat. There is no tracking of shark products besides meat and fins. As a result, NOAA Fisheries cannot track trade in shark leather, oil, cartilage, or other shark products.

Table 7.17 indicates the magnitude and value of shark exports, excluding smoothhound sharks, by the United States from 2008 to 2018. The amount and value of shark exports were greatest in 2008, and have remained relatively high since 2012, due mostly to large amounts of frozen product. However, exports fell by almost half in 2018 (678 mt). Exports of dried shark fins were highest (56 mt) in 2009 but are much lower since then, ranging between 11 and 19 mt for 2011–2017. In 2017, HTS codes were implemented identifying sharks fins as "frozen" and "fresh," improving tracking of the product. The value of fins in these categories are much lower per unit than dried shark fins (Table 7.18).

Table 7.17 Amount and Value of U.S. Shark Products Exported in 2008–2018

Year	Fin Export* (mt)	Fin Value* ($ MM)	Fresh Export† (mt)	Fresh Value† ($ MM)	Frozen Export† (mt)	Frozen Value† ($ MM)	Total Exports (mt)	Total Value ($ MM)
2008	11	0.69	559	1.21	4,122	7.21	4,692	9.11
2009	56	2.82	254	0.72	320	1.33	630	4.87
2010	36	2.89	222	0.67	244	0.52	502	4.08
2011	15	1.51	333	0.89	59	0.22	407	2.62
2012	11	0.99	436	1.08	1,054	4.52	1,501	6.58
2013	12	0.79	196	0.57	1,043	5.21	1,250	6.57
2014	19	0.98	218	0.57	828	5.31	1,064	6.86
2015	18	1.02	273	0.66	930	4.92	1,221	6.60
2016	12	0.85	285	0.61	1,499	7.38	1,794	8.83
2017**	11	0.62	474	0.89	730	2.05	1,305	3.79
2018	10	1.08	462	0.89	206	0.69	678	2.53

Note: Exports may be in whole weight or product weight. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. *Prior to 2017, shark fin exports may include fresh, frozen, and dried products. **New Harmonized Tariff Schedule codes for shark fins were implemented in 2017, allowing for tracking of fresh and frozen shark fins (see Table 7.18 for reports of other shark fin exports). †Fresh and frozen shark product not provided to species. Source: U.S. Census Bureau.

Table 7.18 Amount and Value of Total U.S. Shark Fin Products Exported in 2017–2018

Year	Dried Landings (mt)	Dried Value ($ MM)	Fresh Landings (mt)	Fresh Value ($ MM)	Frozen Landings (mt)	Frozen Value ($ MM)	Total Landings (mt)	Total Value ($ MM)
2017	11	0.62	2	0.01	88	0.22	101	0.85
2018	10	0.95	4	0.03	12	0.10	26	1.08

Note: U.S. shark fin products include dried, fresh, and frozen shark fins. New Harmonized Tariff Schedule codes for fresh and frozen products were implemented in 2017. $ MM = Millions of dollars. mt = Metric tons. Source: U.S. Census Bureau.

7.4.4.4 Swordfish Exports

Swordfish HTS categories were modified in 2012, allowing for exported quantities of "fresh" swordfish meat to be collected (Table 7.19). The low cost and year-round availability of swordfish imports into the United States are believed to have reduced the marketability of U.S. domestic swordfish. A modest export market for U.S. swordfish product exists, but total exports have been steadily decreasing. In 2008, the U.S. exported of 349 mt of swordfish, while the 2017 total was 102 mt. Total exports in 2018 demonstrated an increase for the first time since 2013, rising to 166 mt.

Table 7.19 Amount and Value of U.S. Swordfish Product Exported in 2008–2018

Year	Fresh Fillet Export (mt)	Fresh Fillet Value ($ MM)	Frozen Fillet Export (mt)	Frozen Fillet Value ($ MM)	Fresh Fish Export (mt)	Fresh Fish Value ($ MM)	Frozen Fish Export (mt)	Frozen Fish Value ($ MM)	Fresh Meat Export* (mt)	Fresh Meat Value* ($ MM)	Frozen Meat Export (mt)	Frozen Meat Value ($ MM)	Total Exports (mt)	Total Value ($ MM)
2008	24	0.25	48	0.34	121	0.89	1	0.01	-	-	154	0.88	349	2.37
2009	43	0.38	19	0.23	133	0.81	12	0.04	-	-	24	0.13	231	1.59
2010	98	0.71	16	0.15	134	0.78	1	0.01	-	-	3	0.02	252	1.67
2011	32	0.26	31	0.28	134	0.80	72	0.45	-	-	1	0.01	269	1.80
2012	0	0.01	4	0.05	141	0.82	11	0.09	7	0.09	5	0.03	168	1.09
2013	0	0	18	0.09	160	0.87	13	0.13	2	0.04	2	0.02	196	1.15
2014	1	0.01	14	0.14	115	0.63	22	0.06	3	0.04	1	0.01	156	0.90
2015	1	0.01	24	0.23	94	0.56	20	0.12	1	0.01	9	0.04	148	0.97
2016	1	0.01	5	0.04	87	0.46	38	0.31	6	0.07	3	0.02	140	0.91
2017	1	0.01	9	0.08	64	0.36	9	0.03	3	0.06	0	0	102	0.54
2018	1	0.03	25	0.15	101	0.54	9	0.06	4	0.06	26	0.07	166	0.91

*Harmonized Tariff Schedule codes were not available for fresh swordfish meat prior to 2012. $ MM = Millions of dollars. mt = Metric tons. Source: U.S. Census Bureau.

7.4.4.5 Re-Exports of Atlantic HMS

For purposes of HMS international trade tracking, 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). Re-export activity of most HMS is normally a small fraction of export activity and well below relative reference points of 1,000 mt and/or $1 million annually. Exceptions include re-exports of yellowfin tuna (fresh or frozen) and shark fins which may exceed 1,000 mt and frequently exceed the value reference point of $1 million. Annual re-export figures in excess of either of these relative reference points, other than for bluefin tuna are given in Table 7.20. Re-exports of bluefin tuna, alongside bluefin tuna imports, are shown in Section 7.4.5.

Table 7.20 Re-Exports of Highly Migratory Species (Excluding Bluefin Tuna) in Excess of 1,000 mt* and/or $1 Million (U.S.) in 2008–2018

Year	Product	Amount	Value ($ MM)
2008	Yellowfin tuna, fresh	224	3.40
2008	Shark fins, dried	26	1.37
2009	Yellowfin tuna, fresh	162	2.18
2010	Yellowfin tuna, fresh	130	1.88
2019	Yellowfin tuna, frozen	340	1.12
2011	Yellowfin tuna, fresh	117	1.85
2011	Swordfish fillet, frozen	302	2.70
2011	Shark fins, dried	23	1.42
2012	Yellowfin tuna, fresh	123	2.26
2012	Yellowfin tuna, frozen	515	1.63
2012	Shark fins**	41	1.86
2012	Shark, unspecified, frozen	405	1.46
2013	Yellowfin tuna, fresh	102	1.80
2014	Yellowfin tuna, fresh	65	1.17
2015	None	-	-
2016	None	-	-
2017	None	-	-
2018	Yellowfin tuna, frozen	412	1.49

$ MM = Millions of dollars. *HMS re-exports weights have not exceeded 1,000 mt during this time period. **In 2012, the product classification "shark fin, dried" in the Harmonized Tariff Schedule was renamed "shark fins." Source: U.S. Census Bureau.

7.4.5 U.S. Imports of HMS

All import shipments must be reported to and cleared by Customs and Border Protection. 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 Customs and Border Protection-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, Customs and Border Protection data for certain products are provided to NOAA Fisheries for use in implementing trade tracking programs. Census Bureau import data are used by NOAA Fisheries as well.

7.4.5.1 Atlantic and Pacific Bluefin Tuna Imports

Atlantic and Pacific bluefin tuna import amounts are recorded by Customs and Border Protection and by the Atlantic HMS Management Division through the HMS ITP, which includes data from ICCAT bluefin catch documents. These programs differ in data collection methods and data quality review. A comparison of total bluefin import data between the two programs in 2008–2018 is shown in Table 7.21. In the early part of the time series, import amounts between the two programs differed, at times to a large degree; however, since the implementation of ICCAT's eBCD program in 2016, import amounts are more similar. As shown in the HMS ITP bluefin catch documentation data, imports have increased annually since 2012. A contributing factor to this increased import market is the rise in popularity in the United States of sashimi using Atlantic and Pacific bluefin tuna. Re-exports of bluefin tuna in 2013 were particularly high, with 2018 being the third highest re-export year in the time series. The value of bluefin tuna in 2018 is the highest in the time series.

Table 7.21 U.S. Imports and Re-Exports of Atlantic and Pacific Bluefin Tuna From Two Data Collection Programs in 2008–2018

Year	Imports (mt)—HMS ITP*	Imports (mt)—CBP Data	Value ($ MM)—CBP Data	Re-Exports (mt)—HMS ITP*
2008	412.7	487.1	11.91	16.8
2009	407.7	476.8	10.29	33.6
2010	512.3	682.5	15.75	61.5
2011	442.5	555.4	14.01	35.1
2012	400.2	770.4	14.74	25.9
2013	569.0	1,177.5	20.52	71.3
2014	670.4	1,087.2	20.75	40.7
2015	861.0	1,243.9	21.46	32.7
2016	1338.0	1,303.5	25.65	39.8
2017	1,777.2	1,760.5	33.20	38.1
2018	2,232.1	2,235.6	47.69	50.1

Note: Most imports of bluefin tuna were in dressed form, while some were round and gilled/gutted fish or fillets or belly meat. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. *Atlantic catch documentation data after 2015 collected by the International Commission for the Conservation of Atlantic Tunas eBCD program. Source: Highly Migratory Species International Trade Program (bluefin catch documentation through 2015 and eBCD after 2015); U.S. Customs and Border Protection.

U.S. consumption of Atlantic bluefin tuna is calculated by first combining the total landings and imports and then subtracting the total amount of exports and re-exports. U.S. consumption has increased over the last six years to an all-time high for the time series in 2018 (Figure 7.5). Consumption of domestic landings was fairly consistent until 2014, ranging between about 100 and 200 mt per year. Since then, domestic landings consumption has climbed closer to 400 mt, where it has remained since 2016. Consumption of imported bluefin tuna has been more variable but has increased substantially each year since 2013.

Figure 7.6 also shows U.S. domestic landings and imports of Atlantic bluefin tuna alongside exports and re-exports since 2008. Annually, the United States has imported

more bluefin tuna than it has exported. This trade gap has increased noticeably since 2015.

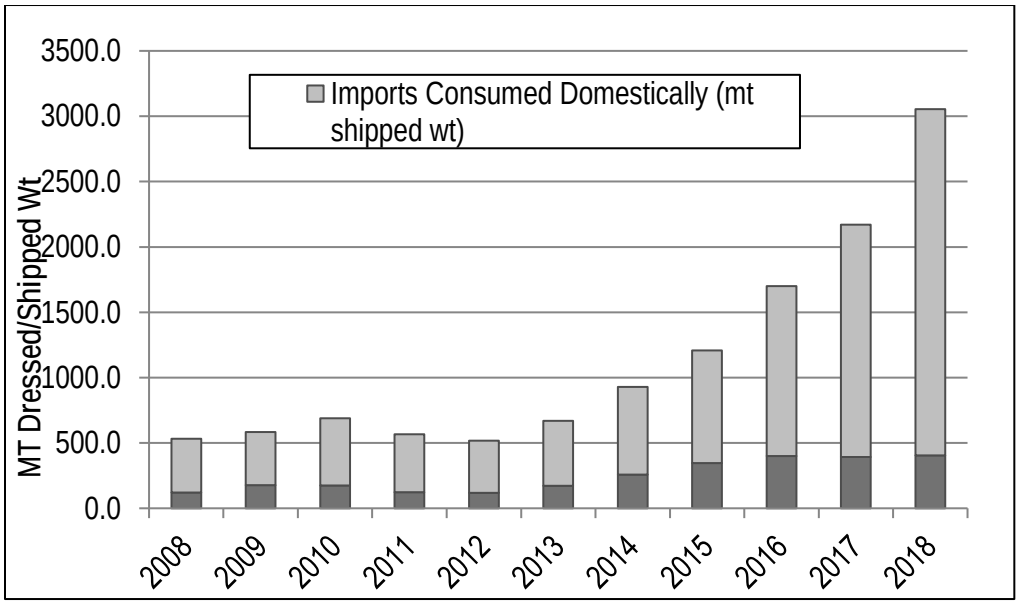

Figure 7.5 U.S. Annual Consumption of Atlantic and Pacific Bluefin Tuna by Imports and U.S. Landings in 2008–2018

Note: Annual U.S. imports, re-exports, exports, and landings are also depicted. Consumption is defined as landings combined with imports minus all exports and re-exports. mt = Metric tons. wt = Weight. dw= Dressed weight.

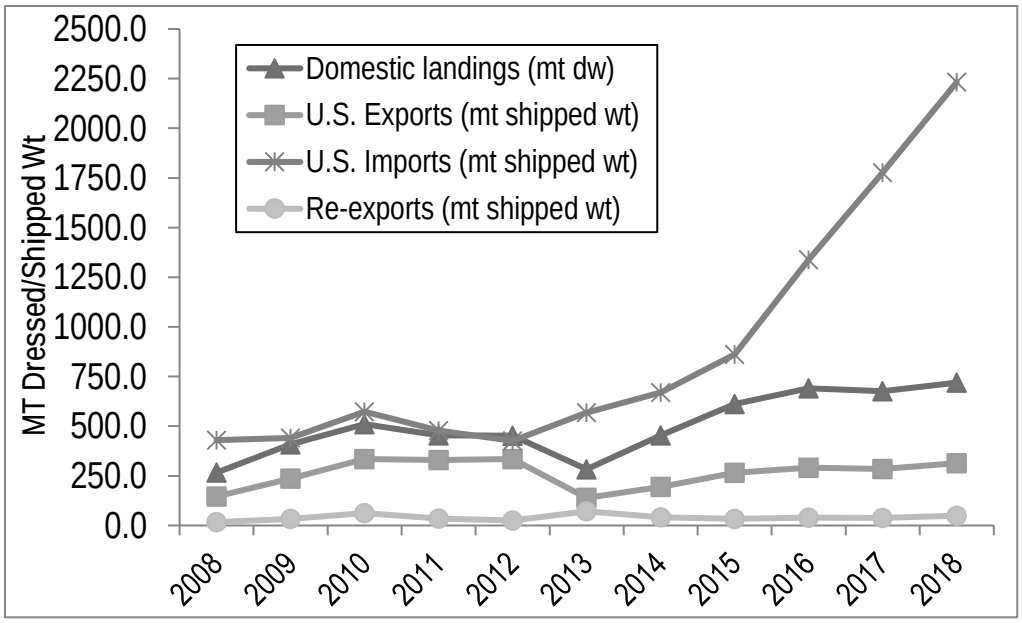

Figure 7.6 U.S. Domestic Landings of Atlantic Bluefin Tuna, and Exports, Imports and Re-Exports of Atlantic and Pacific Bluefin Tuna in 2008–2018

mt = Metric tons. wt = Weight. dw= Dressed weight.

7.4.5.2 Other Tuna Imports

Customs and Border Protection collects species-specific import information for bigeye, albacore, yellowfin and skipjack tunas grouped to include all ocean areas. Table 7.22 shows the total amount of bigeye tuna imports between 2008 and 2018. Following an initial decline in 2009, total annual imports are reported between 4,000 mt and 5,000 mt since 2010 for all but two years in the time series. Levels fell to about 3,400 mt in 2011 and 2018. Total imports and values have exhibited a general decline since 2015.

Table 7.22 U.S. Imports of Bigeye Tuna From All Ocean Areas Combined in 2008–2018

Year	Fresh Imports (mt)	Fresh Value ($ MM)	Frozen Imports (mt)	Frozen Value ($ MM)	Total Imports (mt)	Total Value ($ MM)
2008	5,462	41.43	2,597	5.31	8,059	46.74
2009	5,459	41.72	1,125	2.36	6,584	44.08
2010	4,025	32.39	316	0.73	4,340	33.12
2011	3,011	26.72	487	1.01	3,498	27.73
2012	3,723	33.43	580	1.22	4,304	34.65
2013	4,023	35.51	498	1.02	4,521	36.52
2014	4,126	35.61	338	0.68	4,465	36.30
2015	5,023	45.17	6	0.02	5,029	45.20
2016	4,217	36.91	36	0.09	4,253	37.00
2017	3,876	34.01	193	0.44	4,070	34.44
2018	3,198	31.24	236	0.52	3,435	31.77

Note: Imports may be whole weight or product weight. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. Source: U.S. Census Bureau.

Annual yellowfin tuna imports into the United States for all ocean areas combined are in Table 7.23. Yellowfin tuna products are imported in the greatest quantity of all the HMS-managed tuna in both fresh and frozen products, with a majority of the products imported fresh. The highest annual levels of total yellowfin imports was in 2018 at just over 20,000 mt. Total imports have generally been increasing since 2015.

Table 7.23 U.S. Imports of Yellowfin Tuna From All Ocean Areas Combined in 2008–2018

Year	Fresh Imports (mt)	Fresh Value ($ MM)	Frozen Imports (mt)	Frozen Value ($ MM)	Total Imports (mt)	Total Value ($ MM)
2008	15,904	129.59	3,847	27.97	19,751	157.56
2009	14,199	112.34	2,868	24.73	17,067	137.07
2010	15,985	128.69	2,077	16.91	18,062	145.60
2011	15,635	141.83	2,398	17.56	18,033	159.39
2012	15,829	152.66	2,076	25.84	17,905	178.52
2013	16,031	156.58	2,602	24.69	18,633	181.27
2014	16,160	155.73	2,029	13.94	18,183	169.62
2015	15,532	146.76	2,657	18.62	18,189	165.38
2016	16,550	150.96	3,207	24.91	19,757	175.87
2017	16,278	150.94	3,385	31.44	19,663	182.38
2018	16,602	168.08	3,525	33.44	20,127	201.52

Note: Imports may be whole weight or product weight. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. Source: U.S. Census Bureau.

The amount of fresh and frozen albacore products imported from all ocean areas (Table 7.24) was greatest in 2011 (4,462 mt) and lowest in 2018 (1,571 mt) without any perceptible pattern from year to year. The greatest total value of albacore imports was in 2017 ($11.25 million). Imports for both fresh and frozen products fell by more than 50 percent in 2018 compared to the previous year, but values did not. Products in airtight containers like cans and foil pouches are not included in these data.

Table 7.24 U.S. Imports of Albacore Tuna From All Ocean Areas Combined in 2008–2018

Year	Fresh Imports (mt)	Fresh Value ($ MM)	Frozen Imports (mt)	Frozen Value ($ MM)	Total Imports (mt)	Total Value ($ MM)
2008	703	2.95	1,632	4.73	2,335	7.68
2009	718	3.07	1,493	3.46	2,211	6.53
2010	519	2.19	1,860	5.17	2,380	7.36
2011	669	3.05	3,794	7.17	4,462	10.22
2012	748	3.53	1,178	2.61	1,926	6.14
2013	858	3.57	2,199	4.27	3,057	7.84
2014	844	3.49	1,362	3.14	2,205	6.63
2015	962	4.25	1,373	3.04	2,335	7.29
2016	1,014	5.07	2,240	4.26	3,254	9.33
2017	1,072	5.06	2,369	6.19	3,441	11.25
2018	886	4.12	685	6.26	1,571	10.38

Note: Imports may be whole weight or product weight. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. Source: U.S. Census Bureau.

Skipjack tuna imports into the United States are comprised mainly of frozen product (Table 7.25). The total amount of skipjack imports has generally been decreasing between 2008 (699 mt) and 2018 (101 mt). A notable exception from this trend occurred in 2012, when 890 mt of skipjack tunas were imported. Products in airtight containers like cans and foil pouches are not included in these data.

Table 7.25 U.S. Imports of Skipjack Tuna rom All Ocean Areas Combined in 2008–2018

Year	Fresh Imports (mt)	Fresh Value ($ MM)	Frozen Imports (mt)	Frozen Value ($ MM)	Total Imports (mt)	Total Value ($ MM)
2008	14	0.02	685	0.77	699	0.79
2009	20	0.04	498	0.63	519	0.67
2010	36	0.09	542	0.79	578	0.87
2011	2	0.05	594	0.92	595	0.96
2012	23	0.05	866	1.16	890	1.21
2013	38	0.11	272	0.51	310	0.62
2014	70	0.13	395	0.62	467	0.75
2015	4	0.03	230	0.36	233	0.39
2016	0	0	251	0.37	251	0.37
2017	0	0	129	0.24	129	0.24
2018	1	0.01	100	0.19	101	0.19

Note: Imports may be whole weight or product weight. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. Source: U.S. Census Bureau.

7.4.5.3 Swordfish Imports

Table 7.26 provides annual amounts and values of swordfish products from all ocean areas combined that were imported into the United States from 2008 to 2018. Overall, annual totals for products and value are increasing over the time series, with the total import amount and value ranging from a low of 7,272 mt in 2009 to a high of 11,684 mt in 2018. The last three years of data exhibit a trend of increasing product amount and decreasing product value.

Table 7.26 Imported Swordfish Products (mt dw*) in 2008–2018

Year	Fresh Fillet	Fresh Steak	Fresh Meat	Fresh Other	Frozen Fillet	Frozen Steak	Frozen Meat[1]	Frozen Meat[2]	Frozen Other	Total Imports (mt)	Total Value ($ MM)
2008	96	13		5,658	2,673	170	55	207	88	8,962	68.98
2009	53	10		5,312	1,632	112	96	23	33	7,272	55.85
2010	125	2		5,228	2,077	153	277	45	31	7,939	68.33
2011	74	1		5,060	2,116	139	1,384	471	12	9,258	68.64
2012	13	2	66	5,478	2,013	604	825	43	15	8,993	77.01
2013	31	2	62	6,011	1,394	457	182	4	12	8,093	71.38
2014	31	0	24	7,137	1,575	512	153	<1	32	9,442	82.00
2015	2	162	15	7,751	1,833	578	454	38	56	10,890	87.85
2016	3	20	2	7,780	1,905	266	379	2	10	10,367	87.36
2017	9	4	1	7,100	2,831	325	862	2	18	11,150	85.79
2018	4	3	2	7,863	2,386	264	1,129	14	18	11,684	85.53

Note: Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. dw = Dressed weight. *Imports may be whole weight or product weight. [1]Frozen meat > 6.8 kg. [2]Frozen meat ≤ 6.8 kg. Source: U.S. Census Bureau.

Table 7.27 summarizes swordfish import data collected by the NOAA Fisheries Swordfish Statistical Document Program for the 2018 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. Customs and Border Protection data located at the bottom of the table reflect a larger amount of imports than reported by the import monitoring program and may be used by NOAA Fisheries staff to follow up with importers, collect statistical documents that have not been submitted, and enforce dealer reporting requirements. Customs and Border Protection data may include product that is improperly labelled as swordfish.

Table 7.27 U.S. Imports (mt dw) of Swordfish by Flag of Harvesting Vessel and Ocean of Origin in 2018

Harvesting Vessel Flag	Atlantic	North Atlantic	South Atlantic	Pacific	Western Pacific	Indian	Not Provided	Total
Australia			2.3		274.3	6.53		283.1
Brazil			1,458.9	2.0				1,460.9
Canada		465.1						465.1
Chile				164.3				164.3
China			49.9	43.1		55.9		149.0
Chinese Taipei			76.5	112.6		303.1		492.2
Costa Rica				1,097.9				1,097.9
Ecuador				3,381.3				3,381.3
El Salvador				0.7				0.7
Fiji Islands				11.1	10.2			21.3
France						0.8		0.8
French Polynesia				40.1				40.1
Guatemala				0.1				0.1
Indonesia				13.5		302.6		316.1
Korea, Republic of				12.0				12.0
Maldives				13.53		57.7		71.2
Marshall Islands				1.36				1.4
Mauritus						10.5		10.5
Mexico		3.6		412.9				416.5
Mozambique						87.9		87.9
Namibia						0.3		0.3
New Zealand					237.1			237.1
Nicaragua				19.3				19.3
Panama				158.4				158.4
Portugal				1.9				1.9
Saint Vincent and the Grenadines		0.4						0.4
Senegal		43.9						43.9
Seychelles						162.4		162.4
South Africa			171.9			28.0		199.9
Spain		0.3		12.3		0.1		12.6

Harvesting Vessel Flag	Atlantic	North Atlantic	South Atlantic	Pacific	Western Pacific	Indian	Not Provided	Total
Sri Lanka						38.9		38.9
Trinidad & Tobago		0.1						0.1
Vanuatu				41.5		4.2		45.7
Vietnam				301.1		11.3		312.4
Total imports reported by statistical documents								9,705.60
Total imports reported by U.S. Customs and Border Protection								11,151.39
Total imports not reported by statistical documents								1,445.79

mt dw = Metric tons dressed weight. Source: NOAA Fisheries Swordfish Statistical Document Program.

7.4.5.4 Shark Imports

NOAA Fisheries does not require shark importers to collect and submit information regarding the ocean area of catch. Shark imports are not categorized by species and lack specific product information on imported shark meat, such as the proportion of fillets and steaks.

Table 7.28 summarizes Census Bureau data on shark imports for 2008 through 2018. Imports of fresh and frozen shark were lowest in 2018 at 34 mt. Imports of dried shark fins have been variable between a range of 3 mt in 2018 and 63 mt in 2013. In 2017, fresh and frozen shark fins were given new HTS codes (Table 7.29). Total shark fin imports for all categories were greater in 2017 than 2018. As of July 2, 2008, shark fin importers, exporters, and re-exporters must obtain a permit under NOAA Fisheries HMS ITP regulations (73 FR 31380). Permitting of shark fin traders assists in enforcement and monitoring the trade of this valuable commodity.

Table 7.28 U.S. Imports of Shark Products† From All Ocean Areas Combined in 2008–2018

Year	Dried Fins (mt)	Fins Value ($ MM)	Fresh Shark* (mt)	Fresh Value* ($ MM)	Frozen Shark* (mt)	Frozen Value* ($ MM)	Total Imports (mt)	Total Value ($ MM)
2008	29	1.74	348	0.72	189	1.88	566	4.34
2009	21	0.97	180	0.37	125	1.50	326	2.83
2010	34	1.18	114	0.33	34	1.16	182	2.66
2011	58	1.79	72	0.22	32	1.20	162	3.21
2012**	43	0.77	88	0.30	9	0.07	141	1.14
2013	63	0.74	153	0.46	3	0.05	219	1.25
2014	35	0.45	105	0.35	8	0.20	146	0.99
2015	24	0.29	88	0.32	21	0.26	133	0.87
2016	56	0.69	67	0.23	108	0.60	231	1.52
2017***	35	0.54	65	0.26	30	0.20	238	1.30
2018	3	0.01	30	0.14	0	0	34	0.3

Note: Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. †Imports may be whole weight or product weight. *Shark product not reported to species. **In 2012, the product classification "shark fin, dried" in the Harmonized Tariff Schedule was renamed "shark fins." ***New HTS codes for shark fins were implemented in 2017, allowing for tracking of fresh and frozen shark fins. See total shark fin exports in Table 7.29. Source: U.S. Census Bureau.

Table 7.29 U.S. Imports of Total Shark Fin Products in 2017–2018

Year	Dried Landings (mt)	Dried Value ($ MM)	Fresh Landings (mt)	Fresh Value ($ MM)	Frozen Landings (mt)	Frozen Value ($ MM)	Total Landings (mt)	Total Value ($ MM)
2017	35	0.54	44	0.15	65	0.14	143	0.83
2018	2	0.15	3	0.01	0	0.00	4	0.15

Note: The Harmonized Tariff Schedule code for shark fins was sub-divided into fresh, frozen, and dried in 2017. $ MM = Millions of dollars. mt = Metric tons. Source: U.S. Census Bureau.

7.5 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.

7.5.1 Recreational Angling

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

In 2014, NOAA Fisheries conducted a partial update of the National Marine Recreational Fishing Expenditure Survey that collected data on marine angler expenditures for fishing equipment and durable goods related to recreational fishing (e.g., boats, vehicles, tackle, electronics, and second homes). This survey covered Atlantic HMS anglers from Maine to Texas. HMS anglers in the Northeast, from Maine to Virginia, were found to spend $12,913 on average for durable goods and services related to marine recreational fishing. Of that, $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 this Northeast region 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 was estimated to generate $73 million in economic output and support 697 regional jobs in 2014 (Lovell et al. 2016).

HMS anglers from North Carolina to Texas were found to spend $29,532 on average for durable goods and services related to marine recreational fishing. Of that, $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 in this Southeast region 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. These expenditures in turn were estimated to generate $152 million in economic output and support 1,331 regional jobs in 2014 (Lovell et al. 2016). An updated durable goods expenditures survey of Atlantic HMS Angling permit holders from Maine to Texas was conducted in the fall of 2019, and a final report will be issued in 2020.

In 2015, researchers with the Virginia Institute of Marine Sciences funded by NOAA Fisheries conducted a survey of HMS Angling permit holders from Maine to North Carolina to estimate the economic value of recreational bluefin tuna fishing (Goldsmith et al. 2018).

Survey participants were presented with examples of hypothetical fishing trips that varied by the size of bluefin tuna caught, bag limit regulations, and trip costs. They found the overall average willingness-to-pay for a bluefin trip to be $1,285 per angler trip. Increasing the bag limit by one school-sized bluefin tuna increased the willingness-to-pay by approximately $160, while increasing the bag limit by a large school/small medium or large medium/giant bluefin tuna increased the willingness-to-pay by approximately $289–360 per angler trip. Overall, the 2015 bluefin tuna private boat fishery was estimated to have a value of $14 million in addition to the angling expenditures of $8.7 million.

In 2016, NOAA Fisheries conducted another update to the National Marine Recreational Fishing Expenditure Survey to collect national level data on trip expenditures related to marine recreational fishing and estimate the associated economic impact (NOAA Fisheries 2018). Nationally, marine anglers were estimated to have spent $4.3 billion on trip related expenses (e.g., fuel, ice, and bait) and $26.6 billion on fishing equipment and durable goods (e.g., fishing rods, tackle, and boats). Using regional input-output models, these expenditures were estimated to have generated $67.9 billion in total economic impacts and supported 472,000 jobs in the United States in 2016.

This survey also included a separate survey of HMS Angling permit holders from Maine to Texas (Hutt and Silva 2019). Estimated non-tournament trip-related expenditures and the resulting economic impacts for HMS recreational fishing trips are presented in Table 7.30. 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 non-tournament related 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 1,806 HMS anglers who returned a survey, 63 percent indicated their primary target on their most recent private boat trip was either bluefin, yellowfin, bigeye, or albacore tuna, or they simply indicated they had fished for tuna in general without identifying a specific species. Of the rest of those surveyed, 14 percent reported trips targeting billfish (i.e., blue marlin, white marlin, or sailfish), 12 percent reported trips targeting shark (i.e., shortfin mako, thresher shark, or blacktip shark), 6 percent reported trips targeting swordfish, and 5.6 percent reported trips that did not target HMS or failed to indicate what species they targeted. Average trip expenditures ranged from $623/trip for shark trips to $1,015/trip for billfish trips. Boat fuel was the largest trip-related expenditure for all HMS trips and made up about 56 percent of average trip costs overall. Total trip-related expenditures for 2016 were calculated by expanding average trip-related expenditures with estimates of total directed boat trips per region from the LPS and MRIP survey. 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 coastal states from Maine to Texas. Overall, $46.7 million of HMS angling trip-related expenditures generated approximately $103 million in economic output, $30.5 million in household income, and $54.8 million in value added impacts. The expenditures also supported 577 full-time jobs from Maine to Texas in 2016.

Table 7.30 Highly Migratory Species Recreational Angler Expenditure Survey Results of Estimated Non-Tournament Expenditures and Economic Contributions, Regionally, and Nationally in 2016

Region	Average Trip Expenditures	Total HMS Trips[1]	Total Expenditures	Jobs	Total Sales Output[2]
New England	$502	10,132	$5,172,293	37	$4,867,047
Mid-Atlantic	$678	15,753	$10,676,438	75	$10,891,525
South Atlantic	$680	30,149	$20,498,004	187	$21,427,876
Gulf of Mexico	$821	12,254	$10,055,265	105	$16,979,295
Total United States	$682	68,468	$46,675,320	577	$103,372,357

[1]HMS-directed non-tournament angling trips were estimated in New England and the Mid-Atlantic using data from the Large Pelagics Survey, in the South Atlantic using the Marine Recreational Information Program, and in the Gulf of Mexico using data from MRIP, the Louisiana Recreational Creel survey, and the Texas Parks and Wildlife Division. [2]Total sales output represents all business sales within the regional economy supported by HMS trip-related expenditures, either through direct expenditures by HMS anglers, indirect expenditures by supported business, or household expenditures by individuals whose employment and income is supported by the above expenditures. Source: LPS; MRIP; LA Creel; Texas Parks and Wildlife Division.

7.5.2 Atlantic HMS Tournaments

In 2019, NOAA Fisheries released the results of the Atlantic HMS Tournament Economic Study, which provides expenditure data on a unique group of saltwater angling trips that are largely under-represented in national surveys (Hutt and Silva 2019). This study was conducted in 2016 in two parts. The first part involved a survey of registered 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, referred to as "teams" below, on their expenditures associated with participating in an HMS tournament. To meet the study criteria, all tournaments selected had to be:

- Registered with the Atlantic HMS Management Division.
- Held within the United States or its Caribbean territories.
- Ten days or less in duration.

Letters were sent to 218 HMS tournaments requesting their participation in the operator survey. Completed operator surveys were returned by 73 of the selected tournaments.

Results from the operator survey showed that reporting tournaments averaged 2.8 days in length, 39 participating vessels, and 194 participating anglers. The number of participating vessels varied considerably ranging from 4 to 308. Reporting tournaments were most likely to target blue and white marlin (61 percent), sailfish (54 percent), and yellowfin tuna (52 percent). Tournament operations reported average net revenues of $175,000 against average expenses of $148,000 plus $11,357 in charitable donations. The result was average net revenues over $16,000. Extrapolated values to all 218 qualifying tournaments resulted in estimates of $38.4 million in total revenue, $32.4 million in operating expenses and prizes, $2.5 million in charitable donations, and $3.5 million in net revenue. After excluding monetary prizes paid out ($22 million), an economic impact analysis was conducted on the remaining $20 million in tournament operation expenditures, which supported an estimated $44 million in total economic output, $15.1 million in household income, and 295 full- or part-time jobs in 2016. Monetary prizes

were excluded from economic contribution analysis as they were considered a redistribution of income from multiple participants entering the tournament to a single individual or team. As such, they would not be considered to represent a new economic impact.

Of the 218 registered tournaments, 94 tournaments were randomly selected to assist NOAA Fisheries to recruit tournament participants to complete the participant survey. Ultimately, 99 participant responses were received from 27 tournaments, representing 29 percent of tournaments selected for participant reporting.

Results from the participant survey showed that teams participating in HMS tournaments spent over $85.6 million across 218 registered HMS tournaments, with an average of $13,361 per team and average total expenditures of $392,661 per tournament. Fifty-six percent of the total expenditures, or $48 million, covered registration and optional entry fees, which were also accounted for in tournament operator revenues. Excluding tournament registration and optional entry fees, teams spent $5,860 per tournament and $37.5 million across all tournaments. Other top expenditure items for participating teams included boat fuel ($2,079), lodging ($998), restaurants and groceries ($993 combined), and bait ($367). Tournament-related HMS fishing trips generated $37.5 million in expenditures, minus registration fees. Those expenditures in turn generated economic contributions of $84.7 million in total output, $46 million in value added impacts, $30.5 million in income, and 532 jobs.

Results from the Atlantic HMS Tournament Economic Study are summarized in Table 7.31.

Table 7.31 Atlantic Highly Migratory Species Tournament Economic Study Results for 2016

Measurement	Tournament Events	Participating Teams
Number of events/teams	218	6,407
Average prize payout	$100,991	--
Average registration fees	--	$7,501
Average other expenditures	$92,525	$5,860
Total expenditures, minus prizes and fees	$20,171,466	$35,544,910
Jobs	295	532
Total sales output	$43,970,942	$84,671,666

Notes: Selected, registered tournaments excluded those held in the Bahamas or lasting longer than 10 days. Economic contributions are estimated based on expenditures, excluding tournament registration fees for participants and prize money awards by tournament operators. Source: Hutt and Silva 2019.

7.5.3 Atlantic HMS Charter and Party Boat Operations

At the end of 2004 and 2012, NOAA Fisheries collected market information regarding advertised charter boat rates. The analysis of this data focused on advertised rates for full-day charters. Full-day charters vary in length from 6 to 14 hours, 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 charter boats throughout Alabama, Mississippi, Louisiana, and Texas in 1998 and found the average charter boat base fee to be $762 for a full-day trip. Holland et al. (1999) conducted a similar study on charter boats 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 charter boat rate in 2004 and 2012, it is apparent that there has been a significant increase in charter boat rates.

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

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

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

In the Northeast, the average net return per HMS charter boat trip was $969 (Table 7.32). Inflows from charter fees averaged $2,450 per trip. Northeast charter boat trips averaged $1,229 in material costs, with their greatest material expenditures being for fuel ($966) and bait ($129). In the Southeast, the average net return per HMS charter boat trip was $534. Inflows from charter fees averaged $1,223 per trip.

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

Table 7.32 Average Expenditures and Revenues for Highly Migratory Species Charter Boat Trips by Region in 2013

Type	Expenditures	Northeast Region	Southeast Region	Gulf of Mexico
Outflow	Material costs ($)	1,228.62	495.66	857.56
	Fuel costs ($)	966.79	376.32	631.03
	Fuel price ($)	3.96	3.74	3.64
	Gallons used (gal)	244.14	100.62	173.36
	Bait costs ($)	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 ($)	1,791.67	1,201.55	1,422.19
Net return	Net return ($)	968.51	528.38	1,028.41

Note: The Northeast region, with 95 responses, includes states from Maine to Virginia. The Southeast region, with 297 responses, includes states from North Carolina to the east coast of Florida. The Gulf of Mexico, with 86 responses, includes states from the west coast of Florida to Texas. Source: Hutt and Silva 2015.

In the Northeast, LPS estimated there were 4,936 charter trips from July to November in 2013 that targeted HMS (Table 7.33). Extrapolating the average gross revenue per HMS trip in the Northeast resulted in an estimate of $12.1 million in gross revenue from July to November of 2013. Of that gross revenue, $7.3 million went towards covering trip expenditures (e.g., fuel, bait, ice, and crew), and $4.8 million went to owner net return and other annual operation costs. An input-output analysis in the economic impact assessment software 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 7.34).

In the Southeast, MRIP estimated that there were 3,008 charter trips from July to November of 2013 that targeted HMS (Table 7.33). Extrapolating the average gross revenue per HMS trip in the Southeast resulted in an estimate of $3.7 million in gross revenue from July to November of 2013. Of that gross revenue, $2.1 million went towards covering trip expenditures (e.g., fuel, bait, ice, and crew), 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 7.34).

In the Gulf of Mexico, excluding Texas, MRIP estimated that there were 1,505 charter trips from July to November of 2013 that targeted HMS (Table 7.33). 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 to November of 2013. Of that gross revenue, $1.6 million went towards covering trip expenditures (e.g., fuel, bait, ice, and crew), 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 7.34).

Table 7.33 Total Costs and Earnings for Highly Migratory Species Charter Boats by Region in July–November 2013

Type	Expenditure	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 Marine Recreational Information Program survey. 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 7.34). 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.

Table 7.34 Estimated Total Expenditures and Economic Impacts Generated by Atlantic Highly Migratory Species Charter Boat Trip Operations by Region in July–November 2013

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

Source: Hutt and Silva 2015.

7.6 Economic Impact of Regulations on Small Entities

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. 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.

Final rules are reviewed to determine whether they should be continued without change, amended, or rescinded consistent with the stated objectives of applicable statutes. Section

610 requires NOAA Fisheries to consider the following factors when reviewing rules to minimize any significant economic impact of the rule on a substantial number of small entities:

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

NOAA Fisheries published a 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, which can be found in the 2017 SAFE Report. An updated plan for reviewing rules from 2011 and 2012 is expected to be issued in 2020.

Chapter 7 References

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8 Community Profiles

8.1 Background

National Standard 2 of the Magnuson-Stevens Act requires that each SAFE Report contain, among other things, "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 SAFE Reports and was most recently updated in the 2011 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 SAFE Reports summarized demographic profiles from the results of the 2010 U.S. census, comparing 1990, 2000, and 2010 Census Bureau 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. In addition to 2010 census data, the descriptive community profiles in the 2011 SAFE Report include information provided by Wilson et al. (1998), Kirkley (2005), and Impact Assessment, Inc. (2004) and information obtained from MRAG Americas, Inc. (2008).

Of the 24 communities profiled in previous SAFE Reports, 10 were originally selected due to higher proportions of HMS landings in the town, the relationship between the geographic communities and the fishing fleets, the existence of other community studies, and input from the HMS and Billfish Advisory Panels, which preceded the combined HMS Advisory Panel that currently exists. Profiles of the remaining 14 communities, although not selected initially, were incorporated because they were identified as communities that could be impacted by changes to HMS regulations due to the number of HMS permits associated with them. The profiled 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.

8.2 Community Impacts From Hurricanes

This section is an overview of the impacts on HMS communities caused by hurricanes during 2018 (National Hurricane Center 2018). For an analysis of the impacts of past hurricanes, download previous SAFE Reports at www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-highly-migratory-species-stock-assessment-and-fisheries-evaluation-reports.

During the 2018 Atlantic hurricane season, 16 named storms formed. Eight of those became hurricanes and two reached major hurricane strength based on the Saffir-Simpson Hurricane Wind Scale. Of the 16 storms that formed during the 2018 Atlantic hurricane season, four made landfall on the continental United States and U.S. territories. Those

storms were Tropical Storm Alberto, Major Hurricane Florence, Tropical Storm Gordon, and Major Hurricane Michael.

Tropical Storm Alberto made landfall on May 28, 2018, west of Panama City, Florida, and affected areas over the northeastern Gulf coastal region before pushing as far north as Michigan. Rainfall totals of 5–12 inches occurred over areas of Florida, Georgia, the Carolinas, and Virginia. The storm is estimated to have cost a total of around $125 million in wind and water damage.

Tropical Storm Gordon made landfall three times: on September 3, 2018, near Tavernier in the Florida Keys, near Flamingo on the southern tip of the Florida peninsula, and then between the Mississippi-Alabama border and Pascagoula, Mississippi, on September 5, 2018. It then continued to track across southern Mississippi before moving into Arkansas. Due to the track of Tropical Storm Gordon, rainfall associated with the storm was quite widespread across the eastern Gulf states, with a maximum total of 6 inches around southern Florida and the Florida Keys and totals of 6–12 inches in the Florida panhandle and west-central Alabama. This storm is estimated to have cost a total of nearly $200–250 million in damages across Southeast and Midwest states.

Hurricane Florence was the first major hurricane of the 2018 Atlantic hurricane season to make landfall in the United States and caused a damage estimate of $24 billion. It made landfall on September 14, 2018, near Wrightsville Beach, North Carolina, as a strong Category 1 storm, but it had been rated as strong as a Category 4 storm just three days before landfall. In the final days before making landfall, a combination of cold water upwelling along the North Carolina coast and collapsing steering currents caused the storm to slow and shift to a parallel path along the coast. This lead to catastrophic flooding from storm surge and torrential rains. Storm surge ranged between 3 and 11 feet above ground level in coastal North and South Carolina, with the highest storm surges around the Neuse River and its tributaries. Rainfall estimates totaled 30 inches in certain areas of North Carolina, particularly around Wrightsville Beach and Elizabethtown. Additionally, Florence produced heavy rain over much of coastal North and South Carolina that led to record or top five flood levels in dozens of U.S. Geological Survey stream gauges throughout the region.

Hurricane Michael made catastrophic landfall on October 10, 2018, as a Category 5 hurricane near Mexico Beach, Florida, and caused a total damage estimate of $25 billion, of which $18.4 billion occurred in Florida. Michael produced devastating storm surges as high as 14 feet in Mexico Beach, with significant wave activity that exacerbated the damage. Michael's winds and storm surge caused catastrophic damage to much of Bay County, Florida, including Tyndall Air Force Base. Storm surges along the Florida panhandle ranged from 4 to 6 feet around Panama City and St. Andrew Bay to the west, and from 7 to 9 feet throughout much of the panhandle to the east of Mexico Beach. Storm surges as high as 2–4 feet were reported as far away as Tampa. Michael brought heavy wind, rain, and some flooding to many areas as it moved northward through the Florida panhandle and all the way to southeast Virginia. Lynn Haven, Florida, received nearly 12 inches of rain, and the maximum storm rainfall reported was 13 inches near Black Mountain, North Carolina.

8.3 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 wellhead on the sea floor. In response to the *Deepwater Horizon* MC252 oil spill, NOAA Fisheries issued a series of emergency rules (75 FR 24822, May 6, 2010; 75 FR 26679, May 12, 2010; 75 FR 27217, May 14, 2010) closing a portion of the Gulf of Mexico Exclusive Economic Zone to all fishing and analyzed the environmental impacts of these closures in an environmental assessment. Between May and November of 2010, NOAA Fisheries closed additional portions of the Gulf of Mexico to fishing. The maximum closure was implemented on June 2, 2010, when fishing was prohibited in approximately 37 percent of the Gulf of Mexico Exclusive Economic Zone. Significant portions of state territorial waters in Alabama (40 percent), Louisiana (55 percent), and Mississippi (95 percent) were closed to fishing (Upton 2011), along with 2 percent of waters in Florida. After November 15, 2010, approximately 0.4 percent of the federal fishing area, or 1,041 square miles, immediately around the *Deepwater Horizon* wellhead was kept closed. That continued 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 revenue and negative psychological impacts. One study (Sumaila et al. 2012) estimated the loss in commercial pelagic fish revenue, which includes HMS species, at $35–58 million over the next seven years. That study also estimated that Gulf of Mexico recreational fisheries could lose 11,000–18,000 jobs and face an overall economic loss of $2.5–4.2 billion.

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

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

Demographic data for coastal counties was evaluated, taking into consideration communities that could be disproportionately affected by the Oceanic Fish Restoration Project. It found that the dispersed low-income minority Vietnamese-American populations in Louisiana who actively participate in the Gulf of Mexico pelagic longline fishery and commute to fishing ports exist; however, the project would not disproportionately affect minority or low income populations. The project is voluntary in nature, and as such, any fishermen in the Gulf of Mexico pelagic longline fishery can choose whether to participate in the repose and alternative gear provisioning. During the

repose project, fish dealers, fuel suppliers, and ice, bait, and 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 green-stick gear on 25 fishing trips for a total of 280 days at sea, averaging 3–4 trips per vessel. Observer records showed clear bycatch reduction benefits, with fewer bycatch species caught using the alternative gear and live releases of what bycatch was caught.

The 2019 repose contained several enhancements carried over from 2018. The repose period was set from January 1 to June 30. Participation expanded throughout the Gulf States, with the Gulf of Mexico separated into two focus regions. The two regions are defined as the western Gulf, which includes vessels with hailing ports in Louisiana, Mississippi, Alabama, and Texas, and the eastern Gulf, with vessels hailing from Florida and along the Atlantic Coast. All participating vessels were required to have a history of pelagic longline fishing in the Gulf of Mexico. Participants were able to fish using alternative gear, including green-stick gear options for yellowfin tuna, buoy gear for swordfish, buoy gear for yellowfin tuna, and deep drop gear for swordfish, for up to 60 sea-days. They were compensated for alternative gear trips taken during the repose period. Finally, for the 2019 repose, motorized haulers were authorized for use with buoy gear during the project time under an exempted fishing permit.

Additional information on the Deepwater Restoration Plan and Environmental Assessments can be found at www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/Final-Phase-IV-ERP-EA.pdf and www.gulfspillrestoration.noaa.gov.

8.4 Social Indicators of Fishing Community Vulnerability and Resilience

The NOAA Fisheries Office of Science and Technology presents community profiles by region at www.fisheries.noaa.gov/national/socioeconomics/fishing-community-profiles. Information on community vulnerability and resilience is presented by the same office in a technical memo at www.fisheries.noaa.gov/national/socioeconomics/social-indicators-fishing-communities-0.

Jepson and Colburn (2013) originally developed a series of social indicators of vulnerability and resilience for over 3,800 U.S. coastal communities. These indices are regularly updated based on new data, and the most recent indices and scores can be found on the NOAA Fisheries Social Indicators webpage listed above. Nine social indicators are presented in this document for 25 communities selected for having a greater than average number of Atlantic HMS permits associated with them. These indicators are presented below with discussion in Table 8.1. This series of indices developed by NOAA Fisheries used social indicator variables that could assess a coastal community's vulnerability or resilience to potential economic disruptions such as those resulting from drastic changes

in fisheries quotas and seasons or natural and anthropogenic disasters. Indices and index scores were developed using factor analyses of data from the U.S. Census, permit sales, landings reports, and recreational fishing effort estimates from the MRIP survey (Jepson and Colburn 2013). The nine social indices developed by Jepson 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.

8.4.1 Fishing Reliance and Engagement Indices

Jepson 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 the value of landings per capita, number of commercial permits per capita, dealers with landings per capita, and data on the percentage of people employed in agriculture, forestry, and fishing from the Bureau of Labor Statistics. The recreational fishing engagement index was measured using MRIP estimates of the number of charter, private boat, and shore recreational fishing trips originating in each community. The recreational fishing reliance index was generated using the same fishing trip estimates adjusted to a per capita basis. MRIP data is not available for the state of Texas, so the recreational indexes for Texas were instead calculated based on recreational permit data from NOAA Fisheries and boat ramp data from the state of Texas. As such, recreational index scores for Texas communities are only comparable to other communities within the state.

In Table 8.1, fishing reliance and engagement index scores are presented for 25 HMS communities. Ten of the 25 HMS communities scored either high or medium high on at least three indicators of fishing reliance and engagement, and all scored at least medium high on one of the four indices. Four communities that scored high on all four indices included Montauk, New York; Barnegat Light, New Jersey; Cape May, New Jersey; and Grand Isle, Louisiana, indicating that these communities have greater than normal dependence on the recreational and commercial fishing sectors for jobs and economic support. Beaufort, North Carolina, and Panama City, Florida, both scored high or medium high on both fishing engagement indices while scoring medium or low on both fishing reliance indices, indicating that while both have a significant fishing community, it is not a massive component of either city's overall population. Conversely, Atlantic Beach, North Carolina; Orange Beach, Alabama; and Port Aransas, Texas, all scored 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.

8.4.2 Social Vulnerability Indices

Five indices of social vulnerability developed by Jepson and Colburn (2013) are also presented in Table 8.1. The personal disruption index includes the following community variables representing disruptive forces in family lives: percent unemployment, crime index, percent with no diploma, percent in poverty, and percent separated females. The

population composition index shows the presence of populations that are traditionally considered more vulnerable due to circumstances associated with low incomes and fewer resources. The poverty index includes several variables measuring poverty levels within different community social groups, including the percent receiving government assistance, percent of families below poverty line, percent over age 65 in poverty, and percent under age 18 in poverty. The labor force index characterizes the strength and stability of the labor force and employment opportunities that may exist. A higher ranking indicates fewer employment opportunities and a more vulnerable labor force. Finally, the housing characteristics index is a measure of infrastructure vulnerability and includes factors that indicate housing that may be vulnerable to coastal hazards such as severe storms or coastal flooding.

The only HMS community to score high or medium high on all five social vulnerability indices was Fort Pierce, Florida. Communities that scored high or medium high on four indices include New Bedford, Massachusetts; Pompano Beach, Florida; Port Salerno, Florida; and Freeport, Texas. Six other HMS communities scored high or medium high on three social vulnerability indices: Beaufort, North Carolina; Morehead City, North Carolina; Apalachicola, Florida; Panama City, Florida; Dulac, Louisiana; and Grand Isle, Louisiana. These scores suggest these communities would likely experience greater difficulty recovering from economic hardships caused by job losses in the recreational and commercial fishing sectors.

Table 8.1 Social Indicators of Resilience and Vulnerability for 25 Highly Migratory Species Communities

Community	Pop. (2017)	Commercial Engagement[1]	Commercial Reliance[1]	Recreational Engagement[1]	Recreational Reliance[1]	Personal Disruption[2]	Population Composition[2]	Poverty[2]	Labor Force[2]	Housing[2]
Gloucester, MA	29,858	High	Medium	High	Medium	Low	Low	Low	Low	Medium
Nantucket, MA	10,912	Medium	Low	Med high	Medium	Low	Low	Low	Low	Low
New Bedford, MA	95,323	High	Medium	Medium	Medium	Med high	Med high	High	Low	Med high
Narragansett, RI	15,601	High	Medium	High	Med high	Low	Low	Low	Medium	Low
Montauk, NY	3,662	High	High	High	High	Low	Low	Low	Medium	Low
Barnegat Light, NJ	494	High	High	High	High	Low	Low	Low	High	Low
Brielle, NJ	4,738	Medium	Low	Med high	Medium	Low	Low	Low	Low	Low
Cape May, NJ	3,500	High	High	High	High	Low	Low	Low	High	Medium
Ocean City, MD	7,026	High	Medium	High	High	Low	Low	Low	Med high	Med high
Atlantic Beach, NC	1,763	Medium	Medium	High	High	Medium	Low	Low	Low	High
Beaufort, NC	4,164	High	Medium	High	Medium	Med high	Low	Med high	Medium	Med high
Morehead City, NC	9,200	High	Low	High	High	Med high	Low	Med high	Medium	Med high
Wanchese, NC	1,619	High	High	Med high	High	Low	Low	Low	Low	High
Fort Pierce, FL	44,248	High	Low	High	Medium	High	High	High	Med high	Med high
Islamorada, FL	6,488	Med high	Low	Low	Low	Low	Low	Low	Medium	Low
Pompano Beach, FL	107,542	Med high	Low	Med high	Low	Med high	Med high	Med high	Medium	Med high
Port Salerno, FL	10,760	Med high	Low	Med high	Low	Med high	Med high	Med high	Medium	Med high
Apalachicola, FL	2,257	High	Medium	Medium	Medium	Medium	Low	Medium	Medium	Med high
Destin, FL	13,421	High	Low	High	High	Low	Low	Low	Low	Medium
Madeira Beach, FL	4,352	Med high	Medium	Medium	Medium	Low	Low	Low	Med high	Medium
Panama City, FL	36,661	High	Low	High	Medium	Med high	Medium	Med high	Medium	Med high
Orange Beach, AL	5,826	Low	Low	High	High	Low	Low	Low	Med high	Medium
Dulac, LA	1,292	High	High	Medium	Med high	Med high	Medium	High	Med high	N/A
Grand Isle, LA	760	High	High	High	High	Low	Low	Medium	Med high	Med high
Freeport, TX	12,082	Med high	Low	High	Medium	High	High	High	Low	Med high
Port Aransas, TX	3,980	Medium	Low	High	High	Low	Low	Low	Low	Medium

Note: Social indicator scores are based on 2016 Marine Recreational Information Program, commercial landings, and permit data and on U.S. Census Bureau data. [1]Index scores for fishing engagement and reliance indices. [2]Index scores for ssocial vulnerability indices. Source: Jepson and Colburn 2013.

Chapter 8 References

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9 Appendix

9.1 Descriptions of Gear Used in Highly Migratory Species Fisheries

This section provides descriptions of the gear types used to fish for Atlantic HMS and how those gears are deployed or used. Gears are defined for NOAA Fisheries under regulations implementing the Magnuson-Stevens Act (50 CFR § 600.10).

The broad descriptions below are compiled from multiple cited sources.

9.1.1 Pelagic Longline

Pelagic longline gear is composed of several parts (Figure 9.1). The primary fishing line, or mainline of the longline system, can vary from 5 to 40 miles in length, with approximately 20–30 hooks per mile. The depth of the mainline is determined by ocean currents and the length of the floatline. The floatline connects the mainline to several buoys and periodic markers which can have radar reflectors or radio beacons attached. Each individual hook is connected by a leader, or gangion, to the mainline. Lightsticks, which contain light emitting chemicals, are used, particularly when targeting swordfish. When attached to the hook and suspended at a certain depth, lightsticks attract baitfish, which may, in turn, attract pelagic predators (NOAA Fisheries 1999).

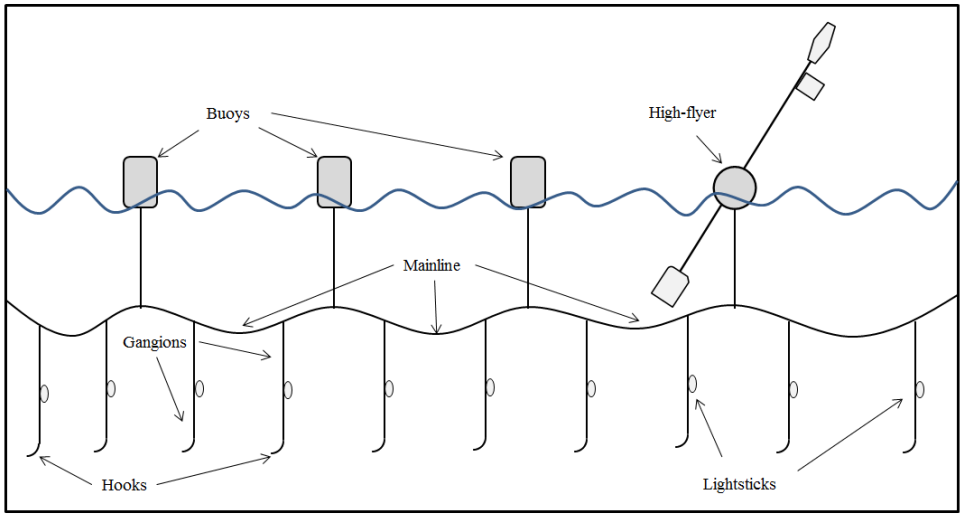

Figure 9.1 Typical U.S. Pelagic Longline Gear

Source: Redesign from original in Arocha (1997).

When targeting swordfish, pelagic longline gear is generally deployed at sunset and hauled at sunrise to take advantage of swordfish's nocturnal, near-surface feeding habits (NOAA Fisheries 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 in 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.

Basic differences between shallow swordfish and deep tuna pelagic longline sets are illustrated in Figure 9.2. 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 farther 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.

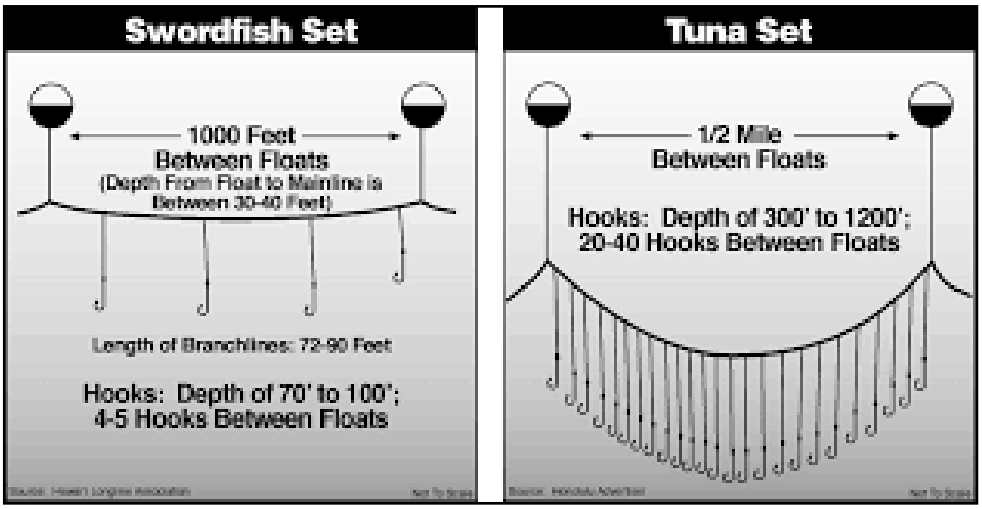

Figure 9.2 Pelagic Longline Gear Deployment Techniques

Note: This figure is 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.

Pelagic longline vessel operators are opportunistic, switching gear style and making subtle changes to target the best available economic opportunity on each individual trip. Pelagic longline gear sometimes attracts and hooks non-target finfish with little or no commercial value, as well as species that cannot be retained by commercial fishermen due to regulations, such as billfish.

Pelagic longline gear may also interact with protected species such as marine mammals, sea turtles, and seabirds. Thus, this gear has been classified as a Category I fishery with respect to the Marine Mammal Protection Act. Any species that cannot be landed due to fishery regulations is required to be released, regardless of whether the catch is dead or alive. More information on fishery interactions and reduction measures are available in Chapter 6.

9.1.2 Purse Seine

A purse seine is a large wall of netting deployed around an entire area or school of fish. The gear, illustrated in Figure 9.3, consists of a floated top line with a weighted bottom lead line, or purseline, threaded through rings along the bottom that can be closed by a drawstring. Once a school of fish is located, a skiff encircles the school with the net. The lead line is then pulled in, "pursing" the net closed on the bottom, preventing fish from escaping by swimming downward. The efficiency of this gear can be enhanced by the assistance of spotter planes used to locate schools of tuna.

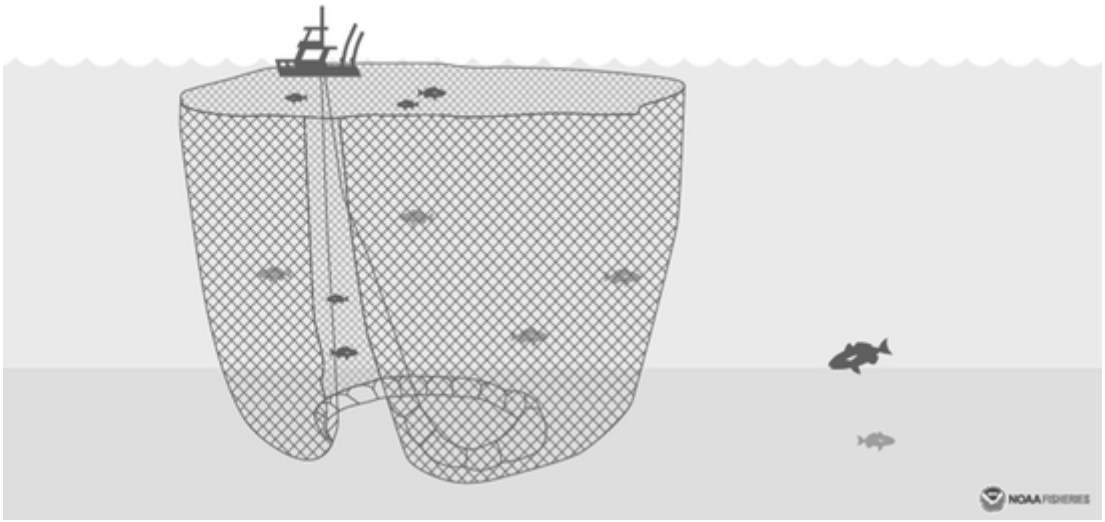

Figure 9.3 Purse Seine Gear Illustration

Source: NOAA Fisheries.

Purse seines can reach more than 6,500 feet (2,000 meters) in length and 650 feet (200 meters) in depth, varying in size according to the vessel, mesh size, and target species. They are used to target schooling pelagic fish of all sizes, from small sardines to large tunas, and squid.

Purse seining is a non-selective fishing method that captures everything that it surrounds, including protected species. Information on fishery interactions and reduction measures is available in Chapter 6.

9.1.3 Handgear

Handgears, including rod and reel, handline, harpoon, and bandit gear are often used to fish for Atlantic HMS by fishermen on private vessels, charter vessels, and headboat vessels. Green-stick may also be considered as commercial handgear for swordfish, but it is described separately below. Buoy gear is a relatively recent handgear used in swordfishing, primarily off the east coast of Florida. Each of these gears are described below.

Rod and reel gear is a handheld fishing rod with a manually or electronically operated reel attached. It is a popular gear type in the commercial Atlantic Tunas General category fishery as well as in all recreational HMS fisheries. It may be deployed from a vessel that is anchored, drifting, or underway and can be used to present artificial lures or flies and live or dead baits.

Rod and reel gear used while the vessel is underway is referred to as trolling. Trolling involves dragging baits, artificial lures, or combinations of the two, through or on top of the water's surface, similar to green-stick fishing. While trolling, vessels often use outriggers to assist in spreading out or elevating multiple baits or lures and to prevent fishing lines from tangling. Trolling arrays for HMS can include upwards of a dozen lines at a time and in some cases upwards of a dozen artificial lures on a single line. Trolling in HMS fisheries is used primarily to target billfish and tuna. Trolling rigs for billfish typically combine an artificial lure with a plastic skirt and a dead bait, such as a ballywoo, herring, or mullet, rigged on a circle or J-hook. These baits are usually fished to skip along the surface to draw in marlin and sailfish. Trolling rigs for tuna often involve umbrella rigs with multiple soft plastic artificial lures that are fished below the surface.

Fishing with rod and reel gear from an anchored or drifting boat is a popular way to present artificial lures and live or dead baits to all HMS, particularly tunas, swordfish, and sharks. Artificial lures may be fished by casting to surface feeding fish chasing baitfish or by vertically jigging under the boat for schools of fish located with a fish finder or along bottom ledges known to hold fish. Live and dead baits may be allowed to drift or swim with the current or be weighted down to fish at depth. Deep-drop fishing is a popular technique used for swordfish that allows recreational anglers to fish baits over a thousand feet deep. Deep-drop fishing employs the use of a large mechanical reel spooled with wire to lower heavy weights to great depths and baited lines on rod and reel gear attached to the wire line using quick-release clips. When a fish bites, the quick-release clips release the wire line so the fish can be fought to the surface without the heavy weight. Chumming is another popular technique when fishing from an anchored vessel, especially for sharks, and involves putting ground-up fish meal and blood in the water to attract fish to baited hooks drifting behind the boat. Chunking is a variation on chumming that involves cutting up bait fish into chunks and throwing them over board to attract fish to the boat, particularly tuna.

Handline gear must be attached to, or be in contact with, a vessel. It consists of a mainline with no more than two gangions or hooks attached. A handline must be released and retrieved by hand instead of by mechanical means. There are gear marking requirements for floats attached to the handline.

Harpoon gear is attached to a pole that is propelled only by hand instead of through mechanical means. A harpoon is a pointed dart or iron attached to the end of a line several hundred feet in length, the other end of which is attached to a floatation device. HMS targeted with harpoon gear include large tuna, swordfish, and sharks.

Similar to harpoon gear, spearfishing gear uses heavy rubber bands to launch small spears at great speed underwater. Spearfishing is popular among divers, and is an authorized method for targeting bigeye, albacore, yellowfin, and skipjack tunas.

Bandit gear is a vertical hook and line gear with rods attached to the vessel when in use. Lines may be retrieved with manual, electric, or hydraulic reels.

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

9.1.4 Bottom Longline

Bottom longline gear is a longline that is deployed with enough weights or anchors to maintain contact with the ocean bottom (Figure 9.4). While bottom longline may have floats and high flyers, they are used only to mark the location of the gear and not to float the gear.

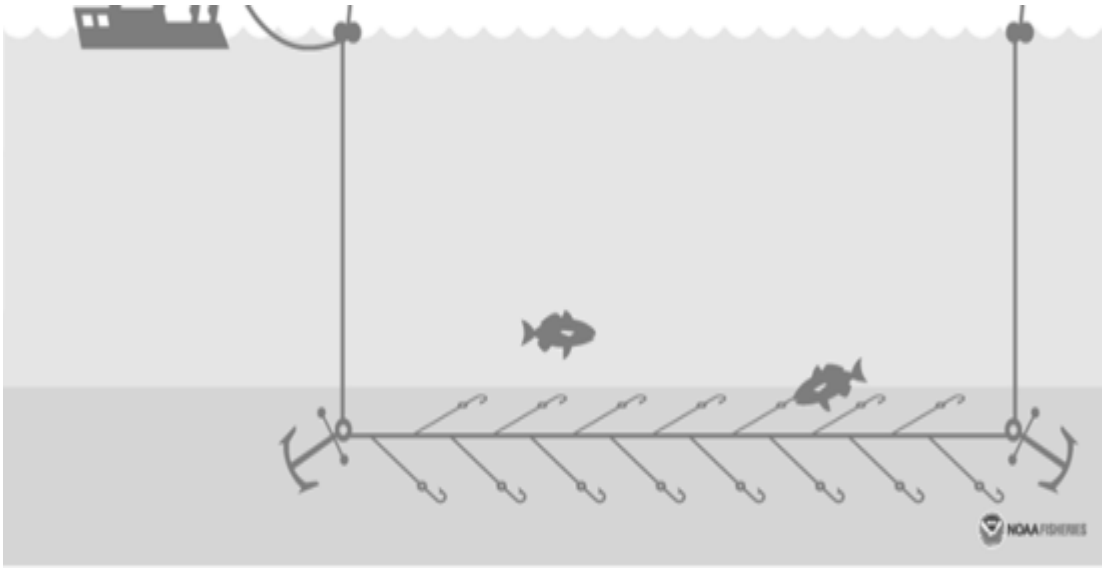

Figure 9.4 Bottom Longline Gear Illustration

Source: NOAA Fisheries.

Bottom longline is the primary commercial gear employed for targeting large coastal sharks in all regions. Small coastal sharks are also caught on bottom longline gear. This gear rarely, if ever, interacts with other HMS.

Gear characteristics vary by region and target species. Since January 1, 2018, Shark Directed permit holders using bottom longline gear have been required to use circle hooks as implemented by Amendment 5b to the 2006 Consolidated Atlantic HMS FMP.

9.1.5 Gillnet

A gillnet is a wall of netting that hangs in the water column, typically made of monofilament or multifilament nylon (Figure 9.5). The gillnet itself can be composed of different panels of netting that may have different mesh sizes depending on the target species. Gillnets used while fishing for Atlantic HMS cannot have a total length of more than 2.5 kilometers.

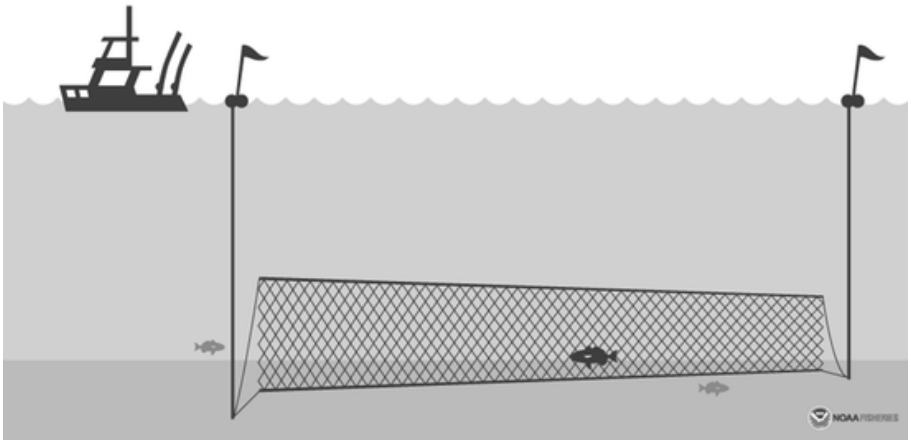

Figure 9.5 Generalized Gillnet Diagram

Source: NOAA Fisheries.

Gillnets are designed to allow fish to get only their head through the netting but not their body. The fish's gills then get caught in the mesh as the fish tries to back out of the net. A variety of regulations and factors determine the mesh size, length, and height of commercial gillnets, including the area fished and target species. In HMS fisheries, fishermen can only use gillnets to catch sharks, primarily small coastal sharks and smooth dogfish. Gillnets cannot be used for swordfish, billfish, or tuna fishing.

Regulations on gillnet use are dependent on gillnet type. Under HMS regulations at CFR 635.2, two types of gillnets are defined: sink and drift gillnets.

A sink gillnet is designed to be or is fished on or near the ocean bottom in the lower third of the water column by means of a weight line or enough weights and/or anchors that the bottom of the gillnet sinks to, on, or near the ocean bottom. Sink gillnets used to fish for Atlantic HMS cannot remain in the water longer than 24 hours from when the gillnet first enters the water. The gear must be completely removed within that 24-hour period. Generally, fishermen use sink gillnet to target smooth dogfish in the Northeast.

A drift gillnet is one that floats unattached to the ocean bottom and is not anchored, secured, or weighted to the ocean bottom. Drift gillnets used to fish for Atlantic HMS must remain attached to the vessel at one end at all times unless the vessel is checking the net for sea turtles or marine mammals, which must be done at least every two hours. Fishermen can use drift gillnets in different ways. One way is to allow the gillnet to drift in the water. The other way is to target and encircle a group of fish, similar to how purse seine gear is used. When used in this way, the gillnet is called a strike gillnet or strike net. Endangered and threatened species or protected marine mammals have never been observed taken in strike net sets.

9.1.6 Green-Stick

Green-stick gear consists of 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 (Figure 9.6). The suspended line, attached gangions and/or hooks, and catch may be retrieved collectively by hand or mechanical means.

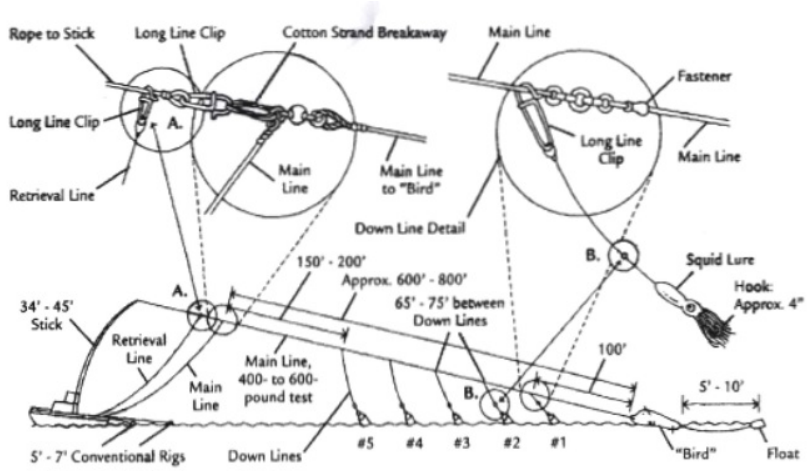

Figure 9.6 Green-Stick Gear Configuration

Source: NOAA Fisheries.

Green-stick gear may be used to harvest bigeye, albacore, yellowfin, skipjack, and bluefin tunas aboard vessels with Atlantic Tunas General category, Atlantic HMS Charter/Headboat, and Atlantic Tunas Longline category permits.

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

9.2 HMS Management History

9.2.1 Historical Fishery Management Plans

During the 1980s, Atlantic HMS were managed under the authority of the five Atlantic regional fishery management councils: New England, Mid-Atlantic, South Atlantic, Gulf of Mexico, and Caribbean. In 1985 and 1988, the councils published joint FMPs for swordfish and billfish.

In 1993, the newly established Atlantic HMS Management Division finalized the 1993 Atlantic Shark FMP. That was later replaced by the 1999 Atlantic Tunas, Swordfish, and Sharks FMP. The 1999 FMP was the first for Atlantic tunas. Management measures that changed in the 1999 FMP included:

- Expanding the list of prohibited shark species to 19 species.
- Establishing a shark public display quota.
- Identifying essential fish habitat for all Atlantic tunas, swordfish, and sharks.
- Establishing the Swordfish Directed, Swordfish Incidental, Swordfish Handgear, Shark Directed, Shark Incidental, and Atlantic Tunas Longline category permit types.

As part of the 1999 FMP, the regulations for all Atlantic HMS, including billfish, were consolidated into one part of the Code of Federal Regulations, 50 CFR Part 635. The implementing regulations were published on May 28, 1999 (64 FR 29090).

Also in 1999, NOAA Fisheries updated the Billfish FMP originally passed by the councils. For the next six years, NOAA Fisheries upheld management measures maintained in both the Billfish FMP (Amendment 1) and the Atlantic Tunas, Swordfish, and Sharks FMP.

9.2.2 Current Fishery Management Plan and Amendments

In 2006, NOAA Fisheries finalized a consolidated FMP for Atlantic tunas, swordfish, and sharks. This amended certain management objectives to the 1999 FMP and the 1999 Billfish FMP amendment. Additionally, the 2006 FMP combined management measures for billfish into the same document as tunas, swordfish, and sharks.

Since the finalization of the 2006 Consolidated Atlantic HMS FMP, NOAA Fisheries has finalized a variety of amendments for Atlantic HMS. Table 9.1 summarizes all finalized amendments. For additional information on these and to view amendments currently in the rulemaking process, visit www.fisheries.noaa.gov/atlantic-highly-migratory-species/atlantic-hms-fishery-management-plans-and-amendments.

Table 9.1 Amendments to the 2006 Consolidated Atlantic Highly Migratory Species Fisheries Management Plan

Amendment	Year	Primary Impact	Actions
1	2009	All HMS	Revised existing essential fish habitat (EFH), established a new Habitat Areas of Particular Concern (HAPC) for bluefin tuna in the Gulf of Mexico, and provided conservation recommendations for fishing and non-fishing impacts on EFH.
2	2008	Sharks	Established measures to rebuild overfished species and prevent overfishing of Atlantic sharks. Measures included developing rebuilding plans for porbeagle, dusky, and sandbar sharks, implementing commercial quotas and retention limits, modifying recreational measures to reduce fishing mortality of overfished/overfishing stocks, modifying reporting requirements, requiring that all Atlantic sharks be offloaded with fins naturally attached, collecting shark life history information via the implementation of a shark research program, and implementing time/area closures recommended by the South Atlantic Fishery Management Council.
3	2010	Sharks	Implemented conservation and management measures to rebuild blacknose sharks and end overfishing of blacknose and shortfin mako sharks. This amendment also placed smooth dogfish and Florida smoothhound into a complex managed under this FMP.
4	2012	Caribbean	Amended regulations in Puerto Rico and the U.S. Virgin Islands to better manage the traditional, small-scale commercial HMS fishing fleet in the region, enhancing fishing opportunities, improving profits, and providing NOAA Fisheries with improved capability to monitor and manage those fisheries. This amendment also created the HMS Commercial Caribbean Small Boat permit and stipulated that it cannot be held in combination with any other HMS permit.
5a	2013	Sharks	Implemented measures to maintain the rebuilding of sandbar sharks, end overfishing and rebuild scalloped hammerhead and Atlantic blacknose sharks, establish total allowable catch and commercial quotas for Gulf of Mexico blacknose and blacktip sharks, and establish new recreational shark fishing management measures.
5b	2017	Sharks	Established measures to end overfishing of and rebuild the dusky shark stock. Measures included modifying the rebuilding plan to ensure fishing mortality levels are maintained at or below levels needed to meet the goal of achieving a 35 percent mortality reduction relative to 2015 levels and rebuild the stock by 2107, as well as clarifying annual catch limits and implementing preventative accountability measures for the prohibited shark species complex.
6	2015	Sharks	Increased management flexibility to adapt to the changing needs of Atlantic shark fisheries, prevent overfishing while achieving optimum yield, and rebuild overfished stocks.

Amendment	Year	Primary Impact	Actions
7	2014	Bluefin tuna	Implemented measures related to the pelagic longline fishery, including individual bluefin quotas, two new gear restricted areas, closure of the pelagic longline fishery when the annual bluefin tuna quota is reached, elimination of target catch requirements associated with retention of incidental bluefin tuna in the pelagic longline fishery, mandatory retention of legal-sized bluefin tuna caught as bycatch, expanded monitoring requirements, and transiting provisions for pelagic and bottom longline vessels. This amendment also required vessel monitoring system use and reporting by the Purse Seine category, required the use of the Automated Catch Reporting System by the General and Harpoon categories, provided additional flexibility for inseason adjustment of the General category quota and Harpoon category retention limits, and changed the allocation of the Angling category Trophy South subquota for the Gulf of Mexico.
8	2013	Swordfish	Implemented new and modified commercial vessel permits allowing holders to retain and sell a limited number of swordfish caught on rod and reel, handline, harpoon gear, green-stick, and bandit gear.
9	2015	Sharks	Established Atlantic and Gulf of Mexico regional smoothhound shark annual commercial quotas, implemented the shark gillnet requirements of the 2012 Shark and Smoothhound Biological Opinion, modified regulations related to the use of vessel monitoring systems by Atlantic shark fishermen using gillnet gear, and implemented the smooth dogfish-specific provisions in the Shark Conservation Act of 2010.
10	2017	All HMS	Revised existing EFH, modified the HAPCs for bluefin tuna and sandbar sharks, and created new HAPCs for juvenile and adult lemon sharks.
11	2019	Shortfin mako sharks	Implemented new retention requirements for commercial and recreational fisheries to reduce fishing mortality of shortfin mako sharks and establish the foundation for rebuilding the shortfin mako shark population.

9.3 Descriptions of HMS Data Collections

This section provides a summary of some of the data sources referenced in this report.

9.3.1 Commercial Vessel Logbook Data

9.3.1.1 Background

Almost all federally permitted commercial vessels are required to report their fishing activities in a logbook, with some limited exceptions. Logbooks typically require information on the gear used, the date a fishing trip occurred, the quantity of fish landed, and the fishing location. Because commercial fishermen are reporting this data themselves, it is referred to as "self-reported" data. Different logbooks are required and used depending on the data collection needs and requirements of the different fisheries.

Owners of permitted vessels are required to maintain and submit logbooks as specified in federal regulations, consistent with the conditions of their federal permits. Not all federal permits currently require logbooks to be submitted at this time.

9.3.1.2 Atlantic HMS Logbook

Atlantic HMS permit holders using pelagic longline gear are required to use this logbook; however, Atlantic HMS permit holders who are selected to report and who use other gears, including rod and reel, green-stick, and bottom longline gear, may also report fishing activities in this logbook. The fishermen using this logbook primarily target swordfish and tunas.

There are three forms that must be submitted for a logbook report to be complete: the trip report form, the set report form, and the dealer weigh-out tally sheet. The trip report form provides information on the trip itself, such as the start and end dates, the vessel name and identification number, and economic information, such as the total cost of trip expenses (e.g., groceries and fuel). The set form provides information on an individual fishing set, including the specific latitude/longitude coordinates at which gear was set and hauled back, the amount of gear used, and the number and species of fish and protected species kept, released alive, and discarded dead. Each logbook submission will include only one trip form but may include numerous set forms. Weigh-out slips or tally sheets must be submitted by the fishermen along with the trip and set forms. Permitted dealers provide these slips, which records the fish purchased by the dealer, to the fishermen and must include, at a minimum, the numbers and weights of the fish landed. These tally sheets frequently list the weights of each HMS purchased.

If no fishing trips occurred during a given month, the no-fishing form is required, which allows NOAA Fisheries to confirm that permit holders are not fishing, as opposed to not reporting.

9.3.1.3 Southeast Coastal Fisheries Logbook

This logbook is primarily used by fishermen with commercial shark permits who do not use pelagic longline gear and by fishermen with permits in the South Atlantic and Gulf of Mexico regions to report fishing activity in the Gulf of Mexico reef fish, South Atlantic snapper/grouper, king and Spanish mackerel, shark, and Atlantic dolphinfish/wahoo fisheries. This logbook is primarily used for bottom longline, gillnet, and vertical line

(including bandit) gears, but other gears can also be reported here. As with the Atlantic HMS Logbook, the Southeast Coastal Fisheries Logbook has several associated forms. Unlike the Atlantic HMS Logbook, though, additional forms are not required by every fisherman or for every trip.

The trip form includes information specific to the trip, such as vessel name and identification number and dates of the trip. However, unlike the trip form in the Atlantic HMS Logbook, the Southeast Coastal Fisheries Logbook trip form collects information on the gear used, location, and species kept for an entire trip rather than on every set of the fishing trip. Gear effort information (e.g., number of hooks, lines fished, and length of longline) is reported as the average for an entire trip, as opposed to the specific number of hooks or length of line for each set. "Species kept" is also reported in total weight for the entire trip, not in numbers of fish per set like for the Atlantic HMS Logbook. Economic information, such as the total cost of groceries and fuel, is collected on this form and is required for each trip from a group of fishermen representing 20 percent of the active fleet randomly selected annually.

Also unlike the Atlantic HMS Logbook, the trip form does not record information on released or discarded fish or protected species. A separate discard form for that information exists; however, not all permit holders using the logbook are required to complete a discard form. Every year, NOAA Fisheries requires approximately 20 percent of those fishermen selected randomly to report to the Southeast Coastal Fisheries Logbook program to also report discards using a discard logbook form. This discard form is also trip based and does not have specific location data available for each set. Additionally, this logbook form does not provide specific information on individual fish that are discarded dead or alive. For each species reported on the discard form, fishermen are required to report whether all the fish were discarded dead, most were discarded dead, all were discarded alive, most were discarded alive, some were kept but not sold (e.g., if they used the fish as bait), or the fishermen was unable to determine which category to check. Fishermen may also report "no discards" when submitting a discard logbook form and remain in reporting compliance. Such reporting means that no individuals of any species were discarded during the fishing trip.

This logbook also has a no-fishing form. As with the Atlantic HMS Logbook, fishermen are required to submit this form if they did not take fishing trips during a month.

9.3.1.4 Northeast Vessel Trip Reports

Any fisherman with a permit issued out of the Greater Atlantic Regional Fisheries Office (GARFO) is required to use this logbook to report all fish landed, regardless of species. Most non-HMS fishermen from the Mid-Atlantic to Maine use this logbook program to report their landings. For the most part, the fishermen reporting in this logbook use trawls, dredges, or gillnet gear and are fishing for non-HMS such as scallops, squid, herring, groundfish, skates, and spiny dogfish. Except for some smoothhound shark permit holders who also hold GARFO permits that require reporting and a few swordfish permit holders that target *Loligo* squid and land swordfish incidentally, no HMS permit holders use this logbook. Unlike the Atlantic HMS Logbook and the Southeast Coastal Fisheries Logbook, this logbook is used not only by commercial permit holders but also by charter/headboat fishermen when fishing recreationally.

The Northeast Vessel Trip Reports logbook has only one form. Permit holders use that form to report trip-level information, gear information, location by both grid and longitude and latitude, and, for commercial trips, the weight of each species kept or discarded. There is no indication on the form whether the discards are alive or dead. A new form must be filled out when the fisherman moves to a new area or uses a different gear. "Species kept" is reported in total weight for the entire trip, not in numbers of fish per set like for the Atlantic HMS Logbook.

From 2000 to 2015, fishermen using this logbook were required to submit a monthly no-fishing report if they did not fish.

9.3.2 Observer Data

9.3.2.1 Northeast Fisheries Observer Program

This program covers the states in the Northeast and Mid-Atlantic regions in non-HMS fisheries, such as groundfish, monkfish, squid, skates, herring, and scallops, as well as the HMS Mid-Atlantic smoothhound shark fishery. These fisheries primarily use trawls, gillnets, and dredges. Trips in each fishery are randomly selected for observer coverage. Coverage rates vary year-to-year and by gear type and fishery, but on average, this program observes approximately 8 percent of trips in this region.

9.3.2.2 Southeast Bottom Longline Observer Program

This observer program collects data on temporal and spatial catch, release mortality, bycatch, and discards on trips targeting HMS, primarily sharks, and non-HMS such as snapper/grouper on vessels that fish from North Carolina to Louisiana. Vessels are selected at random each quarter based on reported use of longline and targeted shark interactions in the same season of the previous year. The coverage level of all southeast and Gulf of Mexico trips that use bottom longline gear is 5 to 10 percent.

This observer program also observes the shark research fishery. The shark research fishery started in 2008 to ensure that data critical to effective shark management could continue to be gathered, even after commercial shark quotas were significantly cut that year in Amendment 2 to the 2006 Consolidated Atlantic HMS FMP. There are approximately 5 to 10 vessels in the research fishery each year, and they must carry an observer on 100 percent of all research fishery trips. These vessels generally make only one or two research fishery trips per month.

9.3.2.3 Southeast Gillnet Observer Program

This observer program focuses on all anchored, sink, strike, or drift gillnet fishing by vessels that fish from Florida to North Carolina and in the Gulf of Mexico. Similar to the Southeast Bottom Longline Observer Program, vessels are randomly selected on a quarterly basis from a pool of vessels that had reported fishing with gillnet gear during the same quarter the previous year in the Southeast Coastal Fisheries Logbook. The coverage level for this observer program is approximately 8 to 10 percent of all trips in the Southeast that use gillnet gear.

9.3.2.4 Gulf of Mexico Reef Fish Observer Program

This observer program, which began in 2006, provides quantitative biological, vessel, and some gear-selectivity information relative to the directed reef fish fishery in the Gulf of

Mexico. This program primarily focuses on bottom longline and vertical line (bandit or handline). More recently, it has included limited observer coverage on modified buoy gear trips. Although many reef fish species are retained, the predominant target species are snapper/grouper. The coverage level for this observer program is approximately 2-5 percent of all Gulf of Mexico trips that fish for reef fish.

9.3.2.5 Gulf of Mexico Shrimp Trawl Observer Program

This observer program provides quantitative biological, vessel, and gear-selectivity information relative to the southeastern shrimp fishery. This program provides general fishery bycatch characterization and catch rates for finfish species by area and target species and provides catch rates to estimate protected species bycatch levels. Until the late 2000s, this observer program did not identify sharks to species. The coverage level for this observer program is approximately 2 percent of all Gulf of Mexico shrimp trawl trips.

9.3.2.6 Pelagic Observer Program

Data from this program is collected during trips on pelagic longline vessels with HMS permits. These vessels are generally targeting swordfish and yellowfin and bigeye tunas. Once a set is retrieved, information like the length, dressed weight, sex, and tag number of each individual fish is recorded. Typically, the target coverage level is approximately 10-15 percent of the vessels, based on the fishing effort of the fleet. There have been times and areas where the agency has required 100 percent coverage, including during bluefin tuna spawning time period in the Gulf of Mexico for a number of years and in the Mid-Atlantic Bight.

9.3.3 Recreational Data

9.3.3.1 Marine Recreational Information Program

MRIP uses a network of complementary surveys to collect recreational fishing data to estimate fishing effort and catch from Maine to Mississippi. The primary MRIP surveys are the Access Point Angler Intercept Survey (APAIS), the Coastal Household Telephone Survey (CHTS), and the For-Hire Survey (FHS).

APAIS is conducted by state fisheries agency partners. Interviewers survey individual recreational anglers at marinas and other known fishing access sites to collect data on the angler's catch, including the length, weight, and species of fish caught. They also collect information on number of fish released and general information about the fishing trip, including its length and mode (i.e., shore, private boat, or for-hire charter boat or headboat). The primary purpose of this survey is to estimate average catch rates per angler. In this survey, most harvested fish are directly observed by the on-site interviewers who are trained to identify fish to the species level, while the collection of data on released fish relies on anglers to identify the species or a more generic category like "shark."

CHTS was a telephone survey of randomly selected coastal households used to collect data on the number of saltwater fishing trips taken by recreational anglers on privately owned boats or from shore. Data were collected at the end of two-month waves to minimize recall bias that would result from asking individuals to recollect the number of trips taken over a longer period. In 2018, CHTS was replaced by the Fishing Effort Survey, a mail survey of licensed recreational anglers and coastal households.

FHS is a telephone survey of known charter boat and headboat vessel operators used to collect data on the number of saltwater fishing trips taken by recreational anglers on for-hire vessels. To minimize recall bias, FHS asks vessel operators to report vessel fishing activity for one-week periods, including the number of anglers fishing per trip, hours spent fishing, areas fished, and species targeted. The primary purpose of FHS is to estimate total fishing effort by recreational anglers fishing from for-hire charter boat and headboat vessels.

MRIP estimates total annual catch and harvest per species and mode by multiplying average catch rates obtained by APAIS by estimates of total fishing effort obtained by CHTS and FHS. Thus, MRIP estimates are extrapolated estimates of catch. When data is extracted, the MRIP database provides confidence intervals.

9.3.3.2 Large Pelagics Survey

LPS, which began in 2001, collects information regarding the recreational fishery directed at large pelagic species (e.g. tunas, billfishes, swordfish, sharks, wahoo, dolphinfish, and amberjack) in the offshore waters from Maine through Virginia from June through October. The purpose of LPS is to collect more precise estimates of fishing effort and catch for large pelagic species that are rarely encountered in the general MRIP surveys. LPS includes two independent surveys: Large Pelagics Telephone Survey (LPTS) and Large Pelagics Intercept Survey (LPIS). These provide effort and average catch-per-trip estimates needed to estimate total catch by species.

LPIS is a dockside survey of known offshore fishing access sites primarily designed to collect catch data from private and charter boat captains who completed fishing trips directed at large pelagic species. LPIS data are used to estimate the average recreational catch per large pelagic boat trip by species. Unlike APAIS, LPIS collects aggregate catch data for all anglers fishing on a given vessel.

LPTS is a telephone survey that collects data used to estimate the total number of boat trips on which anglers fished for large pelagic species with rod and reel or handline. For-hire HMS vessels are covered by FHS (listed above), and private boats are covered by LPTS, a biweekly survey. LPTS covers both commercial fishing by vessels with Atlantic Tunas General category permits and true recreational fishing by vessels with Angling category permits.

LPS estimates total annual catch and harvest per large pelagic species and mode (i.e., private boat or for-hire) by multiplying the average catch rates obtained by LPIS by estimates of total fishing effort obtained by LPTS and FHS. Thus, LPS estimates are extrapolated estimates of catch. As with MRIP, LPS confidence intervals are generated online when reviewing the extrapolated estimates (www.st.nmfs.noaa.gov/recreational-fisheries/data-and-documentation/queries/index).

9.3.3.3 Texas Parks and Wildlife Department Recreational Survey

The Texas Parks and Wildlife Marine Recreational Fishing Survey collects recreational data regarding bait and gear used, species composition and size, trip length, etc. Information is collected via on-site, post-fishing trip interviews of anglers at coastal boat access sites. The amount of angling activity and harvest are estimated with data collected from anglers during coastal harvest surveys (tpwd.texas.gov/fishboat/fish/didyouknow/coastal/creel.phtml). This survey is the only

source of recreational landings estimates for Texas. The landings estimates are extrapolated estimates.

9.3.3.4 Southeast Region Headboat Survey

SRHS focuses on monitoring and sampling data from the recreational headboat fisheries in the South Atlantic and Gulf of Mexico. Data collected from this survey consist of trip-level logbook records submitted by captains and biological samples collected dockside by port agents.

SRHS is composed of three main components: the dockside intercept biological sampling program, which collects data on the length, weight, age, and sex of fish caught on headboats; the headboat activity report, which collects data on the number and type of trips taken by headboats and the number of anglers per trip; and the logbook/trip report, which collects data on the number of fish caught and released per headboat trip by species. SRHS landings estimates are extrapolated from the logbook data to account for non-reporting.

9.3.3.5 Louisiana Recreational Creel Survey

LA Creel was implemented by Louisiana in 2014 to replace MRIP data collection. LA Creel uses a combination of data gathered through interviews at public fishing areas and weekly phone and email surveys to produce weekly estimates of recreational fish harvests.

In January 2018, NOAA Fisheries certified LA Creel as an alternative for MRIP. LA Creel catch statistics could not be used in stock assessments and management actions until they were converted into a "common currency" that makes them comparable to historical MRIP estimates. Implementation of such a conversion required development of peer-reviewed, scientifically valid methods. LA Creel data were used for the first time in the 2019 SAFE Report.

9.3.4 Seafood Dealer Data

9.3.4.1 Pelagic Dealer Compliance System

This reporting system was implemented for federally permitted HMS seafood dealers primarily to monitor landings of tunas and swordfish, but sharks purchased by these dealers were also reported. All commercial HMS permit holders are required to sell to federally permitted dealers, and all federally permitted dealers were required to report all HMS fish purchases to the Pelagic Dealer Compliance System until 2013. This system was replaced by the electronic dealer reporting system described below.

9.3.4.2 Electronic Dealer Reporting System

Since 2013, the electronic dealer reporting system, known as eDealer, has provided self-reported data from federally permitted HMS dealers. As of January 1, 2013, all federally permitted HMS dealers have to submit electronic dealer reports on a weekly basis. The eDealer program pulls in all federally submitted HMS landings from other electronic dealer reporting systems from Maine to Texas, including the U.S. Caribbean, to provide one complete dataset for all electronically submitted HMS dealer data.

NOAA Fisheries regularly cross-validates the weight of fish and the purchase dates provided in dealer reports with the logbook trip information, including the weigh-out

slips, to ensure all fish are accounted for throughout the fishery. When discrepancies are found, NOAA Fisheries works to ensure the fish are correctly entered in the appropriate dealer reporting system and in the logbook.

9.3.4.3 Gulf Fisheries Information Network

GulfFIN is a self-reported, state-federal cooperative program to collect, manage, and disseminate statistical data and information on the marine and estuarine commercial and recreational fisheries. It includes data for Texas to Florida as well as Puerto Rico. The program originally collected data via paper, but information is now collected through both paper and via electronic methods. Electronic reporting by federal dealers was implemented and made available to dealers in Texas, Louisiana, Alabama, and Florida by 2011 and in Mississippi by 2014. Federal dealers were always required to report landings of federally managed species to both state and federal agencies. State regulations dictated whether or not a state-only dealer (purchasing fish caught within the Exclusive Economic Zone) was required to report or could report voluntarily.

GulfFIN metadata indicates that landings exist for all five Gulf States and Puerto Rico from 1985 to 2019. The GulfFIN commercial landings database stores Gulf landings data captured by state commercial dealers via the Trip Ticket Program, which are reported by state commercial fishermen. The data used in the GulfFIN data management system for recreational catch, harvest, and effort estimates are based on the NOAA Fisheries Marine Recreational Fishery Statistics Survey; however, in 2017, GulfFIN completed its MRIP Regional Implementation Plan. Non-confidential data include yearly summary landings, marine recreational fishery catch and effort estimates, and biological samples. Commercial dealer reports are comprised by year, state, and species. When combined with the Atlantic Coastal Cooperative Statistics data, information from the GulfFIN reflect landings across all states from Maine to Texas.

9.3.4.4 Atlantic Coastal Cooperative Statistics Program

This program is the Atlantic coast complement to GulfFIN. It includes state reports from seafood dealers who purchase fish in both state and federal fisheries. The program covers landings from Maine to Florida's east coast. When combined with GulfFIN data, information from the Atlantic Coastal Cooperative Statistics Program reflect landings across all states from Maine to Texas.

9.3.4.5 Northeast Dealer Database

The Northeast dealer database contains data from federally permitted seafood dealers in Virginia to Maine. Prior to May 2004, Northeast landings data were collected directly from federally permitted dealers through federal field agents during dockside interviews, and non-federal data were obtained through a state's trip ticket program. After May 2004, regulations mandated that all dealers with a federal permit issued by GARFO submit their landings data for each trip electronically. GARFO also made available to all dealers the Standard Atlantic Fisheries Information System: an online application allowing seafood dealers in the Northeast to enter landings statistics that met the reporting requirements of both the respective state and NOAA Fisheries.

For each species purchased, dealers provide the following information: fisherman, vessel, trip data (start date, end date, etc.), gears used, and the unit of measure, quantity, market

information, price paid for the species, and area where a fish was caught or removed from the water.

9.3.5 Exempted Fishing Permits

9.3.5.1 Exempted Fishing Permits Database

EFPs are issued to individuals for the purpose of conducting scientific research or other fishing activities aboard private, non-research vessels. NOAA Fisheries also issues Scientific Research Permits to agency or state scientists or academics who conduct research aboard research vessels. The type of EFP issued depends not only on the type of fishing vessel but also on the species being researched. Display permits, another type of EFP, are issued to individuals who are fishing for, catching, and then transporting HMS to certified aquariums for public display. One hundred percent of HMS catches on all EFP trips are reported to NOAA Fisheries.

Appendix References

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