Stock Assessment and Fishery Evaluation Report

NOAA FISHERIES

Atlantic Highly Migratory Species

2022

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

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/news

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

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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

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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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Table of Contents

List of Tables and Figures

List of Commonly Used Acronyms

Acronym	Definition
1999 FMP	1999 Atlantic Tunas, Swordfish, and Sharks Fishery Management Plan
2006 Consolidated HMS FMP	2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan
ABC	Acceptable biological catch
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
CFL	Curved fork length
CFR	Code of Federal Regulations
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COASTSPAN	Cooperative Atlantic States Shark Pupping and Nursery survey
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
ESA	Endangered Species Act
F	Fishing mortality
FES	Fishing Effort Survey
FHS	For-Hire Survey
FL	Fork length
FMP	Fishery management plan

Acronym	Definition
F_{MSY}	Instantaneous fishing mortality rate expected to result in maximum sustainable yield
F_{OY}	Fishing mortality rate expected to result in 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
LJFL	Lower-jaw fork length
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
NED	Northeast Distant Gear Restricted Area
nmi	Nautical mile
NOAA	National Oceanic and Atmospheric Administration
OY	Optimum yield
PLL	Pelagic longline
PLTRP	Pelagic Longline Take Reduction Plan
RFDs	Restricted fishing days
RPMs	Reasonable and prudent measures
SAB	South Atlantic Bight area
SAFE	Stock assessment and fishery evaluation
SAFIS	Standard Atlantic Fisheries Information System

Acronym	Definition
SCRS	Standing Committee on Research and Statistics
SCS	Small coastal sharks
SDC	Status Determination Criteria
SEDAR	SouthEast Data, Assessment, and Review
SEFSC	Southeast Fisheries Science Center
SSB	Spawning stock biomass
SSF	Spawning stock fecundity
TAC	Total allowable catch
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	Vessel monitoring system
ww	Whole weight

Executive Summary

This 2022 Stock Assessment and Fishery Evaluation (SAFE) Report is produced by the NOAA Fisheries Atlantic Highly Migratory Species (HMS) Management Division. It summarizes the best scientific information available concerning the past, present, and possible future condition of HMS stocks, essential fish habitat (EFH), marine ecosystems, and HMS fisheries. It also describes the year's accomplishments in managing these tunas, swordfish, billfishes, and sharks. HMS SAFE Reports provide the public with information on the latest developments in Atlantic HMS management and fulfills Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requirements. All references to HMS in this SAFE Report are regarding Atlantic HMS unless [otherwise] noted.

In 2022, the HMS Management Division accomplished the key actions listed below. The referenced amendments are to the 2006 Consolidated HMS Fishery Management Plan (FMP) (2006 Consolidated HMS FMP).

- Held one virtual and two hybrid HMS Advisory Panel meetings.
- Released a supplemental document regarding Amendment 14 to gather public comment about the acceptable biological catch (ABC) framework for Atlantic sharks (87 FR 3501).
- Published a notice of initiation of a 5-year review of EFH and a request for information (87 FR 19667).
- Published a final rule to increase the annual U.S. quota and subquotas for Atlantic bluefin tuna , as well as the annual U.S. North Atlantic albacore tuna (northern albacore) quota (87 FR 33049).
- Published a final rule to set Atlantic bluefin tuna General category restricted-fishing days (RFDs) for the 2022 fishing year and clarify the regulations regarding applicability of RFDs to HMS Charter/Headboat permitted vessels (87 FR 33056).
- Published a final rule to establish a flexible shortfin mako shark retention limit with a default limit of zero in commercial and recreational HMS fisheries, consistent with the management measure adopted by the International Commission for the Conservation of Atlantic Tunas (ICCAT or "Commission") in 2021 (87 FR 39373).
- Published a final rule regarding Final Amendment 13 to modify Atlantic bluefin tuna management measures applicable to the incidental and directed bluefin tuna fisheries (87 FR 59966).
- Published a final rule to adjust the quotas and retention limits and establish the opening date for the 2023 fishing year for the commercial Atlantic shark fisheries (87 FR 68104).
- Took responsive management action through 19 inseason actions for HMS, particularly for the Atlantic bluefin tuna and shark fisheries.

ICCAT's Standing Committee on Research and Statistics (SCRS) completed stock assessments in 2022 for western Atlantic skipjack tuna and North and South Atlantic swordfish. ICCAT held its 23rd Special Meeting in Vale do Lobo, Portugal from November 14-21, 2022. The goals for the United States in these negotiations 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 HMS stocks, including those important to U.S. interests. The United States advocated for needed conservation and management measures for bluefin tuna, bigeye tuna and other tropical tunas, swordfish, sea turtles, and sharks. In a historic agreement, ICCAT adopted its first management procedure for both stocks of Atlantic bluefin tuna. Led by the United States, ICCAT adopted its first measure on gear and bait modifications to mitigate the impacts of fishing interactions on sea turtles and also adopted a resolution that calls on the Commission to account for the impacts of climate change on ICCAT-managed species and related ecosystems.

NOAA Fisheries partners continued research on shark nursery grounds and studies on EFH along the U.S. Atlantic, Gulf of Mexico, and Caribbean through the Cooperative Atlantic States Shark Pupping and Nursery and the Gulf of Mexico Shark Pupping and Nursery surveys.

Much of the information in this report is based on final reports of 2021 data that were completed or published in 2022. Domestic fishery landings and bycatch data are obtained from the U.S. Annual Report to ICCAT, Fisheries of the United States 2021, and directly from NOAA Fisheries program databases. These include commercial landings from the HMS and coastal fisheries vessel logbook programs; Pelagic Longline, Northeast Fisheries, 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 (MRIP), the Large Pelagics Survey (LPS), 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 (ATR) system.

International landings data are taken from the ICCAT SCRS annual report. International trade data are acquired from the electronic Bluefin Tuna Catch Documentation (eBCD) and Swordfish Statistical Document programs (NOAA Fisheries Office of International Affairs, Trade, and Commerce), 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 (IFTP) database, the permit databases managed by the Greater Atlantic Regional Fisheries Office (GARFO) and Southeast Regional Office (SERO), the HMS dealer permits database, the HMS-managed database containing permit information for exempted fishing, display, and scientific research, and the ATR 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 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 SAFE Report (as specified at 50 CFR 600.315(d)), or similar document. In the SAFE Report, NOAA Fisheries is required to summarize, on a periodic basis, the best scientific information available concerning the condition of the stocks, 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 2022 HMS SAFE Report (Table 1.1) managed under the 2006 Consolidated HMS FMP and subsequent amendments.

Table 1.1 Species Managed under the 2006 Consolidated HMS FMP 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*
Blacktip shark	*Carcharhinus limbatus*
Oceanic whitetip shark	*Carcharhinus longimanus*

Common Name	Scientific Name
Dusky shark	*Carcharhinus obscurus*
Caribbean reef shark	*Carcharhinus perezii*
Sandbar shark	*Carcharhinus plumbeus*
Smalltail shark	*Carcharhinus porosus*
Night shark	*Carcharhinus signatus*
Sand tiger shark	*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 shark	*Isurus oxyrinchus*
Longfin mako shark	*Isurus paucus*
Porbeagle shark	*Lamna nasus*
Smooth dogfish	*Mustelus canis*
Florida smoothhound shark	*Mustelus norrisi*
Gulf smoothhound shark	*Mustelus sinusmexicanus*
Lemon shark	*Negaprion brevirostris*
Bigeye sand tiger shark	*Odontaspis noronhai*
Blue shark	*Prionace glauca*
Whale shark	*Rhincodon typus*
Caribbean sharpnose shark	*Rhizoprionodon porosus*
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*
Scalloped hammerhead shark	*Sphyrna lewini*
Great hammerhead shark	*Sphyrna mokarran*
Bonnethead shark	*Sphyrna tiburo*
Smooth hammerhead shark	*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 HMS stocks, EFH, marine ecosystems, and fisheries managed under federal regulations from a variety of sources across a wide range of disciplines. This includes information from the latest stock assessment data from ICCAT's SCRS and a summary of recommendations and resolutions from ICCAT. 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 2022

Since the publication of the 2021 SAFE Report, NOAA Fisheries proposed or implemented a number of HMS actions. These actions were published in the Federal Register (FR) and are listed in Table 1.2. In 2022, NOAA Fisheries published 7 final rules, 4 proposed rules, 18 inseason actions and temporary final rules, and 13 notices related to HMS, as shown in Figure 1.1. The major actions are also discussed below. Most documents related to these and previous actions are available on the HMS website at www.fisheries.noaa.gov/topic/atlantic-highly-migratory-species or by calling the HMS Management Division at (301) 427-8503.

NOAA Fisheries held three HMS Advisory Panel meetings in 2022 on February 11, May 18-20, and September 7-8. These meetings provided valuable opportunities for comments on management actions that NOAA Fisheries pursued or considered in 2022. Meeting presentations and transcripts are posted online at the HMS website.

On January 24, 2022, NOAA Fisheries published a Notice of Availability of a Supplement to Draft Amendment 14 (87 FR 3504) that provided more details on the tiered acceptable biological catch (ABC) control rule. This Supplement was completed after considering comments received on Draft Amendment 14 (85 FR 60132, September 24, 2020). This amendment relates to implementation of updated 2016 National Standard 1 guidelines as they relate to catch limits for sharks (81 FR 74858; October 18, 2016). Amendment 14 would revise the mechanism or "framework" used in establishing the ABC and allowable catch limits (ACLs) for Atlantic sharks and the process used to account for carryover and underharvest of quotas. Additionally, Amendment 14 would establish an option to phase-in ABC catch control rules and adopt multi-year overfishing status determination criteria (SDC) in certain circumstances. Final Amendment 14 published on January 24, 2023 (88 FR 4157). The framework established in Amendment 14 will be implemented in a future rulemaking.

On April 5, 2022, NOAA Fisheries published a notice of initiation of a 5-year review of HMS EFH and a request for information (87 FR 19667). The purpose of the HMS EFH 5-year review is to evaluate the EFH provisions of the HMS FMP and determine whether updates are warranted. Information was due to NOAA Fisheries by June 6, 2022. A draft HMS EFH 5-year review was in development at the time of publication of this SAFE Report. Additional information can be found in Chapter 3.2.

On May 6, 2022, NOAA Fisheries released Final Amendment 13 to the 2006 Consolidated HMS FMP to modify bluefin tuna management measures applicable to the incidental and directed bluefin tuna fisheries. On October 3, 2022, NOAA Fisheries published the final rule to implement Amendment 13 (87 FR 59966). Amendment 13 included measures that make several changes to the Individual Bluefin Tuna Quota (IBQ) Program in the pelagic longline fishery; discontinue the Purse Seine category and reallocate that bluefin tuna quota to other directed quota categories; cap Harpoon category daily bluefin tuna landings; modify the recreational trophy bluefin tuna areas and subquotas; modify regulations regarding electronic monitoring of the pelagic longline fishery as well as green-stick use; and modify the regulations regarding permit category changes. The proposed rule for this action published on May 21, 2021 (86 FR 27686), and the public comment period was extended on July 20, 2021 (86 FR 38262) to end on September 20, 2021. The final rule became effective on January 1, 2023. Applicable details will be included in the 2023 SAFE Report.

On June 1, 2022, NOAA Fisheries published a final rule to increase the annual U.S. Atlantic bluefin tuna quota and subquotas, as well as the annual U.S. northern albacore quota (87 FR 33049). These quota increases were consistent with ICCAT recommendations adopted in 2021. The final rule also adjusted the bluefin tuna Reserve

category and northern albacore quotas based on the underharvest of the 2021 quotas. The proposed rule for this action published on March 7, 2022 (87 FR 12648) and the public comment period ended on April 6, 2022. The final rule became effective on July 1, 2022.

On June 1, 2022, NOAA Fisheries published a final rule to set Atlantic bluefin tuna General category restricted-fishing days (RFDs) for the 2022 fishing year and clarify the regulations regarding applicability of RFDs to HMS Charter/Headboat permitted vessels (87 FR 33056). This action established RFDs on Tuesdays, Fridays, and Saturdays from July through November 2022. On an RFD, Atlantic Tunas General category permitted vessels may not fish for (including catch-and-release or tag-and-release fishing), possess, retain, land, or sell bluefin tuna. On RFDs, persons aboard HMS Charter/Headboat permitted vessels with a commercial sale endorsement are prohibited from fishing commercially for bluefin tuna. Persons aboard all HMS Charter/Headboat permitted vessels can fish recreationally for bluefin tuna under the applicable Angling category restrictions and retention limits. The proposed rule for this action was published on March 7, 2022 (87 FR 12643), with the public comment period ending on April 6, 2022. The final rule became effective on July 1, 2022.

On July 1, 2022, NOAA Fisheries published a final rule to establish a flexible shortfin mako shark retention limit with a default limit of zero in commercial and recreational HMS fisheries, consistent with the management measure adopted by ICCAT in 2021 (87 FR 39373). The default limit of zero will remain in place unless and until changed. Under this final rule, future changes to the retention limit can only be made based on consideration of regulatory criteria and only if consistent with an allowable retention determination made by ICCAT pursuant to Recommendation 21-09. The proposed rule for this action was published on April 11, 2022 (87 FR 21077) and the public comment period ended on May 11, 2022. The final rule became effective on July 5, 2022.

On November 14, 2022, NOAA Fisheries published a final rule to adjust the quotas and retention limits and establish the opening date for the 2023 fishing year for the Atlantic commercial shark fisheries (87 FR 68104). This action adjusted quotas as allowable based on underharvests from the 2021 fishing year. The proposed rule for this action was published on September 9, 2022 (87 FR 55379) and the public comment period ended on October 11, 2022. The final rule became effective on January 1, 2023.

Table 1.2 HMS Federal Management Actions for January 1–December 31, 2022

Fisheries Affected	Rule or Notice	Published	Citation
Atlantic Sharks	Notice of Availability of Supplement to Draft Amendment 14 to the 2006 Consolidated HMS FMP	1/24/2022	87 FR 3504
Atlantic Sharks	Proposed Rule to Modify the Retention Limit for Shortfin Mako Sharks	4/11/2022	87 FR 21077
Atlantic Sharks	Inseason Adjustments to Gulf of Mexico Aggregated Large Coastal Shark and Atlantic Hammerhead Shark Quotas	6/29/2022	87 FR 38676
Atlantic Sharks	Final Rule to Modify the Retention Limit for Shortfin Mako Sharks	7/1/2022	87 FR 39373
Atlantic Sharks	2023 Atlantic Shark Commercial Fishing Year Proposed Rule	9/9/2022	87 FR 55379
Atlantic Sharks	Notice to Request Applications for the 2023 Shark Research Fishery	11/2/2022	87 FR 66163
Atlantic Sharks	2023 Atlantic Shark Commercial Fishing Year Final Rule	11/14/2022	87 FR 68104
Atlantic Tunas	Proposed Rule to Modify Northern Albacore and Atlantic Bluefin Tuna Quotas for 2022	3/7/2022	87 FR 12648

Fisheries Affected	Rule or Notice	Published	Citation
Atlantic Tunas	Final Rule to Modify Northern Albacore and Atlantic Bluefin Tuna Quotas for 2022	6/1/2022	87 FR 33049
Bluefin Tuna	Annual Adjustment of the Purse Seine and Reserve Category Quotas; General Category Fishery Inseason Transfer of 26 MT from the Reserve Category	2/2/2022	87 FR 5737
Bluefin Tuna	Closure of the January-March 2022 General Category Fishery	2/15/2022	87 FR 8432
Bluefin Tuna	Closure of the 2022 Angling Category Southern Area Trophy Fishery	2/17/2022	87 FR 8983
Bluefin Tuna	Proposed Rule to Adjust the 2022 General Category RFDs	3/7/2022	87 FR 12643
Bluefin Tuna	2022 Angling Category Retention Limit Adjustment	5/4/2022	87 FR 26299
Bluefin Tuna	Closure of the 2022 Angling Category Gulf of Mexico Trophy Fishery	5/20/2022	87 FR 30838
Bluefin Tuna	General Category Retention Limit Adjustment (one fish to three fish)	5/27/2022	87 FR 32094
Bluefin Tuna	Final Rule to Adjust the 2022 General Category RFDs	6/1/2022	87 FR 33056
Bluefin Tuna	General Category Retention Limit Adjustment (three fish to one fish)	6/29/2022	87 FR 38673
Bluefin Tuna	Closure of the Angling Category Northern Area Trophy Fishery	7/1/2022	87 FR 39383
Bluefin Tuna	Transfer of 30 mt from the Reserve Category to the Harpoon Category	7/21/2022	87 FR 43447
Bluefin Tuna	Closure of the June-August 2022 General Category Fishery	8/11/2022	87 FR 49532
Bluefin Tuna	Transfer of 90.5 mt from the Reserve Category to the General Category	9/8/2022	87 FR 54910
Bluefin Tuna	Closure of the 2022 Harpoon Category	9/8/2022	87 FR 54912
Bluefin Tuna	Closure of the September 2022 General Category Fishery	9/21/2022	87 FR 57648
Bluefin Tuna	Final Rule for Amendment 13 to the 2006 Consolidated HMS FMP	10/3/2022	87 FR 59966
Bluefin Tuna	Transfer of 125 mt from the Reserve Category to the General Category	10/7/2022	87 FR 60938
Bluefin Tuna	Closure of the October-November 2022 General Category Fishery	10/26/2022	87 FR 64720
Bluefin Tuna	Transfer of 57.5 mt from the Reserve Category to the General Category	11/30/2022	87 FR 73504
Bluefin Tuna	Closure of the December 2022 General Category Fishery	12/14/2022	87 FR 76427
Swordfish	Final Rule to Adjust the 2022 North and South Atlantic Swordfish Quotas	7/15/2022	87 FR 42373

Fisheries Affected	Rule or Notice	Published	Citation
General	Final Rule on Technical Corrections to the HMS Regulations	3/1/2022	87 FR 11322
General	Notice of Dates for Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops	3/7/2022	87 FR 12667
General	Notice of Public Meeting for the Atlantic Shark Research Fishery	3/25/2022	87 FR 17072
General	Notice of Initiation of 5-Year Essential Fish Habitat Review and Request for Information	4/5/2022	87 FR 19667
General	Notice of Public Meeting of the HMS Advisory Panel	4/25/2022	87 FR 24282
General	Notice of Dates for Atlantic Shark Identification Workshops and Protected Species Safe Handling, Release, and Identification Workshops	6/28/2022	87 FR 38383
General	Notice of Public Meeting of the HMS Advisory Panel	8/2/2022	87 FR 47192

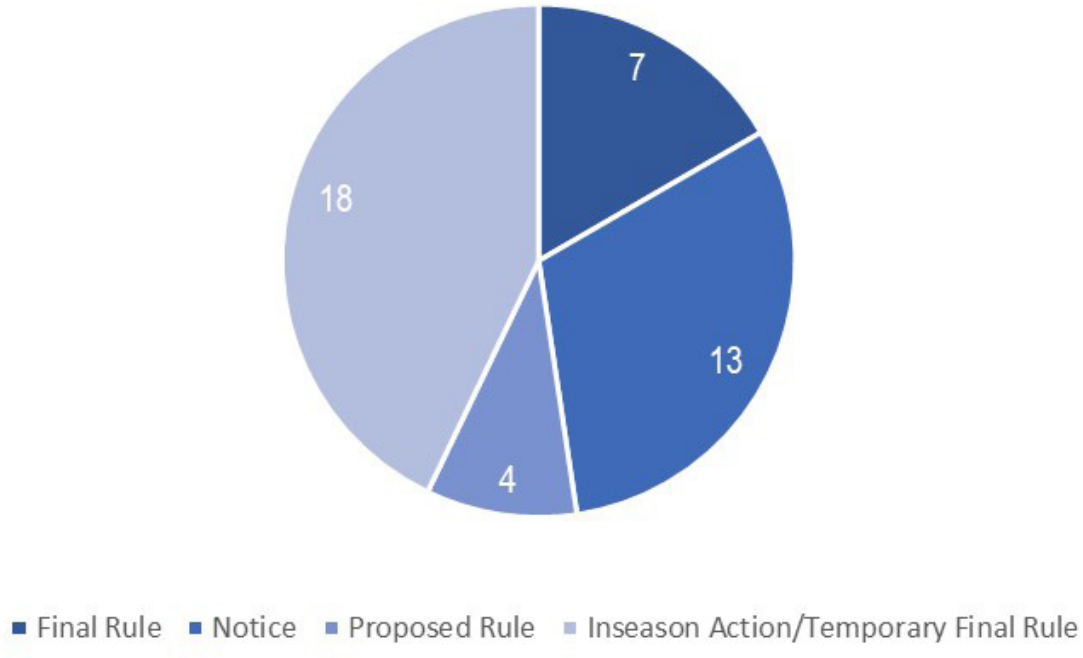

Figure 1.1 HMS Federal Management Actions for January 1–December 31, 2022

1.3 ICCAT 2022 Accomplishments

ICCAT is a regional fishery management organization with 52 members as of 2022, also referred to as CPCs (Contracting Parties, Cooperating Non-Contracting Parties, Entities, or Fishing Entities). The United States is one of these CPCs. The 23rd Special Meeting of the Commission was held virtually and in person in Vale do Lobo, Portugal from November 14 through 21, 2022. 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 HMS stocks (i.e., tunas and swordfish), including those important to U.S. interests. ICCAT made progress on a number of issues, including final action on measures for the conservation and management of bluefin tuna, tropical tunas, and swordfish; on monitoring, control, and surveillance measures, including a measure that requires ICCAT parties to investigate and take appropriate action to address allegations of illegal, unreported, and unregulated (IUU) fishing by their citizens, including not only those individuals directly engaging in illegal fishing activity, but also those benefiting from or supporting IUU fishing activities (e.g., as vessel operators, owners, financial services providers); and compliance. Led by the United States, ICCAT adopted its first measure on gear and bait modifications to mitigate the impacts of fishing interactions on sea turtles and also adopted a resolution that calls on the Commission to account for the impacts of climate change on ICCAT-managed species and related ecosystems. At ICCAT, the United States advocated for needed conservation and management measures for sharks, and for a joint high seas boarding and inspection scheme, although such measures were not adopted this year. ICCAT publishes recommendations from annual meetings online at this website by ICCAT: https://www.iccat.int/en/RecRes.asp

1.3.1 Temperate Tunas

Temperate tunas include Atlantic bluefin tuna and northern albacore.

In a historic agreement, ICCAT adopted its first management procedure (MP) for both stocks of Atlantic bluefin tuna (Recommendation 22-09). An MP is an approach to fisheries management decision-making that applies a pre-agreed framework for actions, such as setting catch limits, designed to achieve specific objectives. These objectives could include meeting conservation obligations and providing stability in fisheries. This advancement will allow for more effective management of stocks in the face of identified uncertainties. The MP establishes an annual total allowable catch of 2,726 mt for 2023 through 2025 for the western Atlantic, which results in a total U.S. quota of 1,341.14 mt (Recommendation 22-10). Recommendation 22-10 was a U.S. proposal co-sponsored by Canada and Japan.

1.3.2 Tropical Tunas

Tropical tunas include bigeye, yellowfin, and skipjack tunas. A stock assessment was conducted for skipjack tuna in 2022. The 2022 assessment report for western Atlantic skipjack tuna noted that the stock is not overfished nor undergoing overfishing.

During the 2022 annual meeting, ICCAT adopted Recommendation 22-01, a one-year rollover recommendation, which extended conservation and management measures for tropical tunas through 2023, including the TAC of 62,000 mt for bigeye tuna and a shortened Atlantic-wide closure of fishing on fish aggregating devices (FADs) to protect juvenile bigeye and yellowfin tuna. The TAC, catch limits, and FAD closure period are expected to be revisited in 2023, including at one or more intersessional meetings of Panel 1. ICCAT also adopted Resolution 22-02 on development of initial conceptual management objectives for western Atlantic skipjack.

1.3.3 Swordfish and Sharks

For North Atlantic swordfish, ICCAT adopted Recommendation 22-03 which was a U.S. proposal and maintained the current TAC of 13,200 mt and rolled over the current management measures from Recommendation 17-02 through 2023. Scientific work continues on developing management strategy evaluation for this important stock. Based

on this, the Commission aims to adopt an MP for North Atlantic swordfish in 2023 that will determine TACs for 2024 onward. The United States and other parties advocated for a shark fins naturally attached measure, but it was ultimately not adopted.

1.3.4 Sea Turtles

Led by the United States, ICCAT adopted its first measure on gear and bait modifications to mitigate the impacts of fishing interactions on sea turtles (Recommendation 22-12). The proposal was co-sponsored by Brazil, Canada, Gabon, Egypt, Turkey, and the European Union. It requires science-based mitigation measures, such as the use of circle hooks in shallow-set longline fisheries, in the Atlantic Ocean. These measures will reduce bycatch and increase post-release survival of sea turtles that are unintentionally caught in ICCAT fisheries. The United States has been promoting this issue at ICCAT for years, and similar measures have been adopted in other regional fishery management organizations.

1.3.5 Compliance

ICCAT completed compliance review as part of the 2022 annual meeting, including review and endorsement of the Chair's recommendations and compliance tables. To further strengthen ICCAT's multilateral compliance process, the Commission adopted a *Schedule of Compliance Actions* (Ref. 22-18). It provides a set of common standards for evaluating the severity of incidents of non-compliance and applying responsive actions in a fair and transparent manner. The Commission also reached agreement on the mandatory use of electronic reporting to submit certain scientific and compliance-related data (Resolution 22-17). This will improve the efficiency of operations and the accessibility of information submitted to ICCAT.

1.4 State Regulations

A periodic review of state tuna regulations for federal consistency by NOAA Fisheries is required by ATCA. Atlantic bluefin and BAYS 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 Connecticut and Mississippi, which previously were determined under ATCA provisions to have regulations at least as restrictive as federal regulations. (50 CFR 635.1(b)).

State fishery management measures for Atlantic sharks, as well as migratory coastal species, largely are coordinated through commissions. These commissions aim to create consistent regulations and ensure stocks are protected across state boundaries. The Atlantic States Marine Fisheries Commission (ASMFC) is composed of 15 member states along the U.S. Atlantic coast. The Gulf States Marine Fisheries Commission (GSMFC) is composed of five member states along the U.S. Gulf of Mexico coast.

In August 2008, the ASMFC approved the Interstate FMP for Atlantic Coastal Sharks, effective as of January 1, 2010. This FMP was modified via Addendum I in September 2009 to allow for limited at-sea processing of smoothhound sharks and to remove recreational smoothhound shark possession limits. The ASMFC Interstate FMP was also modified via Addendum II in May 2013 to establish state shares of any future federal smoothhound shark quota and to allow smoothhound sharks to be fully processed at sea provided the fin to carcass ratio does not exceed

12 percent. In October 2013, the Interstate FMP was further modified through Addendum III to reorganize some shark complexes consistent with federal regulations. Most recently, in August 2016, Addendum IV was finalized, which amended the smooth dogfish at-sea processing requirements consistent with federal regulations. Under

Addendum IV, which states were required to implement by January 1, 2017, smooth dogfish fins may be removed at sea provided that at least 25 percent of the retained catch (by weight) is smooth dogfish. All other requirements such as the 12-percent fin-to-carcass ratio are still applicable, consistent with federal regulations. Addendum V, implemented in October 2018, allows the ASMFC Coastal Shark Board to respond to changes in the stock status of

coastal shark populations and adjust regulations through Board action rather than an addendum, ensuring greater consistency between state and federal shark regulations. Two ASMFC motions of note were approved in 2019. On April 30, 2019, the ASMFC 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. On May 4, 2022, ASMFC approved a zero retention limit in state waters for Atlantic shortfin mako sharks for both recreational and commercial fisheries, consistent with the NOAA Fisheries' zero retention limit proposed rule. This measure became effective at the same time as the NOAA Fisheries final rule (87 FR 39373, July 1, 2022).

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 minimis* 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, Texas, Florida, and New Jersey, although some of these states allow limited exemptions for species such as smoothhound sharks and, in the case of Florida, exempt some federal commercial shark permit holders. 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 October 20, 2022, are listed in Table 1.3. While the 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.

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Table 1.3 State Rules and Regulations Pertaining to HMS

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
Maine				X	Sharks: 13-188 CMR Ch. 50, §50.02	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	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 http://gencourt.state.nh.us/rules/state_agencies/fis600.html); 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	Tunas Regs	Swordfish	Billfishes	Sharks	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. (Continued on next page)	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

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
Rhode Island (Continued)				X	Sharks: RI Code of Regulations 250-RICR-90-00-3.19	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 22-01	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
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

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
New Jersey				X	Sharks: NJ Admin Code, Title 7. Dept of Environmental Protection, NJAC 7:25-18.1 and 7:25-18.12	Sharks: Sharks may be harvested in the recreational fishery only by angling with a handline or rod and reel. Sharks may be harvested in the commercial fishery only by gillnets, trawl nets, and pound nets. State waters are closed to possession of species belonging to the aggregated large coastal shark and hammerhead groups from May 15 through July 15. A shark or dogfish may be eviscerated prior to landing. The fins may not be removed from a shark or spiny dogfish until fishing has ceased and such shark or spiny dogfish has been landed, except that commercial fishermen may completely remove the fins of any of the species in the smoothhound shark group prior to landing if the total wet weight of the fins does not exceed 12 percent of the dressed weight of the carcasses and at least 25 percent of the total retained catch of all marine species, by weight, is comprised of smooth dogfish. Effective January 1, 2021 the possession and sale of shark fins is prohibited.	New Jersey Division of Fish and Wildlife Greg Hinks Phone: (609)748-2020 Fax: (609) 748-2032
Delaware			X	X	Billfish: DE Code. titl. 7, § 1310 Sharks: DE Code Title 7 § 928ADE Code Regulations 3541	Billfish: Prohibition on sale of Atlantic sailfish and blue, white, and striped marlin. Sharks: ASMFC Coastal Shark Plan. Shark fins may be possessed, but cannot be sold. It is unlawful to land or possess any species of shark in state waters that is illegal to catch or land or possess in federal waters.	Delaware Division of Fish and Wildlife David Stormer Phone: (302) 739-9914

State	Tunas Regs	Swordfish	Billfishes	Sharks	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/Billfish/Swordfish: 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 catch required to be tagged and reported using catch cards. 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 shark fins are removed, the total wet weight of caudal fins may not exceed 4 percent of total dw of smoothhound shark carcasses landed or found on board vessel, and dorsal and pectoral fins may not exceed 8 percent of the total dw of smoothhound shark carcasses landed or found on board a vessel. Shark fin prohibition: no person shall possess, sell, offer for sale, trade or distribute a shark fin, excluding spiny dogfish and smooth dogfish. Commercial fishermen with a license and permit issued by the State to take or land sharks for commercial purposes may possess or distribute, but not sell within Delaware. Recreational fishermen may possess shark fins for personal use.	Maryland Department of Natural Resources Sarah Widman Phone: (410) 260-8266

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
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: It is unlawful to take blue marlin, white marlin, roundscale spearfish or sailfish, except by hook and line or for recreational purposes; recreational possession limit of one blue marlin, white marlin, or roundscale spearfish/vessel/trip; one sailfish/person/day; minimum size of 99" for blue marlin, 66" for white marlin and roundscale spearfish, and 63" for sailfish; unlawful to sell or offer for sale blue marlin, white marlin, roundscale spearfish, 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 Steve Poland Phone: (252) 808-8011 Fax: (252) 726-0254
South Carolina	X	X	X	X	Tuna/Swordfish: SC Code Ann 50-5-2725 and 2730 Billfish: SC Code Ann 50-5-1700, 1705, 2725 and 2730; 50-1-30 (7)	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. (Continued on next page)	South Carolina Department of Natural Resources Amy Dukes Phone: (843) 953-9365 Fax: (843) 953-9362

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
South Carolina (Continued)	X	X	X	X	Sharks: SC 50-5-2725, 2730	Sharks: See list for prohibited sharks; gillnets may not be used in the shark fishery in state waters; state commercial permit required for shark fishing in state waters.	South Carolina Department of Natural Resources Amy Dukes Phone: (843) 953-9365 Fax: (843) 953-9362
Georgia			X	X	Gear Restrictions/ Prohib: GA Code Ann 27-4-7(gillnets); 391-2-4-.12 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: May be landed by recreational fishermen provided activities are in compliance with Federal regulations. Sharks (commercial/recreational): Prohibited species same as federal, plus silky and oceanic whitetip sharks; Gear is restricted to the use of rod and reel or handlines; non-offset, non-stainless, corrodible circle hooks required in the recreational shark fishery except when fishing with flies or artificial lures; 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; shortfin mako retention limit one/person or boat (whichever less) with minimum size of 83” FL (regardless of sex); other sharks retention limit one shark/person or boat (whichever is less) with minimum size of 54” FL; all species may have the head removed but fins and tails must remain naturally attached; 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

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
Florida		X	X	X	Sharks: FL Administrative Code 68B-44 Billfish and Spearfish: FL Administrative Code 68B-33 Swordfish: FL Administrative Code 68B-58	Billfish: Longbill and Mediterranean spearfish harvest, possession, landing, purchase, sale, 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. (Continued on next page)	Florida Fish and Wildlife Conservation Commission Christine Kittle Phone: (850) 487-0554 Fax: (850) 487-4847

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
Florida (Continued)		X	X	X	Sharks: FL Administrative Code 68B-44 Billfish and Spearfish: FL Administrative Code 68B-33 Swordfish: FL Administrative Code 68B-58	Sharks (commercial/recreational): Prohibited species same as federal regulations plus prohibition on harvest of spiny dogfish, lemon, sandbar, silky, tiger, great hammerhead, smooth hammerhead, scalloped hammerhead, and shortfin mako (commercial harvest only) 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, smoothhounds, finetooth, Atlantic sharpnose and a minimum size of 83" for shortfin mako; 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, scalloped hammerhead, and shortfin mako 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. (Continued on next page)	Florida Fish and Wildlife Conservation Commission Christine Kittle Phone: (850) 487-0554 Fax: (850) 487-4847

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
Florida (Continued)		X	X	X	Sharks: FL Administrative Code 68B-44 Billfish and Spearfish: FL Administrative Code 68B-33 Swordfish: FL Administrative Code 68B-58	Effective Jan 1, 2021, the possession, import, export, and sale of shark fins are prohibited with the following 2 exceptions: 1) shark fins may be sold by commercial fishermen who harvested sharks from a vessel holding a valid federal shark fishing permit on January 1, 2020 and 2) shark fins may be exported and sold by any wholesale dealer holding a valid federal Atlantic shark dealer permit on January 1, 2020.	Florida Fish and Wildlife Conservation Commission Christine Kittle Phone: (850) 487-0554 Fax: (850) 487-4847
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; yellowfin retention limit 3/person/day. 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 fishermen possess a federal shark research fishery permit), and silky (unless fishermen possess a federal Atlantic shark permit). (Continued on next page)	Alabama Department of Conservation and Natural Resources, Marine Resources Division Director Scott Bannon Phone: (251) 861-2882 www.outdooralabama.com

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
Alabama (Continued)	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	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. When using natural bait in state waters to fish for sharks, anglers must use non-offset non-stainless-steel circle hooks. Restrictions on chumming and shore-based angling if creating unsafe conditions for beach goers, sun bathers, swimmers, or any other person. 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	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
Mississippi	X	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. Swordfish: 47" LJFL minimum size. 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. Commercial fishery has identical size regulations to the recreational fishery. Bag limit is 25 small and large coastal sharks in aggregate per endorsed individual per day. Seasons are set to run concurrently with the federal shark fisheries. To qualify for a Commercial Shark Endorsement, anglers must attend an ID and Safe Handling Course and pass an exam.	Mississippi Department of Marine Resources Trevor Moncrief Phone: (228) 374-5000

State	Tunas Regs	Swordfish	Billfishes	Sharks	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 and roundscale spearfish, 63" LJFL for sailfish, and 25" carcass length for swordfish (47" LJFL if not dressed swordfish possession limit is 1/angler or 4/vessel on recreational trips, 1/angler or 6/vessel on charter vessels, and 1/angler or 15/vessel on headboats, whichever is lower; 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. (Continued on next page)	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	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
Louisiana (Continued)	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	Sharks: Recreational/Commercial: 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; male shortfin mako sharks must be at least 71 inches fork length and female mako sharks must be at least 83 inches fork length; bag limit for sharks, except sandbar, silky, and all prohibited sharks of one/ vessel/ trip in aggregate, in addition, no person shall possess more than one Atlantic sharpnose shark and one bonnethead shark per person per trip. 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
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. (Continued on next page)	Texas Parks & Wildlife Department Perry Trial Phone: (361) 729-2328 Fax: (361) 729-1437 (fax)

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
Texas (Continued)		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	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 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. Sharks: Nurse sharks year-round closed season. Federal regulations and permit requirements apply in territorial waters.	Puerto Rico Department of Natural and Environmental Resources Grisel Rodriguez-Ferrer Email: grodriguezf@drna.pr.gov Phone: (787) 999-2200 ,x 3211

State	Tunas Regs	Swordfish	Billfishes	Sharks	Citation Reference	Regulatory Details	Contact Information
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

State regulations are subject to change. Please contact the appropriate state personnel to ensure that the regulations listed above are current. States are listed 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

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 (Magnuson-Stevens Act §3(42) 16 U.S.C. 1802(42)). "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 (50 CFR 600.310(d)). Stock assessments measure the impact of fishing on stocks and project harvest levels that maximize the number of fish that can be caught sustainably while preventing overfishing and, where necessary, rebuilding depleted stocks (for additional information on stock assessments, also known as fish population assessments, please see https://www.fisheries.noaa.gov/topic/population-assessments).

Stock status determination criteria (SDC) are measurable and objective factors that are used to determine if overfishing has occurred, or if a stock or stock complex is overfished. The Magnuson-Stevens Act (section 3(34)) defines both "overfishing" and "overfished" to mean a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce MSY on a continuing basis. To avoid confusion, the NS1 guidelines section on SDC clarifies that "overfished" relates to biomass of a stock or stock complex, and "overfishing" pertains to a rate or level of removal of fish from a stock or stock complex" (50 CFR 600.310(e)(2)(i)(A)). This section of the NS1 guidelines also provides a definition of overfished and overfishing.

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

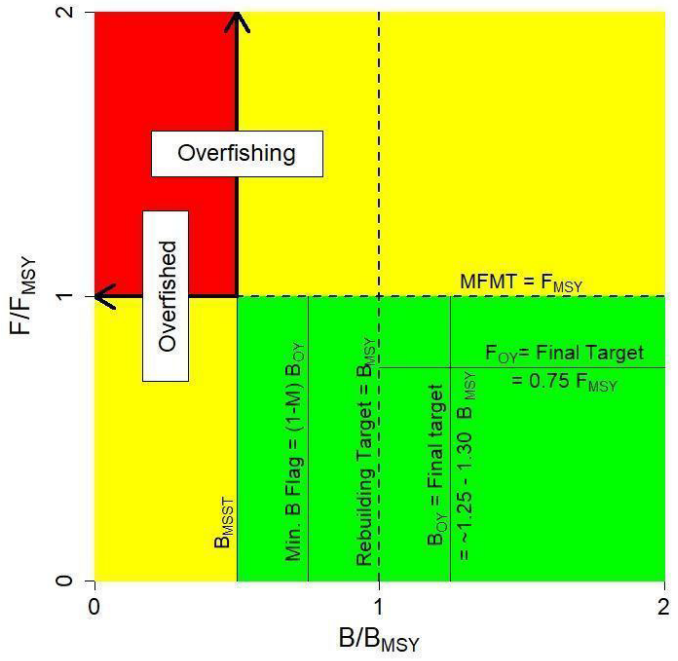

Figure 2.1 Illustration of the Status Determination Criteria and Rebuilding Terms for Domestically-managed HMS Stocks

Images like Figure 2.1, also known as a Kobe plot, are frequently used by stock assessment scientists to summarize the results of various stock assessment models. Generally, if the model results are in the green portion of the figure, the stock may have a status of "not overfished" and "overfishing is not occurring." Similarly, model results in the yellow portions of the figure are not desirable, generally representing a stock with a status of "overfished" or "overfishing is occurring," and results in the red portion represent a stock that is both "overfished" and for which "overfishing is occurring."

Under the applicable SDC used for HMS that are not ICCAT-managed species (i.e., most species of sharks), a species is considered overfished when the current biomass in a given year (Byear) is less than the minimum stock size threshold ($B < B_{MSST}$) (MSST). The 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, B, can fall below B_{MSY} without causing the stock to be declared overfished as long as B remains above B_{MSST}. If a stock is declared overfished, action to rebuild the stock is required by law. A stock is considered rebuilt when B is greater than B_{MSY}. A minimum biomass flag is a biomass level below B_{MSY} and above B_{MSST}, which can be used to alert managers to the need to implement measures to prevent the stock from becoming overfished.

The thresholds used to calculate the overfished status of domestically assessed HMS (i.e., most species of sharks) as described in the 1999 FMP are:

- A stock is overfished if $B_{year} < B_{MSST}$.
- 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. In many cases, an average M across age classes or sensitivity runs from a stock assessment model is used to calculate MSST.
- Biomass target during rebuilding = B_{MSY}.
- Minimum biomass flag = $(1\text{-}M)B_{OY}$.
- Level of certainty of *at least* 50 percent but depends on species and circumstances.

Prior to final Amendment 12 to the 2006 Consolidated HMS FMP (Amendment 12), to determine whether a stock was overfished, NOAA Fisheries applied the above domestic status criteria to all HMS, although the ICCAT criteria for determining a stock "overfished" was different than the domestic criteria. ICCAT defines overfished status as Byear relative to BMSY, while the domestic criteria define overfished status as Byear relative to BMSST. Under both the ICCAT and domestic criteria, a stock is considered rebuilt once B in a given year (Byear) is greater than or equal to BMSY. With the finalization of Amendment 12, NOAA Fisheries adopted the ICCAT criteria for overfished status (B or its proxy) for all ICCAT-managed stocks. Now the overfished thresholds and statuses are the same domestically and internationally for the ICCAT-managed species in Table 2.1. In other words, the thresholds used to calculate the overfished status of internationally assessed HMS are:

- A stock is overfished if $B_{year} < B_{MSY}$.
- Biomass target during rebuilding = B_{MSY}.

Figure 2.2 illustrates the SDC, or thresholds, relevant to ICCAT-managed HMS stocks.

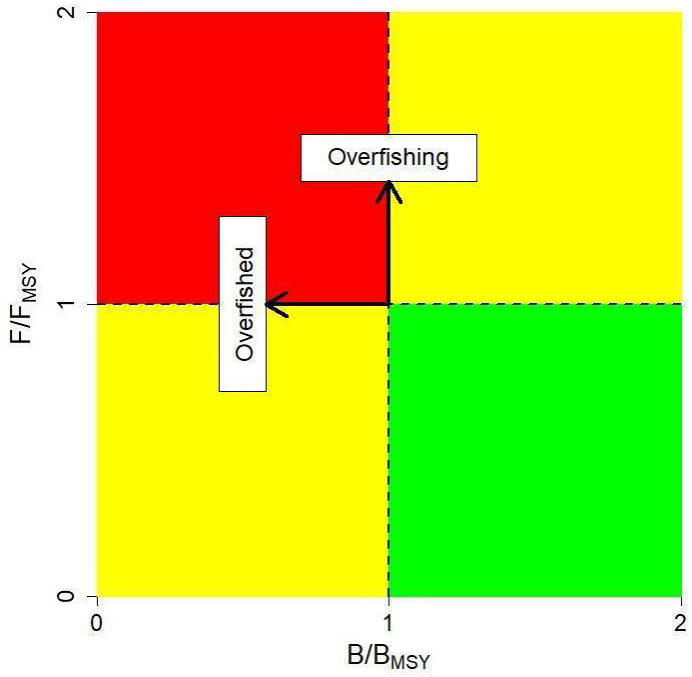

Figure 2.2 Illustration of the Status Determination Criteria and Rebuilding Terms for ICCAT-managed HMS Stocks

For all HMS, SDC for overfishing are the same for ICCAT and NOAA Fisheries (Figure 2.2). The maximum fishing mortality (F) threshold is represented by F_{MSY}. If fishing mortality in the current year exceeds the maximum sustainable fishing threshold ($F > F_{MSY}$), the criteria state that overfishing is occurring for that stock. Under the Magnuson-Stevens Act, such a determination legally requires actions to end overfishing and improve the fishery status. The thresholds used for calculating overfishing status for all HMS (internationally assessed or domestically assessed) are:

- Maximum fishing mortality threshold = $F_{limit} = F_{MSY}$.
- Overfishing is occurring when $F_{year} > F_{MSY}$.
- Fishing mortality during rebuilding < F_{MSY}.

Domestically, a stock has a healthy status 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}).

- Biomass for healthy stocks = $B_{OY} \approx 1.25$ to $1.30B_{MSY}$.

Fishing mortality for healthy stocks = $0.75F_{MSY}$ (final target = F_{OY}).

2.2 Stock Assessment Determinations

Table 2.1 and Table 2.2 present the stock assessment information and the current stock statuses of HMS as of October 2022 under the domestic thresholds and applicable international thresholds. The domestic hammerhead

shark stock assessment is still underway. When reviewing the table, note that for some stocks (e.g., bluefin tuna, northern albacore), spawning stock biomass is used as a proxy for biomass. For sharks, in some cases, spawning stock fecundity (SSF) or number of fish is 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.

NOAA Fisheries updates the status of fish stocks managed under federal fishery management plans quarterly based on stock assessments completed during that quarter https://www.fisheries.noaa.gov/national/status-stocks-reports and provides an annual Status of U.S. Fisheries Report to Congress (https://www.fisheries.noaa.gov/national/sustainable-fisheries/status-stocks-2021). NOAA Fisheries recently launched the Stock Status, Management, Assessment, and Resource Trends (Stock SMART) web tool, which can be found at: https://www.st.nmfs.noaa.gov/stocksmart?app=homepage. StockSMART has applications to search, view, compare, and download the results of assessments for stocks managed by NOAA Fisheries.

Table 2.1 Domestic and International Stock Statuses for Overfished and Not Overfished Atlantic Highly Migratory Species - ICCAT-managed species

Species	Current Relative Biomass Level	B_{MSY}	Threshold	International Stock Status	Domestic Stock Status	Years to Rebuild	Rebuilding Start Date (End Date)
Western Atlantic bluefin tuna	Unspecified*1	Unspecified*1,*2	B_{MSY}	Unspecified*1	Unknown*1		
Atlantic bigeye tuna	SSB_{2019}/SSB_{MSY} = 0.94 (0.71–1.37)	Unspecified*2	B_{MSY}	Overfished	Overfished	Not available*3	1/1/1999
Atlantic yellowfin tuna	B_{2018}/B_{MSY} = 1.17 (0.75–1.62)	Unspecified*2	B_{MSY}	Not overfished	Not overfished		
North Atlantic albacore tuna	B_{2018}/B_{MSY} = 1.32 (1.13–1.51)	B_{MSY} = 392,556 mt (349,403–405,097)	B_{MSY}	Not overfished	Not overfished (rebuilt)		
Western Atlantic skipjack tuna	B_{2020}/B_{MSY}: 1.60 (0.90–2.87)	48,736 mt (31,755-72,196)	B_{MSY}	Not overfished	Not overfished		
North Atlantic swordfish	B_{2020}/B_{MSY} = 1.08 (0.71-1.33)	57,919 mt (23,666-153,156)	B_{MSY}	Not overfished	Not overfished		
South Atlantic swordfish	B_{2020}/B_{MSY} = 0.77 (0.53–1.11)	74,641 mt (60,179-92,946)	B_{MSY}	Overfished	*4	Not available*3	6/11/2018
Blue marlin	SSB_{2016}/SSB_{MSY} = 0.69 (0.52–0.91)	Unspecified*2	B_{MSY}	Overfished	Overfished	Not available*3	6/1/2001
White marlin (and roundscale spearfish)	B_{2017}/B_{MSY} = 0.58 (0.27–0.87)	Unspecified*2	B_{MSY}	Overfished	Overfished	Not available*3	6/1/2001

Species	Current Relative Biomass Level	B_{MSY}	Threshold	International Stock Status	Domestic Stock Status	Years to Rebuild	Rebuilding Start Date (End Date)
West Atlantic sailfish	SSB_{2014}/SSB_{MSY} = 1.81 (0.51–2.57)*[5] SSB_{2014}/SSB_{MSY} = 1.16 (0.18–1.69)*[6]	1,438–1,636 mt*[5,*6]	B_{MSY}	Not likely overfished	Not overfished (rebuilding)		
Longbill spearfish	Unknown	Unknown	B_{MSY}	Unknown	Unknown		
Northwest Atlantic porbeagle sharks	B_{2018}/B_{MSY} = 0.57*[7]	Unspecified*[2,*8]	B_{MSY}	Overfished	Overfished	100	7/24/2008 (2108)
North Atlantic blue shark	B_{2013}/B_{MSY} = 1.35–3.45	Unspecified*[2]	B_{MSY}	Not likely overfished	Not Overfished		
North Atlantic shortfin mako shark	B_{2015}/B_{MSY} = 0.57–0.95	62,555 mt–123,475 mt*[9]	B_{MSY}	Overfished	Overfished	48	6/17/2022 (2070)
Sandbar shark	SSF_{2015}/SSF_{MSY} = 0.77	SSF_{MSY} = 681,000 (numbers of sharks)	595,000 (1-M)SSF_{MSY}	NA	Overfished	66	1/1/2005 (2070)
Gulf of Mexico blacktip shark	SSF_{2016}/SSF_{MSY} = 2.73	SSF_{MSY} = 14,400,000 (numbers of sharks)	12,200,000 (1-M)SSF_{MSY}	NA	Not overfished		
Atlantic blacktip shark	SSF_{2018}/SSF_{MSY} =1.16	SSF_{MSY} = 449,000 (numbers of sharks)	387,000 (1-M) SSF_{MSY}	NA	Not overfished		

Species	Current Relative Biomass Level	B_{MSY}	Threshold	International Stock Status	Domestic Stock Status	Years to Rebuild	Rebuilding Start Date (End Date)
Dusky shark	SSF_{2015}/SSF_{MSY} = 0.41–0.64	Unknown*[2]	(1-M)SSB_{MSY}	NA	Overfished	~100	7/24/2008 (2107)
Scalloped hammerhead shark	N_{2005}/N_{MSY} = 0.45	N_{MSY} = 62,000 (numbers of sharks)	(1-M)N_{MSY}	NA	Overfished	10	7/3/2013 (2023)
Atlantic bonnethead shark	Unknown	Unknown	Unknown	NA	Unknown		
Gulf of Mexico bonnethead shark	Unknown	Unknown	Unknown	NA	Unknown		
Atlantic sharpnose shark—Atlantic stock	SSF_{2011}/SSF_{MSY} = 2.07	SSF_{MSY} = 4,860,000 (numbers of sharks)	(1-M)SSF_{MSY}	NA	Not overfished		
Atlantic sharpnose shark—Gulf of Mexico stock	SSF_{2011}/SSF_{MSY} = 1.01	SSF_{MSY} = 17,900,000	(1-M)SSF_{MSY}	NA	Not overfished		
Atlantic blacknose shark—Atlantic stock	SSF_{2009}/SSF_{MSY} = 0.43–0.64	SSF_{MSY} = 77,577–288,360 (numbers of sharks)	62,294–231,553 (1-M)SSF_{MSY}	NA	Overfished	30	7/3/2013 (2043)
Atlantic blacknose shark—Gulf of Mexico stock	Unknown	Unknown	(1-M)B_{MSY}	NA	Unknown		
Finetooth shark	N_{2005}/N_{MSY} = 1.80	N_{MSY} = 3,200,000 (numbers of sharks)	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	3,701,000 (1-M)SSF_{MSY}	NA	Not overfished		

Species	Current Relative Biomass Level	B_{MSY}	Threshold	International Stock Status	Domestic Stock Status	Years to Rebuild	Rebuilding Start Date (End Date)
Gulf of Mexico smoothhound shark complex	N_{2012}/N_{MSY} = 1.68–1.83	N_{MSY} = 7,190,000	5.53E+06 $(1\text{-}M)N_{MSY}$	NA	Not overfished		

B = Biomass (may include 95% confidence intervals). 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. CPUE = Catch Per Unit Effort. THRESHOLD is the "Minimum Stock Size Threshold" (B_{MSST}) for stocks managed domestically. For ICCAT-managed stocks, maximum sustainable yield (B_{MSY}) is used as the threshold. Minimum Stock Size Threshold (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.

*[1]In the 2021 bluefin tuna stock assessment, the SCRS did not use biomass-based reference points in formulating 2017, 2020 update, or 2021 revised models. The SCRS has been unable to resolve the long-term recruitment potential reiterated that it is not possible to calculate biomass-based reference points (e.g., B_{MSY}) absent additional knowledge or a basis for assumptions regarding how future recruitment potential relates to spawning stock biomass].

*[2]A value for B_{MSY} (or its proxy) was not provided in the 2021 stock assessment.

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

*[4]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.

*[5]Stock synthesis estimate based on increasing CPUE trends, with approximate 95 percent confidence intervals.

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

*[7]Value obtained with the Incidental Catch Model. The reference point used (SPR_{MER}) is a proxy for B_{MSY}.

*[8]No value is available because spawning potential ratio (SPR) is a relative amount. The SPR measures the reproductive potential of a fished stock relative to that of an unfished stock.

*[9]Only the BSP2-JAGS and JABBA models provided B_{MSY} values in biomass. The B_{MSY} range encompasses the eight scenarios run of the BSP2-JAGS and JABBA models. The SS3 model provided B_{MSY} values in numbers.

Source: Standing Committee on Research and Statistics reports (SCRS 2007, 2008, 2009a, 2009b, 2010, 2011, 2012a, 2012b, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022); Gibson and Campana 2005; NOAA Fisheries (2006, 2007); Hayes et al. 2009; Southeast Data, Assessment, and Review (SEDAR 2011a, 2011b, 2011c, 2011d, 2013a, 2013b, 2015a, 2015b, 2016, 2018a, 2018b, 2020).

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
Western Atlantic bluefin tuna	$F_{current\ (2018\text{-}2020)}$ = 0.063 (0.059–0.067) $F_{0.1}$ = 0.118 (0.113–0.123) $F_{current}/F_{0.1}$ = 0.53 (0.49-0.58)	*1	Overfishing is not occurring	Overfishing is not occurring
Atlantic bigeye tuna	F_{2019}/F_{MSY} = 1.00 (0.63–1.35)	*2	Overfishing is not occurring	Overfishing is not occurring
Atlantic yellowfin tuna	F_{2018}/F_{MSY}= 0.96 (0.56–1.50)	*2	Overfishing is not occurring	Overfishing is not occurring
North Atlantic albacore tuna	F_{2018}/F_{MSY} = 0.62 (0.52–0.74)	F_{MSY} = 0.093 (0.091–0.108)	Overfishing is not occurring	Overfishing is not occurring
Western Atlantic skipjack tuna	F_{2020}/F_{MSY}: 0.41 (0.19-0.89)	F_{MSY} = 0.54 (0.36-0.83)	Overfishing is not occurring	Overfishing is not occurring
North Atlantic swordfish	F_{2020}/F_{MSY} = 0.80 (0.64–1.24)	F_{MSY} = 0.15 (0.08-0.23)	Overfishing is not occurring	Overfishing is not occurring
South Atlantic swordfish	F_{2020}/F_{MSY} = 1.03 (0.67–1.51)	F_{MSY} = 0.15 (0.12-0.19)	Overfishing is occurring	*3
Blue marlin	F_{2016}/F_{MSY} = 1.03 (0.74–1.50)	*2	Overfishing is occurring	Overfishing is occurring
White marlin (and roundscale spearfish)	F_{2017}/F_{MSY} = 0.65 (0.45-0.93)	*2	Overfishing is not occurring	Overfishing is not occurring
West Atlantic sailfish	F_{2014}/F_{MSY} =0.33 (0.25–0.57)*[4] F_{2014}/F_{MSY} =0.63 (0.42–2.02)*[5]	*2	Overfishing is not likely occurring	Overfishing is not occurring
Longbill spearfish	Unknown	Unknown	Unknown	Unknown
Northwest Atlantic porbeagle shark	$F_{2010\text{-}2018}/F_{MSY}$ = 0.413	F_{MSY} = 0.049	Overfishing is not likely 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*[6]	Overfishing is occurring	Overfishing is occurring
Sandbar shark	F_{2015}/F_{MSY} = 0.58	F_{MSY} = 0.07	NA	Overfishing is not occurring

Species	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Threshold	International Stock Status	Domestic Stock Status
Gulf of Mexico blacktip shark	F_{2016}/F_{MSY} = 0.023	F_{MSY} = 0.087	NA	Overfishing is not occurring
Atlantic blacktip shark	F_{2018}/F_{MSY} = 0.51	F_{MSY} = 0.051	NA	Overfishing is not occurring
Dusky shark	F_{2015}/F_{MSY} = 1.08–2.92	F_{MSY} = 0.015–0.046	NA	Overfishing is occurring
Scalloped hammerhead shark	F_{2005}/F_{MSY} =1.29	F_{MSY} = 0.11	NA	Overfishing is occurring
Bonnethead shark—Atlantic stock	Unknown	Unknown	NA	Unknown
Bonnethead shark—Gulf of Mexico stock	Unknown	Unknown	NA	Unknown
Atlantic sharpnose shark—Atlantic stock	F_{2011}/F_{MSY} = 0.23	F_{MSY} = 0.184	NA	Overfishing is not occurring
Atlantic sharpnose shark—Gulf of Mexico stock	F_{2011}/F_{MSY} = 0.57	F_{MSY} = 0.331	NA	Overfishing is not occurring
Atlantic blacknose shark—Atlantic stock	F_{2009}/F_{MSY} = 3.26–22.53	F_{MSY} = 0.01–0.15	NA	Overfishing is occurring
Atlantic blacknose shark—Gulf of Mexico stock	Unknown	Unknown	NA	Unknown
Finetooth shark	F_{2005}/F_{MSY} = 0.17	F_{MSY} = 0.03	NA	Overfishing is not occurring
Atlantic smooth dogfish	F_{2012}/F_{MSY} = 0.61–0.99	F_{MSY} = 0.129	NA	Overfishing is not occurring
Gulf of Mexico smoothhound shark complex	F_{2012}/F_{MSY} = 0.07–0.35	F_{MSY} = 0.106	NA	Overfishing is not occurring

F = Fishing mortality. MSY = Maximum sustainable yield. NA = Not assessed internationally, CPUE = Catch per unit effort.

*[1]F_{year} refers to the geometric mean of the estimates for 2018–2020 (a proxy for recent F levels). In the 2021 bluefin tuna stock assessment, the Standing Committee on Research and Statistics did not use biomass-based reference points (e.g., F_{MSY}) in formulating 2017, 2020 update, or 2021 revised models. The SCRS has been unable to resolve the long-term recruitment potential. In the 2021 bluefin tuna stock assessment and the 2020 stock assessment update, the SCRS reiterated that it is not possible to calculate biomass-based reference points (e.g., F_{MSY}) given the inability to resolve differing possible recruitment scenarios. In the absence of such knowledge, SCRS considers F0.1 to be a reasonable proxy for the western stock. $F_{0.1}$ 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]Stock synthesis estimates are based on increasing CPUE trends, with approximate 95 percent confidence intervals.

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

*[6]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.

Source: Standing Committee on Research and Statistics reports (SCRS 2007, 2008, 2009a, 2009b, 2010, 2011, 2012a, 2012b, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022); Gibson and Campana 2005; NOAA Fisheries (2006, 2007); Hayes et al., 2009; Southeast Data, Assessment, and Review (SEDAR 2011a, 2011b, 2011c, 2011d, 2013a, 2013b, 2015a, 2015b, 2016, 2018a, 2018b, 2020).

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

In 2022, the SCRS completed assessments for western Atlantic skipjack tuna and North and South Atlantic swordfish. Northeast porbeagle sharks were also assessed, but NOAA Fisheries does not monitor this stock. A history of HMS stock assessments conducted by the SCRS is shown in Table 2.3.

Table 2.3 International HMS Stock Assessments Conducted by the SCRS

Stock	Last Assessment Year	Upcoming Assessment*	Notes
Western Atlantic bluefin tuna	2021	TBD (2026 or 2027)	
Atlantic bigeye tuna	2021	TBD	
Atlantic yellowfin tuna	2019	TBD	
North Atlantic albacore tuna	2020	2023	
Western Atlantic skipjack tuna	2022	TBD	
North Atlantic swordfish	2022	TBD	
South Atlantic swordfish	2022	TBD	
Blue marlin	2018	2024	
White marlin (and roundscale spearfish)	2019	2025	
West Atlantic sailfish	2016	2023	
Longbill spearfish	1997	TBD	
Porbeagle	2020	TBD	NW, SE, and SW stocks assessed in 2020. NE stock assessed in 2022.

Stock	Last Assessment Year	Upcoming Assessment*	Notes
Shortfin mako	2017	2024	In 2019, SCRS updated projections from the 2017 assessment.
Blue shark	2015	2023	

Tentative dates; reflects information known as of December 2022. TBD = To be determined.

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 has been 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 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. 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. In the past, for species that had been assessed before, SEDAR has either used an "update" assessment, where data are updated for recent years and no changes are made to the model or data streams, or a "standard" assessment, where minor changes to the data streams or model could be made. SEDAR is now moving to instead have "operational" assessments. For stocks that have just finished a research track, managers would wait for the results of an operational assessment. This assessment would use the approach approved in the research track and use up-to-date data. Future assessments of that stock would be operational assessments until such a time it was determined that a new research track would be required. The first HMS stocks to be assessed using this approach is the hammerhead shark complex, which started in 2021. These stocks are currently being assessed under the research track. More information on how SEDAR assessments are conducted can be found at sedarweb.org/sedar-process.

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 stock within the complex due to life history differences.
Finetooth	2007	Benchmark	2024	Research	Next assessment is expected to split this species into two stocks. Assessment will consider data poor stocks including spinner, bull, and tiger sharks.
Blacknose—Atlantic	2011	Benchmark	TBD	Research	
Blacknose—Gulf of Mexico	2011	Benchmark	TBD	Research	2011 assessment rejected by NOAA Fisheries because of a fundamental lack of fit in the assessment model.
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	2020	Benchmark	TBD	Operational	
Scalloped hammerhead	2009	Outside SEDAR	TBD	Research	Ongoing. Scheduled to be completed in 2023.
Sandbar	2018	Standard	TBD	Operational	
Blacktip—Gulf of Mexico	2018	Update	TBD	Operational	
Great hammerhead	N/A	N/A	TBD	Research	Ongoing. Scheduled to be completed in 2024.
Smooth hammerhead	N/A	N/A	TBD	Research	
Bull	N/A	N/A	2024	Research	Assessment will consider data poor stocks including spinner, tiger, and finetooth sharks.
Lemon	N/A	N/A	TBD	Research	
Nurse	N/A	N/A	TBD	Research	
Silky	N/A	N/A	TBD	Research	
Spinner	N/A	N/A	2024	Research	Assessment will consider data poor stocks including bull, tiger, and finetooth sharks.
Tiger	N/A	N/A	2024	Research	Assessment will consider data poor stocks including spinner, tiger, and finetooth sharks.

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	Operational	
Smoothhounds—Gulf of Mexico	2015	Benchmark	TBD	Operational	
Thresher	N/A	N/A	N/A	N/A	Individual species have not been assessed.
Oceanic whitetip	N/A	N/A	N/A	N/A	

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	Research	Next assessment expected to be a research track to consider issues raised after the last update assessment.
Atlantic angel	N/A	N/A	N/A	N/A	
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	Individual species have not been assessed; some species may have been included in some of the early large coastal shark complex assessments.
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: https://www.iccat.int/Documents/Meetings/Docs/2021/REPORTS/2021_WBFT_SA_ENG.pdf
- North Atlantic albacore tuna: http://www.iccat.int/Documents/Meetings/Docs/2020/REPORTS/2020_ALB_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: http://sedarweb.org/sedar-65
- 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 (updated projections)
- Northwest Atlantic porbeagle shark: https://www.iccat.int/Documents/Meetings/Docs/2020/REPORTS/2020_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: https://www.iccat.int/Documents/Meetings/Docs/2022/REPORTS/2022_SWO_SA_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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NOAA Fisheries. 2007. SEDAR 13 Stock Assessment Report: small coastal sharks, Atlantic sharpnose, blacknose, bonnethead, and finetooth shark. Silver Spring (MD): Atlantic HMS Management Division.

Restrepo VR, Thompson GG, Mace PM, Gabriel WL, Low LL, MacCall AD, Methot D, Powers JE, Taylor BL, Wade PR, Witzig JF. 1998. Technical guidance on the use of precautionary approaches to implementing National

Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Tech. Mem. NMFS-F/ SPO-31.

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3 Ecosystem Based Fishery Management and Essential Fish Habitat

3.1 Ecosystem-Based Fishery Management

NOAA strives to adopt an ecosystem-based approach throughout its broad ocean and coastal stewardship, science, and service programs. Ecosystem-based management is a systemic approach that aims to maintain ecosystems in a healthy, productive, and resilient condition. In the fisheries sector, this approach is known as ecosystem-based fisheries management (EBFM). NOAA Fisheries has both an agency-wide EBFM Policy (https://www.fisheries.noaa.gov/resource/document/ecosystem-based-fisheries-management-policy) and an EBFM Road Map (https://www.fisheries.noaa.gov/resource/document/ecosystem-based-fisheries-management-road-map). NOAA Fisheries also developed regional EBFM Implementation Plans, including one for HMS. The HMS EBFM plan describes milestones that further progress towards EBFM. Some of these milestones include participation on committees or work groups that further ecosystem management goals, support essential fish habitat designations and consultations, and support the collection of information or data that can inform EBFM. The HMS EBFM plan can be downloaded at this link: https://media.fisheries.noaa.gov/dam-migration/final_hms_ebfm_implementation_plan_041519.pdf.

The HMS Management Division implemented rulemakings to support EBFM in 2021-2022. For example, Amendment 12 to the 2006 Consolidated HMS FMP (86 FR 46836; August 20, 2021) created a new EBFM objective for the FMP. This new objective specifies that the agency will: "[C]onsistent with the other objectives of this FMP, consider ecosystem-based effects and seek to understand the impacts of shifts in the environment, including climate change, on Atlantic HMS fisheries to support and enhance effective HMS fishery management." Amendment 12 is available at this website: https://www.fisheries.noaa.gov/action/amendment-12-2006-consolidated-hms-fishery-management-plan-msa-guidelines-and-national. NOAA Fisheries also published a paper in September 2021 on an HMS predictive spatial modeling tool ("PRISM") that could inform future rulemakings (see https://www.fisheries.noaa.gov/atlantic-highly-migratory-species/new-scientific-paper-published-noaas-highly-migratory-species).

The HMS Management Division is involved in other EBFM initiatives as a cooperating partner. For example, in 2021, the Division contributed data and information to "State of the Ecosystem" reports for the New England and Mid-Atlantic Fishery Management Councils. These reports inform the councils about social, ecological, and economic aspects of the ecosystem – from fishing engagement to oceanographic and climate conditions. The State of the Ecosystem Reports for the Northeast U.S. Shelf can be downloaded here: https://www.fisheries.noaa.gov/new-england-mid-atlantic/ecosystems/state-ecosystem-reports-northeast-us-shelf. Some information included in the State of the Ecosystem report is also included in the NOAA National Marine Ecosystem Status website (https://ecowatch.noaa.gov/), which provides data on major marine ecosystem indicators by theme and region. The HMS Management Division will work with the NOAA Research Council's Ecosystem Indicators working group in 2023 to consider potential HMS indicators that could be incorporated into this website and other integrated ecosystem assessment products. HMS Management Division staff have also participated in other climate initiatives, such as the Mid-Atlantic Fishery Management Council scenario planning exercise (for more details, see https://www.mafmc.org/climate-change-scenario-planning).

3.1.1 Climate Regional Action Plans

The NOAA Fisheries Climate Science Strategy (https://www.fisheries.noaa.gov/national/climate/noaa-fisheries-climate-science-strategy) addresses the need for more information on the impacts of climate changes on living marine resources, and science-based approaches for sustaining living marine resources and resource-dependent communities in a changing climate. The goal of this strategy is to increase the production, delivery, and use of climate-related information required to fulfill NOAA Fisheries mandates. The strategy is regionally implemented

through regional action plans (RAPs), of which the first versions were published in 2016. HMS are included in both the Northeast and Southeast RAPs, and the HMS Management Division is considered a partner in the regional climate teams that implement the RAPs.

On April 22, 2022, NOAA Fisheries published a request for public comment on the second version of the RAPs ("RAP 2.0") (87 FR 24099). On May 23, 2022, NOAA Fisheries published an extension of the public comment period through July 29, 2022 (87 FR 31215). As of October 2022, finalized versions of RAP 2.0 are in development. The HMS Management Division is an active partner in finalizing the Northeast and Southeast RAP 2.0 reports.

3.1.2 HMS Climate Vulnerability Assessment (CVA)

- The NOAA Fisheries Climate Science Strategy prioritized the use of CVAs to better understand what is at risk and why, and to help triage and prioritize climate science funding and resource decisions. Some HMS sharks have been included in CVAs conducted by RAP teams (Table 3.1), however there is a strong need for a comprehensive HMS CVA for several reasons:
- The regional nature of these exercises is often not aligned with the full range of the analyzed species. For example, sandbar shark was analyzed in the Gulf of Mexico and South Atlantic CVAs. However, it was not included in the Northeast CVA. Their known distribution extends into waters off southern New England, and there are several important nursery areas for neonate and young-of-year sandbar recognized as Habitat Areas of Particular Concern in the Mid-Atlantic Bight region. A comprehensive analysis can consider how best to incorporate results from the work previously done, and provide connectivity across these efforts to address information gaps.
- There has not been a CVA completed yet in the U.S. Caribbean.
- Atlantic tunas, billfish and swordfish have not yet been considered in a CVA.

On September 8, 2022 NOAA Fisheries announced the start of a new comprehensive Atlantic HMS CVA project at the Fall 2022 HMS Advisory Panel meeting (see presentation: https://media.fisheries.noaa.gov/2022-08/Fall%202022%20HMS%20AP%20Meeting%20CVA_508.pdf). NOAA Fisheries uses CVAs to identify what species may be most vulnerable to climate change based on: 1) their exposure to predicted changes in the environment; and 2) their sensitivity or adaptability to handle those changes based on life history characteristics. The Office of Sustainable Fisheries will lead the HMS climate vulnerability assessment based on a general approach published in 2015 for marine fish and invertebrates (https://www.st.nmfs.noaa.gov/Assets/ecosystems/climate/documents/TM%20OSF3.pdf). As of October 2022, NOAA Fisheries has initiated identification of a core planning team, scoping and preparations for a scoring exercise that is anticipated to occur in Q2 or Q3 of FY23.

The HMS CVA has been highlighted as a priority exercise in both the southeast and northeast RAPs (see Section 3.1.1).

Table 3.1 CVA Summary

CVA	Year Completed	Species Included (sharks)
Northeast region	2016	Dusky, porbeagle, sand tiger, smooth dogfish
Gulf of Mexico region	In progress; 2022-2023	Atlantic sharpnose, bonnethead, dusky, sandbar, sand tiger
South Atlantic region	In progress; 2022-2023	Atlantic sharpnose, blacknose, bonnethead, dusky, finetooth, great hammerhead, scalloped hammerhead, lemon, nurse, sandbar, tiger

3.2 Essential Fish Habitat (EFH)

3.2.1 Current EFH Boundary Data Sources

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

3.2.2 Essential Fish Habitat Designations in the 2006 Consolidated HMS FMP 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 (Magnuson-Stevens Act § 303(a)(5); 16 U.S.C. 1853(a)(5)). 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 (50 CFR 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 Notice of Availability for Amendment 10 and supporting documents are available at: https://www.fisheries.noaa.gov/action/amendment-10-2006-consolidated-hms-fishery-management-plan-essential-fish-habitat.

The HMS Management Division initiated an EFH 5-Year Review in early 2022 with a public request for information that was not previously included in recent updates to HMS EFH or has become available since publication of Final Amendment 10 (87 FR 19667; April 5, 2022). The submission window for public feedback closed on June 6, 2022. NOAA Fisheries received a new dataset including metadata and information from the Maryland Department of Natural Resources , and two submitted comments. One of these comments concerned EFH designations for spiny dogfish, which is not managed under the HMS FMP and is therefore beyond the scope of the HMS EFH 5-Year Review. The 5-year review will evaluate published scientific literature, unpublished scientific reports, information solicited from interested parties, and previously unavailable or inaccessible data related to the 10 mandatory components of EFH (see 50 CFR 600.815(a)(1)-(10)) to determine whether modifications to existing EFH descriptions and delineations are warranted.

A summary of the management history of HMS EFH is provided in Table 3.2.

Table 3.2 Management History for HMS EFH

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 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 HMS. HAPC for bluefin tuna spawning area designated in the Gulf of Mexico.
2010 Amendment 3 to the 2006 Consolidated Atlantic HMS FMP	EFH first defined for smoothhound sharks (smooth dogfish, Florida smoothhound, and Gulf smoothhound).
2010 White Marlin/ Roundscale Spearfish Interpretive Rule and Final Action	EFH first defined for roundscale spearfish (same as white marlin EFH designation in Amendment 1 to the 2006 Consolidated Atlantic HMS FMP).
2015 Atlantic HMS EFH 5-Year Review	Comprehensive review of EFH for all HMS. Determined that changes to some EFH descriptions and boundaries were warranted.
2017 Amendment 10 to the 2006 Consolidated Atlantic HMS FMP	EFH updated for all federally managed HMS. Existing HAPCs for sandbar shark and bluefin tuna adjusted and new HAPCs for sand tiger shark and lemon shark created to reflect recommendations in the 2015 5-year review.
TBD, Atlantic HMS EFH 5-Year Review	Comprehensive review of EFH for all HMS. In progress, anticipated publication in 2023.

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 delineate shark nursery habitats in the Atlantic and Gulf of Mexico. The Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) and the Cooperative Gulf of Mexico States Shark Pupping and Nursery (GULFSPAN) surveys 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. Shark nursery habitat is defined in Heupel et al. (2007) as habitats in which: 1) juvenile sharks are more commonly encountered in the area; 2) juvenile sharks remain or return to the area over an extended period; 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 2020 COASTSPAN survey, the most recent year for which data are available, are shown in Figure 3.1. Results by region from this survey (McCandless, personal communication) are described below, and shark species found by sampling location are summarized in Table 3.3.

Figure 3.1 Regions Sampled During the 2021 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 in 2021 encompassed the entire bay, from the mouth of the Delaware River to the mouth of Delaware Bay, using bottom longline gear in a random stratified design based on depth and geographic location. Additional sampling was also conducted at historical fixed stations throughout the bay.

Sandbar sharks dominated the catch (68 percent) in 2021, as in previous years, followed by sand tigers and smooth dogfish. Nine adult male Atlantic sharpnose sharks were also caught during July and August in Delaware Bay; the majority were caught in the more saline parts of the bay near the shipping channel on the New Jersey side of the Bay or within the Anchorage Area on the Delaware side of the Bay. Additionally, juveniles of three other species were caught during 2021 sampling: four spinner sharks (including two young of the year), two dusky sharks, and one scalloped hammerhead. As in previous years, the majority (98 percent) of sandbar sharks were immature, with 18 percent of the juveniles being young of the year. The remaining sandbar sharks were considered mature females based on published size at maturity estimates. Most smooth dogfish caught were immature in 2021, with young of the year dominating the catch. Only two mature smooth dogfish were caught, both were females caught during the July survey in deeper cooler water at the mouth of the Bay. Thirty-five percent of sand tiger sharks caught were immature, with the remaining considered mature based on clasper calcification for males and published size at maturity for females.

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

3.3.1.2 Virginia

COASTSPAN sampling in 2021, 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 bottom longline gear in a stratified random design, with stratification based on depth and geographic location.

Sandbar sharks continued to dominate the catch (97 percent) in the bay, lagoon, and inlet habitats of Virginia in 2021. All sandbar sharks caught were juveniles and the majority were young of the year: 86 percent along the Eastern Shore and 77 percent within Chesapeake Bay. Total catches were similar between regions, although the majority (69 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. More sandbar sharks (60 percent) were caught at depths less than 30 feet along the Eastern Shore, but the catch rates were higher at sampling locations with depths of 30 feet or greater. In addition to sandbar sharks, six other species were caught in Virginia waters during the 2021 survey and all individuals were considered immature based on clasper calcification and/or published size at maturity estimates, except one female blacknose shark and one male Atlantic sharpnose shark caught along the Eastern Shore in July and within Chesapeake Bay in August, respectively. Other sharks caught along the Eastern Shore included two blacktip sharks (one in July and a young of the year in August), a smooth dogfish in July, and a scalloped and smooth hammerhead in June and August, respectively. Within Chesapeake Bay, an additional young of the year blacktip shark was caught in August, an Atlantic sharpnose shark in July, and two scalloped hammerheads, one in June and one in July. Virginia's estuarine waters continue to provide important nursery habitat for sandbar sharks.

3.3.1.3 South Carolina

COASTSPAN sampling in 2021, conducted by the South Carolina Department of Natural Resources, took place using bottom longline, drumline, and gillnet gear 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.

Fifteen species of sharks were captured; the most abundant, at 35 percent of the total catch, was Atlantic sharpnose. Other sharks captured, in order of abundance, were sandbar, finetooth, bonnethead, scalloped hammerhead, blacktip, blacknose, spinner, sand tiger, bull, lemon, nurse, and dusky sharks. There were also two shortfin makos and one night shark caught offshore of Charleston Harbor. Winyah Bay's estuarine and nearshore waters had the greatest species diversity; all but three species (night shark, sand tiger, and shortfin mako sharks) were encountered in 2021. 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, still primarily contained mature finetooth sharks caught near the bay entrance. Scalloped hammerheads were found in all regions sampled except North Edisto but 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 89 percent of the juvenile scalloped hammerheads caught in 2021 similar to previous years. The majority of sharks captured in all locations were immature, but the following species primarily consisted of mature sized individuals: Atlantic sharpnose, bonnethead, blacknose, nurse, and sand tiger.

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 in 2021, conducted by the University of North Florida, took place using bottom longline gear

in the estuarine waters of the Altamaha, St. Simons, and St. Andrew sound systems.

Of the eight species of shark captured, Atlantic sharpnose and bonnethead sharks were the most abundant, accounting for 36 and 35 percent of the catch, respectively. Other sharks, in order of abundance, were sandbar, blacktip, and bull sharks. There were also two juvenile finetooth sharks, one juvenile scalloped hammerhead, and one lemon shark (estimated at 250 cm TL) caught in the St. Simons sound system during June and July. The Altamaha sound system continued to provide nursery habitat for young-of-the-year bull sharks in 2021. St. Simons and St. Andrew sound systems also continued to provide nursery habitat for bonnethead, Atlantic sharpnose, sandbar, and blacktip sharks. The majority of all species captured were immature, highlighting the importance of these areas as nursery habitat for both small and large coastal shark species. As in previous years, several of the bonnethead and Atlantic sharpnose sharks captured 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 in 2021, conducted by the University of North Florida, used bottom longline and drumline gear within Cumberland Sound, Nassau Sound, and the Tolomato River. Species in the 2021 catch included, in order of abundance, sandbar, scalloped hammerhead, Atlantic sharpnose, finetooth, blacktip, bonnethead, and bull sharks. Additionally, one lemon shark estimated at 250 cm total length was caught within Cumberland Sound in June. The Tolomato River had the greatest species diversity, providing nursery habitat for all species encountered except for the lemon shark. Primarily mature bonnethead sharks (60%) were caught in 2021, including stations within the Tolomato River and Nassau and Cumberland Sounds. Cumberland Sound provided nursery habitat for sandbar, blacktip, finetooth, Atlantic sharpnose, and bonnethead sharks. Nassau Sound was also used as a nursery habitat by sandbar and blacktip sharks in 2021. Mature Atlantic sharpnose sharks were also encountered within the Tolomato River and Cumberland Sound. These findings highlight the importance of the estuarine waters as nursery habitat for several small and large coastal shark species and note the continued use of these areas and the nearshore coastal waters by adult small coastal sharks.

Florida Atlantic University surveyed the Indian River Lagoon from Sebastian Inlet to Saint Lucie Inlet using drumline and gillnet gear in 2021. Only two shark species were encountered in this area: bull sharks (67 percent) and bonnethead (33 percent). Captured bull sharks were all juveniles, primarily caught over mud habitat within the lagoon during winter, spring, and summer. Of the bonnethead sharks that were caught during the fall in 2021, two juveniles were encountered in the lagoon system over mud habitat and the remaining mature bonnetheads were captured over sand and mud bottoms. Continued monitoring of this region will help to refine EFH for species encountered here.

Table 3.3 Shark Species and Sampling Locations in the 2021 COASTSPAN Survey

Sampling Region	Shark Species*	Sampling Locations
New Jersey and Delaware	Atlantic sharpnose, dusky, sand tiger, sandbar, scalloped hammerhead, smooth dogfish, and spinner sharks	Entire bay from the mouth of the Delaware River to the mouth of the Delaware Bay
Virginia	Atlantic sharpnose, blacknose, blacktip, sandbar, scalloped hammerhead, smooth dogfish, and smooth hammerhead 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, dusky, finetooth, lemon, night, nurse, sand tiger, sandbar, scalloped hammerhead, shortfin mako*, and spinner sharks	Nearshore and estuarine waters, including Bulls Bay, Charleston Harbor, North Edisto, Port Royal Sound, St. Helena Sound, and Winyah Bay. Additional sampling in offshore waters off Charlestown Harbor
Georgia	Atlantic sharpnose, blacktip, bonnethead, bull, finetooth, lemon, sandbar and scalloped hammerhead sharks	Estuarine waters of the Altamaha, St. Simons and St. Andrew Sound systems
Florida (Atlantic Coast)	Atlantic sharpnose, blacktip, bonnethead, bull, finetooth, lemon, sandbar, and scalloped hammerhead sharks	Nearshore and estuarine waters, including Cumberland Sound, Nassau Sound, Tolomato River, off Mayport Beach, and the Indian River Lagoon from Sebastian Inlet to Saint Lucie Inlet

*Species are listed alphabetically. Ordering is not reflective of abundance or catch-per-unit-effort. Source: Northeast Fisheries Science Center (C. McCandless, personal communication).

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 NOAA Fisheries Southeast Fisheries Science Center (SEFSC) Panama City Laboratory administers the GULFSPAN program. 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 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.

The following is a summary of the 2021 GULFSPAN catch and noted habitat associations (Carlson et al. 2021). Shark species found by sampling locations are summarized in Table 3.4. Due to COVID-19 restrictions, NOAA Fisheries was unable to conduct sampling. However, academic and non-governmental organizations that are partners in the GULFSPAN project were able to complete sampling in 2021. GULFSPAN sampling in 2020, the most recent year for which data are available, covered three areas (Figure 3.2):

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

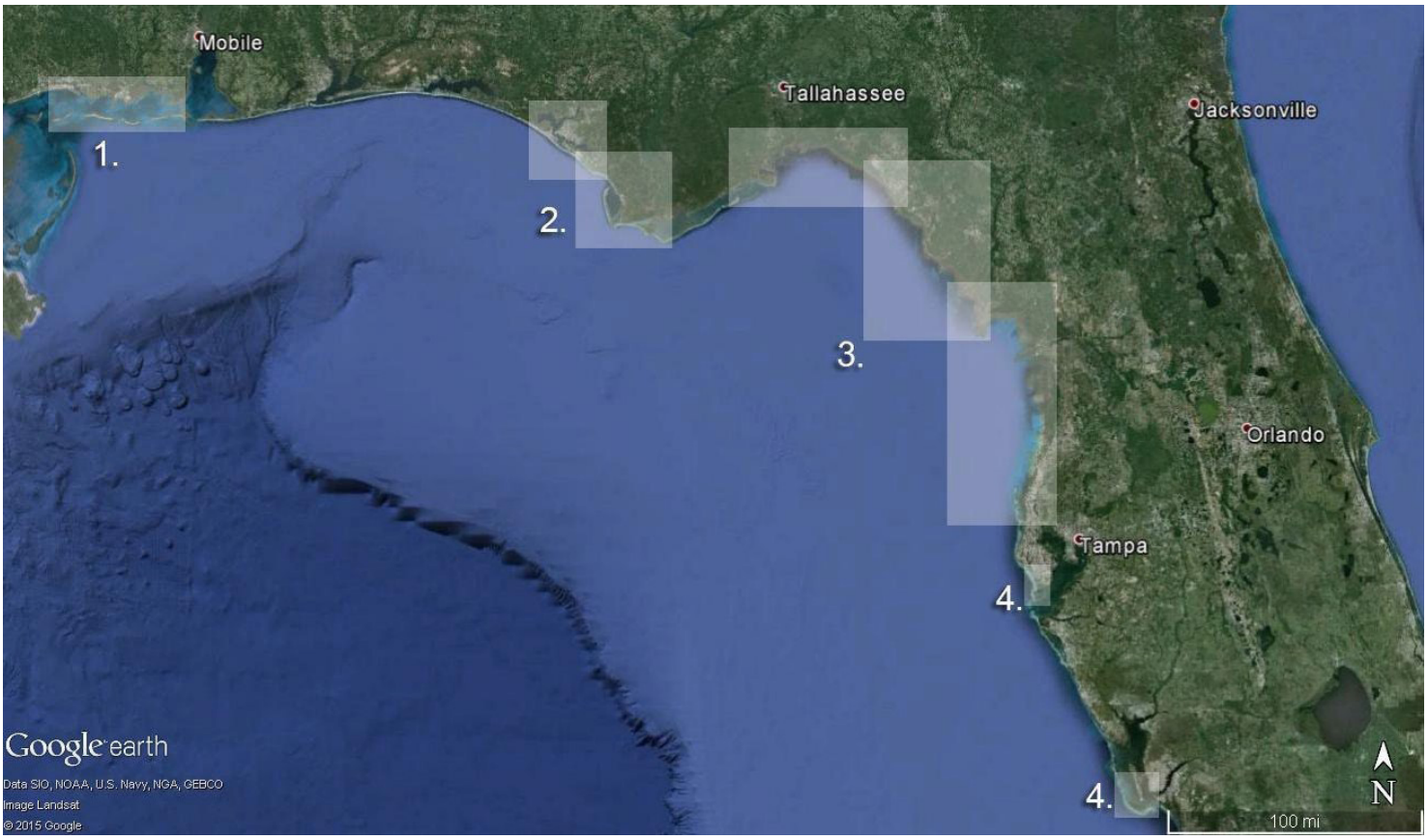

Figure 3.2 Regions Sampled During the 2021 GULFSPAN Survey

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

3.3.2.1 Mississippi Sound

In 2021, GULFSPAN sampling by the University of Southern Mississippi Gulf Coast Research Laboratory divided the coastal waters of the Mississippi Sound into eastern, central, and western regions that were each 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 scheduled to be sampled monthly between April and October.

A total of 21 gillnet sets were made, capturing 44 individual sharks of four shark species (finetooth, Atlantic sharpnose, bull, and blacktip). Approximately 90 percent of the elasmobranch catch were juvenile or young of the year (n = 41 out of 44). All four shark species were predominantly caught in habitats that had predominantly mud/sand or mud/silt/sand substrate. Fifteen rays of three different species (bluntnose stingray, cownose ray, and Brazilian cownose ray) were also captured.

Atlantic sharpnose sharks were the most abundant shark encountered, making up 36.4 percent of the shark catch. All three life stages were encountered in Mississippi Sound. All life stages occurred in higher salinity waters and young-of-year were caught in the lowest water clarity.

Bull sharks were the second most abundant species caught (n = 12), which was a higher rate of capture for this species than recorded in previous years. Only juveniles were encountered in the survey. The next most abundant

species were finetooth (n = 10; only juvenile) and blacktip (n = 6; all three life stages) sharks. Encounters with bull and finetooth sharks occurred over a wide range of salinity and water clarity conditions, and only occurred in summer and early fall. Blacktip shark encounters occurred in higher water temperatures, likely due to the season of capture (fall only). The one adult blacktip shark encountered was considered a rare catch for this survey, as this species usually occurs further south than Mississippi Sound.

Overall, the dominance of juvenile and young-of-the-year sharks suggests the Mississippi Sound continues to be an important habitat for several species of sharks as they mature. Due to the sample design requirements established in 2012, the same sites cannot 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 COVID19 restrictions on sampling activities,correlations of 2021 catch with environmental factors should be interpreted with caution due to sample size and distribution, and are not broadly interpreted in this section.

A total of 33 gillnet sets were made, capturing 10 shark species (bonnethead, Atlantic sharpnose, scalloped hammerhead, blacktip, finetooth, blacknose, bull and lemon). Bonnethead and Atlantic sharpnose sharks were the most abundant species caught with 33.3 and 24.8 percent, respectively, of the total elasmobranch catch. Scalloped hammerhead shark was the second-most encountered species (13.3 percent), followed by blacktip (6.7 percent), finetooth (4.8 percent), blacknose (2.9 percent), lemon (1.0 percent), and bull (< 1.0 percent) sharks. The most abundant batoid captured was the cownose ray, making up 10.5 percent of the total catch. Other species of batoids encountered that made up less than 1 percent of the total catch included smooth butterfly ray and southern 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. Neonate sharks were generally caught in either mud or seagrass habitats at depths of 1.2 to 3.5 meters. Juvenile and adult sharks were predominately captured over mud habitats. Juvenile sharks were caught in slightly deeper waters (average 3.35m ± 1.35m) than neonate (average 1.95m ± 0.85m) or adult (average 2.00m ± 1.11m) sharks. Some variation in habitat by life stage was noted. For example, neonate and juvenile bonnethead were associated with seagrass habitat, but adults were associated with mud. Bull, blacktip, finetooth, and scalloped hammerhead sharks were generally captured at sites with mud bottom.

3.3.2.3 Big Bend of Florida

Sampling by Florida State University Coastal and Marine Laboratory, which consisted of 54 gillnet and 54 longline sets, covered more than 300 km of Florida's coastline from St. George Sound to Anclote Keys. A total of 582 elasmobranchs comprising 15 species were caught. Shark species encountered included Atlantic sharpnose, bonnethead, blacktip, blacknose, finetooth, lemon, and scalloped hammerhead. One individual batoid, a bluntnose stingray, was also caught. Of the 582 sharks caught (313 on longline gear; 269 with gillnets), 279 individuals were tagged and released. Individual species counts provided in the following paragraphs summarize catch from sampling efforts that include both the GULFSPAN (April-October) time window and some sampling that occurred outside of this time window (i.e., in March and November).

Atlantic sharpnose and bonnethead sharks were a combined 77.7 percent of the shark catch in gillnets. All adult Atlantic sharpnose sharks encountered were males, while juveniles and young of the year displayed relatively even sex ratios. Catch of bonnetheads included juveniles and adults of both sexes. Six other species of shark were

caught in gillnets: five blacknose sharks (one young-of-year, two juvenile, and two mature), 29 blacktip (13 young of the year. 13 juveniles and three mature), one mature female great hammerhead shark, three juvenile Florida smoothhound shark, one mature female bull shark, and one young-of-the-year female spinner shark.

Blacktip sharks dominated the catch of the longline sets (148 individuals). Atlantic sharpnose sharks were the second most abundant sharks captured on longline. All mature Atlantic sharpnose captured were males. Blacknose sharks accounted for 11.5 percent of the total shark catch on longline, and included all life stages of both sexes. Tiger sharks comprised 5.4 percent (18 individuals) of the catch on longlines, most of which were juveniles. Five other species were also caught on longlines: four spinner sharks, four bull sharks, two nurse sharks, seven lemon sharks, and two juvenile female great hammerhead sharks.

Sampling in 2021 continued to indicate that this region provides important primary nursery habitat for several species of large and small coastal sharks. Habitats sampled included seagrass (*T. testudinum, H. wrightii, and Syringodium filiforme*), drift algae-dominated bottom, mud bottom, sandy ridges, and hard bottom reefs dominated by soft corals and sponges. Seagrass habitats in this region were in waters shallower than 4 meters, and most sampling effort occurred in this habitat type. All life stages of Atlantic sharpnose sharks, except adult females, were found in all habitats sampled, although very few were captured over hard bottom reefs. Juvenile and adult bonnethead sharks 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 sharks were typically captured on the edges of muddy channels adjacent to seagrass habitats.

Sampling in St. George Sound occurred from April 12 through October 14, 2021. Water temperatures varied throughout the sampling season, and salinity was moderate to high (26 to 33.3). Sampling from Apalachee Bay to Anclote Key occurred over June, July, and August when water temperatures were high, and salinity at most stations above 25.0. Of the three dominant species captured, generalized additive models indicate that capture rates of Atlantic sharpnose sharks and blacktip sharks are significantly correlated with clarities under 300 cm and bonnetheads are negatively correlated with clarity and maximum depth, but correlation coefficients suggest weak relationships.

3.3.2.4 Southern Tampa Bay, Florida

In 2021, New College of Florida conducted GULFSPAN sampling in three areas: Terra Ceia Bay, the Manatee River, and Sarasota Bay. Sampling was conducted monthly from May through October with paired longline and gillnet sets in all three areas.

A total of 193 sets were made (95 gillnet sets and 98 longline sets) capturing 366 elasmobranchs from nine shark and five batoid species. Shark species encountered include bonnethead, blacktip, Atlantic sharpnose, bull, blacknose, nurse, great and scalloped hammerhead, lemon and nurse sharks. The five batoid species include cownose ray, bluntnose ray, Atlantic stingray, southern stingray and smooth butterfly ray. Immature animals made up 66 percent of the total catch, with 24 percent of these being young of the year. Twelve neonate sharks were caught: five blacktip, three bull, an Atlantic sharpnose, a blacknose, a great hammerhead, and a scalloped hammerhead. Approximately 7 percent of the catch was not assigned a life stage.

Abundance and size trends differed slightly by area. Blacktip shark was the most abundant species encountered, comprising 26 percent of the total elasmobranch catch. Catch of this species was composed of primarily immature animals of both sexes. The bonnethead, comprising 25 percent of the total elasmobranch catch, was the second most abundant species encountered overall. Over 80 percent of the catch was female, with approximately equal numbers of mature and juvenile animals. The cownose ray, was the third most abundant species encountered overall, comprising 19% of the total elasmobranch catch. Catch of this species was primarily males, mature and immature. The Atlantic sharpnose shark was the fourth most abundant species encountered overall, at 13% of the total elasmobranch catch. Catch of this species was predominantly male (77%), mostly immature animals. The bull shark was the fifth most abundant species, at 4% of the catch. Catch of this species was consisted of immature animals of both sexes. Elasmobranchs encountered in low abundance (<4 percent of the catch) included the

Atlantic stingray (immature and mature animals of both sexes), the blacknose shark (mostly female neonate/YOY), the great hammerhead (mostly immature females), the southern stingray (all female), the scalloped hammerhead (all neonate/YOY), the bluntnose stingray, the nurse shark, the smooth butterfly ray, and the lemon shark.

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.

Juvenile bull sharks were associated with a similarly wide range of salinities and a broader range of depths, but were only encountered over muddy to sandy habitat in the Manatee River, whereas YOY bull sharks were found in similar habitat, but only encountered in low salinity areas. Blacktip sharks were associated with a broad range of abiotic factors and were captured over all bottom types and in all depths sampled. Atlantic sharpnose sharks were associated with moderate to high salinity and mostly sandy to muddy bottoms, but were similarly found in all depths sampled. Bonnetheads were similarly associated with moderate to high salinities, but were primarily associated with a mixture of sandy and seagrass bottom and shallower depths. Great hammerhead sharks were associated with higher salinities and sandy bottoms at a range of depths. Blacknose and scalloped hammerhead sharks were only encountered in Sarasota Bay this year, were found only at high salinity (>32 ppt) and associated primarily with sand or mixed sand and seagrass bottoms. Nurse sharks were encountered only in the deeper waters sampled, associated with moderate to high salinity, and sandy bottoms. One lemon shark was encountered this year in Terra Ceia Bay during one of the earliest, and thus coldest sets of the season, in a shallow area with mixture of mud and seagrass.

Table 3.4 Shark Species and Sampling Locations in the 2021 COASTSPAN Survey

Sampling Region	Shark Species*	Sampling Locations
Mississippi	Atlantic sharpnose, bull, finetooth, blacktip	Mississippi Sound
Northwest Florida – St. Andrew Bay to St. Vincent Island	Bonnethead, Atlantic sharpnose, scalloped hammerhead, blacktip, finetooth, blacknose, and lemon sharks	St. Andrew Bay, Crooked Island Sound, St. Joseph Bay, Apalachicola/St. Vincent Island
Big Bend of Florida – St. George Sound to Anclote Keys	Atlantic sharpnose, blacktip, bonnethead, blacknose, tiger, lemon, bull, spinner, great hammerhead, Florida smoothhound, and nurse sharks	St. George Sound, Apalachee Bay, Suwanee Sound, Waccasassa Bay, Anclote Keys (and locations in between these sites)
Florida—Southern Tampa Bay	Blacktip, bonnethead, Atlantic sharpnose, bull, blacknose, great and scalloped hammerhead, nurse, and lemon sharks	Terra Ceia Bay, Estuarine Manatee River, and Sarasota Bay

*Species are listed by order of abundance in surveys. Source: Carlson et al. 2022.

3.3.3 Conclusion

The COASTSPAN and GULFSPAN surveys provide comprehensive information that is incorporated into the HMS EFH 5-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.

3.4 Chapter 3 References

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4 Permits and Tournaments

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.

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. Prior to January 1, 2023, the HMS limited access permit program was 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.

Several of these permits were designed to be held in combination to reduce regulatory discards and monitor bycatch in the pelagic longline fishery. 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 held, 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 October 2022, approximately 172 Swordfish Directed, 70 Swordfish Incidental, 206 Shark Directed, and 241 Shark Incidental limited access permits were issued. In addition, approximately 77 Swordfish Handgear permits and 240 Atlantic Tunas Longline category permits were issued.

The purse seine fishery was managed under a limited entry system with transferable individual vessel quotas among existing fishery participants. New entrants were excluded from the Atlantic Tunas Purse Seine category. There were no active vessels permitted for this category in 2021. As of January 1, 2023, the Atlantic Tunas Purse Seine category was discontinued (87 FR 59966, October 3, 2022).

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 2022 is 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,2017-2022*

Year	Swordfish Directed	Swordfish Incidental	Swordfish Handgear	Shark Directed	Shark Incidental	Atlantic Tunas Longline Category	Permit Holders (Permits Issued)
2017	185	72	83	221	269	280	588 (1,110)
2018	185	72	83	220	268	280	537 (1,108)
2019	183	71	82	218	263	280	527 (1,097)
2020	177	71	81	213	256	281	513 (1,079)
2021	177	69	82	213	256	284	580 (1,081)
2022	172	70	77	206	241	240	502 (1,006)

Note: Number of permits and permit holders in each category subject to change as permits are renewed or expire. *As of October 2022. Source: SERO.

Table 4.2 Numbers of Limited Access Shark, Swordfish, and Atlantic Tunas Longline Category Vessel Permits and Permit Holders by State in 2022*

State	Swordfish Directed	Swordfish Incidental	Swordfish Handgear	Shark Directed	Shark Incidental	Atlantic Tunas Longline Category	Permit Holders (Permits)
Maine	3	1	1	1	7	4	9 (17)
Massachusetts	10	2	4	5	12	12	21 (45)
Rhode Island	-	-	8	-	2	-	8 (10)
Connecticut	3	2	-	1	4	5	5 (15)
New York	8	2	1	6	8	10	14 (35)
Pennsylvania	1	-	-	1	1	1	2 (4)
New Jersey	20	10	5	18	23	30	44 (106)
Delaware	1	-	1	2	1	1	2 (6)
Maryland	4	-	-	2	2	4	4 (12)
Virginia	1	-	-	1	2	1	3 (5)
North Carolina	11	10	-	24	11	21	24(77)
South Carolina	5	1	-	8	10	6	17 (30)
Georgia	-	1	-	4	3	1	7 (9)
Florida	76	30	55	109	113	105	270 (488)
Alabama	1	-	-	3	3	1	6 (8)
Louisiana	24	4	1	18	26	28	48 (101)
Texas	1	7	-	2	10	7	13 (27)
Ohio	-	-	1	-	-	1	1 (1)

State	Swordfish Directed	Swordfish Incidental	Swordfish Handgear	Shark Directed	Shark Incidental	Atlantic Tunas Longline Category	Permit Holders (Permits)
Michigan	1	-	-		1	1	1 (3)
Indiana				1			1 (1)
Hawaii	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 October 2022. Source: SERO.

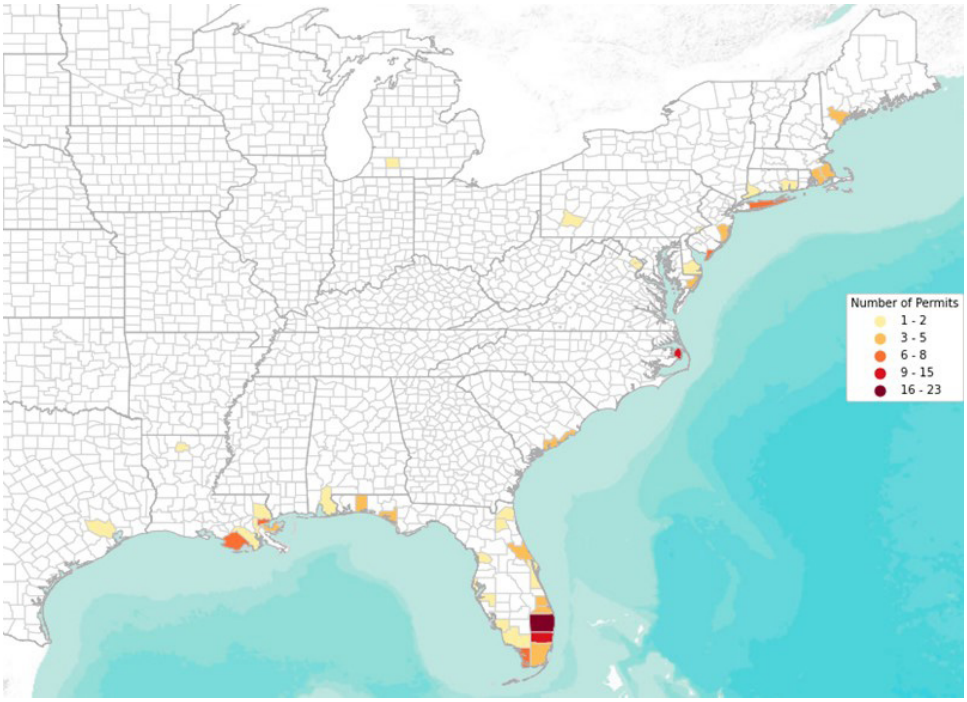

Figure 4.1 Distribution of Swordfish Directed Permits as of October 2022

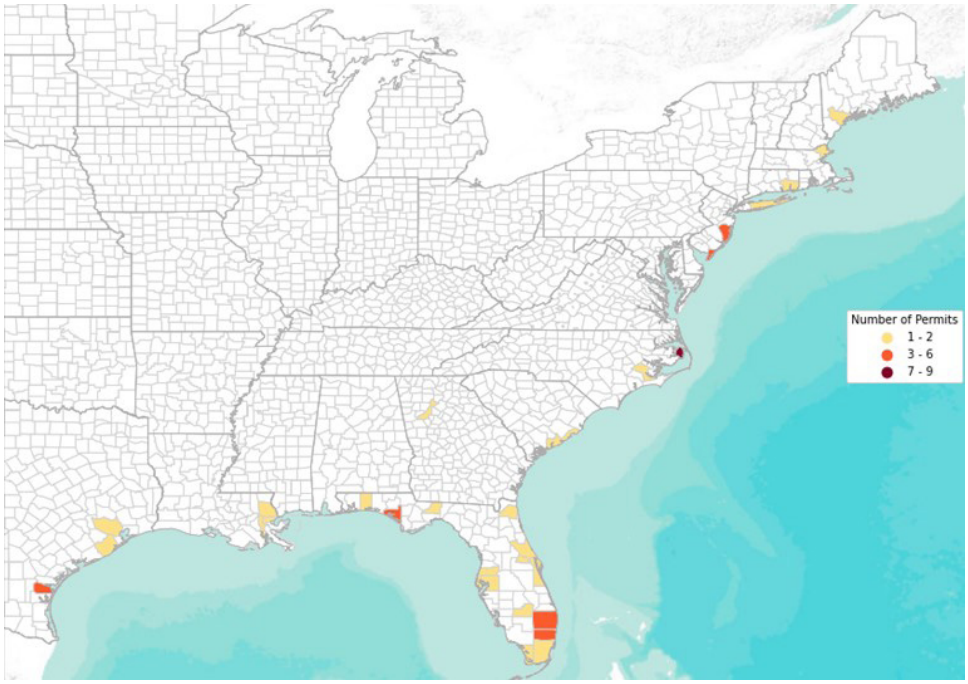

Figure 4.2 Distribution of Swordfish Incidental Permits as of October 2022

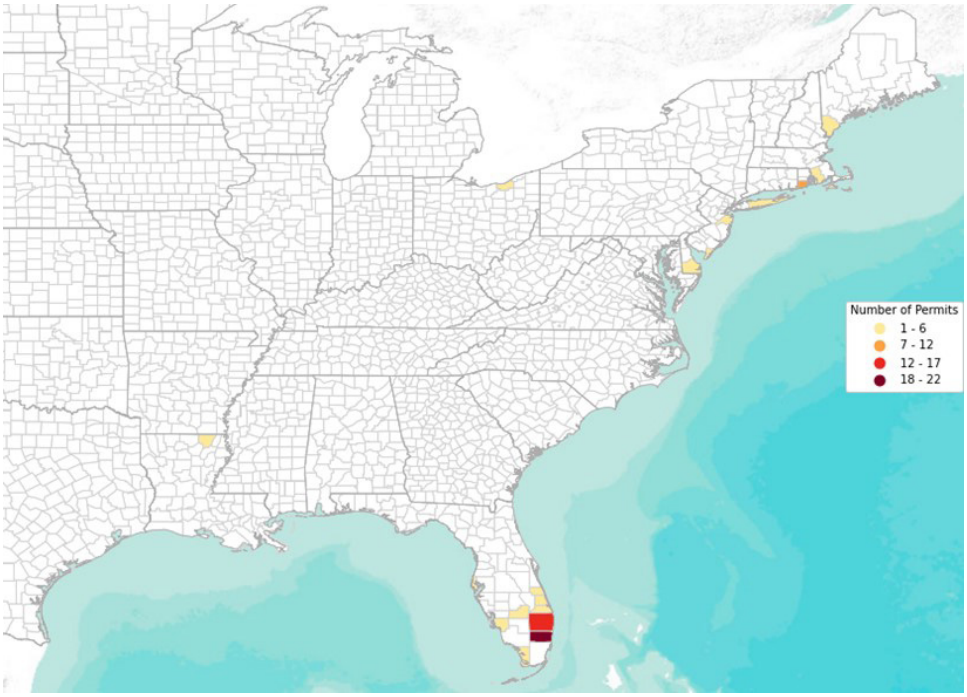

Figure 4.3 Distribution of Swordfish Handgear Permits as of October 2022

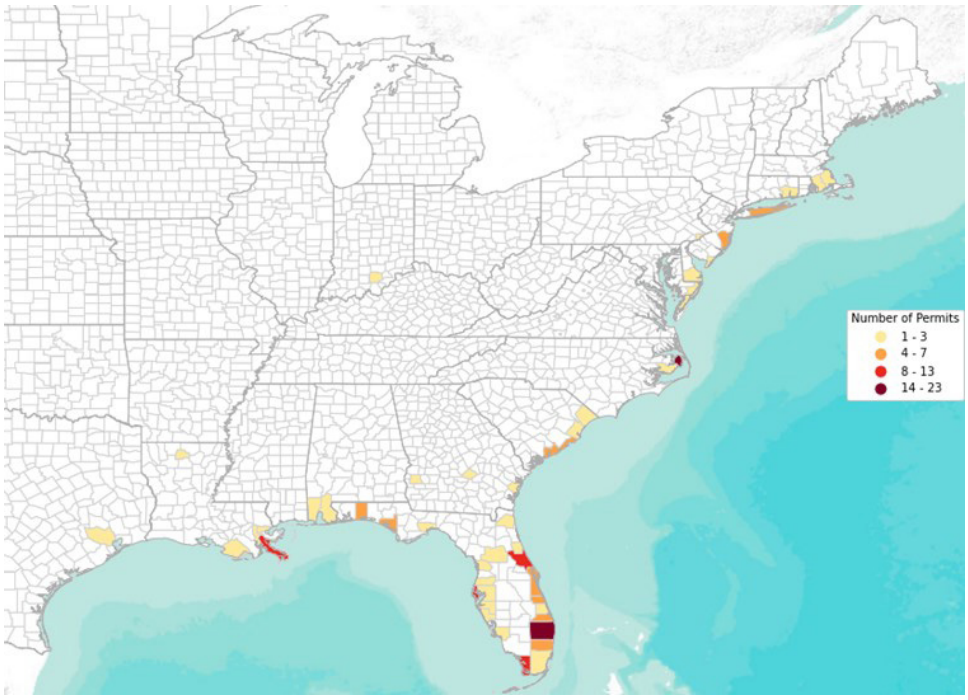

Figure 4.4 **Distribution of Shark Directed Permits as of October 2022**

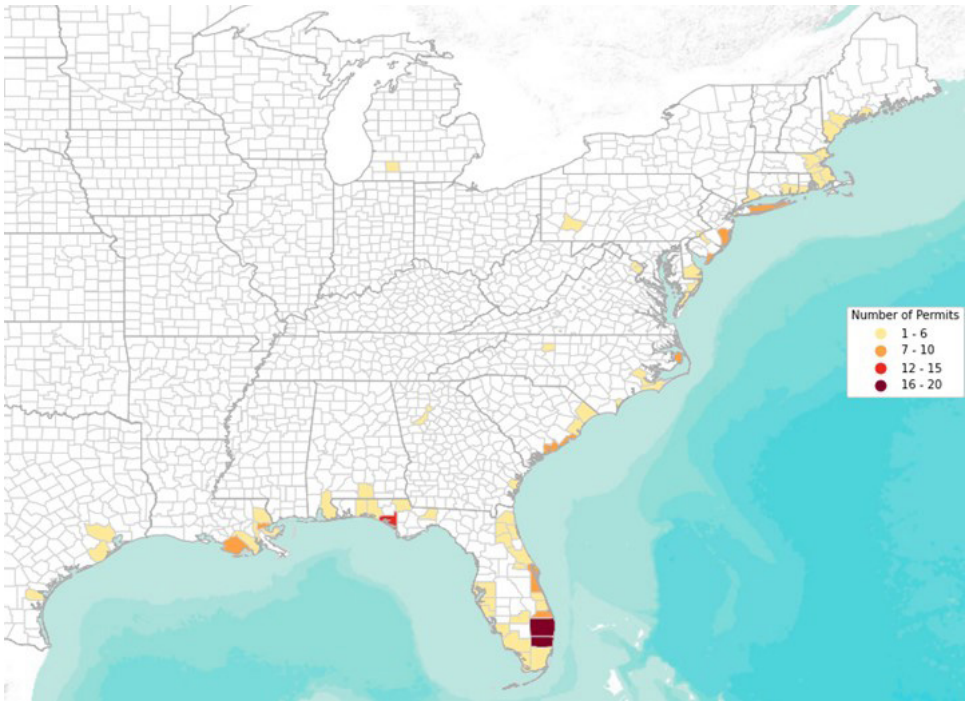

Figure 4.5 **Distribution of Shark Incidental Permits as of October 2022**

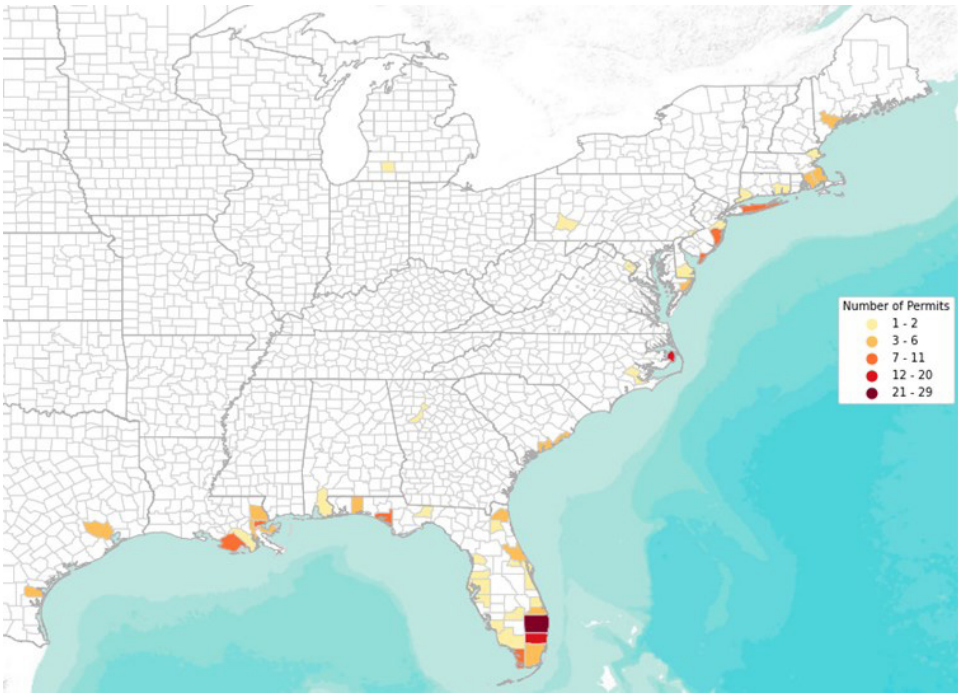

Figure 4.6 **Distribution of Atlantic Tunas Longline Category Permits as of October 2022**

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 (76 FR 49368, August 10, 2011). 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 onboard. The distribution of Incidental HMS Squid Trawl permits among Atlantic states is presented in Table 4.3.

Table 4.3 **Number of Incidental HMS Squid Trawl Permits by State in 2021 and 2022***

State	Issued Permits
Maine	2
Massachusetts	12
Rhode Island	15
Connecticut	3
New York	6
New Jersey	27
Virginia	3
North Carolina	2

State	Issued Permits
2022 total*	70
2021 total	71

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of October 2022. Source:GARFO.

4.1.3 Open Access Permits

Unlike limited access permits, open access permits are not limited in the number issued, can be issued to new permit holders, and may not be transferred from one permit holder to 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.
- HMS Charter/Headboat permit.
- HMS Angling permit.

4.1.3.1 Commercial Caribbean Small Boat Permit

The Commercial Caribbean Small Boat permit is valid only in the U.S. Caribbean region on vessels that are less than 45 feet long (77 FR 59842; October 1, 2012). This permit allows the commercial retention of tunas, swordfish, and sharks. On April 30, 2021, NOAA Fisheries published a final rule (86 FR 22882) that modified the swordfish default retention limits from a trip limit of two swordfish to 18 swordfish per vessel per trip for HMS Commercial Caribbean Small Boat permit holders in U.S. Caribbean waters. Additionally, this rule established a default retention limit of three non-prohibited smoothhound sharks, non-blacknose small coastal sharks, or large coastal (other than hammerhead, silky, and sandbar) sharks (combined) per vessel per trip for HMS Commercial Caribbean Small Boat permit holders. Finally, this action established inseason adjustment procedures for the HMS Commercial Caribbean Small Boat permit swordfish and shark retention limits. The current default retention limit for bigeye, albacore, yellowfin, and skipjack tuna is 10 fish. 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 2021 and 2022*

State	Issued Permits
South Carolina	3
Florida	41
Alabama	1
Louisiana	3
Texas	1
Puerto Rico	23

State	Issued Permits
Virgin Islands	4
Not Reported	2
2022 total*	76
2021 total	37

Note: These permits are only valid when used in the U.S. Caribbean region. Also, the number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of October 2022.
Source: Southeast Regional Office.

4.1.3.2 Swordfish General Commercial Permit

The Swordfish General Commercial permit (78 FR 52011; August 21, 2013) 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 HMS tournament.

The swordfish retention limit under this permit may be set between zero and 18 fish per vessel per trip. The default retention limits for North Atlantic swordfish are 18 in the northwest Atlantic, Gulf of Mexico, and the U.S. Caribbean, and zero in the Florida Swordfish Management Area. On June 1, 2021, a final rule became effective that modified the default swordfish retention limit for this permit to 18 swordfish per vessel per trip (86 FR 22882; April 30, 2021). 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 2021 and 2022*

State	Issued Permits
Maine	110
New Hampshire	35
Vermont	2
Massachusetts	161
Rhode Island	41
Connecticut	19
New York	54
Pennsylvania	2
New Jersey	19
Delaware	2
Maryland	6
Virginia	14
North Carolina	74
South Carolina	11
Florida	59
Alabama	9
Louisiana	5

State	Issued Permits
Texas	2
Arkansas	1
California	2
Oregon	1
Puerto Rico	12
2022 total*	641
2021 total	701

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of October 2022. Source: SERO.

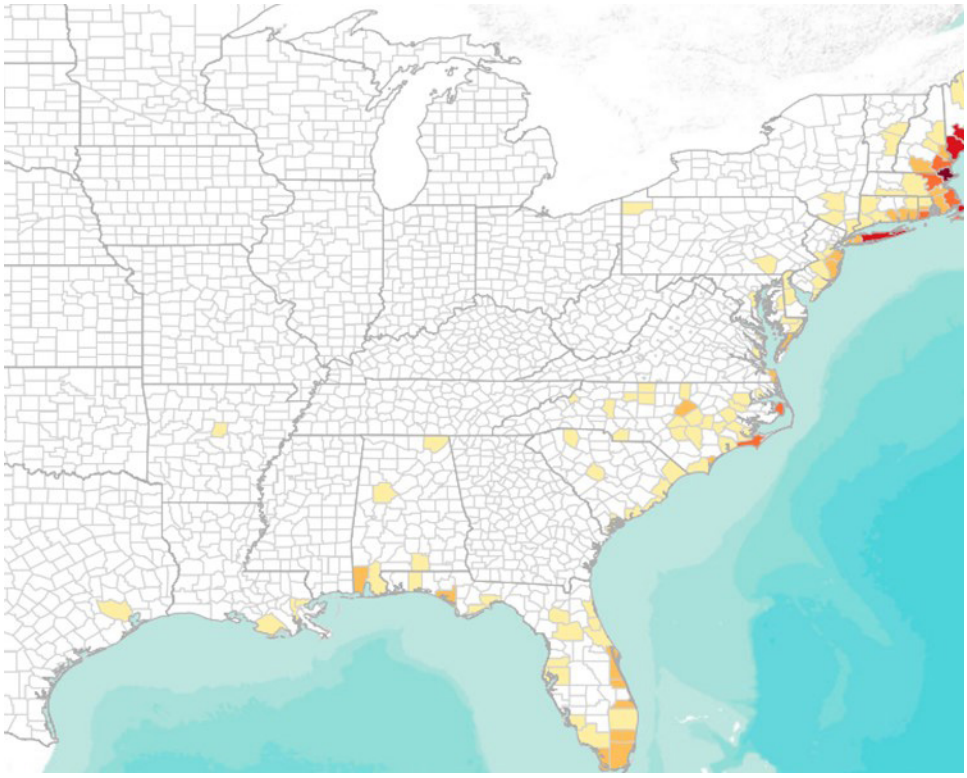

Figure 4.7 Distribution of Swordfish General Commercial Permits as of October 2022

4.1.3.3 Smoothhound Shark Permit

The commercial Smoothhound Shark permit has been required since March 15, 2016 (80 FR 73128; November 24, 2015) 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 is mapped in Figure 4.8.

Table 4.6 **Number of Smoothhound Shark Permits by State in 2021 and 2022***

State	Issued Permits
Maine	2
Rhode Island	11
New York	16
New Jersey	34
Pennsylvania	1
Delaware	3
Maryland	4
Virginia	17
North Carolina	71
South Carolina	12
Florida	38
Louisiana	2
Illinois	1
2022 total*	212
2021 total	168

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of October 2022. Source: SERO.

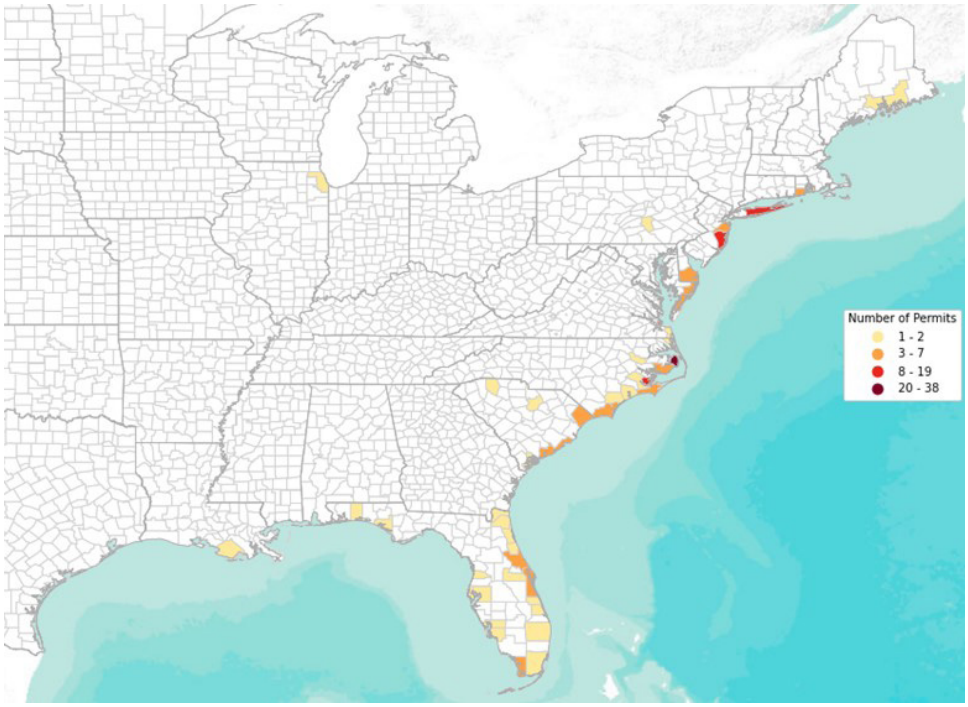

Figure 4.8 **Distribution of Smoothhound Shark Permits as of October 2022**

4.1.3.4 Atlantic Tunas Permit

Background

Commercial fisheries targeting Atlantic tunas are currently managed through an open access vessel permit program, which includes the Atlantic Tunas permit and the 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 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 allowed to sell Atlantic tunas only to federally permitted Atlantic tunas dealers.

Open access tuna permits are listed by category in Table 4.7. For more information on the limited access Longline and Purse Seine permit categories, Section 4.1.1.

Table 4.7 Number of Commercial Atlantic Tunas Permits by Category in 2017-2022*

Category	2017	2018	2019	2020	2021	2022*
General	2,940	2,942	9,721	2,645	2,730	2,630
Harpoon	11	21	20	7	35	27
Trap	1	-	2	5	2	5
Total	3,237	3,248	3,023	2,948	2,767	2,662

Notes: The General and Harpoon categories listed include those held in conjunction with a Swordfish General Commercial permit. The actual number of 2022 permit holders in each category is subject to change as individuals renew their permits or allow them to expire.*As of October 2022. †Number of available permits. Source: HMS Management Division.

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 until 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. Prior to January 1, 2023, the General category received approximately 47 percent of the U.S. bluefin tuna quota (following subtraction of 68 mt from the U.S. bluefin tuna quota and allocation to the Longline category). This percentage changed when Amendment 13 became effective on January 1, 2023.

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

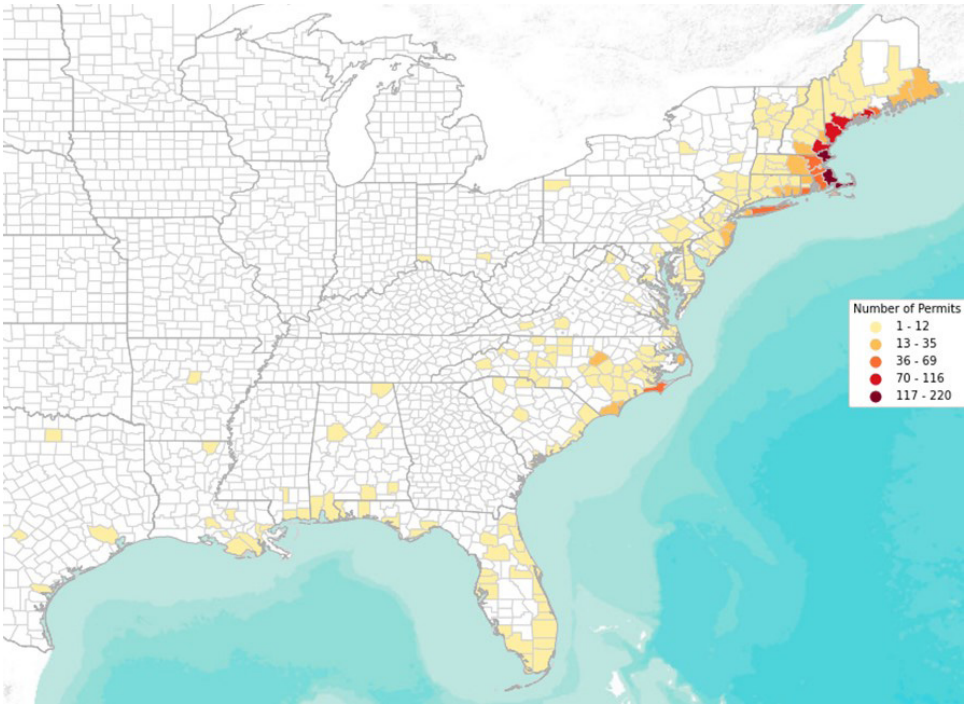

Figure 4.9 **Distribution of Atlantic Tunas General Category Permits as of October 2022**

Table 4.8 **Number of Atlantic Tunas General Category Permits by State/Territory in 2021 and 2022***

State	Issued Permits
Maine	523
New Hampshire	171
Vermont	8
Massachusetts	925
Rhode Island	134
Connecticut	71
New York	140
Pennsylvania	8
New Jersey	84
Delaware	10
Maryland	12
Virginia	31
North Carolina	250
South Carolina	21
Florida	103

State	Issued Permits
Alabama	18
Mississippi	5
Louisiana	8
Texas	7
Ohio	2
Arkansas	1
Puerto Rico	91
U.S. Virgin Island	2
Colorado	1
Oregon	2
California	2
2022 total*	2,630
2021 total	2,730

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of October 2022. Source: HMS Management Division.

Harpoon Category

The Harpoon category provides different rules and regulations for vessels permitted to fish exclusively with harpoon gear than for vessels fishing with harpoon gear under the General category, who may also use other gear types. Prior to January 1, 2023, the default retention limit under the Harpoon category permit for bluefin tuna measuring 73 inches to less than 81 inches curved fork length (CFL) was two fish per vessel trip per day, and NOAA Fisheries had the authority to set the limit in the 2–4 fish range. There was 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 Harpoon category bluefin tuna quota was approximately 3.9 percent of the U.S. quota (following subtraction of 68 mt from the U.S. bluefin tuna quota and allocation to the Longline category). Both the retention limits and the quota percentage changed when Amendment 13 became effective on January 1, 2023. The season opens on June 1 of each year and closes November 15 if the quota has not already been reached.

The homeport states for the 27 Atlantic Tunas Harpoon category permits issued in 2022 were Maine (12 vessels) and Massachusetts (15 vessels). A map showing the distribution of Harpoon category permits is illustrated in Figure 4.10.

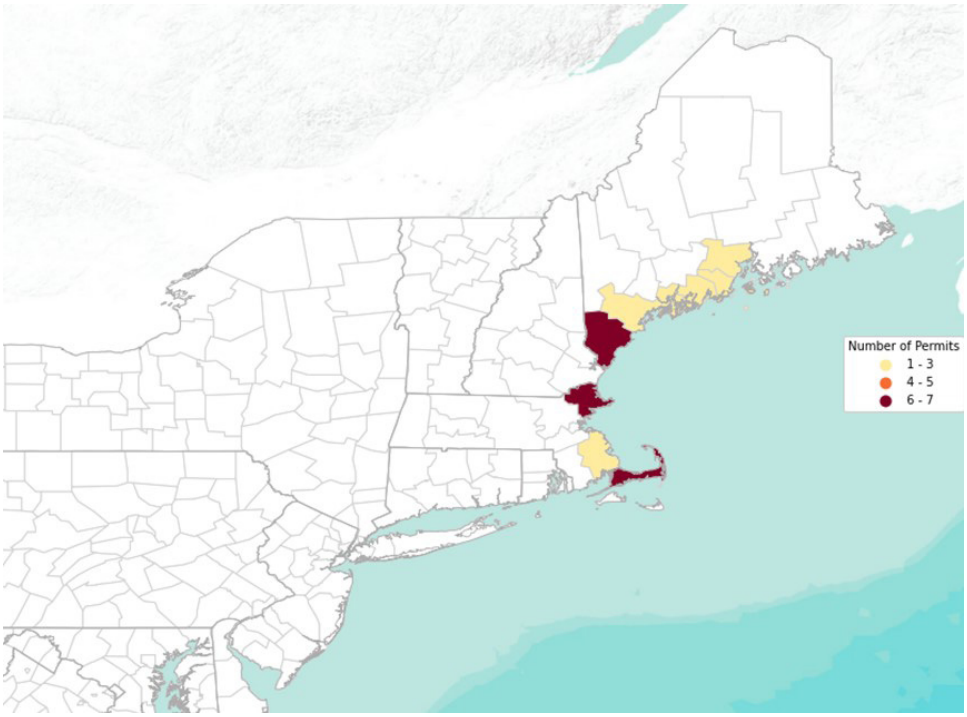

Figure 4.10 Distribution of Atlantic Tunas Harpoon Category Permits as of October 2022

4.1.3.5 HMS Charter/Headboat Permit

The HMS Charter/Headboat permit authorizes recreational fishing for all HMS. It also allows for the sale of Atlantic tunas and swordfish when combined with a commercial sale endorsement (82 FR 57543; December 6, 2017). Swordfish can only be sold on non-for-hire trips. Those vessels with a commercial sale endorsement are required to abide by the U.S. Coast Guard (USCG) 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; April 4, 2017). See Section 4.1.4 for information on issued endorsements.

The distribution of 2022 HMS Charter/Headboat permits is presented in Table 4.9 and in Figure 4.11.

Table 4.9 **Number of HMS Charter/Headboat Permits by State in 2021 and 2022***

State	Issued Permits
Maine	134
New Hampshire	99
Vermont	1
Massachusetts	835
Rhode Island	179
Connecticut	85
New York	349
Pennsylvania	6
New Jersey	503
Delaware	85
Maryland	125
West Virginia	3
Virginia	85
North Carolina	382
South Carolina	125
Georgia	27
Florida	824
Alabama	65
Mississippi	25
Louisiana	72
Texas	105
Ohio	1
Puerto Rico	27
U.S. Virgin Island	22
Wisconsin	3
Nebraska	1
Illinois	1
Montana	1
Michigan	5
2022 total*	4,175
2021 total	4,055

Note: Number of permits and permit holders in each category and state is subject to change as permits are renewed or expire. *As of October 2022. Source: HMS Management Division.

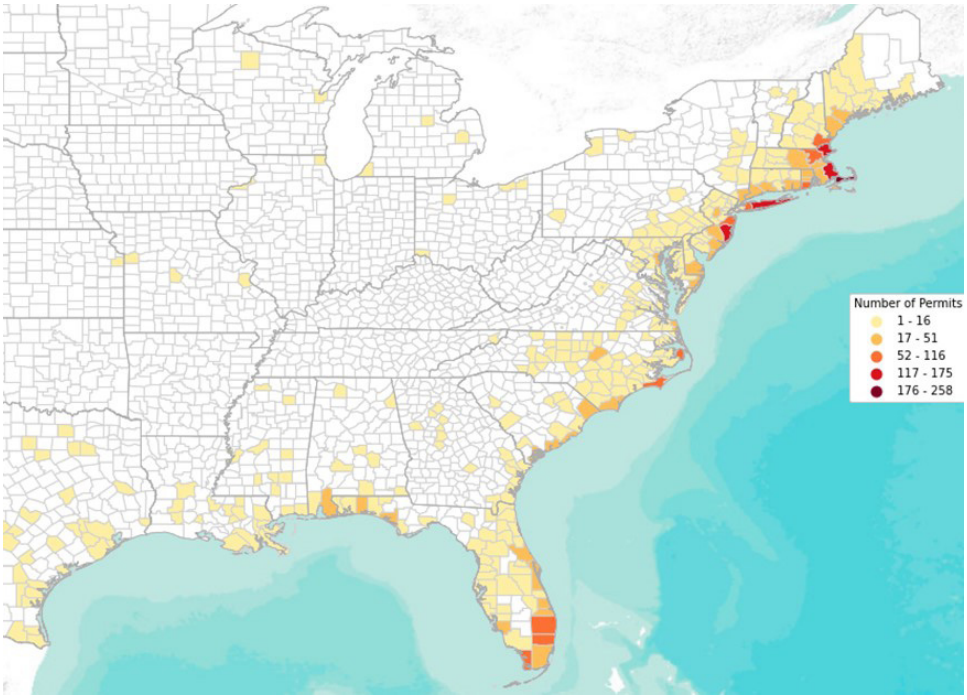

Figure 4.11 Distribution of HMS Charter/Headboat Permits as of October 2022

4.1.3.6 HMS Angling Permit

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

HMS Angling permit distribution is reported in Table 4.10 Tand in Figure 4.12.

Table 4.10 Number of HMS Angling Permits by State or Country in 2021 and 2022†

State/Country	Permits by Home Port*	Permits by Residence**
Alaska	2	1
Alabama	471	441
Arkansas	6	13
Arizona	3	5
California	5	14
Colorado	2	14
Connecticut	897	969
District of Columbia	3	5

State/Country	Permits by Home Port*	Permits by Residence**
Delaware	897	623
Florida	4,209	3,842
Georgia	106	195
Hawaii	2	-
Iowa	-	2
Idaho	-	2
Illinois	8	21
Indiana	2	13
Kansas	3	6
Kentucky	4	13
Louisiana	410	401
Massachusetts	2,880	2,928
Maryland	1,123	1,052
Maine	507	452
Michigan	18	32
Minnesota	7	9
Missouri	10	21
Mississippi	134	155
Montana	-	3
Nebraska	-	2
North Carolina	1,399	1,316
North Dakota	3	2
Nevada	4	2
New Hampshire	325	388
New Jersey	4,255	3,702
New Mexico	1	1
New York	2,672	2,757
Ohio	10	27
Oklahoma	8	12
Oregon	2	-
Pennsylvania	185	1,151
Puerto Rico	312	316
Rhode Island	846	614

State/Country	Permits by Home Port*	Permits by Residence**
South Carolina	491	460
South Dakota	1	-
Tennessee	22	55
Texas	561	614
Utah	1	1
Virginia	735	822
U.S. Virgin Islands	18	14
Vermont	21	28
Washington	4	6
Wisconsin	8	15
West Virginia	6	13
Wyoming	3	2
Canada	5	5
2022 totals, by port and by residence*	23,607	23,607
2021 totals, by port and by residence	23,632	23,632

†As of October 2022. *The vessel port or other storage location. **The permit holder's billing address. Source: HMS Management Division.

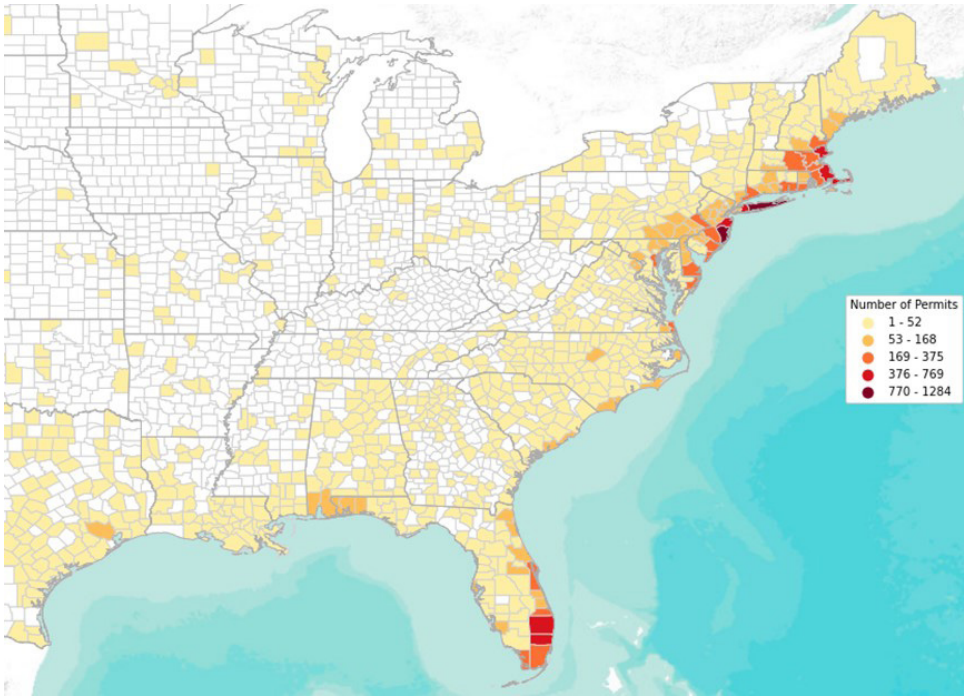

Figure 4.12 Distribution of HMS Angling Permits as of October 2022

4.1.4 HMS Permit Endorsements

Two permit endorsements are available for the HMS Angling and HMS Charter/Headboat permits. A shark endorsement is required for all vessel owners who intend to fish for sharks and who have been issued an HMS Angling or HMS Charter/Headboat permit. The shark endorsement is also required for Atlantic Tunas General or Swordfish General Commercial category permit who intend to fish for sharks while fishing in a registered HMS tournament; the shark endorsement does not allow these permit holders to fish for sharks when fishing outside of a registered HMS tournament. A commercial sale endorsement, when combined with the HMS Charter/Headboat permit, allows for the sale of Atlantic tunas and swordfish in certain situations (see Section 4.1.3.5 and 4.1.4).

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 2022*

Permit Category	Total Permits Issued	Shark Endorsements	Commercial Sale Endorsement
HMS Charter/Headboat	4,175	2,994	1,873
HMS Angling	23,607	12,978	-
Atlantic Tunas General	2,027	916	-
Swordfish General Commercial	19	2	-
Atlantic Tunas General and Swordfish General Commercial	603	388	-

*As of October 2022. Source: HMS Management Division

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 ATCA; 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 2017 through 2022 by category and species are listed in Table 4.12. In 2022, NOAA Fisheries received four applications for the shark research fishery permit. Based on the qualification criteria and random selection process, four 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 2017-2022*

Permit Type	Reason for Permit	2017	2018	2019	2020	2021	2022
Exempted fishing permit	Sharks for display	5	6	5	6	5	4
	HMS** for display	2	2	2	2	1	2
	Tunas for display	0	0	0	0	0	0
	Shark research***, non-scientific vessel	4	4	4	3	3	2
	Tuna research, non-scientific vessel	2	2	1	1	0	2
	HMS** research, non- scientific vessel	4	2	8	10	5	9
	Billfish research, non-scientific vessel	0	0	0	0	0	0
	Swordfish research, non-scientific vessels	0	0	0	0	1	0
	Shark fishing	0	0	0	0	0	0
	Tuna fishing	0	0	1	1	1	0
Total EFPs issued		17	16	21	23	16	19
Scientific research permit	Shark research***	1	1	1	2	1	0
	Tuna research	0	1	0	0	0	0
	Billfish research	0	0	0	0	0	0
	HMS** research	3	6	4	1	3	7
Total SRPs issued		4	8	5	3	4	7
Letters of acknowledgement	Shark research***	12	15	15	5	17	17
Total LOAs issued	Total	12	15	15	5	18	17

*As of October 2022. **Multiple species. Source: HMS Management Division. ***Does not include research conducted as part of the Shark Research Fishery (for information on the Shark Research Fishery see Section 6.3.6.1).

4.3 Dealer Permits for Atlantic Tunas, Swordfish, and Shark

Atlantic 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 2022 are in Table 4.14. The distribution of Atlantic swordfish, shark, and tunas dealer permits issued in 2022 (Figures 4.13, 4.14 , and 4.15, respectively) are mapped below.

Table 4.13 Number of Domestic Atlantic Dealer Permits for Tunas, Swordfish, and Sharks in 2016-2021*

Year	Bluefin Only	BAYS Only	Bluefin and BAYS	Atlantic Swordfish	Atlantic Sharks	Total
2017	32	70	291	189	113	695
2018	30	70	287	193	108	698
2019	34	65	278	200	104	681
2020	101	66	335	200	92	794
2021	63	63	319	197	89	731
2022*	60	63	318	124	57	

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 October 2022. Source: Southeast Regional Office; GARFO.

Table 4.14 Number of Domestic Dealer Permits for Atlantic Tunas, Swordfish, and Sharks by State in 2022*

State/Territory	Bluefin Only	BAYS Only	Bluefin and BAYS	Atlantic Swordfish	Atlantic Sharks	Total
Maine	37	-	23	-	-	60
New Hampshire	6	-	10	-	-	16
Vermont	-	-	1	-	-	1
Massachusetts	11	8	83	8	3	113
Rhode Island	-	2	18	5	3	28
Connecticut	-	1	10	-	-	11
New York	2	24	46	4	5	81
Pennsylvania	-	-	3	-	-	3
New Jersey	-	6	45	9	6	66
Delaware	-	-	6	-	-	6
Maryland	-	-	6	4	2	12
Virginia	-	4	9	3	2	18
North Carolina	3	-	25	17	11	56
South Carolina	-	1	5	8	5	19
Georgia	-	-	1	1	1	3
Florida	-	9	18	52	16	95
Alabama	-	1	-	4	1	6
Louisiana	-	1	3	3	2	9
Texas	-	1	2	2	-	5
Puerto Rico	-	1	1	-	-	2
U.S. Virgin Islands	-	1	-	-	-	1

State/Territory	Bluefin Only	BAYS Only	Bluefin and BAYS	Atlantic Swordfish	Atlantic Sharks	Total
Missouri	-	-	-	1	-	1
Illinois	-	-	-	3	-	3
California	1	-	1	-	-	2
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 October 2022. Source: Southeast Regional Office; GARFO.

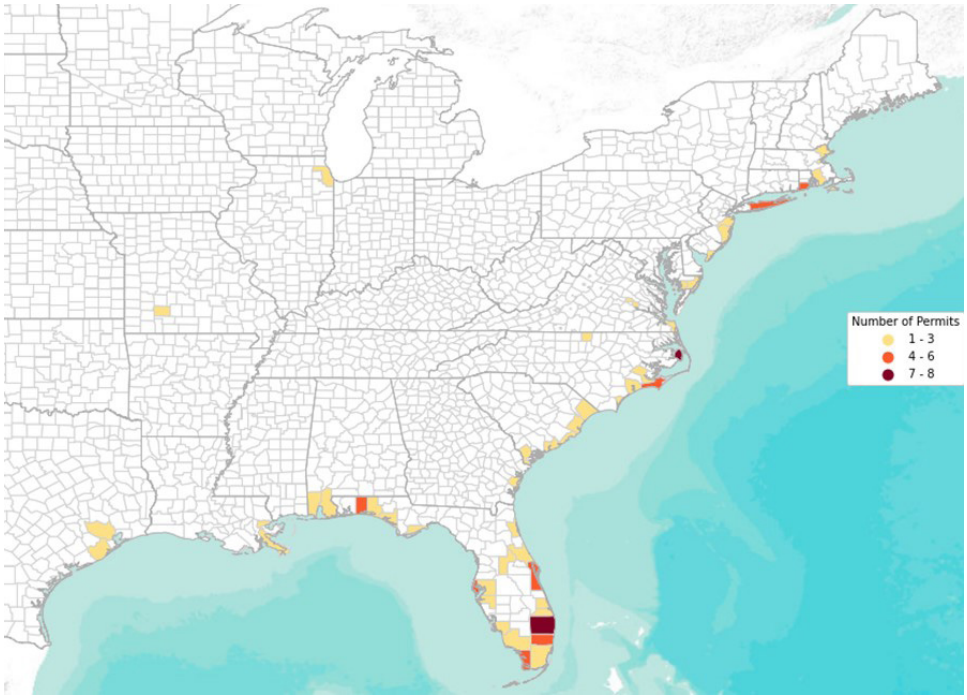

Figure 4.13 Distribution of Swordfish Dealer Permits as of October 2022

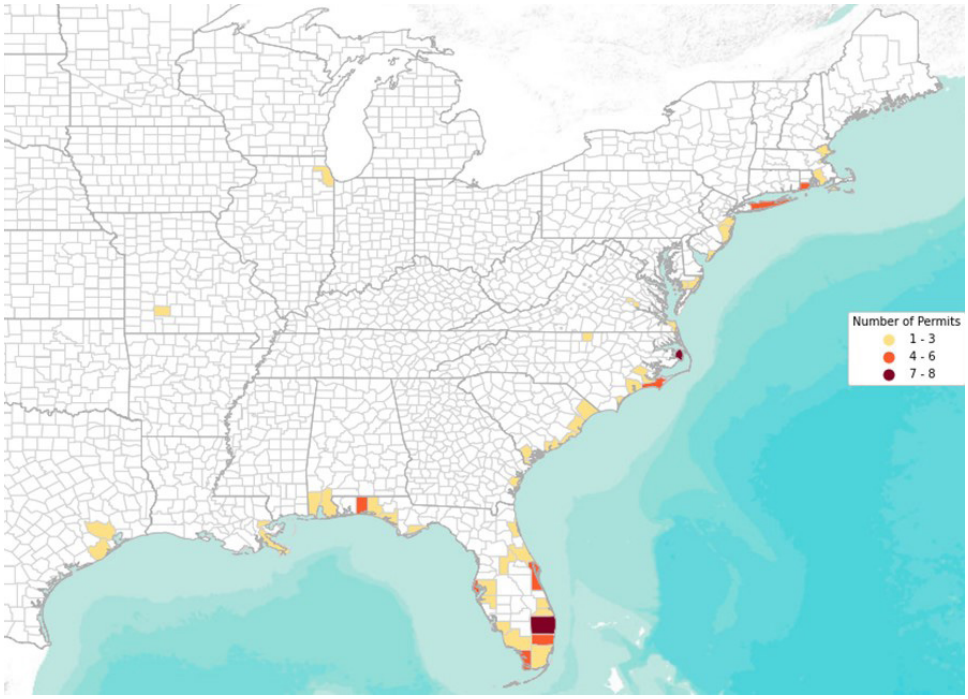

Figure 4.14 Distribution of Shark Dealer Permits as of October 2022

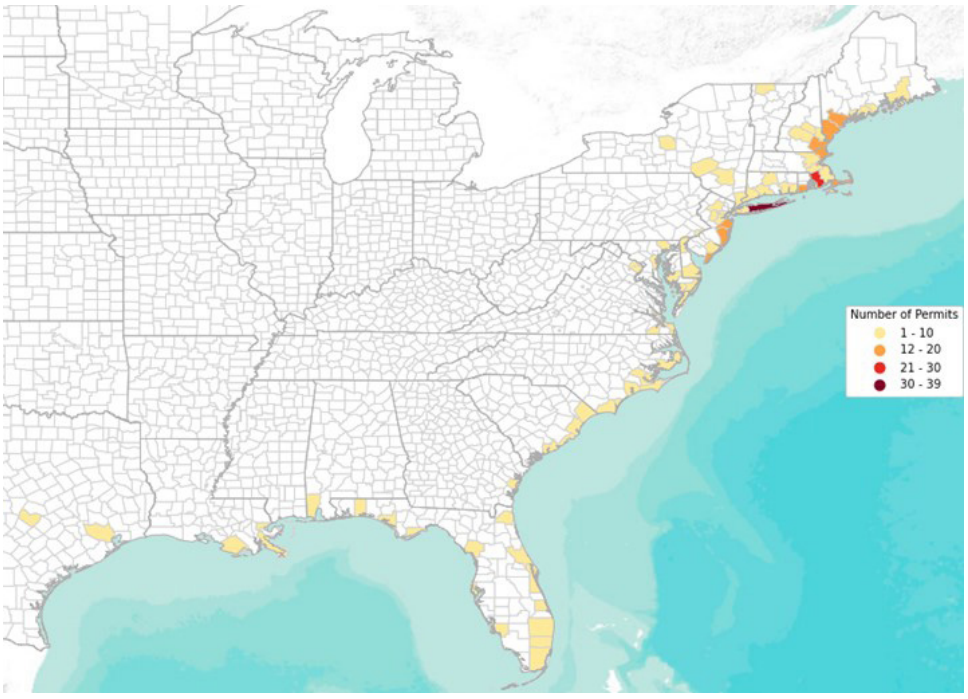

Figure 4.15 Distribution of Tunas Dealer Permits as of October 2022

4.4 HMS Tournaments

4.4.1 Background

An HMS tournament is defined at 50 CFR 635.2 as any fishing competition involving HMS in which participants must register or otherwise enter or in which a prize or award is offered for catching or landing such fish. 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 HMS tournaments support approximately 1,000 jobs and over $130 million in total economic output, according to data from the 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 (50 CFR 635.5(d)). Some foreign tournaments (i.e., those held outside of U.S. waters) 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.

Since January 1, 2019, all HMS tournaments are required to report tournament catch and effort data to NOAA Fisheries within seven days of the tournament's conclusion (83 FR 63831; December 12, 2018). Prior to January 1, 2019, 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 HMS catch 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 improves domestic fishery management decision making and augments 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. Several ICCAT shark recommendations, including Recommendation 19-06 on shortfin mako sharks, recognize the need for parties to strengthen their monitoring and data collection efforts, and while the United States has longstanding recreational data collection programs, the expanded tournament reporting requirement contributes to improved U.S. recreational shark data.

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, "Careful Catch and Release" brochures) to distribute to tournament participants. In 2021, there were 125 tournaments that requested and received 7,851 copies of these materials from the HMS Management Division.

4.4.2 Registration Data

The number of HMS tournaments registered from 2017 through 2022 is reported in Figure 4.15, 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 4.16. Between 2017 and 2021, an average of 246 HMS tournaments have registered each year. The number of HMS tournaments registered as of September 2022 was below that average at 239 tournaments. The largest number of Atlantic HMS tournament registrations for a given year (287) was in 2017. This was possibly due to an increase in outreach and compliance monitoring at the time 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 4.16 through Figure 4.19 and Table 4.15. Tournament landings of billfishes and swordfish are presented in Section 5.3.5.2.

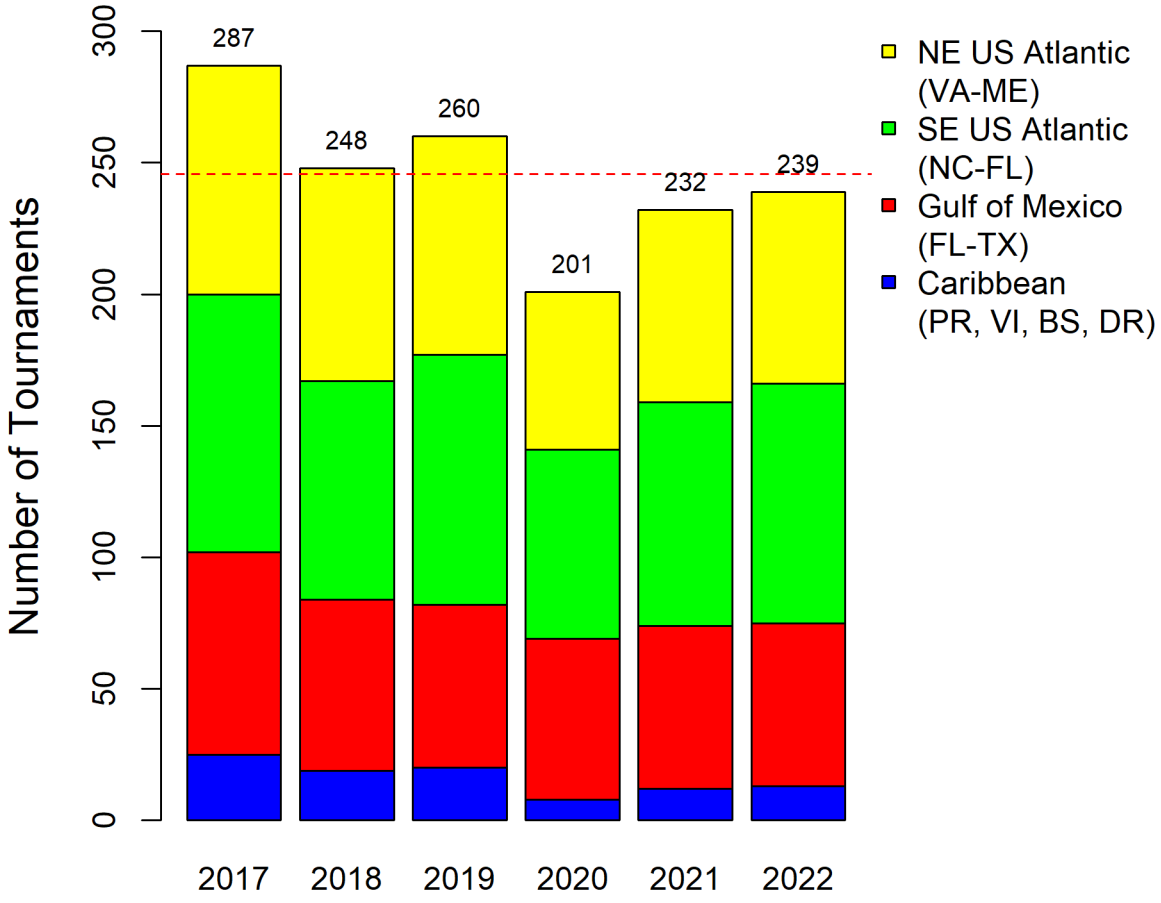

Figure 4.16 **Annual Number of Registered HMS Tournaments by Region in 2017 – 2022 (as of September 2022). Source: ATR database.**

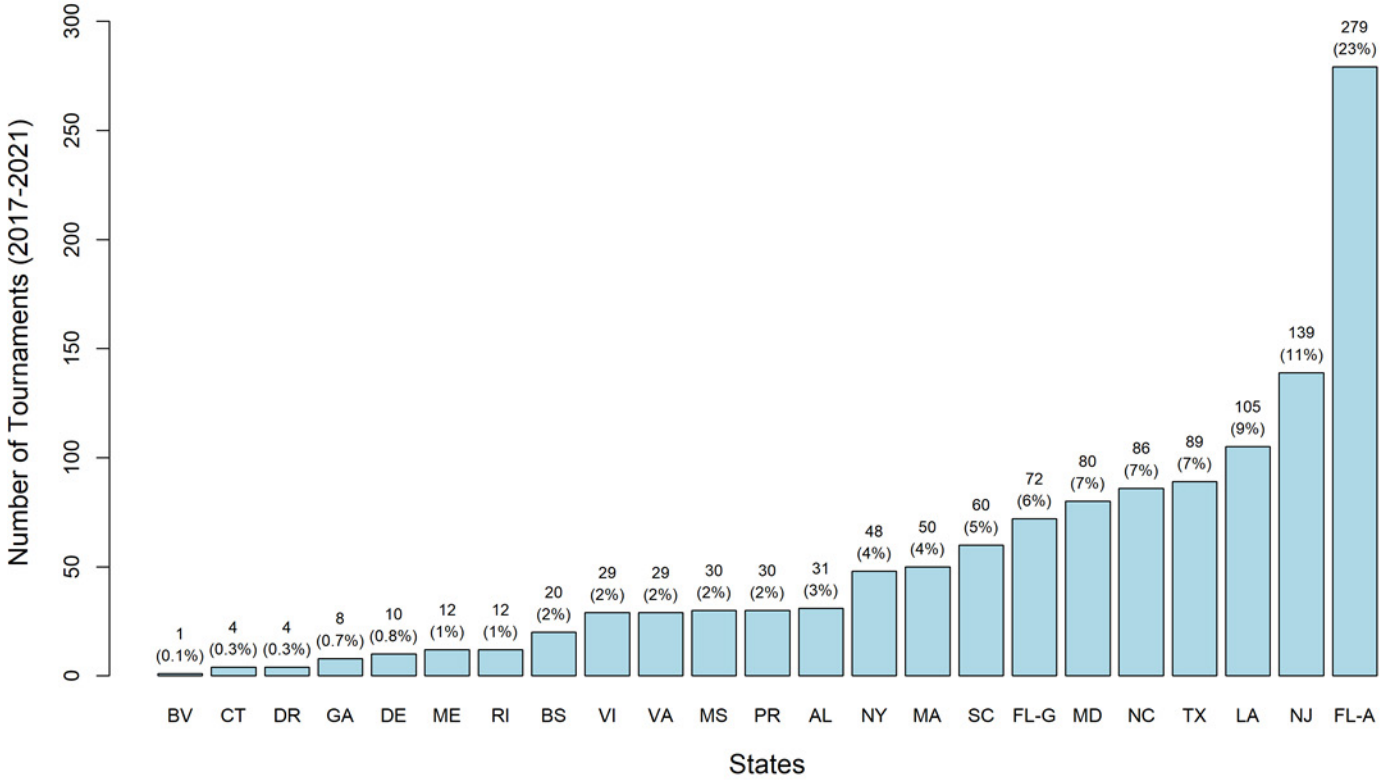

Figure 4.17 Percent of Atlantic HMS Tournaments Held in Each State in 2017-2021.

State abbreviations: AL - Alabama, BS - Bahamas, BV - British Virgin Islands, CT - Connecticut, DE - Delaware, DR - Dominican Republic, FL-A - Florida (Atlantic side), FL-G - Florida (Gulf side), GA - Georgia, LA - Louisiana, MD - Maryland, MA - Massachusetts, ME - Maine, MS - Mississippi, NC - North Carolina, NJ - New Jersey, NY - New York, PR - Puerto Rico, RI - Rhode Island, SC - South Carolina, TX - Texas, VA - Virginia, VI - U.S. Virgin Islands

Note: Total number of tournaments is 1,228. Source: ATR database.

Participants may target one or more HMS in a tournament. Most tournaments register to catch multiple HMS. 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 4.17 gives a breakdown of the percent of tournaments in each state registered for billfish, sharks, swordfish, or tuna species in 2021 (respectively indicated by A, B, C, or D).

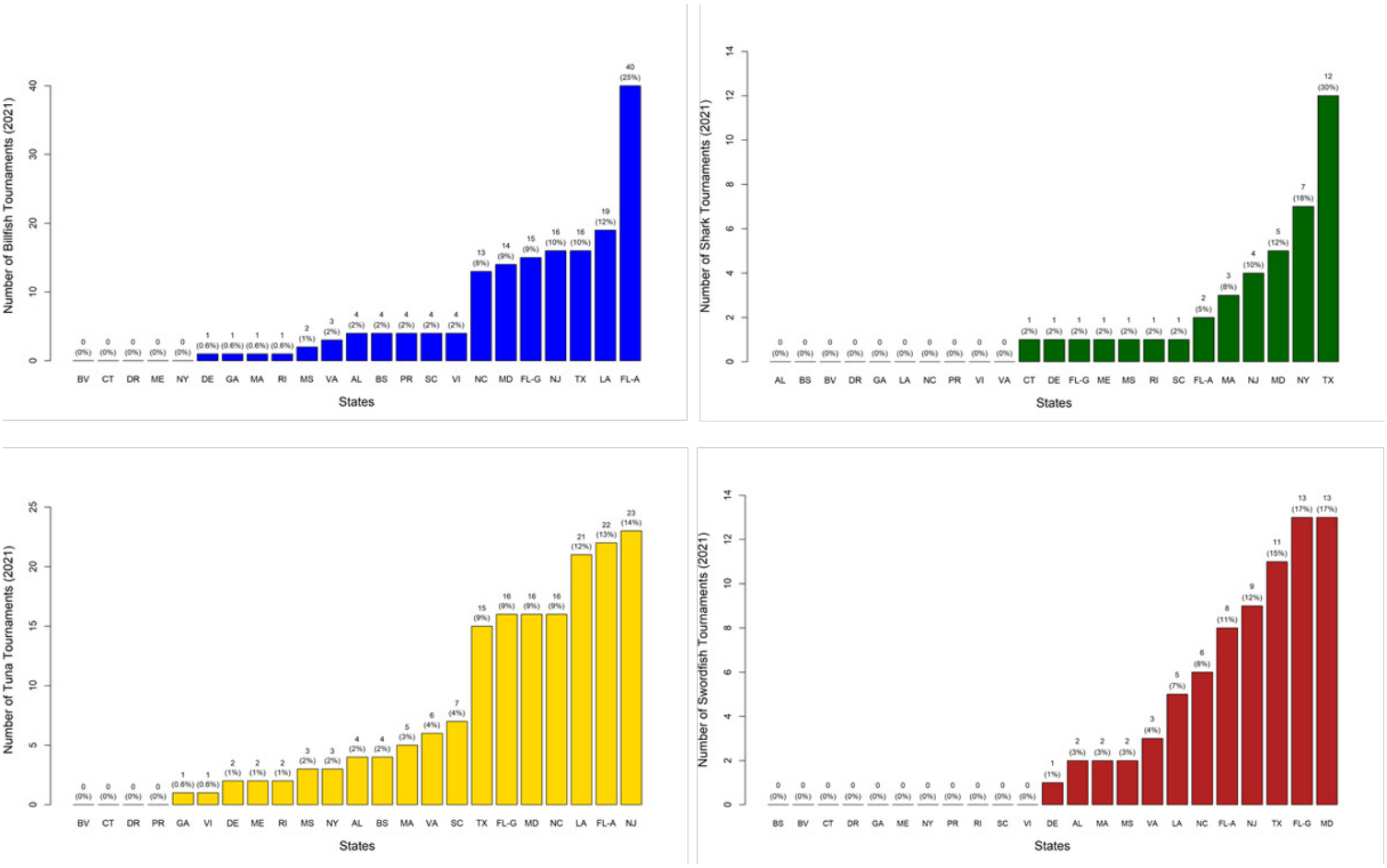

Figure 4.18 Percent of HMS Tournaments in Each State

(A) Billfish (blue marlin, white marlin, roundscale spearfish, and sailfish), (B) Shark (not specified), (C) Swordfish, or (D) Tuna (bluefin, bigeye, albacore, yellowfin, and skipjack) Species in 2020. Source: ATR database. State abbreviations: AL - Alabama, BS - Bahamas, BV - British Virgin Islands, CT - Connecticut, DE - Delaware, DR - Dominican Republic, FL-A - Florida (Atlantic side), FL-G - Florida (Gulf side), GA - Georgia, LA - Louisiana, MD - Maryland, MA - Massachusetts, ME - Maine, MS - Mississippi, NC - North Carolina, NJ - New Jersey, NY - New York, PR - Puerto Rico, RI - Rhode Island, SC - South Carolina, TX - Texas, VA - Virginia, VI - U.S. Virgin Islands

Table 4.15 provides the total numbers of HMS tournaments from 2017 through 2022 that are 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 4.18.

A significant number of blue marlin, white marlin, and sailfish tournaments are "catch-and-release fishing only," utilizing observers, angler affidavits, polygraph tests, photographs, or digital video recorders 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 was previously reported to the Recreational Billfish Survey.

Figure 4.19 depicts the time of year that billfish tournaments are most prevalent in regions of the U.S. Atlantic, Gulf of Mexico, and Caribbean.

Table 4.15 Number of HMS Tournaments by Targeted Species in 2017-2022*

Species	2017	2018	2019	2020	2021	2022*
Blue marlin	174	148	145	130	137	150
White marlin	165	135	128	117	123	137
Longbill spearfish	65	37	38	25	42	32
Roundscale spearfish	102	72	59	54	34	66
Sailfish	175	143	146	123	135	141
Swordfish	81	73	78	75	75	72
Bluefin tuna	87	103	87	71	79	84
Bigeye tuna	96	95	96	83	90	98
Albacore tuna	57	50	47	31	34	50
Yellowfin tuna	183	159	158	140	156	158
Skipjack tuna	56	54	54	33	35	48
Smoothhound sharks†	0	3	9	3	1	1
Small coastal sharks	17	9	9	7	3	7
Large coastal sharks	23	18	29	22	23	24
Pelagic sharks	75	57	55	28	35	23

Note: Tournaments may be represented more than once if registration included more than one highly migratory species. *As of September 2022. †Smoothhounds includes smooth dogfish, Florida smoothhound, and Gulf smoothhound. Smoothhound shark quota monitoring became effective March 15, 2016 (80 FR 73128; November 24, 2015). Source: ATR database.

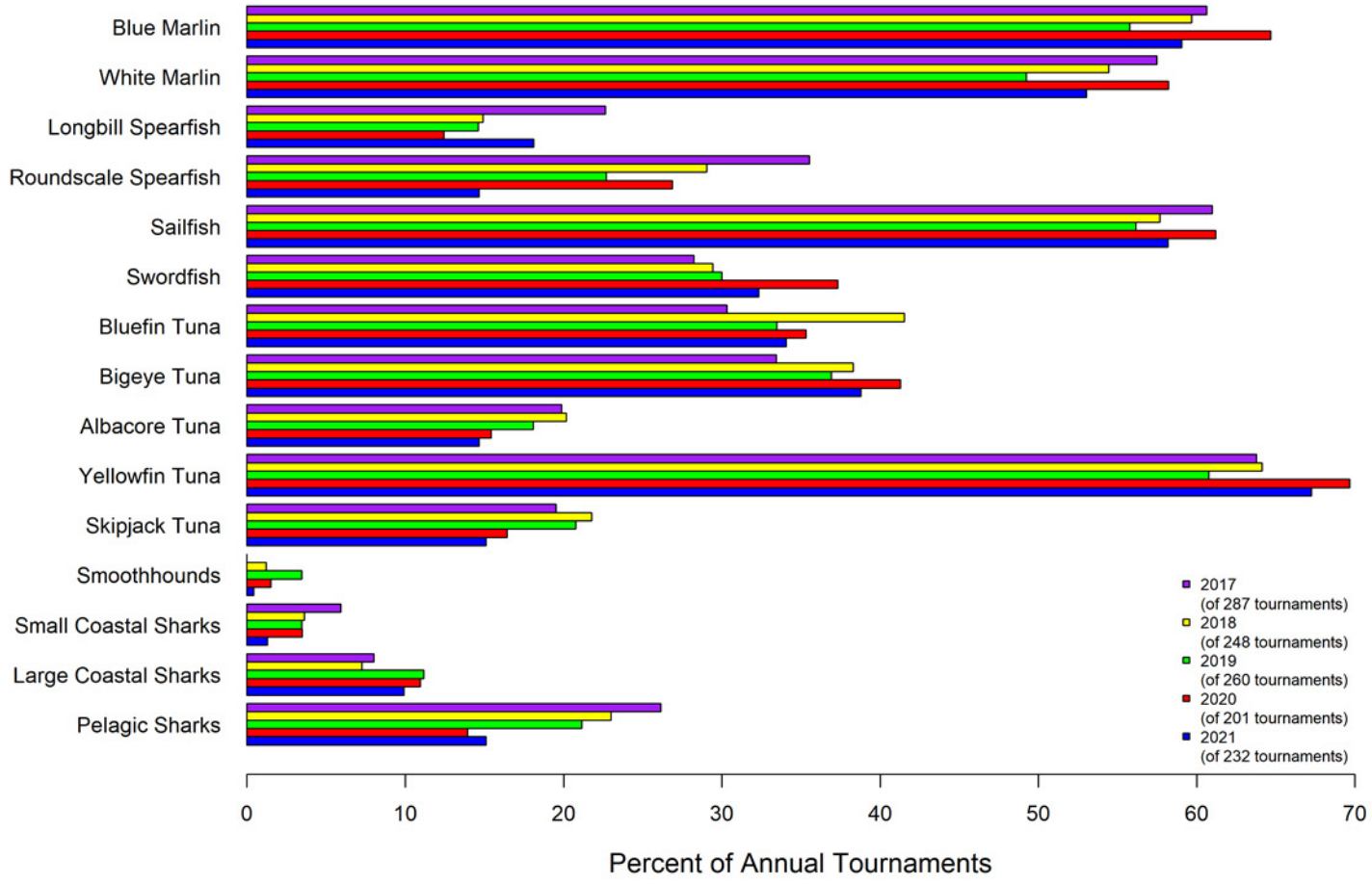

Figure 4.19 Percent of HMS Tournaments Registered for Each Species or Group in 2017-2021

Source: ATR database.

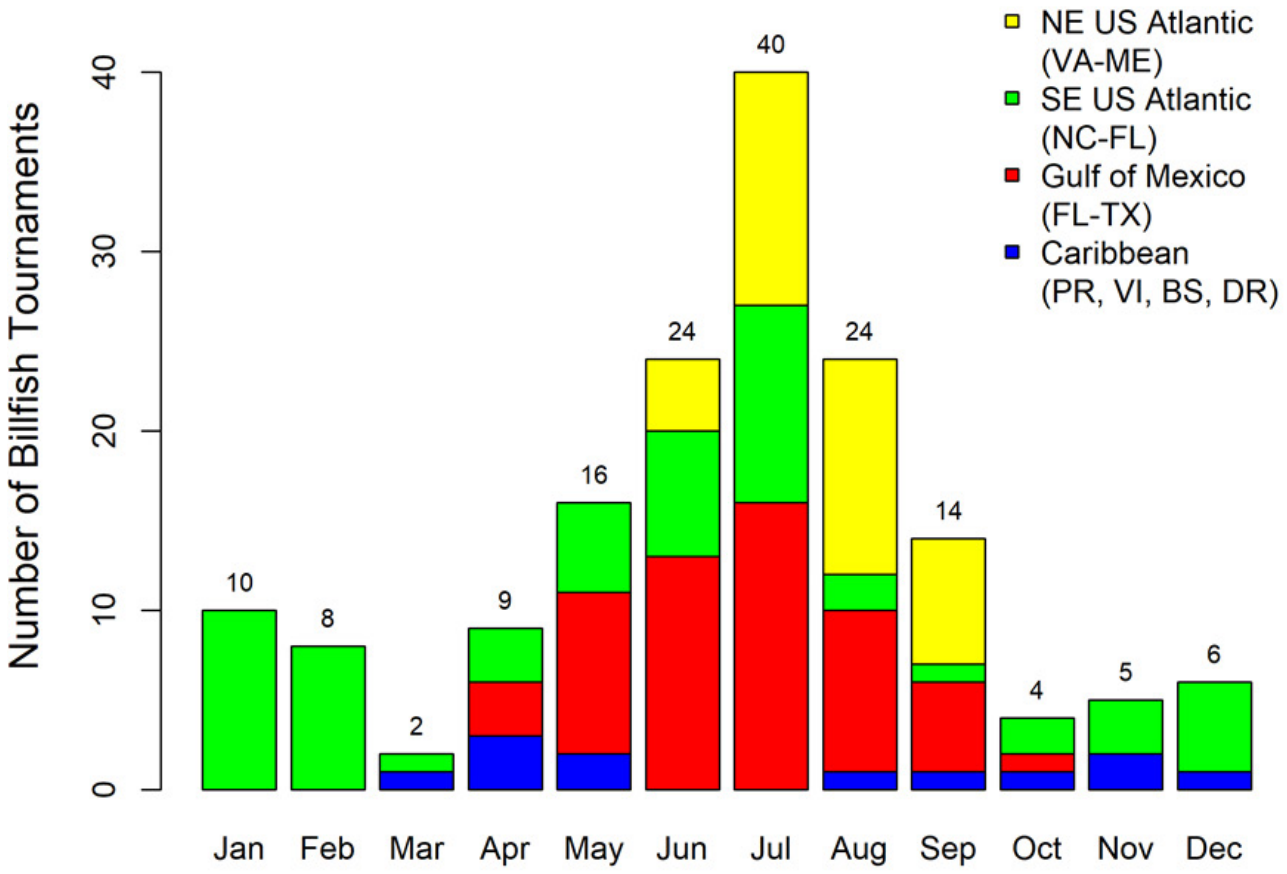

Figure 4.20 Number of Billfish Tournaments by Region and Month, 2021

Source: ATR 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.

Details on bycatch, incidental catch, and protected resource interactions by these gears are provided in Chapter 6. Data and regulations pertaining to the safety of fishermen at sea are included in Chapter 7.

Under the Magnuson-Stevens Act and other statutes, NOAA is authorized to collect and maintain certain information, although some data are subject to confidentiality requirements. Some otherwise confidential data may be released in "any aggregate or summary form which does not directly or indirectly disclose the identity or business of any person who submits such information" (Magnuson-Stevens Act § 402(b)(3); 16 U.S.C. 1881a(b)(3)). NOAA Fisheries presents such information only if it can be aggregated or summarized at a temporal and/or spatial level to maintain confidentiality of individuals, businesses, and related business information.

5.2 Data by Species

5.2.1 TACs and ACLs for HMS Management Groups

ICCAT has established TACs for certain Atlantic tunas, billfishes, and swordfish. The SCRS 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 usually then allocates that TAC among Contracting Parties, Non-Contracting Parties, Entities, or Fishing Entities.

The Magnuson-Stevens Act includes an exception to the requirements in Section 303(a)(15) for ACLs where stocks are managed under international agreements in which the United States participates (Pub. L. 109-479, Section 104(b)(1)). The 2016 updated National Standard 1 guidelines (81 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. Atlantic-wide TACs negotiated by ICCAT and the portion allocated to the United States are delineated by year in Table 5.1.

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Table 5.1 ICCAT-Negotiated Atlantic-wide TAC and U.S. Allocation (mt) for HMS other than Sharks, 2018-2022

Species	2018 Atlantic TAC	2018 U.S. Allocation	2019 Atlantic TAC	2019 U.S. Allocation	2020 Atlantic TAC	2020 U.S. Allocation	2021 Atlantic TAC	2021 U.S. Allocation	2022 Atlantic TAC	2022 U.S. Allocation
Bluefin tuna	2,350	1,247.9†	2,350	1,247. 9†	2,350	1,247. 9†	2,350	1,247. 9†	2,726	1,316.1†
Bigeye tuna	65,000	-	65,000	-	62,500	-	61,500	-	62,000	-
Albacore tuna	33,600	632.4	33,600	632.4	33,600	632.4	37,801	711.5	37,801	711.5
Yellowfin tuna	110,000	-	110,000	-	110,000	-	110,000	-	110,000	-
Skipjack tuna	-	-	-	-	-	-	-	-	-	-
Swordfish	13,200	3,907.0	13,200	3,907.0	13,200	3,907.0	13,200	3,907.0	13,200	3,907.0
Blue marlin	2,000	250 fish, combined*	2,000	250 fish, combined*	1,670	250 fish, combined*	1,670	250 fish, combined*	1,670	250 fish, combined*
White marlin & spearfish	400	250 fish, combined*	400	250 fish, combined*	355	250 fish, combined*	355	250 fish, combined*	355	250 fish, combined*
Sailfish	1,030	-	1,030	-	1,030	-	1,030	-	1,030	-

Note: Species without entries do not have established TACs or the United States does not have a specified limit. Information provided in metric tons unless indicated otherwise. †NOAA Fisheries implements a 25-mt set aside by ICCAT to account for bycatch of bluefin tuna in pelagic longline fisheries in the Northeast Distant GRA. 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.

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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 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 (NOAA Fisheries 2008), Amendment 3 (NOAA Fisheries 2010), Amendment 5a (NOAA Fisheries 2013), Amendment 6 (NOAA Fisheries 2015a), Amendment 9 (NOAA Fisheries 2015b), and Amendment 5b (NOAA Fisheries 2017b).

NOAA Fisheries released Final Amendment 14 to the 2006 Consolidated HMS FMP on January 24, 2023 (88 FR 4157). Amendment 14 revised the mechanism or "framework" used in establishing quotas and related management measures for Atlantic shark fisheries, which was established in Amendment 3 to the 2006 Consolidated HMS FMP. The revised framework will modify the procedures followed in establishing the acceptable biological catch (ABC) and ACLs for Atlantic sharks and the process used to account for carryover or underharvests of quotas. It will also allow the option to phase-in ABC control rules and to adopt multi-year overfishing status determination criteria in some circumstances. Amendment 14 does not make changes to the current quotas or other management measures. Such changes are expected to be adopted through Amendment 16 to the 2006 Consolidated HMS FMP (under development) and other subsequent rulemakings, as needed. Current, 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	27.0*	40.6*
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

Fishery	TAC = ACL	Commercial Sector ACL	Recreational Sector ACL	Dead Discard Sector ACL
Blacknose—Gulf of Mexico	34.9	0	2.6	32.3
Prohibited species[2]	0	0	0	0

Note: 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. * NOAA Fisheries discovered a typographical error in the 2020 SAFE Report and has updated the sandbar shark TAC accordingly, which did not impact the shark research fishery. Source: NOAA Fisheries 2008, 2013, 2015a, 2015b.

5.2.2 U.S. Landings by Species

5.2.2.1 Tuna Landings

Atlantic tunas landings through 2021 (Table 5.3-Table 5.7) are taken from the 2022 National Report of the United States to ICCAT (NOAA Fisheries 2022).

Table 5.3 U.S. Landings (mt ww) of Atlantic Bluefin Tuna by Area and Gear, 2017–2021

Area	Gear	2017	2018	2019	2020	2021
Northwest Atlantic	Longline *	70.8	91.4	77.4	51.2	84.2
	Handline	5.0	1.4	0.0	0.0	0.0
	Purse seine	0.0	0.0	0.0	0.0	0.0
	Trap	0.0	0.0	0.0	0.8	0.0
	Harpoon	81.7	43.6	118.2	85.0	64.1
	Commercial rod and reel	652.8	765.7	798.6	848.8	853.2
	Recreational rod and reel	140.1	112.5	179.9	192.6	182.2
Gulf of Mexico	Longline	11.7	8.0	4.5	4.8.0	14.2
	Recreational rod and reel	1.7	1.6	1.9	0.0	0.4
North Central Atlantic**	Longline	32.9	4.0	9.8	0.2	0.3
Caribbean	Longline	0.0	0.0	0.4	0.4	0.0
All areas	All gears	996.8	1,028.3	1,190.8	1,183.5	1,200.5

*Includes landings and estimated discards from scientific observer and logbook sampling programs.

** Has been referenced as “NCA Area 94a” in previous ICCAT reports. Source: NOAA Fisheries 2022.

Table 5.4 **U.S. Landings (mt ww) of Atlantic Yellowfin Tuna by Area and Gear, 2017–2021**

Area	Gear	2017	2018	2019	2020	2021
Northwest Atlantic	Longline	731.4	392.7	535.2	472.8	435.5
	Rod and reel*	2,427.4	1,463.9	1,417.5	2,374.0	2,436.0
	Troll	35.5	31.2	4.2	10.9	10.9
	Gillnet	0.5	0.3	0.0	0.0	0.0
	Handline	32.4	17.9	48.9	39.6	36.9
	Unclassified	28.6	11.0	3.6	0.9	0.4
Gulf of Mexico	Longline	595.0	367.6	224.2	189.9	161.4
	Rod and reel*	463.8	306.3	251.4	433.6	753.0
	Troll	5.9	30.7	19.1	4.1	0.5
	Handline	5.8	3.8	3.5	3.4	1.4
	Unclassified	0.0	0.0	0.0	<0.1	0.0
Caribbean	Longline	103.2	94.4	117.3	132.4	106.0
	Handline	0.1	<0.1	0.2	0.0	0.0
	Rod and reel*	13.2	0.0	0.0	0.0	0.0
North Central Atlantic**	Longline	1.1	0.2	0.0	0.0	0.0
All areas	All gears	4,443.9	2,720.4	2,625.2	3,661.9	3,942.2

*Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. ** Longline landings and estimated dead discards are from scientific observer and logbook sampling programs. †This area has been referenced as “NCA Area 94a” in the ICCAT report. Source: NOAA Fisheries 2022.

Table 5.5 **U.S. Landings (mt ww) of Atlantic Skipjack Tuna by Area and Gear in 2017–2021**

Area	Gear	2017	2018	2019	2020	2021
Northwest Atlantic	Longline	0.3	0.2	0.3	0.2	0.1
	Rod and reel*	80.9	63.1	36.4	59.9	45.2
	Gillnet	<0.1	0.1	0.2	0.3	0.0
	Trawl	<0.1	0.6	<0.1	<0.1	<0.1
	Handline	1.6	0.2	0.2	0.4	0.2
	Unclassified	1.0	0.2	<0.1	0.0	0.0
Gulf of Mexico	Longline	0.3	0.2	0.1	<0.1	0.0
	Rod and reel*	113.2	12.6	7.2	7.1	18.7
	Handline	0.0	<0.1	<0.1	<0.1	0.0
Caribbean	Rod and reel*	1.0	0.0	0.0	0.0	0.0
	Handline	0.2	0.6	1.1	0.0	0.3
All areas	All gears	179.2	198.6	77.9	45.8	67.9

*Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S.

recreational harvesting sector. Source: NOAA Fisheries 2022.

Table 5.6 **U.S. Landings (mt ww) of Atlantic Bigeye Tuna by Area and Gear, 2017–2021**

Area	Gear	2017	2018	2019	2020	2021
Northwest and North Central Atlantic	Longline	540.4	378.8	571.4	484.9	648.6
	Gillnet	0.0	0.0	0.0	0.0	0.0
	Rod and reel*	259.7	493.9	201.7	278.1	285.8
	Troll	1.7	4.9	1.5	1.0	5.3
	Handline	4.0	25.5	13.9	16.1	14.9
	Trawl	0.0	0.9	0.0	0.2	0.6
	Unclassified	2.9	2.8	1.7	0.1	0.0
Gulf of Mexico	Longline	10.5	8.0	4.9	2.2	5.1
	Rod and reel*	0.0	0.7	30.4	19.9	0.5
	Troll	0.0	2.6	0.3	0.4	0.0
Caribbean	Longline	7.7	2.4	3.3	7.6	39.2
	Rod and reel*	0.0	0.0	0.0	0.0	0.0
	Handline	0.0	0.0	0.0	0.0	0.0
Southwest Atlantic	Longline	9.4	0.0	0.0	0.0	0.1
All areas	All gears	836.3	920.8	829.0	810.6	964.8

*Rod and reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector. Source: NOAA Fisheries 2022.

Table 5.7 **U.S. Landings (mt ww) of Atlantic Albacore Tuna by Area and Gear, 2017–2021**

Area	Gear	2017	2018	2019	2020	2021
Northwest Atlantic	Longline	94.0	44.9	113.2	195.6	149.0
	Gillnet	0.2	0.5	0.3	2.0	0.0
	Handline	0.1	0.2	0.5	2.4	1.5
	Trawl	1.7	<0.1	1.1	0.3	0.0
	Troll	0.0	0.0	0.0	<0.1	<0.1
	Rod and reel*	27.5	8.9	29.5	45.0	54.7
	Unclassified	0.0	0.0	0.0	<0.1	0.0
Gulf of Mexico and Caribbean	Longline	114.7	48.0	76.6	84.9	89.6
	Rod and reel*	0.0	0.0	0.0	0.0	0.0
	Handline	0.0	0.0	0.0	0.0	0.0
All areas	All gears	238.3	102.6	221.2	328.3	294.9

*Rod and reel catches and landings represent estimates of landings and dead discards when available based on statistical surveys of the U.S. recreational harvesting sector. Source: NOAA Fisheries 2022.

5.2.2.2 Swordfish Landings

Swordfish landings through 2021 (Table 5.8) are taken from the 2021 National Report of the United States to ICCAT (NOAA Fisheries 2022).

Table 5.8 U.S. Catches and Landings (mt ww) of Atlantic Swordfish by Area and Gear, 2017–2021

Area	Gear	2017	2018	2019	2020	2021
Northwest Atlantic	Longline*	774.8	839.2	1,035.2	1,039.2	740.8
	Handline	59.5	127.7	201.1	207.5	221.2
	Trawl	6.8	1.0	10.6	19.3	6.6
	Harpoon	0.3	0.1	0.3	0.0	0.0
	Rod and reel**	22.6	24.4	54.2	43.6	29.8
	Unclassified	<0.1	0.1	0.6	<0.1	0.0
Gulf of Mexico	Longline*	250.6	186.8	309.6	132.3	194.4
	Handline	2.7	3.9	3.0	11.0	13.5
	Rod and reel**	10.6	11.4	9.5	8.9	10.4
Caribbean	Longline*	88.4	3.2	6.8	12.1	3.4
	Rod and reel**	0.7	0.4	0.3	0.0	0.0
	Handline	0.0	0.0	0.0	0.1	0.0
North Central	Longline*	187.7	76.5	125.9	1.2	5.6
Southwest Atlantic	Longline*	0.0	0.0	0.0	<0.1	0.0
All areas	All gears	1,377.2	1,274.8	1,758.1	1,476.4	1,226.0

*Includes landings and estimated dead discards from scientific observer and logbook sampling programs. **Rod and reel catches and landings represent estimates of landings and dead discards when available based on statistical surveys of the U.S. recreational harvesting sector. ***Referenced as "NCA Area 94a" in ICCAT report. Source: NOAA Fisheries 2022.

5.2.2.3 Shark Landings

Atlantic shark landings through 2021 (Table 5.9-Table 5.17) are summarized from the NOAA Fisheries electronic dealer reporting program, known as eDealer. Shark fins (Table 5.16) are not required to be reported at the species-level, however, about 70 percent of the reported 2021 shark fin weight includes species-level information for 11 shark species. Most of the species-specific reports of shark fin landings in 2021 are from smoothhound sharks (49 percent). Fins from blacktip and great hammerhead sharks make up the majority of the remaining species-specific landings reported.

Table 5.9 **Commercial Landings (lb dw) of Large Coastal Sharks (LCS)* in Atlantic Region, 2017–2021**

Management Group	LCS	2017	2018	2019	2020	2021
Aggregated LCS	Blacktip	205,138	125,129	88,655	131,962	103,139
	Bull	23,802	16,707	14,677	17,703	8,624
	Lemon	12,005	8,910	5,096	4,479	4,843
	Nurse	0	0	C	0	0
	Silky	702	175	495	223	C
	Spinner	62,314	58,347	59,066	71,094	61,382
	Tiger	6,324	4,073	4,685	2,232	2,432
	Unclassified, assigned to LCS	0	0	0	90	0
Total aggregated LCS		310,286	213,341	<175,000	227,783	<181,000
Hammerhead	Great	17,646	22,881	26,410	27,529	33,464
	Scalloped	4,919	5,927	C	12,024	9,351
	Smooth	1,193	530	661	0	C
Total hammerhead		23,758	29,338	<35,000	39,553	<44,000
Total LCS carcass weight		334,044	242,679	206,015	267,336	223,366

C = landings not disclosed due to reasons of confidentiality. *Sandbar shark landings are presented in a separate table (Table 5.11) Source: eDealer

Table 5.10 **Commercial Landings (lb dw) of Large Coastal Sharks (LCS)* in the Gulf of Mexico Region, 2017–2021**

Management Group	LCS	2017	2018	2019	2020	2021
Blacktip	Blacktip	530,037	815,763	192,962	517,968	556,405
Aggregated LCS	Bull	171,298	176,763	86,230	210,527	155,275
	Lemon	25,039	37,593	46,526	43,602	33,819
	Nurse	C	C	C	C	16,219
	Silky	C	C	71	C	C
	Spinner	46,870	126,249	20,105	35,289	35,052
	Tiger	51,688	44,591	67,286	57,702	36,137
	Unclassified, assigned to LCS	0	0	2,475	1,547	1,771
Total Aggregated LCS		295,677	384,890	<227,000	358,469	<280,000
Hammerhead	Great	18,136	31,425	33,010	10,756	16,407
	Scalloped	15,151	26,303	C	3,755	3,419
	Smooth	0	0	0	0	0

Management Group	LCS	2017	2018	2019	2020	2021
	Unclassified, assigned to Hammerheads	0	0	370	231	155
Total hammerhead		33,287	57,728	<40,000	14,743	19,982
Total LCS carcass weight		859,001	1,258,381	452,876	891,180	<857,000

C = landings are not disclosed due to reasons of confidentiality. *Sandbar shark landings are presented in a separate table (Table 5.11). Source: eDealer.

Table 5.11 Commercial Landings (lb dw) of Sandbar Sharks in the Shark Research Fishery, 2017–2021

Management Group	Species	2017	2018	2019	2020	2021
Sandbar—shark research fishery	Sandbar	121,074	132,688	150,010	49,989	108,197

Source: eDealer.

Table 5.12 Commercial Landings (lb dw) of Small Coastal Sharks (SCS) in Atlantic Region, 2017–2021

Management Group	SCS	2017	2018	2019	2020	2021
Blacknose	Blacknose	17,241	11,335	18,910	10,644	15,056
Non-blacknose	Bonnethead	6,077	4,240	4,134	1,818	4,620
	Finetooth	19,874	17,071	9,688	7,793	21,575
	Sharpnose, Atlantic	251,289	268,395	292,694	214,303	205,681
Total non-blacknose SCS		277,240	289,706	325,426	223,913	231,873
Total SCS carcass weight		294,481	301,041	325,426	234,557	246,931

Source: eDealer.

Table 5.13 Commercial Landings (lb dw) of Small Coastal Sharks (SCS) in the Gulf of Mexico Region, 2017–2021

Management Group	SCS	2017	2018	2019	2020	2021
Blacknose*	Blacknose	0	C	C	0	C
Non-blacknose SCS	Bonnethead	588	729	C	C	986
	Finetooth	54,511	54,436	98,353	93,465	C
	Sharpnose, Atlantic	88,454	90,848	48,288	46,973	50,703
Total non-blacknose SCS		143,553	146,013	146,641	140,437	51,688
Unclassified, assigned to SCS	Unclassified	344	C	0	0	0
Total SCS carcass weight		143,887	146,013	147,478	140,437	88,792

C = landings are not disclosed due to reasons of confidentiality. *Blacknose shark are prohibited in the Gulf of Mexico, however some landings do exist likely due to misidentification problems or lack of awareness of shark fishing regulations. SCS = small coastal sharks. Source: eDealer.

Table 5.14 Commercial Landings (lb dw) of Smoothhound Sharks in Gulf of Mexico and Atlantic Regions, 2017–2021

Region	2017	2018	2019	2020	2021
Atlantic**	831,761	908,072	805,841	619,597	825,304
Gulf of Mexico***	0	C	C	3,144	C
Total smoothhound carcass weight	831,761	908,072	805,841	622,741	825,304

C = Landings are not disclosed due to reasons of confidentiality. **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 5.15 Commercial Landings (lb dw) of U.S. Atlantic Pelagic Sharks, 2017–2021

Management Group	Pelagic Shark	2017	2018	2019	2020	2021
Blue sharks	Blue	4,272	C	0	0	C
Porbeagle sharks	Porbeagle	C	811	C	0	C
Other pelagic sharks	Mako, shortfin	184,993	57,719	53,573	36,029	25,942
	Mako, unclassified	0	0	0	0	0
	Oceanic whitetip	0	0	0	0	C
	Thresher	61,990	63,805	51,170	62,485	58,908

Management Group	Pelagic Shark	2017	2018	2019	2020	2021
Total other pelagic sharks		246,983	121,524	104,742	98,514	84,850
Unclassified, assigned to pelagic	Unclassified	0	0	0	0	0
Total pelagic carcass weight		251,375	122,335	> 104,000	98,514	85,177

C = Landings are not disclosed due to reasons of confidentiality. Source: eDealer.

Table 5.16 Commercial Landings (lb dw) of Shark Fins, 2017-2021

Region	2017	2018	2019	2020	2021
Total landed fin weight	86,117	127,041	52,934	34,985	37,866

Source: eDealer.

Table 5.17 Commercial Landings (lb dw) Reported of Prohibited Shark Species, 2017–2021

Management Group and Region	Prohibited Sharks	2017	2018	2019	2020	2021
LCS and SCS—Gulf of Mexico	Caribbean reef*	335	C	294	683	574
	Atlantic angel*	0	C	0	0	0
Pelagic—Atlantic and Gulf of Mexico	Sevengill*	60	C	71	C	11
Unclassified, assigned to prohibited		192	59	260	194	222
Total prohibited shark weight		394	104	625	886	807

Note: Prohibited shark species with no reported landings from 2017 to 2021 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. 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 2021 Report of the Standing Committee on Research and Statistics at https://www.iccat.int/Documents/Meetings/Docs/2022/REPORTS/2022_SCRS_ENG.pdf (SCRS 2022). 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 assessed by SCRS is presented in Table 5.18. 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 5.18 U.S. vs. Total International Catch (mt ww) of Atlantic HMS Reported to ICCAT in 2021

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 (9,630)	89 (98)	1,226 (9,729)	12.6
	South Atlantic	-- (9,358)	-- (128)	-- (9,486)	--
	Total	1,137 (18,988)	100 (226)	1,237 (19,214)	6.4
Bluefin tuna	West Atlantic	1,177 (2,275)	23 (28)	1,200 (2,303)	52.1
	East Atlantic and Mediterranean	-- (35,070)	-- (5)	-- (35,075)	--
	Total	1,177 (37,345)	23 (33)	1,183 (37,378)	3.2
Bigeye tuna	Atlantic and Mediterranean total	965 (45,934)	6 (25)	971 (45,959)	2.1
Yellowfin tuna	West Atlantic	3,942 (26,765)	12 (18)	3,954 (26,783)	14.7
	East Atlantic	-- (83,791)	-- (29)	-- (83,820)	--
	Total	3,942 (110,556)	12 (47)	3,954 (110,602)	3.6
Albacore tuna	North Atlantic	295 (31,253)	0 (121)	332 (31,374)	1.1
	South Atlantic and Mediterranean	-- (27,896)	-- (10)	-- (27,907)	--
	Total	295 (59,149)	0 (131)	332 (59,281)	0.6
Skipjack tuna	West Atlantic	65 (19,948)	0 (3)	65 (19,951)	0.3
	East Atlantic and Mediterranean	-- (196,948)	-- (39)	-- (196,987)	--
	Total	65 (216,897)	0 (42)	65 (216,939)	0.0
Blue marlin	Atlantic and Mediterranean total	22 (1,659)	20 (52)	42 (1,711)	2.5

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
White marlin + Roundscale spearfish	Atlantic and Mediterranean total	2 (113)	1 (8)	7 3 (121)	2.5
Sailfish	West Atlantic	1 (818)	2 (2)	4 (821)	0.5
	East Atlantic	-- (1,521)	-- (2)	-- (1,523)	--
	Total	1 (2,339)	2 (4)	4 (2,344)	0.2
Blue shark	North Atlantic	10 (21,146)	24 (361)	34(21,507)	0.2
	South Atlantic and Mediterranean	-- (33,155)	-- (226)	-- (33,381)	--
	Total	10 (54,301)	24 (587)	32 (54,552888)	<0.1
Porbeagle shark	North Atlantic	1 (8)	0 (6)	1 (15)	6.7
	South Atlantic and Mediterranean	-- (0)	-- (0)	-- (0)	--
	Total	1 (8)	0 (6)	5 (15)	33.3
Shortfin mako shark	North Atlantic	39 (551)	3 (881)	42 (1,432)	3.0
	South Atlantic and Mediterranean	-- (2,236)	-- (14)	-- (2,250)	--
	Total	39 (4,503)	3 (60)	52 (3,681)	1.4

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. NA = No data are indicated for the United States in the report cited. A double dash (--) indicates that the region does not include U.S. waters; therefore, no U.S. landings would exist for that region. Source: SCRS 2022.

5.3 Data by Gear

More Information

- Gear: Section 10.1
- Management: Section 10.2
- Permits: Section 4.1
- Bycatch: Section 6.3.2

5.3.1 Background

Participation in a fishery requires the use of an authorized gear type in an approved fishery. The list of approved fisheries and authorized gear types are provided in 50 CFR 600.725(v). Generally, 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 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 5.19.

Table 5.19 List of HMS Fisheries and Authorized Gear Types*

HMS Fishery	Authorized Gear Types
Swordfish handgear	Rod and reel, harpoon, handline, bandit gear, buoy gear, green-stick 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 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 HMS primarily targets swordfish and bigeye and yellowfin tunas in various areas and seasons. Although gear can be modified (e.g., depth of set, hook type, hook size, bait) to target swordfish or tunas, the pelagic longline fishery is generally a multispecies fishery.

The number of hooks per set varies with line configuration and target species, as shown in Table 5.20.

More Information

- Gear: Section 10.1
- Management: Section 10.2
- Permits: Section 4.1
- Bycatch: Section 6.3

Table 5.20 Average Number of Hooks per Pelagic Longline Set in 2017-2021

Target Species	2017	2018	2019	2020	2021
Swordfish	797	708	739	710	668
Bigeye tuna	716	640	766	812	771
Yellowfin tuna	549	551	669	774	748
Mix of tuna species	735	629	730	790	789
Shark	295	260	NA	NA	NA
Dolphinfish	917	970	996	852	791
Other species	643	NA	NA	NA	NA
Mix of species	733	716	760	779	638

Source: Unified Data Processing.

5.3.2.2 Pelagic Longline Observer Program

In 2021, NOAA Fisheries observers in the Pelagic Observer Program recorded 412 pelagic longline sets, which is an overall fishery coverage of 9.7 percent. This coverage level met the eight percent observer coverage requirement under the May 2020 BiOp for the pelagic longline fishery.

On December 15, 2020 (85 FR 81168), NOAA Fisheries proposed changes to the Pelagic Longline Take Reduction Program (PLTRP), reflecting the most recent data and recommendations developed since 2009 with a comment period that closed on February 16, 2021. The proposed rule would remove long-finned pilot whales and Risso's dolphins from the scope of the PLTRP because recent data indicate the estimated mortality and serious injury levels for these species have been below their respective insignificance thresholds in the pelagic longline fishery. It also proposes new regulatory and non-regulatory measures to further reduce mortality and injury to short-finned pilot whales. NMFS is preparing the final rule.

Table 5.21 details the amount of observer coverage in past years for this fleet.

Table 5.21 Observer Coverage of the U.S. Atlantic Pelagic Longline Fishery, 2017-2021

Year	Total Observed Sets	Percentage of Total Number of Sets
2017	897	12.2
2018	731	13.0
2019	502	10.4
2020*	379	9
2021	412	9.7

* Due to COVID-19 safety restrictions, observer coverage was lower in 2020. Source: Garrison and Stokes 2016; unpublished Pelagic Observer Program data 2019, 2020, 2021, 2022.

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 5.22 for the entire pelagic longline fishery. Table 5.23 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 5.22 Reported Numbers of Catch and Hooks in the U.S. Atlantic Pelagic Longline Fishery in 2017-2021

Species and Hooks	2017	2018	2019	2020	2021
Swordfish kept	24,865	25,102	27,495	21,781	19,396
Swordfish discarded	7,596	8,004	4,307	4,167	4,635
Blue marlin discarded	1,566	858	984	836	554
White marlin discarded	2,223	1,587	1,467	1,059	1,211
Sailfish discarded	658	810	402	529	547
Spearfish discarded	687	459	469	300	239
Bluefin tuna kept	475	465	447	261	408
Bluefin tuna discarded	229	310	347	293	428
BAYS tunas kept	68,709	37,944	50,291	50,257	48,905
BAYS tunas discarded	6,721	3,230	3,649	3,529	3,409
Pelagic sharks kept	2,564	875	566	459	315
Pelagic sharks discarded	25,155	14,656	12,733	5,812	8,799
Large coastal sharks kept	79	36	117	43	21
Large coastal sharks discarded	11,042	5,639	4,466	3,365	4,640
Dolphinfish kept	29,300	27,515	36,979	13,166	12,366
Dolphinfish discarded	816	830	681	278	200
Wahoo kept	1,479	1,275	987	756	416

Species and Hooks	2017	2018	2019	2020	2021
Wahoo discarded	188	115	84	87	21
Sea turtle interactions	162	86	66	41	35
Number of hooks (× 1000)	5,328	4,056	3,649	3,076	3,065

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

Table 5.23 Reported Landings (mt ww) in the U.S. Atlantic Pelagic Longline Fishery, 2017-2021

Species	2017	2018	2019	2020	2021
Yellowfin tuna	1,430.7	854.9	876.7	795.1	702.9
Skipjack tuna	0.6	0.4	0.4	0.2	0.1
Bigeye tuna	568.0	389.2	579.6	494.7	693.0
Bluefin tuna*	115.4	103.4	92.1	56.6	98.7
Albacore tuna	208.7	92.9	189.8	280.4	238.6
North Atlantic swordfish*	1,301.5	1,105.7	1,477.5	1,184.8	944.2
South Atlantic swordfish*	0.0	0.0	0.0	<0.1	0.0
Total	3,624.9	2,546.5	3,216.1	2,811.8	2,677.5

*Includes landings and estimated discards from scientific observer and logbook sampling programsas reported to ICCAT. Source: NOAA Fisheries 2022.

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 Atlantic-wide 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 tunas 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 swordfish and tunas 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 pelagic longline landings. From 2017 through 2021, U.S. pelagic longline landings have averaged 3.9 percent of total Atlantic pelagic longline landings, ranging from a high of 9.1 percent in 2021 to a low of 3.1 percent in 2018. Table 5.24 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 2017–2021.

Table 5.24 **Estimated International Pelagic Longline Landings (mt ww) of Tuna, Billfish, and Swordfish for All Countries Fishing in the Atlantic, 2017-2021**

Species	Region	2017	2018	2019	2020	2021
Swordfish	North and South Atlantic	19,541	18,728	19,376	18,695	18,847
Yellowfin tuna	West Atlantic[1]	10,407	9,876	11,413	9,831	9,644
Bigeye tuna	Atlantic and Mediterranean	35,156	32,038	34,199	28,376	21,073
Bluefin tuna	West Atlantic[1]	559	664	675	576	651
Albacore tuna	North and South Atlantic	16,625	18,240	17,230	19,264	25,400
Skipjack tuna	West Atlantic[1]	291	322	416	193	420
Blue marlin	Atlantic and Mediterranean[2]	1,446	979	1,027	1,028	782
White marlin	Atlantic and Mediterranean[2]	376	221	238	135	96
Sailfish	West Atlantic[3]	1,059	1,349	1,242	1,136	802
Total international[4]		85,460	82,417	85,495	78,201	77,715
Total U.S.[5]		3,625	2,547	3,216	2,846	7,083
U.S. as percent of total international		4.2%	3.1%	3.8%	3.6%	9.1%

[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 SCRS 2021. [5] Includes swordfish, blue marlin, white marlin, and sailfish longline discards. Source: U.S. ICCAT National Reports 2017–2021 (NOAA Fisheries 2018, 2019, 2020, 2021, 2022); SCRS 2022.

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 shark-related recommendations and resolutions, largely related to sharks caught in association with ICCAT fisheries (e.g., ICCAT Recs. 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, the 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).

More Information

- Gear: Section 10.1.3
- Management: Section 10.2
- Permits: Section 4.1.1 (LAP) and 4.1.3 (Open Access)
- Bycatch: Section 6.3.4

Table 5.25 provides the most recent catch totals for blue, shortfin mako, and porbeagle sharks.

Table 5.25 Estimated International Pelagic Longline Landings (mt ww) of Pelagic Sharks for All Countries in the Atlantic in compared to U.S. Catch, 2017-2021

Species	2017	2018	2019	2020	2021
Total international1 blue shark	66,603	66,681	60,503	52,873	53,081
Total international1 shortfin mako	5,340	5,153	3,975	4,503	2,748
Total international1 porbeagle	30	17	0	1	6
Total International1 longline landings	71,973	71,851	64,478	57,377	55,835
U.S. blue shark catches2	66	30	37	32	10
U.S. shortfin mako catches2	306	167	58	52	39
U.S. porbeagle catches2	17	4	12	5	1
Total U.S. catches2	389	201	107	89	50
U.S. catches2 as percent of total international catch	0.5%	0.3%	0.2%	0.2%	0.1%

[1]International totals include landings from North Atlantic, South Atlantic, and the Mediterranean Sea regions for all countries, including the United States. [2]U.S. totals includes both landings and discards. Source: SCRS 2022.

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. After several years of discussion and public comment, in the final rule for Amendment 13 to the HMS FMP, NOAA Fisheries discontinued the Purse Seine category and redistributed its bluefin quota to the other quota categories, effective January 1, 2023. Purse seine data will no longer be included in future SAFE Reports.

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.

These numbers dropped significantly over the past 20 years and purse seine catch, including landings and dead discards, was last recorded in 2015.

More Information

- Gear: Section 10.1.2
- Management: Section 10.2
- Permits: Section 4.1.1
- Bycatch: Section 6.3.3

5.3.3.3 International Issues and Catch

Although the U.S. Atlantic tunas purse seine fleet historically accounted for a small percentage of the total international Atlantic tuna landings as shown in Table 5.26, since 2015, the U.S. purse seine fishery has contributed none of the total purse seine catch reported to ICCAT.

Table 5.26 **Estimated International Atlantic Tuna Catches (mt ww) for the Purse Seine Fishery in the Atlantic and Mediterranean, 2017-2021**

Species	2017	2018	2019	2020	2021
Bluefin	14,552	17,145	19,575	21,067	22,140
Yellowfin	89,472	92,889	94,929	110,777	71,957
Skipjack	211,040	247,759	230,228	202,098	167,041
Bigeye	27,891	28,437	28,263	18,349	13,384
Albacore	310	539	98	98	123
Total	343,265	386,769	373,093	352,389	273,645
U.S. total	0	0	0	0	0
U.S. %	0	0	0	0	0

Source: SCRS 2022.

5.3.4 Commercial Handgear

5.3.4.1 Background

Commercial handgears, including handline, harpoon, rod and reel, buoy gear, and bandit gear, are used to fish for 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.

More Information

- Gear: Section 10.1.3
- Management: Section 10.2
- Permits: Section 4.1.1 (LAP) and 4.1.3 (Open Acess)
- Bycatch: Section 6.3.4

Fishermen with Atlantic Tunas General and Harpoon category permits, the HMS Charter/Headboat permit, and combination swordfish/tuna permits are required to report all 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 https://hmspermits.noaa.gov/catchReports. These reports are in addition to any information submitted by federally permitted dealers.

5.3.4.2 Trip Estimates

Table 5.27 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 for 2017–

2021. The trips include commercial and recreational trips and are not specific to any particular species. The number of total private trips has been increasing steadily over the time series, with the largest increase in 2020, likely due to the pandemic. Private trips remained relatively high in 2021, but decreased slightly from 2020. The number of charter trips also increased in the first year of the pandemic (2020), and like the number of private trips, has remained relatively high for 2021.

Buoy gear effort reported by the buoy gear fishery is presented in Table 5.28. Effort in this fishery as indicated by number of trips has increased over the time series with a slowing of growth in 2020 and 2021.

Table 5.27 Estimated Number of Rod and Reel and Handline Trips Targeting Atlantic Large Pelagic Species by State in the Northeast, 2017-2021

Vessel Type	Year	NH/ME	MA	CT/RI	NY	North NJ	South NJ/ MD/DE	VA	Total
Private	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
	2019	3,721	10,984	2,294	7,020	2,973	17,728	2,529	47,250
	2020	5,043	12,600	4,529	15,600	4,044	18,842	2,528	63,185
	2021	4,993	13,375	4,718	10,680	5,535	19,363	2,167	60,831
Charter	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
	2019	371	3,576	426	1,908	1,002	3,359	337	10,978
	2020	1,264	6,555	428	1,452	1,242	5,349	474	16,764
	2021	958	6,313	598	2,247	1,573	4,316	550	16,555

Source: LPS.

Table 5.28 Reported Buoy Gear Effort, 2017-2021

Specifications	2017	2018	2019	2020	2021
Number of vessels	36	44	60	63	57
Number of trips	253	582	798	819	833
Average buoy gears deployed per trip	23.3	23.1	25.2	26.9	28.6
Total number of set hooks	6,282	13,572	20,450	26,497	28,040
Average number hooks per gear	1.1	1.0	1.0	1.0	1.0

Source: Unified Data Processing.

5.3.4.3 Recent Catch and Landings

The commercial 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 proportion of domestic HMS landings harvested with commercial handgear varies by species, with Atlantic tunas comprising the majority of these landings. For example, in 2021, Atlantic bluefin tuna commercial handgear landings accounted for approximately 78 percent (by weight) of total U.S. Atlantic bluefin tuna landings (Figure 5.2). By comparison, the shark commercial handgear fishery plays a very minor role in contributing to overall shark landings. Because of the small amount of shark landings contributed by hand gear,several of the tables in this section generally do not

include shark landings. For information regarding shark fishery landings, 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 8.

The majority of U.S. commercial handgear fishing activities for bigeye, albacore, yellowfin, and skipjack tunas takes place in the northwest Atlantic. The commercial handgear fishery for bluefin tuna targets large medium and giant bluefin tuna, and occurs mainly in the summer and fall off New England, and to a lesser degree, in the winter off the coast of southern Atlantic states Virginia, North Carolina, and South Carolina. Targeting bluefin tuna in the Gulf of Mexico is prohibited.

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 increased notably starting in 2017. Gulf of Mexico incidental landings have decreased notably since 2014. Landings by region have been quite consistent over the last three years. The availability of Atlantic tunas at a specific location and time is highly dependent on environmental variables that may fluctuate from year to year.

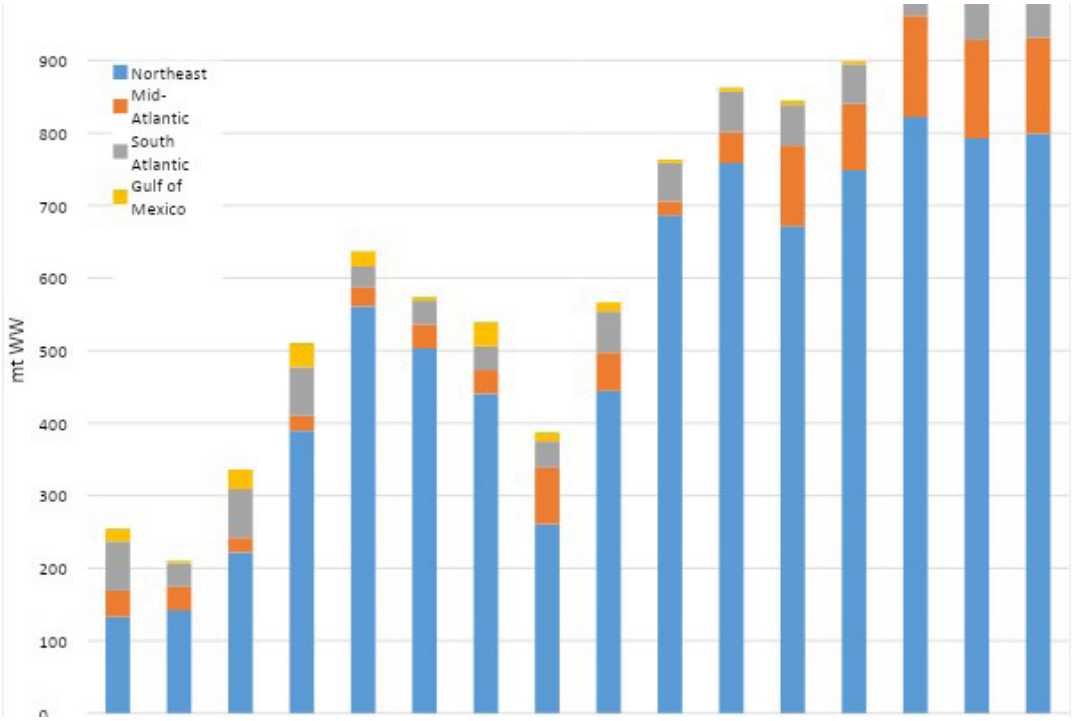

Figure 5.1 Commercial Landings (mt ww) of Atlantic Bluefin Tuna by U.S. Geographic Region, 2006-2021
Source: eBFT.

Figure 5.2 shows Atlantic bluefin tuna landings by category since 2006. Incidental retention of bluefin is allowed by trap and pelagic longline gear, and these landings are combined in the figure. The commercial handgear landings are comprised of bluefin tuna landed by both the General and Harpoon categories. Figure 5.2 shows the large degree by which handgear landings dominate overall commercial bluefin landings since 2010.

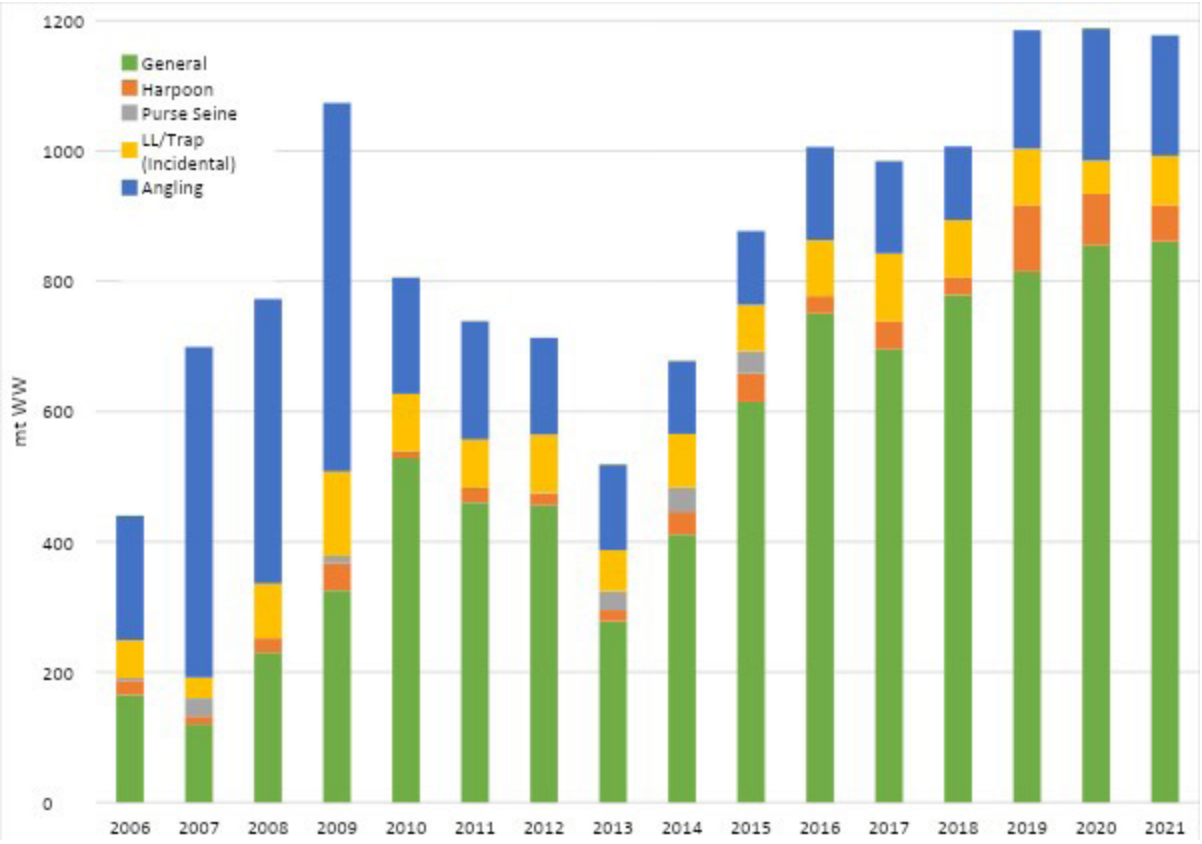

Figure 5.2 Domestic Landings of Bluefin Tuna (mt ww) by Fishing Category, 2006-2021

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

Table 5.29 gives commercial handgear landings of tuna and swordfish by gear, as compared to total U.S. landings of these species. Commercial handgear accounts for the greatest amount of landings in the bluefin tuna fishery at 93 percent of overall landings harvested in the United States in 2021. Other species listed in order of percent caught by commercial handgear are: swordfish (19), bigeye tuna (2), skipjack (0.9), albacore tuna (0.5) and yellowfin tuna (0.3).

Table 5.29 **U.S. Atlantic Commercial Handgear Landings of Tunas and Swordfish (mt ww) by Handgear Type, 2017-2021**

Species	Gear	2017	2018	2019	2020	2021
Bluefin tuna	Rod and reel	652.8	765.7	798.6	848.8	853.2
	Handline	5.0	1.4	0	0	0
	Harpoon	81.7	43.6	118.2	85.0	64.1
Total bluefin tuna (handgear)		739.5	810.7	916.8	933.8	917.3
Total U.S. bluefin tuna		996.8	1028.3	1,190.8	1,183.5	1,200.5
Bigeye tuna	Troll	1.7	7.5	1.8	1.4	5.3
	Handline	4.0	25.5	13.9	16.1	14.9
Total bigeye tuna (handgear)		5.7	33.0	15.7	17.5	20.2
Total U.S. bigeye tuna		836.3	920.8	829.0	810.6	964.8
Albacore tuna	Troll	0.0	0.0	0.0	0.1	<0.1
	Handline	0.1	0.2	0.5	2.4	1.5
Total albacore tuna (handgear)		0.1	0.2	0.5	2.5	1.6
Total U.S. albacore tuna)		238.3	102.6	221.1	328.3	294.9
Yellowfin tuna	Troll	41.4	61.9	23.3	15.0	11.4
	Handline	38.3	21.8	52.6	43.0	38.3
Total yellowfin tuna (handgear)		79.7	83.7	75.9	58.0	49.7
Total U.S. yellowfin tuna		4,443.9	2,720.4	2,625.2	3,661.9	3,942.2
Skipjack tuna	Troll	0.0	0.0	0.0	0.1	0.1
	Handline	1.8	1.3	1.4	0.1	0.5
Total skipjack tuna (handgear)		1.8	1.3	1.4	0.2	0.6
Total U.S. skipjack tuna		198.6	77.9	45.8	67.7	64.7
Swordfish	Handline	62.2	131.6	204.1	218.6	234.7
	Harpoon	0.3	0.1	0.3	0.0	0.0
Total swordfish (handgear)		62.5	131.5	204.4	218.6	234.7
Total U.S. swordfish		1,377.2	1,274.8	1,758.1	1,476.4	1,226.0

Source: NOAA Fisheries 2022.

Commercial handgear landings are shown by area in Table 5.30. Most landings are from the Northwest Atlantic, with minor amounts of Gulf landings for yellowfin tuna and swordfish each year, and even less bigeye tuna and skipjack tuna. The Caribbean contributed the least amount for all areas, with very limited landings of yellowfin, swordfish, and skipjack.

Table 5.30 U.S. Atlantic Commercial Handgear Landings of Tunas and Swordfish (mt ww) by Region, 2017-2021

Species	Region	2017	2018	2019	2020	2021
Bluefin tuna	Northwest Atlantic	734.5	809.3	916.8	933.8	917.2
Bigeye tuna	Northwest Atlantic	5.7	30.4	15.4	17.1	20.2
	Gulf of Mexico	0.0	3.3	0.3	0.4	0.0
	Caribbean	0.0	0.0	0.0	0.0	0.0
Albacore tuna	Northwest Atlantic	0.1	0.2	0.5	2.4	1.5
	Gulf of Mexico/Caribbean	0.0	0.0	0.0	0.0	0.0
Yellowfin tuna	Northwest Atlantic	67.9	49.1	53.1	50.5	47.8
	Gulf of Mexico	11.7	34.5	22.6	7.5	1.9
	Caribbean	0.1	0.1	0.2	0.0	0.0
Skipjack tuna	Northwest Atlantic	1.6	0.8	0.2	0.2	0.3
	Gulf of Mexico	0.0	<0.1	0.1	0.1	0
	Caribbean	0.2	0.6	1.1	0.0	0.3
Swordfish	Northwest Atlantic	59.5	127.7	201.1	207.5	221.2
	Gulf of Mexico	2.7	3.9	3.0	11.0	13.5
	Caribbean	0.0	0.0	0.0	0.1	0.0

Source: NOAA Fisheries 2022.

Table 5.31 Reported Buoy Gear Landings by weight (lb dw), 2017-2021

Species	2017	2018	2019	2020	2021
Swordfish	77,243	186,577	293,651	307,787	370,791
Dolphinfish	298	265	411	314	390
Oilfish	109	1,117	432	839	1,028
Wahoo	26	0	172	0	251
Bigeye tuna	207	92	120	150	325
King mackerel	60	35	0	0	0
Yellowfin tuna	0	350	0	290	490
Bonito	60	14	0	0	0
Blackfin tuna	86	276	427	898	768

Source: Unified Data Processing.

5.3.5 Recreational Handgear

5.3.5.1 Background

Recreational fishermen target various HMS using a variety of handgear: rod and reel, handline, and speargun. HMS Angling and 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.

More Information

- Gear: Section 10.1.3
- Management: Section 10.2
- Permits: Section 4.1.3.5 and 4.1.3.6
- Bycatch: Section 6.3.5
- Tournaments: Section 8.5.2

Each of the following data tables contain estimates of total harvest derived from multiple data sources, some survey based (i.e., Marine Recreational Information Program (MRIP), Large Pelagics Survey (LPS), Louisiana Creel Survey ("LA Creel"), Texas Parks and Wildlife Survey ("TPWD"), and Southeast Regional Headboat Survey), and some census based (ATR, Automated Landings Reporting System (ALRS), MD and NC Catch Cards). One should note that survey-based estimates include estimates of precision (i.e., statistical variance) that allow for the calculation of percent standard errors (PSEs) and confidence intervals, while census-based count data do not. Estimates of PSEs are not included in the following tables because it is computationally difficult to combine variance estimates across surveys using different sampling designs, and impossible to do so between surveys and census-based approaches. As a rule, surveys like theLPS generate lower estimates of variance for HMS because they survey a more targeted audience of offshore anglers while MRIP surveys target anglers fishing for all saltwater fish species. Within any given survey, variance estimates will also be consistently lower for species that are more commonly caught and observed (i.e., higher sample sizes) such as yellowfin tuna, Atlantic sharpnose sharks, bonnethead sharks, shortfin mako sharks, and blacktip sharks than for species that are less commonly caught and observed.

5.3.5.2 Recent Catch and Landings

The landings in this section reflect the re-estimation of recreational effort, catch, and harvest first conducted in 2018 with results from the new Fishing Effort Survey (FES) and redesigned Access Point Angler Intercept Survey (APAIS) (Table 5.33-Table 5.43). 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 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 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 2017 through 2021 are presented in Table 5.33.

Table 5.32 Domestic Landings (mt ww) for the Atlantic Tunas and Swordfish Recreational Rod and Reel Fishery, 2017-2021

Species	Region	2017	2018	2019	2020	2021
Bluefin tuna*	Northwest Atlantic	140.1	112.5	179.9	192.6	182.2
	Gulf of Mexico	1.7	1.6	1.9	0	0.4
	Total	141.8	114.1	181.8	192.6	182.6
Bigeye tuna**	Northwest Atlantic	259.7	493.9	204.9	278.1	285.8
	Gulf of Mexico	0	0.7	30.6	19.9	0.5
	Caribbean	0	0	0	0	0
	Total	259.7	494.6	235.5	298.0	286.3
Albacore**	Northwest Atlantic	27.5	8.9	29.5	45.0	54.7
	Gulf of Mexico and Caribbean	0	0	0	0	0
	Total	27.5	8.9	29.5	45.0	54.7
Yellowfin tuna**	Northwest Atlantic	2,427.4	1,463.9	1,446.7	2,374.0	2,436.0
	Gulf of Mexico	463.8	306.3	254.8	433.6	753
	Caribbean	13.2	0.0	0	0	0
	Total	2,904.4	1,770.2	1,701.5	2,807.6	3,189.0
Skipjack tuna**	Northwest Atlantic	80.9	63.5	34.6	59.9	45.2
	Gulf of Mexico	113.2	12.6	7.5	7.1	18.7
	Caribbean	1.0	0	0	0	0
	Total	195.1	76.1	42.1	67.0	63.9
Swordfish	Northwest Atlantic	22.6	24.4	54.2	43.6	29.8
	Gulf of Mexico	10.6	11.4	9.5	8.9	10.4
	Caribbean	0.7	0.4	0.3	0	0
	Total	33.9	39.8	64.0	52.5	40.2

*Rod and reel catch and landings estimates of bluefin tuna < 73 inches curved fork length (CFL) 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 2018, 2019, 2020, 2021, 2022.

Recreational Billfish Fishery

Table 5.34 provides a summary of reported billfish and swordfish landings from 2017 through 2021. 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 theALRS, 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 5.34). 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 19-05, and as specified at 50 CFR 635.27(d)(1), the U.S. 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.

The number of registered tournaments and reported tournament landings by state are shown in Table 5.35.

Table 5.33 Recreational Swordfish and Billfish Landings in Numbers, 2017-2021

Species	Reporting	2017	2018	2019	2020	2021
Swordfish	Tournament[1]	50	42	62	68	87
	Non-tournament[2]	518	619	1,234	872	603
Total swordfish		568	661	1,296	940	690
Sailfish	Tournament[1]	1	4	14	0	6
	Non-tournament[2]	104	94	96	50	66
Total sailfish		105	98	110	50	72
Blue marlin	Tournament[1]	45	75	51	52	62
	Non-tournament[2]	17	15	28	22	36
Total blue marlin		62	90	79	74	98
White marlin	Tournament[1]	50	51	44	76	29
	Non-tournament[2]	11	27	31	19	27
Total white marlin		61	78	75	95	56
Roundscale spearfish	Tournament[1]	6	20	33	66	21
	Non-tournament[2]	0	0	2	0	0
Total roundscale spearfish		6	20	35	66	21
Total marlin and roundscale spearfish		129	188	189	235	175
Balance remaining from 250 marlin and roundscale spearfish limit		121	62	61	15	75

Source: [1]ATR, Maryland and North Carolina HMS catch cards, LPS, and MRIP; [2]ALRS, Maryland and North Carolina HMS catch cards, LPS, and MRIP.

Table 5.34 Tournaments and Numbers of Billfishes and Swordfish Kept by State/Territory in 2021

State	Tournaments	Blue Marlin	Roundscale Spearfish	Sailfish	Swordfish	White Marlin
Massachusetts	7	0	0	0	0	0
New York	7	0	0	0	0	0
New Jersey	28	8	0	0	1	16
Maryland	18	3	8	0	1	5
Virginia	6	0	0	0	0	0
North Carolina	20	10	0	0	0	0
South Carolina	9	2	0	0	0	0
Florida	71	5	0	0	29	0
Alabama	4	8	0	0	0	0
Mississippi	4	3	0	0	22	0
Louisiana	21	3	0	0	4	0
Texas	17	2	0	5	2	1
Puerto Rico	4	0	0	0	0	0
U,S, Virgin Islands	4	0	0	0	0	0

Notes: Some states have been excluded to protect tournament reporting privacy. These states include Maine, Rhode Island, Delaware, and Georgia. Five registered tournaments were held outside the United States (data not shown). Source: ATR.

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 must and in North Carolina can report shark landings on catch cards at state-operated landings stations. Maryland recreational shark landings in 2017 through 2021 are summarized by species in Table 5.36. North Carolina catch cards from 2017 through 2021 indicate one spinner shark was reported in 2019, one blacktip shark was reported in 2020, and one thresher shark was reported in 2021. 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, 2017-2021

Species	2017	2018	2019	2020	2021
Atlantic sharpnose	40	76	80	70	7
Blacktip	0	0	0	0	1
Blue	4	0	0	0	0
Thresher	10	6	6	0	5
Scalloped hammerhead	0	0	0	0	1

Species	2017	2018	2019	2020	2021
Shortfin mako	61	3	13	6	9
Spinner	0	0	0	1	0
Smoothhound	0	0	0	0	4
Tiger	1	0	0	0	1
Total	116	85	99	77	28

Source: Maryland Department of Natural Resources.

The following tables, which provide estimated shark recreational landings, have undergone changes from previous SAFE Reports. First, beginning in the 2019 report, recreational harvest data from the 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. Second, 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 2021 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 5.37, Table 5.38, and Table 5.39), pelagic sharks (Table 5.40) , and small coastal sharks (Table 5.41 and Table 5.42). Estimated recreational landings for smoothhound (smooth dogfish) sharks are in Table 5.43. Observed and estimated recreational harvest of prohibited shark species are in Table 6.27.

Table 5.36 Estimated Recreational Harvest of Large Coastal Sharks in the U.S. Atlantic Region in 2017-2021 in Number of Fish per Species

Species	2017	2018	2019	2020	2021
Blacktip	1,527	500	224	1,506	673
Bull	3,750	32	.	17	.
Hammerhead, great	.	.	1	5	.
Hammerhead, scalloped	.	.	1	.	.
Hammerhead, smooth	.	.	.	.	.
Hammerhead, unclassified	.	.	.	.	.
Lemon	764	.	4	.	217
Nurse	2	5	13	2	1
Spinner	623	153	66	27	61,359
Tiger	.	1	.	.	1
Requiem shark, unclassified	625	7,544	83,129	37,790	384
Total	7,291	8,235	83,438	39,347	62,635

Note: A period indicates that species were not reported. Source: Southeast Region Headboat Survey and MRIP (FES/APAIS calibrated).

Table 5.37 **Estimated Recreational Harvest of Large Coastal Sharks in the Gulf of Mexico Region in 2017-2021 in Number of Fish per Species**

Species	2017	2018	2019	2020	2021
Blacktip	21,635	17,777	5,725	15,012	17,945
Bull	3,373	5,945	1,993	2,283	631
Hammerhead, great	.	.	.	36	2
Hammerhead, scalloped	58	30	3	1	7
Hammerhead, smooth	.	.	.	.	.
Hammerhead, unclassified	.	.	.	.	.
Lemon	.	47	.	.	.
Nurse	2,282	1	.	.	1
Spinner	4,711	6,050	3,290	2,402	2,048
Tiger	3	1	2	4	24
Requiem shark, unclassified	13,504	1,136	12,703	473	7,811
Total	45,868	30,991	23,726	18,031	28,469

Note: A period indicates that species were not reported. Source: Texas Parks & Wildlife Department; MRIP (FES/APAIS calibrated); Southeast Region Headboat Survey; Louisiana Recreational Creel Survey.

Table 5.38 **Domestic Landings (mt ww) of Pelagic Sharks in the Recreational Rod and Reel Fishery in the U.S. Atlantic, Gulf of Mexico, and U.S. Caribbean, 2017-2021**

Species	2017	2018	2019	2020	2021
Blue shark	21.9	15.2	16.7	8.4	9.3
Mako, shortfin	192.4	125.1	25.2	24.5	21.8
Oceanic whitetip	.	.	< 0.1[1]	.	< 0.1[1]
Porbeagle	7.7	2.8	11.8	4.9	1.2
Thresher	92.0	96.6	108.8	54.1	3.3
Total	314.0	239.7	162.5	91.9	35.6

Sources: LPS; MRIP (FES/APAIS calibrated); Southeast Region Headboat Survey; Louisiana Recreational Creel Survey; Texas Parks & Wildlife Department. A period indicates that species were not reported. [1] 2019 and 2021 each saw a single report of a landed oceanic whitetip shark reported to the Southeast Region Headboat Survey, accounting for less than 0.1 MT.

Table 5.39 **Estimated Recreational Harvest of Small Coastal Sharks in the U.S. Atlantic Region in 2017-2021 in Number of Fish per Species**

Species	2017	2018	2019	2020	2021
Blacknose	13	13	83	661	2,917
Bonnethead	18,239	37,168	31,086	28,861	34,840
Finetooth	1,219	.	176	113	166
Atlantic sharpnose	38,784	24,468	40,144	34,256	72,912
Total	58,255	61,649	71,489	63,891	110,835

Source: MRIP (FES/APAIS calibrated); Southeast Headboat Survey. A period indicates that species were not reported.

Table 5.40 **Estimated Recreational Harvest of Small Coastal Sharks in the Gulf of Mexico Region in 2017-2021 in Number of Fish per Species**

Species	2017	2018	2019	2020	2021
Blacknose	2,487	17,358	406	156	3
Bonnethead	20,663	117,831	20,305	25,808	49,330
Finetooth	2,560	3,910	101	501	38
Atlantic sharpnose	71,719	51,140	25,452	12,045	12,032
Total	97,601	190,579	46,299	35,564	61,403

Source: Texas Parks & Wildlife Department; MRIP (FES/APAIS); Southeast Region Headboat Survey; Louisiana Recreational Creel Survey.

Table 5.41 **Estimated Recreational Harvest of Smoothhound Sharks* in the Gulf of Mexico and U.S. Atlantic Regions in 2017-2021 in Number of Fish per Species**

Region	2017	2018	2019	2020	2021
Atlantic	60,428	40,736	56,375	61,129	37,534
Gulf of Mexico	.	.	.	.	5
Total	58,446	40,736	56,375	61,129	37,539

*Atlantic stock includes smooth dogfish. Gulf of Mexico stock includes smooth dogfish, Florida smoothhound, and Gulf smoothhound. A period indicates that species were not reported. Source: Texas Parks & Wildlife Department; MRIP (FES/APAIS calibrated); Southeast Region Headboat Survey; Louisiana Recreational Creel Survey.

5.3.6 Bottom Longline

5.3.6.1 Background

Bottom longline is the primary commercial gear deployed for targeting large and small coastal sharks throughout the Atlantic Ocean. The bottom longline fishery includes the shark research fishery. Section 6.3.6.1 under the bycatch reduction measures for bottom longline, provides a description of the shark research fishery.

More Information

- Gear: Section 10.1.4
- Management: Section 10.2 (See Amendment 6 and Amendment 5b)
- Permits: Section 4.1.1
- 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, VMS 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 2017 through 2021 is provided in Table 5.44. A targeted shark trip is defined as a trip where 75 percent of the landings by weight were sharks. Few vessels target sharks in the Atlantic and Gulf of Mexico, with only 17 active vessels in 2021. Effort in the Gulf of Mexico has generally been greater than in the Atlantic region since 2018, as reflected by the number of trips, total number of hooks, and total soak time.

Table 5.42 Reported Bottom Longline Effort Targeting Sharks, 2017-2021

Specifications	Region	2017	2018	2019	2020	2021
Number of vessels	Gulf of Mexico	13	13	6	12	7
	Atlantic	18	14	12	13	10
Number of trips	Gulf of Mexico	322	340	119	226	171
	Atlantic	325	212	118	149	183
Average sets per trip	Gulf of Mexico	1.2	1.3	1.8	1.9	1.6
	Atlantic	1.4	1.5	1.8	2.0	1.8
Total number of set hooks	Gulf of Mexico	112,295	121,992	83,335	155,125	68,340
	Atlantic	109,851	85,307	34,322	37,673	39,878
Average number of hooks per set	Gulf of Mexico	292.1	275.9	403.3	281.7	235.7
	Atlantic	260.0	276.1	204.4	135.9	149.9
Total soak time (hours)	Gulf of Mexico	2,140	2,058	1,039	1,392	904
	Atlantic	3,054	1,410	866	682	638
Average mainline length (miles)	Gulf of Mexico	2.9	3.0	6.1	3.4	3.0
	Atlantic	3.6	3.7	3.2	1.9	2.6

Source: Unified Data Processing.

5.3.6.3 Recent Catch and Landings

This section provides information on non-prohibited shark landings and species composition and discards as reported in the Southeast Fisheries Science Center Bottom Longline Observer Program. For information on prohibited sharks, see Section 6.4.

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, 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 1-5 percent (Mathers et al. 2022, unpublished).

In 2021, the Bottom Longline Observer Program placed observers on eight vessels—four of the vessels were selected within the shark research fishery and five were selected in the non-research shark bottom longline fishery. A total of 97 bottom longline sets (defined as setting gear, soaking gear for some duration of time, and retrieving gear) and 60 trips (defined as from the time a vessel leaves the port until the vessel returns to port and lands catch, including multiple hauls therein) were observed from January through December 2021. 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. 2022, unpublished).

The non-research shark fishery data cannot be further described due to vessel data confidentiality requirements under the Magnuson-Stevens Act.

Fishermen in the 2021 shark research fishery targeted sandbar sharks in the Gulf of Mexico and southern Atlantic regions. There were 62 sets on 36 trips, all of which were observed, that caught mostly sandbar sharks, with Atlantic sharpnose,, tiger, and nurse sharks being the next most-caught species (Table 5.45). Trips in the shark research fishery used a bottom longline gear that was an average length of 10.6 km (6.7 miles) with 64-300 hooks attached. The average soak duration was 4.1 hours. Fishermen targeting sandbar sharks with bottom longline gear most commonly used the 20/0 circle hook (38.7 percent of the time) followed by 16/0 circle hooks (37.1 percent of the time) (Mathers et al. 2022, unpublished).

Table 5.43 Non-prohibited Shark Species Caught on Bottom Longline Trips in the Shark Research Fishery in the Gulf of Mexico and Southern Atlantic in 2021

Species	Total Caught	Kept (%)	Discarded Dead (%)	Discarded Alive (%)	Disposition Unknown (%)
Sandbar shark	2,228	97.9	0.0	0.4	1.8
Atlantic sharpnose shark	258	2.7	19.4	77.9	0.0
Tiger shark	164	22.0	73.8	2.4	1.8
Nurse	82	6.1	91.5	0.0	2.4
Blacktip shark	76	73.7	11.8	13.2	1.3

Species	Total Caught	Kept (%)	Discarded Dead (%)	Discarded Alive (%)	Disposition Unknown (%)
Great hammerhead shark	74	50.0	33.8	16.2	0.0
Scalloped hammerhead shark	73	13.7	67.1	19.2	0.0
Bull shark	66	72.7	24.2	1.5	1.5
Lemon shark	22	90.9	4.6	4.6	0.0
Blacknose shark	18	0.0	38.9	61.1	0.0
Spinner shark	7	71.4	28.6	0.0	0.0
Silky shark	7	14.3	71.4	14.3	0.0
Hammerhead shark	4	0.0	50.0	0.0	50.0
Smooth hammerhead shark	2	0.0	100.0	0.0	50.0
Sharks, unclassified	2	0.0	0.0	100.0	0.0
Total	1,825				

Source: Mathers et al. 2022, 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.

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.

5.3.7.2 Trips and Fishing Effort

Southeast Atlantic and Gulf of Mexico Gillnet Fishery

The majority of the vessels and trips catching and landing sharks, other than smooth dogfish, with gillnet gears occurs 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). In 2021, a total of 390 sets comprising various gillnet fisheries were observed. However, landings from all the regions cannot be aggregated at sufficient levels to release location-specific reports of trips and effort data given confidentiality requirements under the Magnuson-Stevens Act (Table 5.46).

Table 5.44 Gillnet Gear Effort in the U.S. South Atlantic and Gulf of Mexico Regions Targeting Sharks, 2017-2021

Specifications	Region	2017	2018	2019	2020	2021
Number of vessels	Gulf of Mexico	3	C	C	C	C

Specifications	Region	2017	2018	2019	2020	2021
	Atlantic	20	27	19	17	C
Number of trips	Gulf of Mexico	15	C	C	C	C
	Atlantic	131	203	264	216	C
Average sets per trip	Gulf of Mexico	1.7	C	C	C	C
	Atlantic	1.4	1.5	2	1.8	C
Total soak time (hours)	Gulf of Mexico	128.0	C	C	C	C
	Atlantic	499.1	562.5	698.8	641	C
Average gillnet length (yards)	Gulf of Mexico	696.7	C	C	C	C
	Atlantic	1,047	1,169	828	1,001	C
Average mesh size (inches stretched)	Gulf of Mexico	8.5	C	C	C	C
	Atlantic	4.7	4.6	6.3	4.6	C

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.

Northeast and Mid-Atlantic Gillnet Fishery

The majority of the vessels and trips fishing with gillnet gear in the northeast and mid-Atlantic regions catch and land smooth dogfish. Interactions in this fishery are recorded by observers with the Northeast Fisheries Observer Program (NEFOP). 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 winter skate, bluefish, and spiny dogfish.

In 2021, the NEFOP observed 5 vessels making 41 sets on 11 trips targeting smooth dogfish. Smooth dogfish was recorded caught on a total of 33 sets. A summary of observed trips targeting smooth dogfish are presented in Table 5.45.

More Information

- Gear: Section 10.1.5
- Management: Section 10.2 (See Amendment 6 and Amendment 5b)
- Permits: Section 4.1.1
- Bycatch: Section 6.3.7

Table 5.45 Gillnet Gear Effort in the U.S. Northeast and Mid-Atlantic Regions Targeting Smooth Dogfish in 2018-2021

Specifications	2018	2019	2020	2021
Number of trips	45	48	9	11
Number of sets	176	191	30	41

Source: NEFOP.

In 2020, NEFOP also observed two vessels making 13 sets on two trips targeting other sharks, other than smooth dogfish sharks. However, given confidentiality limitations we are unable to display the data.

5.3.7.3 Recent Catch and Landings

Table 5.48 displays the total catch, landings, and discards of smooth dogfish sharks in NEFOP observed trips in 2018 through 2021.

Table 5.46 Catch and Landings of Smooth Dogfish using Gillnet Gear in the U.S. Northeast and Mid-Atlantic Regions, 2018-2021

Specifications	2018	2019	2020	2021
Total caught (lb dw)	105,942	83,426	4,406	12,936
Kept (%)	99.4%	98.7%	100.0%	>99.99%
Discarded (%)	0.6%	1.3%	0.0%	<0.01%

Source: NEFOP.

5.3.8 Green-Stick

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, HMS Charter/Headboat, and Atlantic Tunas Longline category permits.

5.3.8.2 Recent Catch and Landings

Table 5.49 presents green-stick landings data from state and federal trip ticket programs.

More Information

- Gear: Section 10.1.6
- Management: Section 10.2 (See Amendment 8)
- Permits: Section 4.1
- Bycatch: Section 6.3.8

Table 5.47 Select Landings with Green-Stick Gear (lb ww), 2017-2021

Species	Region	2017	2018	2019	2020	2021
Yellowfin tuna	Atlantic	92,629	82,040	14,486	20,103	17,321
	Gulf of Mexico	6,177	66,258	40,942	C	C
Bigeye tuna	Atlantic	C	12,975	6,330	C	6,193
	Gulf of Mexico	-	5,095	C	C	-
Skipjack tuna	Atlantic	C	C	C	C	C
	Gulf of Mexico	C	C	C	C	-
Sharks, combined	Atlantic	C	-	-	C	C
	Gulf of Mexico	C	-	-	-	-
Swordfish	Atlantic	-	-	-	-	-

Species	Region	2017	2018	2019	2020	2021
	Gulf of Mexico	-	-	C	C	C

Note: Additional landings of other HMS have occurred but cannot be displayed due to confidentiality requirements. Sources: 2015: eDealer, 2016-2019: ACCSP, GulfFIN. C = Due to confidentiality requirements under the Magnuson-Stevens Act, some of the data are not presented. A dash indicates that species were not reported.

5.4 Landings of Non-Target HMS in Other Fisheries

5.4.1 Bottom Longline Fisheries

The NEFOP may observe HMS catch on bottom longline trips that target other finfish species. In 2021, the NEFOP observed 11 sets on four trips targeting tilefish. Reduced numbers of fishing trips and restrictions on placing observers on fishing vessels occurred due to the events caused by the COVID-19 pandemic. As a result, in 2020, only one vessel targeting golden tilefish was observed interacting with HMS. This is compared to five and three vessels primarily targeting golden tilefish that were observed interacting with HMS in 2019 and 2021, respectively. Due to reasons of confidentiality under the Magnuson-Stevens Act, the details of the 2020 observed trip cannot be provided. HMS caught and kept in this fishery in 2021, as well as 2019 for comparison, are displayed in Table 5.50. Information regarding HMS species caught and discarded in this fishery can be found in Section 6.5.3, Table 6.31.

Table 5.48 Atlantic HMS* Caught and Kept on Observed Bottom Longline Trips Targeting Golden Tilefish and other Finfish in the North Atlantic, 2019-2021

Species	Total Caught 2019	Kept (%) 2019	Total Caught 2020	Kept (%) 2020	Total Caught 2021	Kept (%) 2021
Tiger shark	18	5.6	C	C	0	0.0
Shortfin mako shark	3	100.0	C	C	2	50.0
Yellowfin tuna	2	100.0	C	C	1	100.0
Unidentified shark	0	0.0	C	C	5	0.0
Blacktip shark	1	100.0	C	C	0	0.0
Sandbar shark	0	0.0	C	C	2	0.0
Porbeagle shark	0	0.0	C	C	1	0.0
Bluefin tuna	0	0.0	C	C	1	Unk*
Unidentified tuna	0	0.0	C	C	1	Unk*
Total	24		C		13	

Prohibited shark species landings and interactions are compiled and presented in Section 6.4, Bycatch in the Prohibited Shark Complex. C = data are not disclosed due to reasons of confidentiality; Unk* = final fate not known. Source: NEFOP.

5.4.2 Gillnet Fisheries

5.4.2.1 Northeast and Mid-Atlantic Gillnet Fishery

Two types of gillnet gear, sink and drift, were observed in trips targeting mixed species, other than smooth dogfish or other sharks (J. Mello, personal communication). In 2021, a total of 152 trips totaling 251 sets on 36 vessels were observed interacting with highly migratory species. Shark species dominated the HMS portion of the catch, including porbeagle, Atlantic sharpnose, and unidentified sharks. A list of shark species caught and kept by gillnet fishermen targeting mixed teleosts is presented in Table 5.51. Data on shark species caught and discarded in this fishery can be found in Section 6.5.4, Table 6.32.

Table 5.49 Non-target Shark Species* Caught and Kept on Observed Trips across All Gillnet Gear Types Targeting Mixed Teleosts in 2021

Common Name	Total Number Caught	Kept (%)
Porbeagle shark	202	0.0
Atlantic sharpnose shark	158	99.4
Unidentified shark	103	0.0
Sandbar shark	40	0.0
Blue shark	21	0.0
Thresher shark	9	66.7
Spinner shark	9	44.4
Scalloped hammerhead shark	3	66.7
Sand tiger shark	2	0.0
Tiger shark	2	0.0
Shortfin mako shark	1	0.0
Blacktip shark	1	100.0
Smooth hammerhead shark	1	100.0
Total	552	

Bycatch information of prohibited shark species across all HMS fisheries is presented in Section 6.4. Source: NEFOP.

Drift gillnet gear was used in 27 sets on 12 trips by 8 vessels. The HMS catch from drift gillnets not targeting sharks or smooth dogfish was dominated by Atlantic sharpnose, with spinner, porbeagle, scalloped and smooth hammerhead, thresher, and blacktip sharks also caught. Sink gillnet gear not targeting sharks or smooth dogfish was used in 224 sets on 140 trips by 30 vessels. The HMS catch with sink gillnet gear on these trips was dominated by porbeagle, unidentified, and sandbar sharks.

5.4.2.2 Southeast Atlantic and Gulf of Mexico Gillnet Fishery

The Southeast Gillnet Observer Program covers anchored, strike, and drift gillnet fishing regardless of target species. In 2021, the Southeast program observed 390 sets comprised of various southeast gillnet fisheries. None of the gillnet trips observed targeted sharks. In the strike gillnet fishery, two gillnet vessels were observed making three strike gillnet sets on three trips. In the sink gillnet fishery, 14 gillnet vessels were observed making 321 sink gillnet sets on 75 trips. In the drift gillnet fishery, four vessels were observed making 66 drift net sets on 16 trips. Observed strike gillnet trips exclusively targeted king mackerel. The majority of sink and drift gillnet fisheries continued to target mostly Spanish mackerel.

Table 5.52 and Table 5.53 outlines shark species composition for sharks caught and kept during observed strike and sink gillnet trips with observers onboard in 2021 (Mathers et al. 2022, unpublished). Data on shark species caught and discarded in this fishery can be found in Section 6.5.4, Table 6.32 and Table 6.33.

Table 5.50 Shark Species Caught and Kept on Observed Southeast Drift Gillnet Trips Targeting Spanish Mackerel in 2021

Species	Total Caught	Kept (%)
Atlantic sharpnose shark	137	13.9
Scalloped hammerhead shark	3	0.0
Blacknose shark	2	50.0
Spinner shark	2	0.0
Blacktip shark	2	0.0
Bonnethead shark	2	0.0
Great hammerhead shark	1	0.0
Total	149	

Source: Mathers et al. 2022, unpublished.

Table 5.51 Shark Species Caught and Kept on Observed Southeast Sink Gillnet Trips Targeting Spanish Mackerel in 2021

Species	Total Caught	Kept (%)
Atlantic sharpnose shark	1369	25.6
Bonnethead shark	417	21.8
Scalloped hammerhead shark	55	1.8
Blacknose shark	34	29.4
Blacktip shark	34	20.6
Spinner shark	16	37.5
Finetooth shark	3	0.0
Bull shark	1	0.0
Smooth dogfish	1	0.0
Sharks	1	0.0
Total	1,931	

Source: Mathers et al. 2022, unpublished

5.4.3 Other Fisheries

In trawl fisheries operating in the northeast, observed HMS interactions are most predominant in the haddock, Atlantic long-finned squid, redfish, and groundfish fisheries. While porbeagle and sandbar sharks are the most commonly encountered HMS in the trawl fisheries, only a limited number of swordfish and tunas are retained, solely in the squid trawl fishery, in 2021.

5.5 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 specifically 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 an undesirable species, 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. Implementation of the National Bycatch Reduction Strategy and guidance on the development, documentation, and review of Standard Bycatch Reduction Methodologies began in 2017. In 2021, NOAA Fisheries completed the review for HMS through Amendment 12 to the 2006 Consolidated HMS FMP (86 FR 46836, August 20, 2021). 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 (50 CFR 600.350) 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 HMS fisheries would be impracticable. Methods employed to reduce bycatch in the HMS fisheries are listed in Table 6.1.

Table 6.1 Bycatch Reduction Methods in Highly Migratory Species Fisheries

Commercial Fisheries	Recreational Fisheries
Corrodible (non-stainless steel) circle hooks	Corrodible (non-stainless steel) circle hooks (mortality reduction only)
Prohibiting retention of certain fish	Prohibiting retention of certain fish
Education/outreach	Education/outreach
Use of de-hooking devices (mortality reduction only)	Use of de-hooking devices (mortality reduction only)
Gear modifications (including hook and bait types)	Catch-and-release programs
Weak hooks	
Time/area closures	
Performance standards	
Handling and release requirements (e.g., in the pelagic longline fishery, sharks that are not retained must have less than 3 ft. of trailing gear attached to the hook when released)	
Fleet communication and relocation protocols (e.g., vessels must move 1 mile and inform other vessels that dusky sharks are in the area after a dusky shark interaction)	

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 Fishery Conservation and Management Act (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).

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 (16 U.S.C. 1802(12)). Birds and marine mammals are 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 SBRM 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 CFR 600.1610). The regulations provide that standardized reporting methodologies 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 (50 CFR 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 CFR 600.1605(a)).

The SBRM final rule also required that all FMPs ensured consistency with the requirements related to establishing and reviewing SBRMs by February 21, 2022. (50 CFR 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 reviewed SBRM through Amendment 12 to the 2006 Consolidated HMS FMP. On August 20, 2021, NOAA Fisheries released Final Amendment 12, which, among other things, reviewed and updated SBRM for HMS fisheries (86 FR 46836). Amendment 12 is consistent with a 2017 final rule that established requirements and provided guidance regarding the development, documentation, and review of SBRMs (82 FR 6317, January 19, 2017). For a description of gear-specific SBRM for HMS fisheries, see Section 2.3 of Final Amendment 12 at: https://www.fisheries.noaa. gov/action/amendment-12-2006-consolidated-hms-fishery-management-plan-msa-guidelines-and-national.

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.

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 1994 amendments, Section 118 (16 U.S.C. 1387) 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 1994 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 uses Take Reduction Teams (TRTs) to develop recommendations for measures to be included in take reduction plans and to monitor the implementation of those plans until NOAA Fisheries has determined that the goals have been met. Team members include representatives of relevant fisheries, conservation groups, the academic community, fishery management organizations, and involved federal and state agencies.

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. 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 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 2022 became effective May 19, 2022 (87 FR 23122, April 19, 2022).

Additional information and references to the current list of fisheries can be found at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/list-fisheries-summary-tables.

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 and Interactions in 2022

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
Gray seal	Halichoerus grypus
Harbor porpoise	Phocoena phocoena
Harbor seal	Phoca vitulina
Hooded seal	Cystophora cristata
Humpback whale	Megaptera novaeangliae
False killer whale	Pseudorca crassidens

Common Name	Scientific Name
Killer Whale	Orcinus orca
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 2022

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.

Table 6.3 Marine Mammal Protection Act Classification of Commercial HMS Fisheries

Category	Commercial Fishery
Category I	Atlantic Ocean, Caribbean, and Gulf of Mexico pelagic longline fishery
Category II	Southeastern Atlantic shark gillnet fishery
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 fishery
	Southeastern Atlantic, Gulf of Mexico, and Caribbean 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 (PLTRT) is charged with developing recommendations 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. NOAA Fisheries considered these recommendations and developed a take reduction plan (74 FR 23349, May 19, 2009) that became effective June 18, 2009. A suite of management strategies was 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 (CHSRA), with specific observer and research participation requirements for fishermen operating in that area.
- A 20-nautical mile (nm) 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.

The following non-regulatory measures were also included in the take reduction plan:

- 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 (completed and available here: https://www.fisheries.noaa.gov/resource/document/marine-mammal-handling-release-guidelines-trt.
- Recommended that NOAA Fisheries pursue the research and data collection goals in the take reduction plan regarding pilot whales and Risso's dolphins.

NOAA Fisheries reconvened the Pelagic Longline Take Reduction Plan (PLTRP) in 2015 and 2016 to develop additional take reduction recommendations and meet the MMPA goal. On December 15, 2020, NOAA Fisheries published a proposed rule to amend the regulations for the PLTRP under the Marine Mammal Protection Act based on consensus recommendations by the PLTRT, which is a multi-stakeholder group comprised of representatives from the fishing industry, academia, and non-governmental organizations (85 FR 81168). The purpose of the proposed rule is to reduce mortalities and serious injuries of short-finned pilot whales incidental to the Atlantic portion of the pelagic longline fishery. Regulatory measures in the proposed rule would: (1) remove the CHSRA and its special observer and research participation requirements; (2) modify the mainline length requirements for the Exclusive Economic Zone (EEZ) portion of the Mid-Atlantic Bight to limit total length of active gear in the water and reduce soak times associated with pelagic longline sets that have multiple mainlines; and (3) implement terminal gear (i.e., hook and gangion) requirements to make the hooks the weakest part of the terminal gear (so that the

hooks straighten before the gangion breaks) in the EEZ portion of the Northeast Coastal, Mid-Atlantic Bight, South Atlantic Bight, and Florida East Coast statistical areas. NOAA Fisheries accepted public comments on the proposed rule until February 16, 2021, and is currently developing the final rule. More information on the take reduction team can be found at https://www.fisheries.noaa.gov/national/marine- mammal-protection/pelagic-longline-take-reduction-plan.

6.2.2.2 Atlantic Large Whale Take Reduction Team and Plan

The Atlantic Large Whale Take Reduction Team (ALWTRT) was established in 1996 to help develop plans that mitigate the risks to marine mammals posed by fishing gear. The resulting Atlantic Large Whale Take Reduction Plan (ALWTRP) includes regulatory and non-regulatory measures intended to reduce serious injuries and deaths of large whales, including North Atlantic right 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.

Regulations implementing the Plan can be found at 50 CFR 229.32 and include the following measures that affect HMS fisheries, specifically gillnet fisheries, including closed and restricted areas:

- A closed area for all gillnet fisheries from November 15 to April 15 from 29° 00' N. lat. to 32° 00' N. lat. from shore eastward to 80° 00' W. long. and off South Carolina, within 35 nm of the coast (Southeast U.S. Restricted Area North).
- A restricted area from December 1 to March 31 from 27° 51' N. lat. to 29° 00' N. lat. from shore eastward to 80° 00' W. long. (Southeast U.S. Restricted Area South).
- Additional seasonal boundaries for Exclusive Economic Zone waters east of 80° 00' W. long. from 26° 46.50' N. lat. to 32° 00' N. lat. (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. lat. southward to 26° 46.50' N. lat. eastward to 80° 00' W. long. (Southeast U.S. Monitoring Area).
- Buoy line and gillnet panel marking requirements in these four areas.

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 (80 FR 73128, November 24, 2015) 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.

In 2021, the ALWTRT was asked to recommend risk reduction measures for other Atlantic trap/pot and gillnet fisheries, which includes shark gillnet fisheries. The ALWTRT met virtually on July 1, 2021, to discuss efforts to reduce the risk of entanglement to right, humpback, Rice's, and fin whales in U.S. East Coast gillnet, Atlantic mixed species trap/pot, and Mid-Atlantic lobster and Jonah crab trap/pot fisheries. On September 17, 2021, NOAA Fisheries published a final rule amending the regulations implementing the ALWTRP for northeast commercial lobster and Jonah crab trap/pot fisheries (86 FR 51970). In 2022, the ALWTRT met numerous times to develop the recommended measures for the Phase 2 process for risk reduction in the mid-Atlantic lobster trap/pot, U.S. East Coast multispecies trap/pot, and gillnet fisheries coast-wide. On September 9, 2022, NOAA Fisheries published a Notice of Intent to prepare an EIS on Phase 2 Modifications to the ALWTRP; the comment period closed on October 21, 2022 (87 FR 55405). More information on the ALWTRT and ALWTRP 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 Harbor Porpoise Take Reduction Team 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 Team last met virtually on February 10, 2023 to discuss revising the research provision in the Plan to allow bycatch reduction research during commercial fishing trips. The 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 2006 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. Under the 2006 final rule, night fishing restrictions on medium mesh gillnet fisheries in North and South Carolina waters were to expire on May 26, 2009. The night fishing restrictions on medium mesh gillnet fisheries in North Carolina waters were continued for an additional three years by a final rule that became effective on January 20, 2009 (73 FR 77531, December 19, 2008). 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, July 31, 2012). In 2014, an Environmental Assessment (EA) was completed, which conducted an environmental analysis on the

Bottlenose Dolphin Conservation Measures. This resulted in a rulemaking that revised the Bottlenose Dolphin Take Reduction Plan. NOAA Fisheries published a final rule on February 9, 2015 (80 FR 6925), which amended MMPA and ESA implementing regulations to reduce bottlenose dolphin serious injuries and mortalities from Virginia pound nets, and revised Virginia pound net-related definitions, gear prohibitions, and non-regulatory measures.

NOAA Fisheries has reconvened the Team, with the most recent meeting occurring in December 2017 in St. Petersburg, Florida. Maps, amendments, assessments, and meeting information 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, whereas endangered species are those in danger of becoming extinct throughout all or a significant portion of their range (16 U.S.C. 1532(6), (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 of 163 threatened and endangered marine species (https://www.fisheries.noaa.gov/species-directory/threatened-endangered). 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.

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 (16 U.S.C. 1532(5). 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 the HMS Pelagic Longline Fishery

NOAA Fisheries has taken numerous steps to reduce sea turtle and other endangered species bycatch and bycatch mortality in the HMS pelagic longline fishery over the years. The details of these efforts are described in past SAFE reports and are not repeated here.

On May 15, 2020, NOAA Fisheries released the latest Biological Opinion (BiOp) conducted under Section 7 of the ESA. This BiOp analyzed the best available data, the status of the species, environmental baseline, effects of the proposed action, and cumulative effects. The BiOp concluded that the HMS pelagic longline fishery was not likely to jeopardize the continued existence of sperm whales, the Northwest Atlantic distinct population segment (DPS) of loggerhead, Kemp's ridley, the North and South Atlantic DPSs of green, leatherback, hawksbill, or olive ridley sea turtles, giant manta ray, the Central and Southwest Atlantic DPS of scalloped hammerhead shark, and oceanic whitetip shark. Since no critical habitat will be adversely affected, the action is not likely to destroy or adversely modify designated critical habitat.

The BiOp also determined that the following Reasonable and Prudent Measures (RPMs) were necessary and appropriate to minimize the impacts of future takes on sea turtles and other ESA-listed fish and to monitor levels of incidental take. The HMS Management Division shall ensure that fishermen in the HMS pelagic longline fishery receive relevant outreach materials and provide such materials describing how captured ESA-listed sea turtles and fish should be handled and how gear should be removed from ESA-listed sea turtles, fish, and marine mammals to minimize adverse effects from incidental take and reduce mortality. The HMS Management Division shall provide such training using materials provided by the SERO Protected Resources Division to fishermen. The HMS Management Division must also ensure that any takes of ESA-listed species are monitored and reported, coordinating with the SEFSC as necessary and appropriate. Such reports should allow the agency to: (1) detect any adverse effects resulting from the proposed action; (2) assess the actual level of incidental take in comparison with the anticipated incidental take documented in this Opinion; (3) assess (for sea turtles) the hooking location and gear remaining on every sea turtle released to allow for post-release mortality estimations; and (4) detect when the level of anticipated take (lethal and non-lethal) is exceeded.

To be exempt from the take prohibitions established by Section 9 of the ESA, the BiOp requires compliance with specified terms and conditions, which implement the RPMs described above. The terms and conditions specify the types of outreach materials that must be provided to pelagic longline fishermen, levels of observer coverage, quarterly reporting of the total take and total mortalities (dead-on-retrieval and post-release mortality) of ESA-listed species in the HMS pelagic longline fishery, and an annual report detailing interactions between ESA-listed species and the HMS pelagic longline fishery.

The 2020 HMS Pelagic Longline BiOp can be found at:

https://www.fisheries.noaa.gov/resource/document/biological-opinion-pelagic-longline-fishery-atlantic-highly-

migratory-species.

In early July 2022, NOAA Fisheries requested reinitiation of consultation on the effects of the HMS pelagic longline fishery due to new information on mortality of giant manta ray. Pending completion of this consultation, the fishery continues to operate consistent with the Reasonable and Prudent Measures and Terms and Conditions of the two 2020 BiOps.

Table 6.4 Status of Listed Species that may be Affected in HMS Pelagic Longline Fisheries

Species	Status
Blue whale *(Balaenoptera musculus)*	Endangered
Gulf of Mexico Bryde's Whale (*Balaenoptera edeni*)	Endangered
Fin whale *(Balaenoptera physalus)*	Endangered
North 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
Giant manta ray (*Manta birostris*)	Threatened
Olive ridley sea turtle *(Lepidochelys olivacea)*	Threatened
Gulf of Maine Atlantic salmon (*Salmo salar*)	Threatened
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	Endangered/Threatened**
Gulf sturgeon (*Acipenser oxyrinchus desotoi*)	Threatened
Smalltooth sawfish *(Pristis pectinata)*	Endangered
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). Green sea turtles have two DPSs: North Atlantic and South Atlantic. **Atlantic sturgeon have five distinct population segments (DPSs). 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 the Central and Southwest Atlantic are considered threatened. The other populations in the Northwest Atlantic and Gulf of Mexico DPSs are not considered threatened.

6.2.3.2 Biological Opinion for HMS Non-Pelagic Longline Fisheries

As with the HMS pelagic longline fishery, NOAA Fisheries has taken many actions over the years to reduce sea turtle and other endangered species bycatch and bycatch mortality inHMS non-pelagic longline fisheries. Details on the most recent BiOp for HMS Non-Pelagic Longline Fisheries are below. Details on the previous BiOp for HMS non-Pelagic Longline Fisheries are described in previous SAFE reports and other documents and are not repeated here.

On May 15, 2020, NOAA Fisheries released a BiOp for all HMS fisheries except pelagic longline, which stated that

these fisheries (including handgear fisheries) are not likely to jeopardize the continued existence of sea turtles, sawfish, Atlantic sturgeon, scalloped hammerhead shark (Caribbean and Central Atlantic DPS), oceanic whitetip shark, and giant manta ray. NOAA Fisheries is implementing the RPMs and Terms and Conditions of the 2020 BiOp for HMS fisheries except pelagic longline. This action is not anticipated to affect the above- referenced ESA-listed species in any way not previously analyzed for existing regulations, including the provision for exempted fishing activities, and there is no new information that would alter this conclusion. Any of the covered ESA-listed species taken with handgear would be considered against the Incidental Take Statement (ITS) in the 2020 BiOp for the HMS fisheries except pelagic longline, as long as the operations are consistent with the RPMs in that BiOp, namely: any protected resources caught while engaging in research activities must be safely handled, resuscitated, and released; and all protected resource interactions must be reported to NOAA Fisheries.

The 2020 BiOp for HMS Non-Pelagic Longline Fisheries can be found here: https://www.fisheries. noaa.gov/resource/document/biological-opinion-operation-atlantic-highly-migratory-species-fisheries.

Table 6.5 Status of Listed Species that May Be Affected in HMS Non-Pelagic Longline Fisheries

Species	Status
Blue whale *(Balaenoptera musculus)*	Endangered
Bryde's Whale (*Balaenoptera edeni*)	Endangered
Fin whale *(Balaenoptera physalus)*	Endangered
North 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
Giant manta ray (*Manta birostris*)	Threatened
Gulf of Maine Atlantic salmon (*Salmo salar*)	Endangered
Nassau grouper *(Epinephelus striatus)*	Threatened
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	Endangered/Threatened**
Gulf sturgeon (*Acipenser oxyrinchus desotoi*)	Threatened
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Smalltooth sawfish *(Pristis pectinata)*	Endangered
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 (DPSs). 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 the Central and Southwest Atlantic are considered threatened. The other populations in the Northwest Atlantic and Gulf of Mexico DPSs are not considered threatened.

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 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.

In 2011, the National Seabird Coordinator and regional points of contact were formalized into NOAA Fisheries' National Seabird Program (NSP). In 2015, two key focus areas of the NSP were reaffirmed: addressing seabird bycatch through monitoring, estimating, and mitigation; and promoting seabirds as ecosystem indicators. Today, the NSP is a cross-cutting group of managers and scientists who work domestically and internationally to protect and conserve seabirds.

The NSP met in May of 2018, during which a five-year NSP strategic plan was drafted based on five strategic initiatives:

- monitor and estimate seabird bycatch.
- mitigate seabird bycatch.
- strengthen key partnerships.
- promote seabirds in advancing ecosystem-based fisheries management.
- elevate awareness of and support for the NSP.

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), the 2006 Consolidated HMS FMP (NOAA Fisheries 2006) and its amendments including Amendment 2 (NOAA Fisheries 2008), Amendment 5b (NOAA Fisheries 2017), Amendment 7 (NOAA Fisheries 2014), Amendment 11 (NOAA Fisheries 2018), and Amendment 13 (NOAA Fisheries 2022), and a regulatory amendment regarding gear restricted areas and weak hooks (NOAA Fisheries 2020).

On August 20, 2021, NOAA Fisheries released Final Amendment 12, which, among other things, reviewed and made updates to standardized bycatch reporting methodology (SBRM), for HMS fisheries (86 FR 46836). Amendment 12 addressed the revised NS1 guidelines provisions on SBRM-related requirements for HMS fisheries, consistent with the 2017 SBRM rulemaking (see Section 6.2.1.1).

A summary of bycatch species, data collection methods, and management measures by fishery/gear type is found in Table 6.6.

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Table 6.6 Summary of Bycatch Species, Marine Mammal Protection Act Category, Endangered Species Act Requirements, Data Collections, and Management Measures for HMS Fisheries

Fishery/Gear Type	Bycatch Species	MMPA Category	ESA Requirements	Bycatch Data Collection	Management Measures (Year Implemented)
Pelagic longline	Bluefin tuna; billfish; undersize target species; marine mammals; sea turtles; seabirds; non- target finfish; prohibited SHK; species; LCS species after closure	Category I	Jeopardy findings in 2000, 2004 & 2020; RPA implemented 2001–2004 & 2020; ITS, terms and conditions, RPMs	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 nm 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, increased observer coverage in PLL fishery (2009), weak hook requirement in GOM (2011, modified in 2020); IBQ, GRAs, EM, VMS reporting (2015); sharks released not retained by dehooker or cutting gangion < 3 ft from hook, shark identification course for vessel owners and operators, move 1 nm after dusky shark interaction and notify other vessels (2017); convert Northeastern United States Closed Area and Spring Gulf of Mexico Gear Restricted Area into monitoring areas (2020)
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 nm 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 nm after dusky shark interaction and notify other vessels (2017); circle hooks (2018)
Northeast sink and Mid-Atlantic shark gillnet (smoothhound)	Marine mammals	Category I			Sink gillnet soak time limits and net check requirements for drift gillnets (2016)

Fishery/Gear Type	Bycatch Species	MMPA Category	ESA Requirements	Bycatch Data Collection	Management Measures (Year Implemented)
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 nm 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)
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, online shark identification and management measure video and quiz to obtain shark endorsement (2018)

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. nm = 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).* Per implementation of Amendment 13, this fishery was discontinued effective January 1, 2023.

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 10.3 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.

In addition to the gear-specific measures, 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 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 are 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 Gear Restricted Area (NED). 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. Vessels fishing in the Gulf of Mexico between January 1 and June 30 each year 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 and notify nearby vessels via the radio that dusky sharks are in the area. For dusky sharks, marine mammals, turtles, and smalltooth sawfish, the vessel must move at least 1 nm 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.

Pelagic Longline Bycatch Reduction Measures: Sharks

Management measures for sharks caught in association with ICCAT fisheries using pelagic longline gear have been domestically implemented to comply with ICCAT recommendations. 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 if tunas, swordfish, or billfish are onboard vessels (81 FR 57803, August 24, 2016). Consistent with ICCAT Recommendation 17-08, on February 21, 2019, NOAA Fisheries published a final rule that implemented Amendment 11 (84 FR 5358). In Amendment 11, pelagic longline fishermen were required to release all live shortfin mako sharks; only shortfin mako sharks that were dead at haulback, as verified using EM data, could be retained. Additionally, effective July 5, 2022, the United States set a zero retention limit for shortfin mako sharks in all fisheries, including the pelagic longline fishery (July 1, 2022, 87 FR 39373), consistent with ICCAT Recommendation 21-09. NOAA Fisheries has prohibited the retention of dusky sharks 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.

Pelagic Longline Reduction Measures: Individual Bluefin Quota Program

The Individual Bluefin Quota (IBQ) Program implemented by Amendment 7 to the 2006 Consolidated HMS FMP (79 FR 78310; December 30, 2014) 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. Before Amendment 13 was implemented, a shareholder's share percentage was multiplied by the total pounds of Atlantic Tunas Longline category quota available to derive the amount of allocation in pounds. On January 1, 2023, Amendment 13 became effective. In Amendment 13, NOAA Fisheries implemented a dynamic IBQ allocation where a shareholder's allocation is determined annually during the last quarter of each year, based on the number of pelagic longline sets that a vessel deployed during the recent 36 months of best available data. 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. NOAA Fisheries transferred quota from the Reserve category into the Longline category inseason during 2015 through 2018 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.

During 2019, 2020, and 2021, NOAA Fisheries did not transfer quota from the Reserve category to the Longline category based on various fishery conditions such as trends in the IBQ allocation leasing market (e.g., weighted average lease price, amount of IBQ allocation leased, number of lessees), and the amount of bluefin catch relative to the total Longline category quota. 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 6.7 includes data on the annual, inseason, and combined distributions of IBQ by shareholder tier.

Table 6.7 Individual Bluefin Quota Allocations (mt) to the Pelagic Longline Category by Share Tier (lb) in 2016-2021

Year	Quota Distribution	Date	IBQ(mt)	High Tier (~1.2%)	Medium Tier (~0.6%)	Low Tier (~0.3%)
2016	Annual allocation	1-Jan-16	148.3	3,913	1,956	1,206
	Transfer from Reserve category	4-Jan-16	34	551	551	551
2016 Total			182.3	4,464	2,507	1,757
2017	Annual allocation	1-Jan-17	148.3	3,913	1,956	1,206
	Transfer from Reserve category	2-Mar-17	45	1,102	1,102	1,102
2017 Total			193.3	5,015	3,058	2,308
2018	Annual allocation	1-Jan-18	148.3	3,913	1,956	1,206
	Transfer from Reserve category	13-Apr-18	44.5	1,102	1,102	1,102
	ICCAT baseline quota increase	5-Oct-18	15.3	404	202	124
2018 Total			208.1	5,419	3,260	2,432
2019	Annual allocation	1-Jan-19	163.6	4,317	2,157	1,330
2019 Total			163.6	4,317	2,157	1,330
2020	Annual allocation	1-Jan-20	163.6	4,317	2,157	1,330
2020 Total			163.6	4,317	2,157	1,330
2021	Annual allocation	1-Jan-21	163.6	4,317	2,157	1,330
2021 Total			163.6	4,317	2,157	1,330

*Transfer from Reserve category to vessels with recent fishing activity only.

Pelagic Longline Bycatch Reduction Measures: 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 (Figure 6.1). Time/area closures and gear restrictions have been part of a successful strategy to reduce bycatch in the HMS pelagic longline fishery in the past, although NOAA Fisheries has been considering the ongoing need for such measures in light of improved data collection, current regulations, current fishery trends, and the age of some closures.

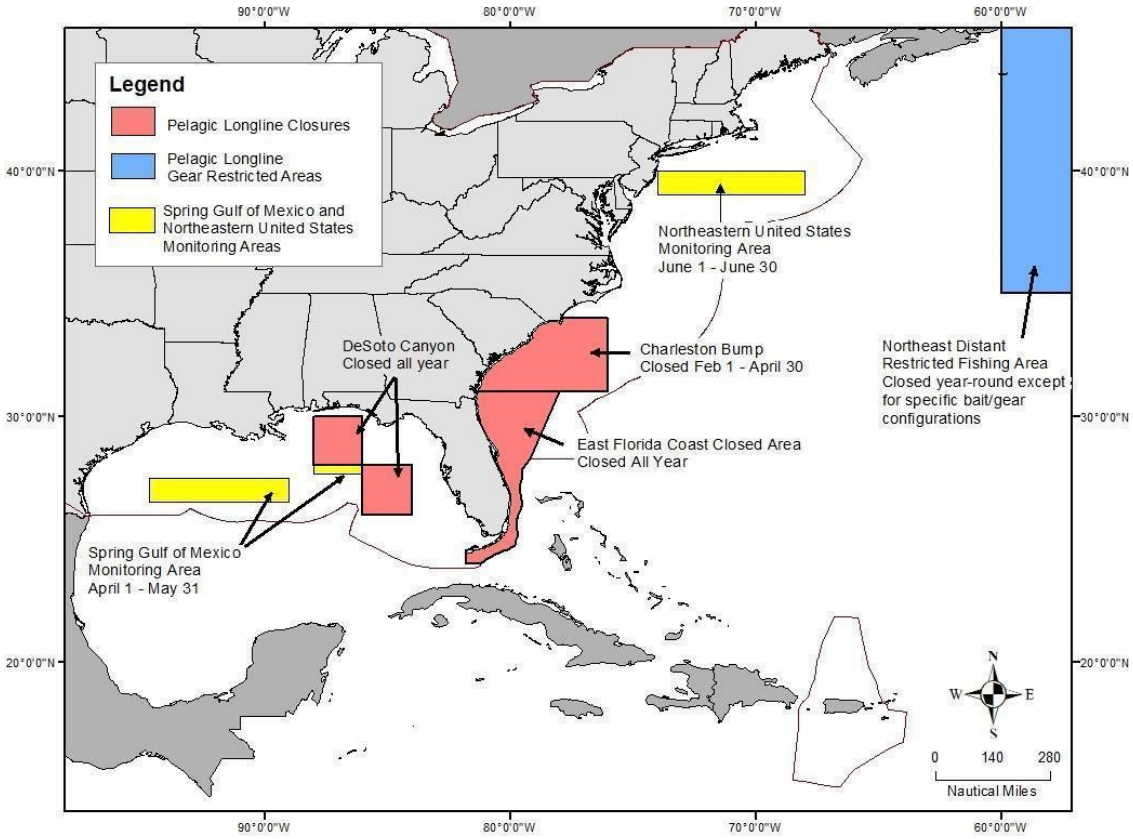

Figure 6.1 Areas Closed/Restricted To Pelagic Longline Fishing by U.S. Flagged Vessels

In a 2020 final rule (85 FR 18812; April 2, 2020) known as the "GRA-Weak Hook Rule," NOAA Fisheries eliminated the Cape Hatteras Gear Restricted Area and converted the Northeastern United States Pelagic Longline Monitoring Area and the Spring Gulf of Mexico Gear Restricted Area into monitoring areas that allow fishing with pelagic longline gear provided specific threshold amounts of bluefin catch are not exceeded. NOAA Fisheries collected relevant data during the conditional three-year evaluation period to determine whether future closure of these geographic areas to pelagic longline gear is necessary. These monitoring areas were previously closed to pelagic longline gear during April and May (Spring Gulf of Mexico Gear Restricted Area) and June (Northeastern United States Closed Area). NOAA Fisheries is reviewing the data collected. At this time, these areas remain open to pelagic longline fishing.

The Joint Explanatory Statement that accompanied the 2021 Appropriations Act included text on "Western Atlantic Bluefin Tuna" directing NOAA Fisheries to reconsider the decision in the April 2020 final rule to open the Spring Gulf of Mexico Monitoring Area to pelagic longline fishing or to take additional monitoring action. As part of this process, NOAA Fisheries held two public sessions and invited the public to submit any information that was not previously considered during the GRA-Weak Hook rulemaking process. NOAA Fisheries received six public responses and reviewed this information. None of the information received warranted a change in the agency decision reflected in the April 2020 final rule. Thus, NOAA Fisheries completed the reconsideration process in 2021, and the Spring Gulf of Mexico Monitoring Area was open to pelagic longline fishing in 2022 according to the monitoring requirements established by the April 2020 final rule. The reconsideration process did not direct the agency to evaluate changes to weak hook regulations in the Gulf of Mexico. Information about the reconsideration process, including links to the Joint Explanatory Statement that accompanied the 2021 Appropriations Act and to the bulletin announcing completion of the reconsideration process, is available on the NOAA Fisheries website at: https://www.fisheries.noaa.gov/action/pelagic-longline-bluefin-tuna-area-based-and-weak-hook-management-measures

Pelagic Longline Reduction Measures: Weak Hook Requirement in the Gulf of Mexico

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 was 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. Weak hooks were initially implemented as a year-round requirement in the Gulf of Mexico (April 5, 2011; 76 CFR 18653) but the measure was modified in 2020. As a result of the Pelagic Longline Bluefin Tuna Area-based and Weak Hook management measures rule adopted in 2020, vessels now are only required to use weak hooks in the Gulf of Mexico between January 1 and June 30 each year (85 FR 18812; April 2, 2020), the time period during which the majority of the incidental catch of bluefin tuna occurs.

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.

Pelagic Longline Bycatch Data: Sharks

The number of releases and the status of ICCAT-prohibited species from pelagic longline vessels in 2021 is presented in Table 6.8.

Table 6.8 ICCAT-Designated Prohibited Shark Interactions and Dispositions in the Pelagic Longline Fishery in 2021

Species	Kept	Released Dead	Released Alive	Released Unknown	Lost at Surface
Bigeye thresher	0	3	11	0	0
Silky	0	104	120	0	7
Great hammerhead	0	2	2	0	0
Oceanic whitetip	0	2	10	0	1
Smooth hammerhead	0	0	0	0	0
Scalloped hammerhead	0	51	36	0	0
Unidentified hammerhead	0	15	13	1	0
Porbeagle*	0	0	0	0	0

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

Pelagic Longline Bycatch Data: IBQ 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 IBQ online 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 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. Another comparison is vessel reported VMS data and the dealer data (for bluefin retained and landed). In 2021 the number of bluefin retained, as reported in the vessel monitoring system, was very similar to the number reported in the bluefin tuna dealer reports with the exception of an abnormal disparity in October due to a reporting error in the self reported VMS reports.(Figure 6.2). The two data sources showed a similar seasonal pattern. Bluefin tuna dealer reports are maintained in the commercial bluefin tuna landings database, also referred to as the electronic bluefin tuna (eBFT) dealer landings database.

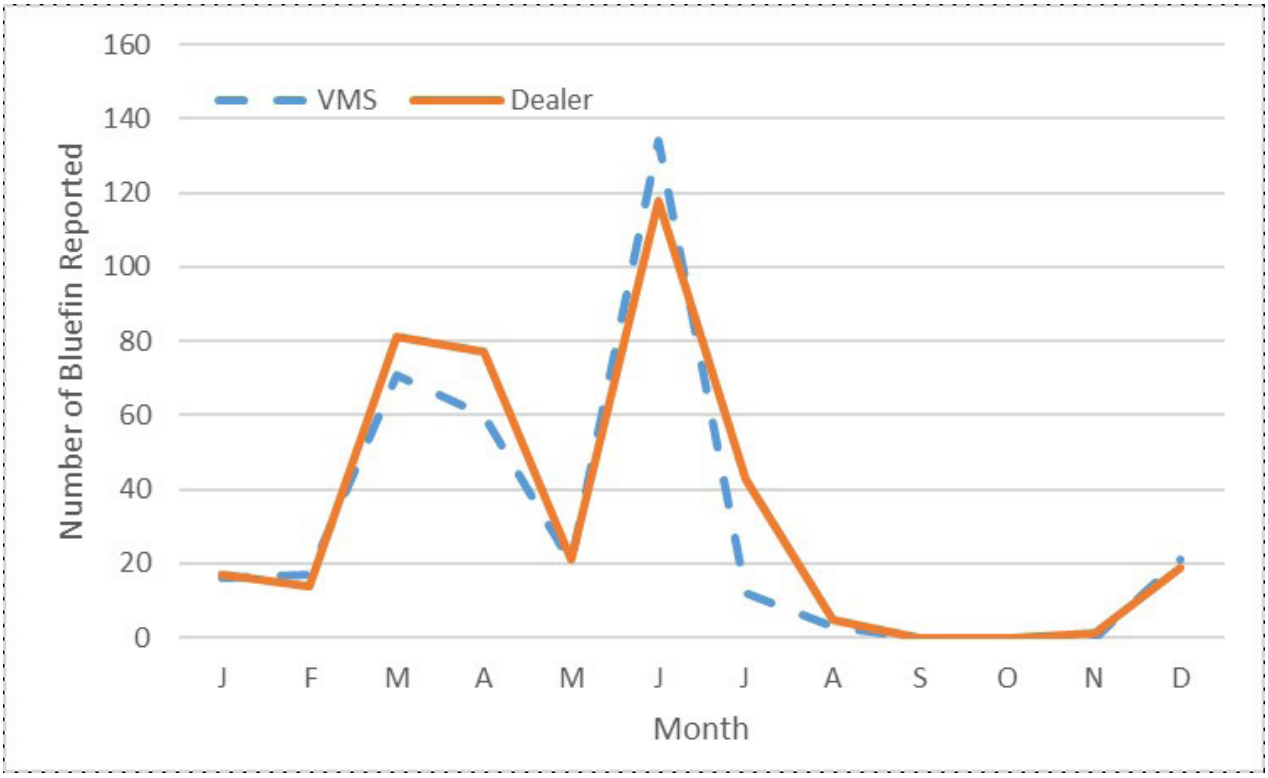

Figure 6.2 Comparisons between the Reported Numbers of Incidentally Caught Bluefin Tuna Retained and Landed in the Pelagic Longline Fishery in 2021

Source: Vessel monitoring system; eBFT.

Table 6.9 summarizes various IBQ Program metrics regarding allocation, catch, fishing effort, IBQ leasing, and reporting and monitoring. Table 6.10 provides data on the number of sets and vessels audited during three-month audit periods. The number of pelagic longline sets and vessels audited is variable due to the sample design. The sample design is referred to 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 6.9 **Bluefin Catch and Other Individual Bluefin Quota Program Metrics, 2017–2021**

Metric	2017	2018	2019	2020	2021
Permits eligible for IBQ shares	136	136	136	136	136
Number vessels fished with pelagic longline gear	89	76	67	72	56
Number vessels landing bluefin tuna	58	50	44	36	32
Weight bluefin landed (mt ww)	104.1	88	86.3	50	75.7
Weight landed in Gulf of Mexico (mt ww)	5.7	3.3	2.1	3.08	4.1
Weight landed in Atlantic (mt ww)	98.1	81	84.2	46.9	71.5
Number of bluefin landed	501	467	445	431	396
Number of bluefin landed in Gulf of Mexico	21	12	7	11	16
Number of bluefin landed in Atlantic	480	455	438	421	380
Quota caught (mt, ww) in Northeast Distant GRA* (max. 25 mt quota)	25	4	9.6	0	0
Total bluefin dead discards (mt ww)	11.4	14.6	8.05	5.3	5.6
Discarded in Gulf of Mexico (mt ww)	6.5	3.6	2.5	2.5	0.5
Discarded in Atlantic (mt, ww)	3.7	11	5.3	2.8	5.1
Discarded in Northeast Distant Waters* (mt ww)	1.2	0	0.25	0	0
Number of trips with pelagic longline gear	1,078	924	870	811	1,027
Number of pelagic longline sets	7,305	5,666	4,803	4,229	4,822
Number of hooks (x 1,000)	5,327	4,056	3,649	3,077	3,051
Number of IBQ leases	85	83	76	38	54
Number of participants leasing	52	55	56	19	25
Average amount leased per transaction (lb)	1,789	2,050	2,378	2,237	3,920
Total amount leased (lb)	152,050	170,160	180,756	84,994	141,796
Average price per pound (weighted average)	$1.67	$2.02	$1.40	$0.87	$1.51
Number of trips based on VMS prelanding declarations	793	936	910	922	797
Number sets based on VMS bluefin reports	6,507	5,479	3,748	2230	3,436
Number vessels with installed EM systems	112	112	110	113	113
Number hard drives received	1,020	925	856	716	747
Number vessels submitting hard drives	86	77	69	65	63

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 6.10 **Numbers of Pelagic Longline Sets and Vessels Audited During Three-Month Audit Periods within the Bluefin Tuna Electronic Monitoring Program, 2017-2021**

Audit Period	Period Coverage	Sets Audited	Vessels Audited
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
17	Apr-Jun 2019	58	23
18	Jul-Sept 2019	24	10
19	Oct-Dec 2019	85	27
20	Jan-Mar 2020	91	26
21	Apr-Jun 2020	80	25
22	Jul-Sept 2020	37	18
23	Oct-Dec 2020	117	43
24	Jan-Mar 2021	67	18
25	Apr-Jun 2021	62	22
26	Jul-Sept 2021	41	14
27	Oct-Dec 2021	91	33

Pelagic Longline Bycatch Data: Area Closures and Gear Restrictions

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 recent reported catch and discards to the averages for the base period of 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 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 6.11, Table 6.12, and Table 6.13.

Overall effort, expressed as the number of hooks fished, declined by 49.5 percent during 2016-2020 from 1997–1999 (Table 6.11). 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 6.11 and Table 6.12). 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 bluefin tuna kept and discarded since 2015 was influenced by the regulatory measures implemented through Amendment 7.

The reported declines in swordfish kept and discarded; bluefin tuna discards; bigeye, albacore, yellowfin, and

skipjack tunas kept (Table 6.11); and large coastal sharks kept (Table 6.12) decreased more than the predicted values developed for 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 Amendment 1), as well as turtle interactions, also declined more than the predicted values. The numbers of large coastal shark 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 6.13). Overall, average total reported effort decreased by 49.5 percent between 1997–1999 and 2016-2020.

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 6.14). While an increase was observed in 2016, discards remain low through 2020. The number of bluefin discarded in other fishing areas are generally lower than those in the Mid-Atlantic Bight/Northeast Coastal areas. Changes in fishing 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.

Table 6.11 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 (2017-2021) 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	8,533.10	69,131	21,519	238	877	72,342	2,489	21,308	1,133	101,477	4,224
(A) 2001–2003	7,364.10	50,838	13,240	212	607	55,166	1,827	13,524	395	76,116	3,069
2017	5,532.60	24,403	7,514	494	229	43,030	2,839	15,907	757	68,329	6,558
2018	4,055.70	25,102	8,004	465	309	23,578	1,569	10,566	767	37,831	3,230
2019	3,649.30	27,495	4,307	447	347	27,757	2,270	14,158	575	50,291	3,649
2020	3,076.20	26,546	4,937	261	293	26,387	2,186	12,014	657	50,370	3,553
2021	3,050.54	19,314	4,457	409	437	23,742	2,413	14,990	748	49,156	2,370
(B) 2017-2021	3,872.87	24,572	5,844	415	323	28,899	2,255	13,527	823	51,195	3,872
% dif (A)	-13.7	-26.5	-38.5	-10.9	-30.8	-23.7	-26.6	-36.5	-65.1	-25	-27.3
% dif (B)	-54.6	-64.5	-72.8	74.5	-63.2	-60.1	-9.4	-36.5	-27.4	-49.5	-8.3

Note: (A) and (B) are average values for the years indicated. Predicted values are from Regulatory Amendment 1 to the 1999 HMS FMP, 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 6.12 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 (2017-2021) 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
2017	2,542	25,567	92	12,005	30,527	816	1,471	188	1,568	2,235	718	686	172
2018	875	14,649	36	7,988	27,392	830	1,275	115	854	1,586	810	459	86
2019	566	12,733	142	6,463	36,979	681	987	84	984	1,467	402	469	66
2020	453	4,955	32	5,545	13,240	277	762	59	841	1,065	520	299	41
2021	305	9,025	14	2,659	12,465	211	417	22	557	1,223	535	239	33
(B) 2017-2021	948	13,386	63	6,932	24,121	563	982	94	961	1,515	597	430	80
% diff (A)	-17	-55.8	-40.1	-27.4	-26.1	-47	-27	-57.7	-49.7	-47	-74.6	-34.7	-28
% diff (B)	-75.7	-74.3	-99.3	9.9	-39.3	-7.4	-81.0	-46.5	-40.7	-23.2	-55.5	102.1	-86.6
Pred 1	-9.5	-2	-32.1	-42.5	-29.3				-12	-6.4	-29.6		-1.9
Pred 2	4.1	8.4	-18.5	-33.3	-17.8				6.5	10.8	-14		7.1

Note: (A) and (B) are average values for the years indicated. Predicted values are from Regulatory Amendment 1 to the 1999 HMS FMP, where Pred 1 = Without redistribution of effort and Pred 2 = With redistribution of effort. Source: Unified Data Processing.

Table 6.13 Reported Distribution of Hooks Set by Area in 2017-2021 and Percent Change since 1997–1999 in the U.S. Atlantic Pelagic Longline Fishery

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
2017	294,901	1,554,480	538,406	1,009,646	1,417,364	216,293	236,253	97,925	3,788	136,553	5,532,609
2018	57,299	1,176,127	348,737	930,082	1,143,221	54,107	112,521	106,906	3,040	123,635	4,055,675
2019	148,192	717,073	405,932	860,929	953,054	345,701	82,686	47,484	3,075	85,150	3,649,276
2020	119,016	459,050	299,526	882,273	886,923	244,556	2,551	30,226	6,759	145,363	3,076,243
2021	150,480	488,999	380,584	667,956	901,738	323,676	2,294	20,750	6,641	107,423	3,050,541
(B) 2017-2021	153,978	879,146	394,637	870,177	1,060,460	236,867	87,261	60,658	4,661	119,625	3,872,869
% diff (A)	-46.6	10	-32.3	-29.9	-25.4	-30.7	-11.5	431.9	16	-70.8	-13.7
% diff (B)	-53.1	-73.7	-45.4	7.0	-16.3	-73.7	-82.9	323.8	-97.6	-72.6	-54.6

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 6.14 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 2017-2021 in the U.S. Atlantic Pelagic Longline Fishery

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
2017	1,633.70	179	128	5,468	3,363	2,139	10,687	57	7,017	1,406	76
2018	1,197.30	162	222	4,644	2,375	675	7,893	18	3,379	702	18
2019	1,298.80	252	305	6,277	753	458	6,240	108	3,281	861	23
2020	1,131.40	168	222	6,440	1,253	333	2,977	1	2,586	355	13
2021	1,225.40	320	395	5,980	1440	264	9,143	8	1,816	944	12

Source: Unified Data Processing.

Table 6.15 Number of Bluefin Tuna, Swordfish, Pelagic and Large Coastal Sharks, Billfish, and Sea Turtles Reported Kept and Discarded in the U.S. Atlantic Pelagic Longline Fishery in All Areas Other than the Mid-Atlantic Bight and Northeast Coastal, 2017-2021

Year	Hooks Set (x1000)	Bluefin Kept	Bluefin Discards	Swordfish Kept	Swordfish Discards	Pelagic Sharks Kept	Pelagic Shark Discards	LCS Kept	LCS Discards	Billfish Discards	Sea Turtle Interactions
2017	3,899.00	315	107	18,935	4,151	499	15,640	32	5,008	3,804	96
2018	2,858.30	203	87	20,458	5,629	200	6,756	18	4,617	3,007	68
2019	2,350.50	195	42	21,218	3,554	108	6,493	32	3,214	2,461	43
2020	1,944.70	93	71	20,106	3,684	120	1,978	31	2,959	2,370	28
2021	1,825	89	42	13,334	3,017	41	763	6	843	1,610	21

Source: Unified Data Processing.

Pelagic Longline Weak Hook Requirement in the Gulf of Mexico

The weak hook requirement established in 2011 for pelagic longline vessels fishing in the Gulf of Mexico required vessels to use circle hooks constructed of corrodible round wire stock no larger than 3.65 mm in diameter to help reduce bluefin tuna bycatch. Analyses of the effectiveness of weak hooks in the Gulf of Mexico to reduce bycatch are found in past SAFE Reports. On April 2, 2020, NOAA Fisheries published a final rule to adjust regulatory measures that manage Atlantic bluefin tuna incidental catch in the pelagic longline fishery (85 FR 18812). This rule specifically addressed the weak hook requirement in the Gulf of Mexico, among other management measures, by adjusting the gear requirements in the Gulf of Mexico to shorten the duration of required weak hook use from year-round to seasonal from January through June.

Pelagic Longline Bycatch Data: 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 2017-2021 are summarized in Table 6.16.

Marine mammals are caught primarily during the third and fourth quarters in the Mid-Atlantic Bight. These geographic areas are illustrated in Figure 6.4.

Table 6.16 Marine Mammal Interactions in the Atlantic Pelagic Longline Fishery, 2017-2021

Year	Species	Total Obs.	Total Est.	Mortality Obs.	Mortality Est.	Serious Injury* Obs.	Serious Injury* Est.	Alive* Obs.	Alive* Est.
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	-	-
2019	Long-finned pilot whale**	0.1	0.4	-	-	0.1	0.4	-	-
	Pantropical spotted dolphin	1.0	12.9	-	-	1.0	12.9	-	-
2020	Bottlenose dolphin	3.0	19.2	-	-	1.5	9.0	1.5	10.2
	Dwarf/pygmy sperm whale	1.0	7.7	-	-	0.5	4.0	0.5	3.7
	Long-finned pilot whale**	1.0	9.1	-	-	0.6	5.7	0.4	3.4
	Short-finned pilot whale**	36.0	501.5	-	-	21.6	370.7	14.3	130.8
	Risso's dolphin	3.0	20.2	-	-	2.0	12.2	1.0	8.0
	Unidentified dolphin	4.0	27.9	-	-	1.5	14.8	2.5	13.1
2021	Bottlenose dolphin	1.0	15.8	1.0	15.8	-	-	-	-
	Long-finned pilot whale**	0.2	3.1	-	-	0.1	2.8	0.1	0.3
	Short-finned pilot whale**	25.8	437.1	1.0	23.1	18.6	331.9	6.2	82.0
	Risso's dolphin	2.0	16.4	-	-	-	-	-	-

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. **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 2017, 2019; Garrison 2019, unpublished data, 2021.

Pelagic Longline Bycatch 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 analyzed in three-year periods in accordance with a BiOp released in May 2020 (NOAA Fisheries 2020b). The BiOp indicates that NOAA Fisheries must continue to monitor sea turtle interactions on a quarterly and annual basis. Additionally, it specifies that sea turtle interactions must also be analyzed in in three-year rolling (not static) time periods. Sea turtle takes are summarized by large geographic areas and are illustrated in Figure 6.4.

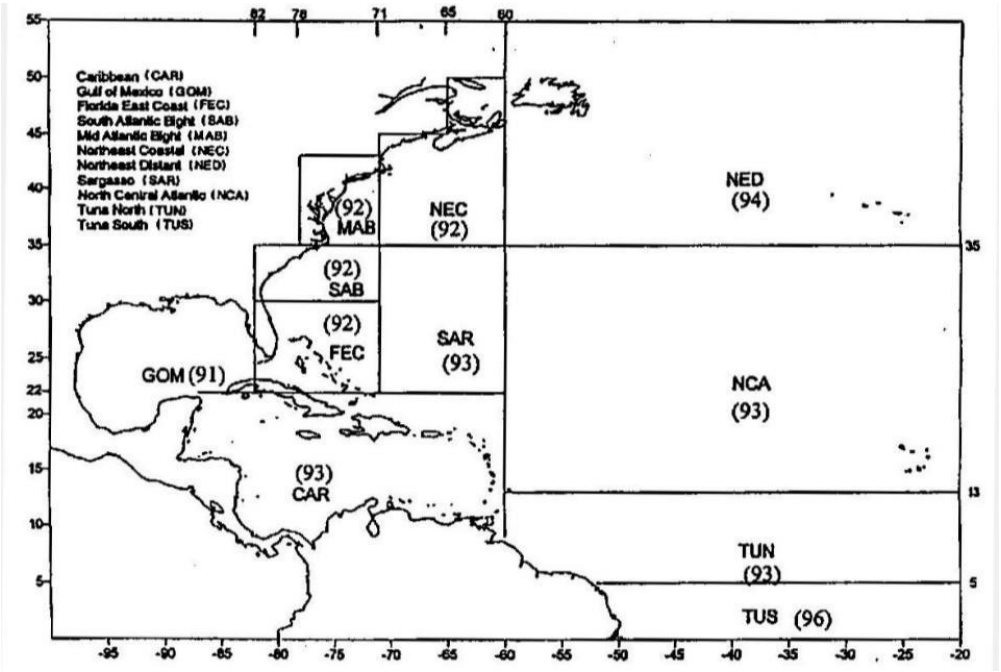

Figure 6.3 Geographic Areas Used in Summaries of Pelagic Logbook Data

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 2017-2021 are summarized for loggerhead sea turtles and leatherback sea turtles in Table 6.17 and Table 6.18, respectively. Sea turtle bycatch in the U.S. Atlantic pelagic longline fishery has decreased significantly in the last five years (Table 6.17, Table 6.18, and Table 6.20). In 2021, the majority of loggerhead sea turtle interactions occurred along the Mid-Atlantic Bight and in the South Atlantic Bight (Table 6.17). Interactions with leatherback sea turtles were highest for 2021 in the Mid-Atlantic Bight, South Atlantic Bight, and Gulf of Mexico (Table 6.18). The total interactions for the most recent and complete three-year period were below the level established in the 2020 BiOp for both loggerheads and leatherbacks (see Table 6.19). Reported leatherback and loggerhead sea turtle interactions remained low in 2021.

Table 6.17 Estimated Number of Loggerhead Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery by Statistical Area, 2017-2021

Area	2017	2018	2019	2020	2021
Caribbean	4	0	5	2	2
Gulf of Mexico	18	10	0	1	2
Florida East Coast	0	9	33	7	0
South Atlantic Bight	41	17	14	0	22
Mid-Atlantic Bight	4	0	9	6	10
Northeast Coastal	1	6	0	0	0
Northeast Distant Waters	4	6	6	0	0

Area	2017	2018	2019	2020	2021
Sargasso Sea	1	13	0	1	1
North Central Atlantic	0	0	0	0	0
Tuna North	5	0	1	0	1
Tuna South	0	0	0	0	0
Total	78	61	68	17	38
Experimental fishery (2012–2014)	-	-	-	-	-
Total	78	61	68	17	38

Source: Garrison and Stokes 2017, 2019, 2020; Garrison unpublished data, 2019, 2020, 2021.

Table 6.18 Estimated Number of Leatherback Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery by Statistical Area, 2017-2021

Area	2017	2018	2019	2020	2021
Caribbean	0	0	0	0	0
Gulf of Mexico	57	20	20	8	19
Florida East Coast	0	5	0	0	0
South Atlantic Bight	67	16	22	8	15
Mid-Atlantic Bight	127	34	30	30	20
Northeast Coastal	8	5	0	9	4
Northeast Distant Waters	27	23	15	1	0
Sargasso Sea	5	13	0	1	1
North Central Atlantic	0	0	0	0	0
Tuna North	1	3	3	6	1
Tuna South	0	0	0	0	0
Total	292	119	90	63	60
Experimental fishery (2012–2014)	-	-	-	-	-
Total	292	119	90	63	60

Source: Garrison and Stokes 2017, 2019, 2020; Garrison unpublished data, 2019, 2020, 2021.

Table 6.19 Estimated Sea Turtle Interactions in the U.S. Atlantic Pelagic Longline Fishery by Species, 2017–2021

Year	Leatherback	Loggerhead	Other/Unidentified Sea Turtles
2017	293	78	26
2018	120	61	4

Year	Leatherback	Loggerhead	Other/Unidentified Sea Turtles
2019	90	68	8
2020	63	17	8
2021	60	38	0

Data for 2021 are preliminary estimates. Source: Garrison and Stokes 2019, 2020; Garrison, unpublished data, 2021

Total interactions of sea turtles over specified three-year periods cannot exceed Incidental Take Statement (ITS) Levels established for leatherback, loggerhead and "Other/unidentified" sea turtles. The three-year ITS Level for leatherback sea turtles is 996 interactions. The ITS Level for loggerhead sea turtles is 1080 interactions. Total interactions for this period were well below the ITS Levels established in the 2020 BiOp.

Pelagic Longline Bycatch 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 2017-2021 is presented in Table 6.20. Seabird species bycatch observed from 2017 through 2021 are listed in Table 6.21 by year, quarter, and the geographic area where they were encountered. Observed seabird bycatch in 2021 was zero.

Table 6.20 Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery, 2017-2021

Species	Released Dead	Released Alive	Released Total	% Released Dead
Greater shearwater	2	0	3	100
Cory's shearwater	1	0	1	100
Unidentified shearwater	3	0	3	100
Herring gull	1	1	2	50
Northern gannet	1	1	2	14
Northern fulmar	1	0	1	100
Unidentified birds	2	0	2	100
Total	11	2	13	86

Source: Pelagic Observer Program.

Table 6.21 Observed Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery, 2017-2021

Year	Quarter	Area	Type of Bird	Number Observed	Status
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

Year	Quarter	Area	Type of Bird	Number Observed	Status
2017	4	MAB	Northern fulmar	1	Dead
2017	4	MAB	Shearwater	2	Dead
2018*	-	-	-	0	-
2019	2	GOM	Northern gannet	1	Dead
2019	2	MAB	Shearwater	1	Dead
2020	2	SAB	Unidentified birds	1	Dead
2020	4	MAB	Greater Shearwater	2	Dead
2020	4	MAB	Cory's shearwater	1	Dead
2021*	-	-	-	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. Source: Pelagic Observer Program.

Incidental seabird catches recorded by observers in the U.S. Atlantic longline fisheries were analyzed from 1992–2017 (Bi et al. 2020) from three geographic zones—the south Atlantic Bight, the Mid-Atlantic Bight, and the Northeast Coastal area (see Figure 6.4 for reference). Of the 6,469 longline sets observed, 99 percent of the sets did not have any recorded interactions. Of the 77 sets with interactions, 149 seabirds were caught, with gulls (*Larus* sp.) captured the most frequently, followed by shearwaters (Procellariidae spp., especially great shearwaters, Ardenna gravis) and northern gannets (Morus bassanus). Obvious spatial and temporal patterns were noted in the seabird bycatch rates, with 99 percent of the seabirds caught in summer through winter, 62 percent of seabirds were caught in the mid-Atlantic Bight, and a peak in catch occurred in 1997.

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. Note that there have been no U.S. purse seine landings since 2015. 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. As noted earlier, purse seine data will no longer be included in future SAFE Reports.

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 toward minimizing bycatch mortality. For a detailed description of the Code of Angling Ethics, refer to Section 3.9.8.3 of the 2006 Consolidated 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 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 (82 FR 16478, April 4, 2017). Several measures were included to educate anglers and reduce post- release mortality of dusky sharks caught as bycatch by recreational fishermen. Since dusky sharks are a prohibited species, recreational fishermen are not permitted to target or retain them. A video and quiz on the safe handling and release of prohibited Atlantic sharks is available for anyone to view and take on the HMS permits website (https://hmspermits.noaa.gov/sharkEndorsementVideo). HMS Angling category and 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.

Effective January 1, 2018, Amendment 5b required anglers fishing recreationally for sharks on a vessel with an HMS Angling or HMS Charter/Headboat permit to use non-offset, non-stainless steel circle hooks when fishing south of 41° 43' N. lat. (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 February 2, 2019, NOAA Fisheries published a final rule implementing Amendment 11 (84 FR 5358), which finalized the implementation of ICCAT Recommendation 17-08, and established male and female minimum size restrictions for shortfin mako sharks. Amendment 11 also extended the requirement to use circle hooks when fishing recreationally for sharks on a vessel with an HMS Angling or HMS Charter/Headboat permit to all federal waters of the Atlantic.

Effective July 5, 2022, the United States set a zero retention limit for shortfin mako sharks in all fisheries, including the recreational handgear fishery (July 1, 2022; 87 FR 39373), consistent with ICCAT Recommendation 21-09.

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 Horodysky (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, Keller et al. 2020). 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. Another meta-analysis conducted by Keller et al. (2020) for the ICCAT SCRS evaluated 28 papers on the effects of hook type on the catchability, at-haulback mortality, post-release mortality, and hooking locations of shortfin mako sharks caught in pelagic longline fisheries. While the findings of the examined studies varied on catchability and at-haulback mortality, the examined studies unequivocally found that circle hooks were more likely to result in mouth-hooking, and less likely to result in gut or foul hooking (Carruthers et al. 2009, Epperly et al. 2012). Similarly, 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.

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 2017–2021, including prohibited sandbar and dusky sharks, are presented in Table 6.22 and Table 6.23.

Table 6.22 Highly Migratory Species Retained by the Rod and Reel Fishery as Reported in the Large Pelagics Survey* between May and October, 2017-2021

Species	2017	2018	2019	2020	2021
White marlin	7	16	22	16	8
Blue marlin	1	2	4	5	4
Sailfish	1	.	0	0	0
Swordfish	14	10	120	100	38
Giant bluefin tuna	194	252	199	162	88
Large medium bluefin tuna	56	20	47	26	12
Small medium bluefin tuna	33	21	26	47	13
Large school bluefin tuna	73	16	108	20	12
School bluefin tuna	224	272	215	237	551

Species	2017	2018	2019	2020	2021
Young school bluefin tuna	3	.	0	4	0
Bigeye tuna	28	469	185	164	189
Yellowfin tuna	2,358	2,328	3,663	3,734	5,114
Skipjack tuna	147	150	115	54	90
Albacore tuna	135	20	103	324	398
Thresher shark	55	55	70	24	15
Shortfin mako shark	146	26	24	11	23
Dusky shark[1]	.	.	0	0	0
Sandbar shark[2]	.	.	0	0	0
Tiger shark	.	1	1	1	1
Porbeagle	6	5	9	3	3
Blacktip shark	.	.	.	0	.
Atlantic sharpnose shark	5	6	2	0	1
Blue shark	17	17	14	2	0
Hammerhead shark	.	.	.	0	0
Smooth hammerhead shark	.	.	.	.	0
Scalloped hammerhead shark	.	.	.	.	.
Unidentified hammerhead shark	1	.	0	0	0
Wahoo	78	32	194	59	70
Dolphinfish	5,080	9,155	9,556	6,982	3,793
King mackerel	5	14	48	8	12
Atlantic bonito	106	158	320	32	25
Little tunny	298	229	311	157	96
Amberjack	8	46	3	3	.
Spanish Mackerel	20	8	3	53	4

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

Table 6.23 **Highly Migratory Species Released Alive and Dead by the Rod and Reel Fishery as Reported in the Large Pelagics Survey* between May and October,2017-2021**

Species	2017	2018	2019	2020	2021
White marlin	735	1,557	1,342	1,115	537
Blue marlin	66	134	206	126	102
Sailfish	19	7	8	27	14
Swordfish	8	2	18	17	12
Giant bluefin tuna	21	13	38	58	11
Large medium bluefin tuna	4	4	18	13	0
Small medium bluefin tuna	29	30	27	43	7
Large school bluefin tuna	48	.	39	3	6
School bluefin tuna	273	158	182	360	718
Young school bluefin tuna	36	12	67	63	55
Bigeye tuna	4	161	16	13	0
Yellowfin tuna	558	354	1,306	310	1,204
Skipjack tuna	109	275	136	36	55
Albacore tuna	54	11	10	35	147
Thresher shark	49	47	47	17	11
Shortfin mako shark	145	269	198	117	155
Dusky shark[1]	71	58	25	23	13
Sandbar shark[2]	88	57	40	25	26
Tiger shark	13	10	7	3	6
Porbeagle	96	57	74	68	25
Blacktip shark	4	.	9	5	.
Atlantic sharpnose shark	21	4	21	17	2
Blue shark	1,316	1,487	1,200	425	546
Hammerhead shark	1	3	6	5	3
Smooth hammerhead shark	1	1	2	.	2
Scalloped hammerhead shark	4	2	10	.	.
Unidentified hammerhead shark	30	21	22	7	6
Wahoo		1	12	1	1
Dolphinfish	215	729	554	347	230
King mackerel		6	5	0	0
Atlantic bonito	31	227	161	106	338
Amberjack		18	1	4	
Spanish mackerel	2		9	2	0

*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 and 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. Vessel operators must also notify nearby vessels via the radio that dusky sharks are in the area. The vessel must move at least 1 nm 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, as part of Amendment 5b, all HMS Directed Shark permit holders using bottom longline gear were required to use circle hooks (82 FR 16478, April 4, 2017).

Effective July 5, 2022, the United States set a zero retention limit for shortfin mako sharks in all fisheries, including the bottom longline fishery (87 FR 39373, July 1, 2022), consistent with ICCAT Recommendation 21-09.

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 four participants in the 2021 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 2021 are shown in Figure 6.5.

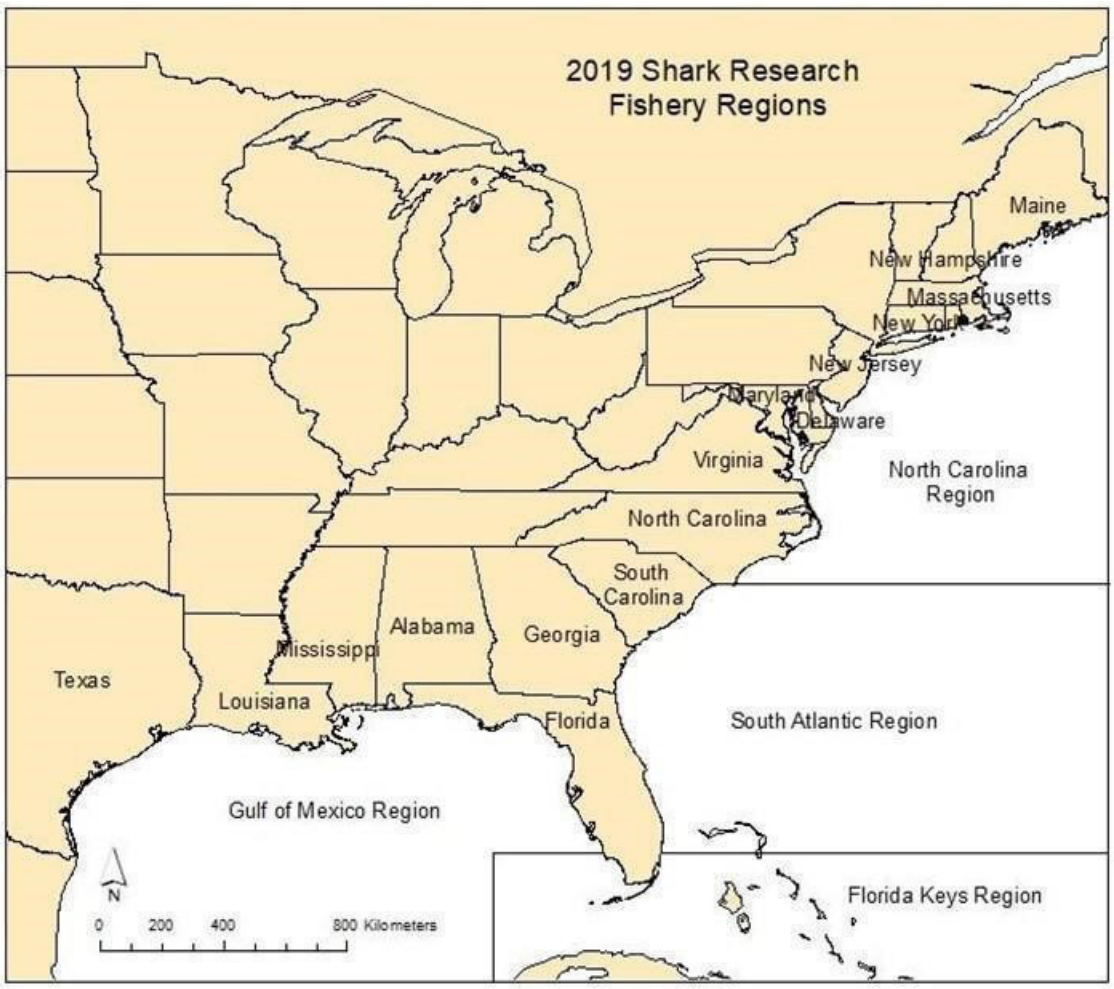

Figure 6.4 Dusky Shark Bycatch Cap Regions for the Shark Research Fishery

6.3.6.2 Bycatch Data

Reporting methods used for the bottom longline fishery are described in Section 6.2.1.1. Landings, including dead discards, for this fishery are reported in Section 5.3.6. Bycatch of prohibited sharks is summarized in Section 6.4.

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 6.24 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 2021, there was one interaction with a smalltooth sawfish that was discarded alive. No other 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. On May 15, 2020, the HMS non-pelagic longline BiOp was released. For more information on the most recent BiOp, see Section 6.2.3.2. Bycatch of seabirds in the shark bottom longline fishery has been virtually non-existent. 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 6.24 **Protected Species Interactions Observed on Bottom Longline Trips Targeting Sharks in the Gulf of Mexico and Atlantic Ocean, 2017-2021**

Year	Sea Turtles	Seabirds	Marine Mammals	Smalltooth Sawfish	Total
2017	3 (1A, 2D)	-	-	-	3
2018	5 (4A, 1D)	-	-	-	5
2019	2 (2A, 0D)	-	-	-	2
2020	-	-	-	-	0
2021	-	-	-	1 (A)	1
Total					11

Note: Letters in parentheses indicate whether the animal was released (A) alive, (D) dead, or (U) unknown. Source: Mathers et al. 2022, unpublished.

6.3.7 Gillnet

6.3.7.1 Reduction Measures

Vessel owners and operators that fish with pelagic or bottom 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 nm after a dusky shark interaction and notify other vessels. Effective July 5, 2022, the United States set a zero retention limit for shortfin mako sharks in all fisheries, including the gillnet fishery (87 FR 39373, July 1, 2022), consistent with ICCAT Recommendation 21-09.

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 Bycatch of prohibited sharks is summarized in Section 6.4.

Southeastern Atlantic and Gulf of Mexico Gillnet Fishery

No interactions with protected species were observed between 2015 and 2016 in the southeastern Atlantic and Gulf of Mexico gillnet fisheries targeting mixed sharks. The declining effort of shark targeted gillnet sets continued to be observed, with only small coastal shark targeted sets observed from 2017 through2021. Strike gillnet gear was observed exclusively in teleost-targeted (king mackerel) sets. The majority of sink and drift gillnet fisheries continued to target mostly Spanish mackerel. Incidental take of protected species, such as sea turtles and marine mammals, which remained a rare occurrence, with none observed in 2021 (Mathers et al. 2021b). Since no gillnet trips targeting sharks occurred in 2017 through 2021, no protected species interactions in this fishery have been observed during this time.

One seabird was observed caught in gillnet gear in 2018 on a trip targeting king mackerel (Mathers et al. 2021b).

No interactions with sea turtles, marine mammals, smalltooth sawfish, or Atlantic sturgeon were observed with gillnet gear in any of the gillnet fisheries in 2021.

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.

Northeast and Mid-Atlantic Gillnet Fishery

Observed interactions with protected species for the 2020 Northeast and Mid-Atlantic smooth dogfish gillnet fishery are presented in Table 6.25. Two Atlantic sturgeon were observed caught in gillnet gear in 2020 on a trip targeting smooth dogfish (J. Mello, personal communication). No interactions with sea turtles or smalltooth sawfish were observed with gillnet gear.

Table 6.25 Observed Protected Species Interactions in the Northeast and Mid-Atlantic Gillnet Fishery Targeting Smoothhounds, 2019-2021

Protected Species	Number of Interactions		
	2019	2020	2021
Sea turtles	0	0	0
Seabirds	0	0	0
Marine mammals	1	0	0
Smalltooth sawfish	0	0	0
Atlantic sturgeon	51	2	13
Total	52	2	

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 HMS Management Division. More recently, the Deepwater Oceanic Fish Restoration Project, a multi-agency program led by NOAA Fisheries and in cooperation with pelagic fishermen in the Gulf of Mexico, included a study directly comparing green-stick gear to pelagic longline gear for yellowfin tuna catch rates, tuna quality, and bycatch. The study was conducted in 2017 and 2018. Preliminary results indicated that green-stick, as well as buoy gear and deep drop rod-and-line, resulted in a reduction in total yield of target species, but also minimal bycatch of unintended species and a high post-release mortality of those species (Appendix C, Foster 2020; https://www.gulfspillrestoration.noaa.gov/2022/01/its-final-year-early-project-data-show-fishermen-are-contributing-healthier-gulf-fisheries).

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 6.26) 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. 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.

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 vary greatly between years. This variability in catches can be observed in Table 6.26. 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 6.27 presents the three-year rolling averages from 2017 through 2021 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 Observed and Estimated Shark Mortality (Dead Discards and Kept in Numbers of Sharks) in the Prohibited Shark Complex, 2017-2021

Species	2017	2018	2019	2020	2021
Atlantic angel	98	31	29	24	12
Basking	4	8	3	3	12
Bigeye sand tiger	0	0	0	0	0
Bigeye sixgill	0	0	0	0	0
Bigeye thresher	21	13	24	2	3
Bignose	0	0	0	1	1
Caribbean reef	0	1	0	0	37
Caribbean sharpnose	0	0	0	0	0
Dusky	22	121	19	4	36
Galapagos	0	0	0	0	0
Longfin mako	14	4	14	0	4

Species	2017	2018	2019	2020	2021
Narrowtooth	0	0	0	0	0
Night	31	74	83	0	6
Sand tiger	9	48	20	23	11
Sevengill	0	0	0	0	0
Sixgill	1	0	0	0	0
Whale	0	0	0	0	0
White	10	5	3	1	3
Total	210	305	195	58	125

Source: Southeast Gillnet Observer Program; Pelagic Observer Program; Northeast Fisheries Observer Program; LPS; MRIP; Bottom Longline Observer Program; the exempted fishery permit program.

Table 6.27 **Three-Year Rolling Average Observed and Estimated Shark Mortality (Dead Discards and Kept in Numbers of Sharks) in the Prohibited Shark Complex, 2017-2021, and the Directional Change between the Two Most Recent Three-Year Averages***

Species	2017-2019	2018-2020	2019-2021	Increase (+)/Decrease (-)/No Change (0)
Atlantic angel	53	28	22	(-)
Basking	5	5	6	(+)
Bigeye sand tiger	0	0	0	0
Bigeye sixgill	0	0	0	0
Bigeye thresher	19	13	10	(-)
Bignose	0	0	1	(+)
Caribbean reef	0	0	12	(+)
Caribbean Sharpnose	0	0	0	0
Dusky	54	48	20	(-)
Galapagos	0	0	0	0
Longfin mako	11	6	6	0
Narrowtooth	0	0	0	0
Night	63	52	30	(-)
Sand tiger	26	30	18	(-)
Sevengill	0	0	0	0
Sixgill	0	0	0	0
Whale	0	0	0	0

Species	2017-2019	2018-2020	2019-2021	Increase (+)/Decrease (-)/No Change (0)
White	6	3	2	(-)
Total	237	186	126	

Source: Southeast Gillnet Observer Program; Pelagic Observer Program; Northeast Fisheries Observer Program; LPS; MRIP; 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 was an increase in observed mortality for basking, bignose, and Caribbean reef sharks. For basking and bignose sharks, the increase was not greater than an order of magnitude. However, the increase in the three-year average from 0 to 12 Caribbean reef sharks is greater than an order of magnitude. This increase suggests there may have been a significant increase in observed mortality for this species. Therefore, NOAA Fisheries intends to evaluate the circumstances influencing the observed increase to determine if additional action is necessary.

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. A total of 208 trips totaling 39 bottom otter trawl sets targeting mixed species on 101 vessels were observed in 2021 in the Northeast and Mid-Atlantic regions. The predominant shark species caught using bottom otter trawl included porbeagle, sandbar, and unclassified sharks (Table 6.28).

Swordfish and tuna landings by U.S. squid trawl fishermen using mid-water gear are reported to ICCAT. In 2021, 7.3 mt whole weight of yellowfin tuna, skipjack tuna, albacore tuna, bigeye tuna, and swordfish incidental to the squid, mackerel, and butterfish trawl fishery (Table 6.29) 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 6.28 **Total Otter Trawl Shark Catches from Non-Smooth Dogfish Targeted Sets by Species, and Species Disposition in Order of Decreasing Abundance for All Observed Trips, 2021**

Species Caught	Common Name	Total Number Caught	Percent Discarded Alive	Percent Discarded Dead	Percent Unknown Disposition
Lamna nasus	Porbeagle shark	132	50.0	40.9	9.1
Carcharhinus plumbeus	Sandbar shark	65	61.5	29.2	9.2
Carcharhinus	Sharks (Unclassified)	57	71.9	17.5	10.5
Prionace glauca	Blue shark	39	56.4	43.6	0.0
Galeocerdo cuvier	Tiger shark	15	86.7	13.3	0.0
Alopias vulpinus	Thresher shark	13	69.2	23.1	7.7
Carcharias taurus	Sand tiger shark	11	81.8	9.1	9.1
Sphyrna lewini	Scalloped hammerhead shark	9	55.6	44.4	0.0
Pelagic shark	Pelagic shark	3	33.3	66.7	0.0
Carcharhinus brevipinna	Spinner shark	2	50.0	50.0	0.0
Carcharhinus falciformis	Silky shark	1	0.0	100.0	0.0
Carcharhinus limbatus	Blacktip shark	1	0.0	100.0	0.0
Isurus oxyrinchus	Shortfin mako	1	100.0	0.0	0.0
Total		349			

Landings, discards, and bycatch information of prohibited shark species across all HMS fisheries is presented in Section 6.4. Source: Northeast Fisheries Observer Program.

Table 6.29 **HMS Landed (mt ww) Incidental to Trawl Fisheries, 2017-2021**

Species	2017	2018	2019	2020	2021
Yellowfin tuna	0.5	0.0	0.0	0.0	0.0
Skipjack tuna	0.1	<0.1	<0.1	<0.1	<0.1
Bigeye tuna	0.0	0.9	0.0	0.2	0.6
Albacore tuna	1.7	<0.1	1.1	0.3	0
Swordfish	6.8	1.0	10.6	19.3	6.6
Total	9.1	2.0	2019	2020	2021

mt ww = Metric tons whole weight. Source: NOAA Fisheries 2022

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).

6.5.3 Non-HMS Bottom Longline Fisheries

The Northeast Fisheries Observer Program may observe highly migratory species on bottom longline trips that target other finfish species. In 2021, reduced numbers of fishing trips and restrictions on placing observers on fishing vessels occurred due to the events caused by the COVID-19 pandemic. As a result, in 2021, two vessels primarily targeting golden tilefish were observed interacting with HMS. This is a reduction compared to the five vessels primarily targeting golden tilefish that were observed interacting with HMS in 2019. Due to confidentiality requirements under the Magnuson-Stevens Act, the details of the 2021 observed trips cannot be provided.

HMS caught and discarded in this fishery in 2021, as well as 2019 and 2020 for comparison, are displayed in Table 6.30. Information regarding HMS species caught and kept in this fishery can be found in Section 5.4.1, Table 5.51.

Table 6.30 HMS* Caught and Discarded on Observed Bottom Longline Trips Targeting Golden Tilefish and Other Finfish in the North Atlantic in 2019 through 2021.

Species	Total Caught 2019	Total Caught 2020	Total Caught 2021	Discarded (%) 2019	Discarded (%) 2020	Discarded (%) 2021
Tiger shark	18	C	C	94.4	C	C
Sharks, Unidentified			C			
Shortfin mako shark	3	C	C	0.0	C	C
Sandbar shark	0		C			
Yellowfin tuna	2	C	C	0.0	C	C
Bluefin tuna	0		C			
Blacktip shark	1	C	C	0.0	C	C
Hammerhead shark	0	na	C	0.0	na	C
Porbeagle shark	0	na	C	0.0	na	C
Pelagic shark	0	na	C	0.0	na	C
Total	24	C	C			C

* Prohibited shark species landings and interactions are compiled and presented in Section 6.4, Bycatch in the Prohibited Shark Complex. C = Data are not disclosed due to reasons of confidentiality. Source: Northeast Fisheries Observer Program.

The Southeast Fisheries Observer Program did not place observers on bottom longline trips targeting non-HMS fisheries in 2020, as a result of COVID-19 restrictions.

6.5.4 Gillnet Fisheries

6.5.4.1 Northeast and Mid-Atlantic Gillnet Fishery

The gillnet fishery in the Northeast and Mid-Atlantic regions is a mixed fishery with a large portion of trips catching

and retaining a variety of species, dominated by bluefish, croaker, and spiny dogfish. Observations in this fishery are reported through the Northeast Fisheries Observer Program. It is also the predominant gear type used in the smooth dogfish shark fishery

Two types of gillnet gear, sink and drift, were observed in trips targeting mixed species, other than smooth dogfish or other sharks (J. Mello, personal communication). In 2021, a total of 147 trips totaling 239 sets on 34 vessels were observed interacting with highly migratory species. Shark species dominated the catch, including porbeagle, unidentified sharks, and sandbar sharks. Data on shark species caught and discarded in this fishery can be found in Table 6.31. Data on shark species caught and kept in this fishery can be found in Section 5.4.2, Table 5.52.

Drift gillnet gear was used in 19 sets on 10 trips by 6 vessels. The catch from drift gillnets not targeting sharks or smooth dogfish was dominated by Atlantic sharpnose, spinner, and porbeagle sharks. Sink gillnet gear not targeting sharks or smooth dogfish was used in 220 sets on 137 trips by 30 vessels. The catch with sink gillnet gear on these trips was dominated by porbeagle, unidentified, and sandbar sharks.

Table 6.31 Shark Species* Caught and Discarded on Observed Trips across All Gillnet Gear Types Targeting Mixed Teleosts (Excluding Sharks and Smooth Dogfish), 2021

Common Name	Total Number Caught	Discard (%)
Porbeagle shark	203	100.0
Shark (Unclassified)	96	100.0
Sandbar shark	40	100.0
Blue shark	21	100.0
Atlantic sharpnose shark	14	7.1
Thresher shark	9	33.3
Spinner shark	8	62.5
Pelagic shark	5	100.0
Tiger shark	2	100.0
Blacktip shark	1	0.0
Silky shark	1	100.0
Hammerhead shark *(Unknown)	1	100.0
Smooth hammerhead shark	1	0.0
Scalloped hammerhead shark	1	100.0
Shortfin mako shark	1	100.0
Total	404	

Bycatch information of prohibited shark species across all HMS fisheries is presented in Section 6.4. Note that Mako sharks became prohibited. Source: Northeast Fisheries Observer Program.

6.5.4.2 Southeast Atlantic and Gulf of Mexico Gillnet Fishery

The Southeast Gillnet Observer Program covers anchored, strike, and drift gillnet fishing regardless of target species. In 2020, the Southeast program observed 390 sets comprised of various southeast gillnet fisheries. None of the gillnet trips observed targeted sharks. In the strike gillnet fishery, two gillnet vessels were observed making three strike gillnet sets on three trips. In the sink gillnet fishery, 14 gillnet vessels were observed making 321 sink gillnet sets on 75 trips. In the drift gillnet fishery, 4 vessels were observed making 66 drift net sets on 16 trips. Observed strike gillnet trips exclusively targeted king mackerel. The majority of sink and drift gillnet fishers continued to target mostly Spanish mackerel.

Table 6.32 and Table 6.33 outline shark species composition for sharks caught and discarded during observed drift and sink gillnet trips with observers onboard in 2010 (Mathers et al. 2022, unpublished). Data on shark species caught and kept in this fishery can be found in Section 5.4.2, Section 5.4.3; Table 5.54.

Table 6.32 Shark Species Caught and Discarded on Observed Southeast Drift Gillnet Trips Targeting Spanish Mackerel in 2021

Species	Total Caught	Discarded (%)
Atlantic sharpnose shark	137	86.1
Scalloped hammerhead shark	3	100
Blacknose shark	2	50
Spinner shark	2	100
Blacktip shark	2	100
Bonnethead shark	2	100
Great hammerhead shark	1	100
Total	149	

Source: Mathers et al. 2022, unpublished.

Table 6.33 Shark Species Caught and Discarded on Observed Southeast Sink Gillnet Trips Targeting King Mackerel in 2021

Species	Total Caught	Discarded (%)
Atlantic sharpnose shark	1369	74.4
Bonnethead shark	417	78.2
Scalloped hammerhead shark	55	98.2
Blacknose shark	34	70.6
Spinner shark	34	79.4
Finetooth shark	16	62.5
Bull shark	3	100.0
Smooth dogfish	1	100.0
Sharks	1	100.0
Total	1,931	

Source: Mathers et al. 2022, unpublished.

Dredge and handline fisheries were also observed, but due to confidentiality requirements, those observations can not be presented.

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7 Safety Data

7.1 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. Additionally, the United States Coast Guard (USCG) 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.

7.2 Commercial Fisheries Safety Statistics

Commercial fishing is one of the most dangerous occupations in the United States (Lambert et al. 2015). The Bureau of Labor Statistics data indicate that there were 23 fatalities in the fishing industry in 2021 (https://www.bls.gov/news.release/pdf/cfoi.pdf). This is equivalent to a work-related fatality rate of 75.2 deaths per 100,000 full- time equivalent workers. The all-worker rate is 3.6 fatalities per 100,000 full-time equivalent workers.

Work-related mortality in the U.S. fishing industry was analyzed in a study published by Lucas and Case (2018) across a 15-year time period (2000–2014) and across smaller time intervals (e.g., 2010–2014) to examine recent and longer term trends. During the 2000–2014 period, there were approximately 693 commercial fishing fatalities (~46 per year) across U.S. fishing regions (Lucas and Case 2018, Table III). Of these 693 fatalities, 164 and 225 commercial fishing deaths occurred in Gulf of Mexico and Atlantic East Coast fisheries during that time period, respectively. The majority of fatalities were due to vessel disasters (e.g., sinking, capsizing, fires, groundings) and falls overboard (e.g., as a result of losing balance, tripping or slipping, becoming entangled in gear). During the most recent time period analyzed (2010–2014), Lucas and Case (2018) noted that victims were on average 44 years of age, predominantly male (98 percent), and most often deckhands (50 percent). Fishery-specific commercial fishing fatality frequencies and rates per 100,000 for some fleets was provided in this study (see Table IV), however these data were not provided for HMS fisheries.

In a separate study, Case et al. (2018) evaluated data concerning fatal falls overboard for incidents reported between 2000 and 2016. A total of 204 commercial fishermen died from falls overboard, representing approximately 27 percent of all work-related deaths analyzed for this industry. Many (59.3 percent) of these falls overboard were not witnessed. Consistent with Lucas and Case (2018), most victims were male, many were experienced deckhands (median 16 years of experience), and none were wearing a personal floatation device at the time of death. In cases where information was available, many of these falls overboard occurred while fishermen were working with gear (setting, hauling, or handling gear on deck). Information specific to HMS fisheries was not provided in this paper, however conclusions are discussed in the broad context of U.S. fisheries.

More recent data provided by the National Institute for Occupational Safety and Health (NIOSH) on fatal fishing incidents between 2015 and 2021 report 88 and 49 fatalities in the Atlantic and Gulf of Mexico regions, respectively. Together, this accounts for 58% of fatal fishing events in the United States between 2015 and 2021. The leading incident type in the Atlantic was vessel disasters (*n* = 34) followed by falls overboard (n = 30). In the Gulf of Mexico, falls overboard were the most numerous incident type (n = 25), with vessel disaster also listed as the second most common cause (n = 14). No distinct fisheries were identified; however, 7 incidents did include information indicating they were targeting pelagic fish species. NIOSH previously published two summary documents that characterize Gulf of Mexico (https://www.cdc.gov/niosh/docs/2017-174/pdf/2017-174.pdf?id=10.26616/NIOSHPUB2017174) and Atlantic region (https://www.cdc.gov/niosh/docs/2017-173/pdf/2017-173.pdf?id=10.26616/NIOSHPUB2017173) fatal fishing events spanning the time period from 2000 through 2014. No information specific to HMS fisheries was provided for the Atlantic region in these publications. However, two of the incidents discussed in the Gulf of Mexico document occurred in the shark fishery. Information on other HMS fisheries operating in the Gulf of Mexico was not provided.

The Commercial Fishing Safety Research and Design Program of the NIOSH recommends prioritizing the use of personal 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.

Under the Coast Guard Authorization Act of 2010, which elevated maritime safety with that of other USCG responsibilities and the U.S. Coast Guard and Maritime Transportation Act of 2012, the USCG has taken several steps to increase safety in U.S. fisheries. The USCG published a report titled "Flag State Control in the United States: 2021 Domestic Annual Report" to summarize statistics and information regarding inspections and enforcement of regulations on U.S. flagged vessels. In 2021, USCG marine inspectors conducted 19,474 inspections on U.S. flagged vessels and identified 31,200 deficiencies. In comparison to 2020, the average number of deficiencies per vessel increased from 1.47 to 2.47 deficiencies per inspection in 2021. A total of 768 and 3,984 fishing vessels (inclusive of vessels used for catching, processing, and support/tender), respectively, participated in initial and renewal dockside examinations. Approximately 4,648 Commercial Fishing Vessel Safety decals were issued. During these exams approximately 7,460 deficiencies were noted. The 10 most prevalent deficiencies noted were for certificates/documentation, radio communications, lifesaving equipment, piloting/steering (i.e., having charts and publications), firefighting (portable extinguishers), engineering deficiencies, navigation equipment, operations/management (accommodations/occupational safety), personnel deficiencies, and pollution prevention/response.

These exams are an important component of addressing safety at sea in commercial fisheries. Minor failures may not necessarily compromise the vessel, and can often be resolved at sea or in port without loss of life or property. However, these failures are often not resolved, and can lead to disaster or loss of life. Research by Case and Lucas (2020) suggests that vessels that experience less serious casualties (e.g., loss of propulsion, fire, or flooding) are often more at risk for a future disaster. Specifically, Case and Lucas found through investigation of several models that predictors of disaster events included having one or more casualties within 10 years, vessel size, hull type, and having expired safety decals. Vessel size and hull type was theorized to have more to do with exposure to high-risk situations, such that larger vessels with steel hulls tend to fish for longer periods of time further offshore, and often year-round, in comparison to smaller fiberglass-hulled vessels that may fish seasonally and/or closer to shore.

7.3 Commercial Fisheries Safety Practices

The National Transportation and Safety Board, an independent federal agency charged by Congress with investigating aviation accidents and significant events in other modes of transportation (including marine transportation), publishes an annual report called the "Safer Seas Digest" (https://www.ntsb.gov/about/organization/MS/Pages/saferseas.aspx). The 2021 report summarized information and knowledge gained from 31 incidents, including accidents involving commercial fishing vessels. The major issues identified as contributing to these events included vessel stability; engine room fire containment; icing/severe weather; risk management

and project planning; cargo preparation and securement; teamwork; effective communication; standard operating procedures; distress communications/abandonment preparations; identification of navigational hazards; AIS input for towing operations; continuous monitoring of unmanned vessels; and sufficient handover periods. Commercial fishing vessel incidents included:

- the 2019 sinking of the *Scandies Rose* off Sutwik Island, Alaska (Bering sea pot cod fishery);
- the 2019 collision of an uninspected shrimp boat *Pappy's Pride* and a tanker Bow Fortune near Galveston, Texas;
- the 2020 engine room fires aboard the Gulf of Mexico shrimp trawl vessels *Lucky Angel* (near Pascagoula, Mississippi), Master Dylan (near Port Fourchon, Louisiana);
- the 2020 engine flooding and sinking of *Illex* fishing vessel Rebecca Mary; and
- the 2019 stranding and subsequent sinking of the fishing vessel *Miss Annie* off Hilton Head Island, South Carolina.

On December 6, 2017, NOAA Fisheries published a final rule (82 FR 57543) prohibiting the sale of any catch of HMS by HMS Charter/Headboat permitted vessels unless they obtain a "commercial sale" endorsement as part of the permit. Interested permit holders can obtain the commercial sale endorsement for no additional cost when renewing or obtaining their HMS Charter/Headboat permit. Those individuals that hold an HMS Charter/Headboat permit with a "commercial sale" endorsement may be categorized as commercial vessels for the purposes of USCG commercial fishing vessel safety requirements. Those vessels holding an HMS Charter/

Headboat permit without a "commercial sale" endorsement would not be categorized as commercial fishing vessels and would not be subject to the USCG commercial fishing vessel safety requirements. More information can be found here: https://www.fisheries.noaa.gov/bulletin/atlantic-highly-migratory-species-charter-headboat-permit-commercial-sale-endorsement.

In 2019, the USCG released a Work Instruction to provide guidance on applying statutory and regulatory requirements to the commercial fishing industry, the USCG, 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.

In 2020, NOAA Fisheries adopted certain Safety at Sea initiatives in response to public health concerns to protect public health and to ensure the safety of fishermen, observers, and others. In response to the pandemic, NOAA Fisheries published an emergency action (effective from March 24, 2020, through September 23, 2020) that permitted the waiver of observer coverage requirements if travel conditions or social control guidance preclude observer placement, or if qualified observers are unavailable for placement due to health, safety, or training issues related to COVID-19 (85 FR 17285, March 27, 2020). Additional actions in 2020 and 2021 provided NOAA Fisheries the authority to waive observer coverage through March 26, 2022 (86 FR 16307, March 29, 2021); however, the waiver policy was updated on June 17, 2021, and vessels are no longer eligible for release from observer or monitor coverage if a fully vaccinated or quarantined/shelter in place observer is available (https://www.fisheries.noaa.gov/leadership-message/noaa-fisheries-updates-policy-issuance-waivers-under-emergency-rule).

On August 31, 2020, the USCG Office of Commercial Vessel Compliance published Work Instruction CVC-WI-025(1), "Risk Based Fishing Vessel Exam Program," which is intended to facilitate more frequent safety examinations of firefighting, lifesaving, and other safety systems on vessels that have a higher probability of being in a marine casualty.

The USCG released Marine Safety Information Bulletin (MSIB) 09-20 on March 26, 2020. In this bulletin, the USCG

allowed for flexibilities to defer Fishing Vessel Safety Exams on a case-by-case basis for up to 90 days. Any Fishing Vessel Safety Exam requested prior to carrying a fishery observer will continue to be coordinated through the local Officer in Charge, Marine Inspections.

On January 21, 2021, the USCG released MSIB 01-21 to provide information to assist mariners in identifying ways to improve their vessel stability awareness. The bulletin highlights six actions that can significantly reduce the risk of capsizing:

- Review the vessel's Stability Instructions (SI) periodically to ensure it accurately reflects the vessel's design and actual conditions.
- Be aware of assumptions or conditions outlined in the vessel's SI.
- At the end of any vessel modifications, ensure all alterations made to the vessel are accurately accounted for in the ship's SI.
- While at sea, be cognizant of watertight integrity.
- During icy conditions, be proactive in removing ice build-up.
- Do not make the mistake of overestimating a vessel's ability to handle heavy loads and heavy seas.

On August 25, 2021, the USCG issued MSIB 08-21 to apprise fishing vessel owners and operators of requirements that apply to the new construction, survey, and maintenance of some commercial fishing vessels. MSIB 08-21 informs fishing vessel owners and operators that certain vessels may meet the classification requirements specified in 46 U.S.C. 4503(d) as an alternative to the classification requirements in 46 U.S.C. 4503(a). The USCG has authorized certain Accepted Organizations to verify compliance with post-construction condition surveys, out-of-water-surveys, and verification of compliance measures outlined in 46 U.S.C. §4503(d). The USCG has made a list of Accepted Organizations available at: https://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Inspections-Compliance-CG-5PC-/Commercial-Vessel-Compliance/Fishing-Vessel-Safety-Division/THIRD-PARTY-ORGANIZATIONS-FV-construction-oversight/

In response to the capsizing of a marine vessel, the USCG issued Safety Alert 03-21, "*Blocked freeing ports can trap seawater on deck reducing your vessel's stability".* Fishing vessels that close freeing ports to prevent catch from washing off deck. The alert recommends that owners/operators come up with alternate means to prevent loss of catch while maintaining adequate deck drainage.

7.4 Recreational Fisheries Safety Statistics

Safety at sea is not just an issue for commercial fisheries. Recreational boating statistics are published annually by the USCG Office of Auxiliary and Boating Safety (https://uscgboating.org/library/accident-statistics/Recreational-Boating-Statistics-2021.pdf). There is evidence that boating activity rose significantly during the pandemic (e.g., increased boat sales, insurance policies taken out, insurance claims, calls for towing assistance). Compared to 2020, the number of accidents, deaths, and injuries decreased by 15.7 percent, 14.2 percent, and 17.2 percent, respectively.

- The following summarizes recreational boating statistics, inclusive of recreational fishing activities for 2021 (USCG 2021):
- There were 11,957,886 recreational vessels registered by states.
- The USCG reported 4,439 accidents involving 2,641 injuries, 658 deaths, and approximately $67.5 million dollars in damages as a result of recreational boating accidents.
- The fatality rate for 2020 was 5.5 deaths per 100,000 registered recreational vessels.

- Where cause was known, most fatalities (81 percent) were associated with drowning. Approximately 83 percent of drowning victims were not wearing a life jacket at the time of fatality.
- Where vessel length was known, 75% of boaters who drowned were using vessels less than 21 feet in length.
- 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 16 percent of deaths.
- Accidents were attributed to several factors, the top five of which included operator inattention, operator inexperience, improper lookout, machinery failure, and excessive speed.
- From a summary of accident reports, approximately 662 vessels were engaged in fishing activities at the time of accidents, which resulted in 173 deaths and 269 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.

7.5 Observer Safety Data for HMS Fisheries

Fishery observers play a critical role in the sustainable management of our nation's fisheries. Fishing vessels participating in fisheries managed by the HMS Management Division are subject to carrying fishery observers to collect data critical to evaluate the harvest and status of fish stocks. Observer programs administered by the Southeast and Northeast Fisheries Science Centers place observers on vessels participating in the shark bottom longline, pelagic longline, and gillnet fisheries, all of which target species managed under the 2006 Consolidated HMS Fishery Management Plan. Additionally, squid trawl and finfish bottom longline fisheries that retain HMS as non-target bycatch may also receive observer coverage.

Common safety issues identified for observers working aboard commercial fishing vessels are similar to those faced by commercial fishermen. These dangers include but are not limited to: the risk of falling overboard; entanglement with fishing gear, trips, slips, and falls; motion sickness; infection; and illness.

Due to the relatively dangerous nature of working aboard commercial fishing vessels, and the propensity of minor safety events to become complicated by the lack of ready access to emergency services while offshore, safety training is required during training of fishery observers and at-sea monitors. Additionally, any vessels selected for observer coverage must have a current USCG dockside examination. A pre-trip vessel safety check performed by the observer is also required to be completed prior to departure. These precautions help ensure that in the event of an emergency, the opportunity to deescalate, avoid, or minimize damages due to equipment failure is maximized.

Information on safety incidents is collected during a trip and in post-trip debriefings by regional observer programs. While the safety record of fisheries observers has been generally good, the NOAA Office of Science and Technology conducted an Observer Safety Program Review (OSPR) that was completed in 2018 (https:// www.fisheries.noaa.gov/resource/document/observer-safety-program-review-report). The review summarized 156 incidents reported by the Pelagic Observer Program from 2011 through the first quarter of 2017. An additional 45 incidents have been reported by the Pelagic Observer Program from 2018 through 2021. The top three most frequently reported incidents were:

- 64 injuries.
- 59 illness.
- 55 sea sickness.

From 2011 through 2021, biting bugs (bed bugs, ants, and other unidentified arthropods) and infection were also

reported, but less frequently.

There were also 26 maritime casualties reported by observers while deployed:

- 8 fire incidents (3 leading to a loss of propulsion).
- 3 flooding incidents (1 leading to a sinking).
- 10 man overboard incidents.
- 10 loss of propulsion that required tow to port incidents.

At the time the OSPR was published, it was noted that there have not been any events that triggered the Emergency Notification Plan in recent history for the Southeast Gillnet and Shark Bottom Longline Observer Programs, and in more recent years (2019-2021) only one observer injury was reported. Quantitative measures were not available for the fishery observer programs administered by the Northeast Fisheries Observer Program that target or incidentally retain HMS (Northeast and Mid-Atlantic gillnet and squid trawl fisheries), but the OSPR reported effective use of their Emergency Action Plan in six to eight instances in 2016. An overview of the National Observer Program with more detailed information on region-specific operations can be found at https://www.fisheries.noaa.gov/topic/fishery-observers.

A regional observer program has also been established by ICCAT to collect data pertaining to transshipment of tuna and other species caught in the ICCAT Convention area. Under this program, foreign flagged vessels have carried observers of U.S. citizenship. Data available until 2018 indicate that there had been no health or safety problems encountered in the ICCAT Transshipment Regional Observer Program. ICCAT Recommendation 19-10 implemented further safety provisions for the program, including requiring an independent two-way satellite communication device be provided to observers, that vessels develop Emergency Action Plans, and that observers be allowed access to inspect safety equipment to ensure the vessel is appropriately outfitted for the entirety of each voyage.

7.6 Chapter 7 References

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8 Economics of HMS Fisheries

8.1 Background

The development of conservation and management measures for 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 the United States and global economy experienced an unprecedented shock and disruption in 2020 as a result of the coronavirus (COVID-19) public health crisis. COVID-19 protective measures instituted in March 2020 across the United States and globe contributed to broad scale economic recession and an almost-immediate impact on seafood sector sales. U.S. Gross Domestic Product declined by 1.5 percent in 2020 (U.S. Bureau of Economic Analysis, 2021). The unemployment rate spiked to 14.8 percent in April of 2020, the highest rate and monthly increase since 1948 (U.S. Bureau of Labor Statistics, 2021). Seated dining at restaurants was almost completely halted across the United States in March and April of 2020 (OpenTable, 2021). Retail sales at food services and drinking places declined by 19.5 percent in 2020 according to the U.S. Census Bureau (U.S. Census Bureau, 2021). Social distancing protocols, travel restriction, and other safety measures also impacted the recreational and tourism sectors resulting in impacts to charter fishing operations, fishing tournaments and angling. The economy began to quickly recover in 2021. U.S. Gross Domestic Product increased 10.7 percent in 2021. Unemployment rate dropped back down to 6.3 in January of 2021 and continued to decline to 3.9 percent in December of 2021. Restaurant sales began to recover throughout 2021 and many of the strict social distancing and travel restrictions were eased throughout 2021. There were major increases in recreational fishing to above even pre-pandemic levels in 2021. Also, Atlantic HMS commercial landings rebounded in 2021 and even exceeded the value of 2019 landings. Further description of the effects of the COVID-19 public health crisis may be found in Section 9.6 below.

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 2017–2021 are provided in Table 8.1. 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 inflat

Table 8.1 Inflation Price Indexes, 2017–2021

Year	CPI-U	GDP Deflator	PPI Unprocessed Finfish
2017	245.1	107.7	674.9
2018	251.1	110.3	653.9
2019	255.6	112.3	673.4
2020	258.8	113.8	665.1
2021	271.0	118.9	852.7

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).

8.2 Commercial Fisheries

In 2020, 8.4 billion pounds valued at $4.8 billion were landed for all fish species by U.S. fishermen at U.S. ports. That represented a 10.5-percent decrease from the 9.4 billion pounds valued at $5.6 billion that were landed for all fish species by U.S. fishermen at U.S. ports in 2019, with the decrease in landings largely being due to the effects of the COVID-19 pandemic on commercial fishing operations. The total value of commercial HMS landings in 2021 was $40.1 million. Revenues of HMS fisheries are further discussed in Section 8.2.2.

8.2.1 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 for 2017-2021 by species and area are summarized in Table 8.2.

Table 8.2 Average Ex-Vessel Price per Pound for Atlantic Highly Migratory Species by Area, 2017–2021

Bluefin tuna	Gulf of Mexico	5.20	5.71	4.58	5.45	5.13
	South Atlantic	6.15	6.80	5.76	5.04	6.42
	Mid-Atlantic	6.21	6.31	5.94	4.99	5.55
	North Atlantic	6.52	7.05	5.61	5.09	7.01
Albacore tuna	Gulf of Mexico	1.05	1.01	1.00	1.15	1.83
	South Atlantic	1.93	2.23	2.32	2.04	2.47
	Mid-Atlantic	1.35	1.98	1.31	1.31	1.87
	North Atlantic	1.49	1.96	1.73	0.97	1.89
Bigeye tuna	Gulf of Mexico	5.52	5.70	6.73	4.29	5.80
	South Atlantic	5.21	5.77	5.44	5.50	6.93
	Mid-Atlantic	5.47	6.22	6.27	5.87	8.33
	North Atlantic	4.53	4.77	4.68	5.24	7.39
Yellowfin tuna	Gulf of Mexico	3.76	4.36	4.38	3.84	4.65
	South Atlantic	3.34	3.83	3.73	3.14	4.31
	Mid-Atlantic	4.26	4.34	4.21	3.72	5.51
	North Atlantic	3.48	3.34	3.21	3.47	3.99
Skipjack tuna	Gulf of Mexico	0.71	1.24	0.90	1.01	2.80
	South Atlantic	0.87	0.90	0.83	1.08	1.38
	Mid-Atlantic	1.11	0.79	1.25	0.83	1.43
	North Atlantic	1.44	1.50	0.93	-	-
Swordfish	Gulf of Mexico	3.09	3.08	3.01	3.17	4.14
	South Atlantic	4.57	4.18	4.41	4.79	5.42
	Mid-Atlantic	3.96	3.93	4.12	4.28	4.95
	North Atlantic	4.37	4.21	4.07	4.19	5.31
Large coastal sharks	Gulf of Mexico	0.53	0.62	0.73	0.85	0.89

Species	Area	2017 ($)	2018 ($)	2019 ($)	2020 ($)	2021 ($)
	South Atlantic	0.86	0.89	0.87	0.99	1.10
	Mid-Atlantic	0.95	0.71	0.94	0.93	1.14
	North Atlantic	-	-	-	-	-
Pelagic sharks	Gulf of Mexico	1.47	0.73	1.38	1.36	0.70
	South Atlantic	1.62	1.50	1.47	1.19	1.01
	Mid-Atlantic	1.18	1.33	1.19	1.45	1.07
	North Atlantic	2.03	1.64	1.44	1.44	0.96
Small coastal sharks	Gulf of Mexico	0.41	0.54	0.59	0.57	0.72
	South Atlantic	0.98	1.02	1.02	1.13	1.20
	Mid-Atlantic	0.93	0.77	0.97	0.94	1.16
	North Atlantic	-	-	-	-	-
Smoothhound	Gulf of Mexico	-	0.65	1.08	0.72	1.25
	South Atlantic	0.94	0.93	1.13	1.14	1.34
	Mid-Atlantic	0.73	0.77	0.82	0.93	1.06
	North Atlantic	0.37	0.42	0.38	0.51	0.61
Shark fins	Gulf of Mexico	11.37	11.18	11.10	10.28	8.85
	South Atlantic	7.88	7.94	8.11	6.02	8.39
	Mid-Atlantic	2.44	2.18	1.87	1.45	1.56
	North Atlantic	-	1.50	2.25	1.00	0.72

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. Mid-Atlantic is Virginia, Maryland, Delaware, New Jersey, New York, and Connecticut. North Atlantic is Rhode Island, Massachusetts, New Hampshire, and Maine. Source: eDealer; dealer weigh-out slips from the

Southeast Fisheries Science Center and Northeast Fisheries Science Center; eBFT.

The average 2021 ex-vessel prices for bluefin tuna increased 33.2 percent relative to 2020. The ex-vessel prices for bluefin tuna can be influenced by many factors, including market supply and the Japanese yen/U.S. dollar (¥/$) exchange rate. Figure 8.1 shows the average ¥/$ exchange rate, plotted with average ex-vessel bluefin tuna prices, from 2017 to 2021.

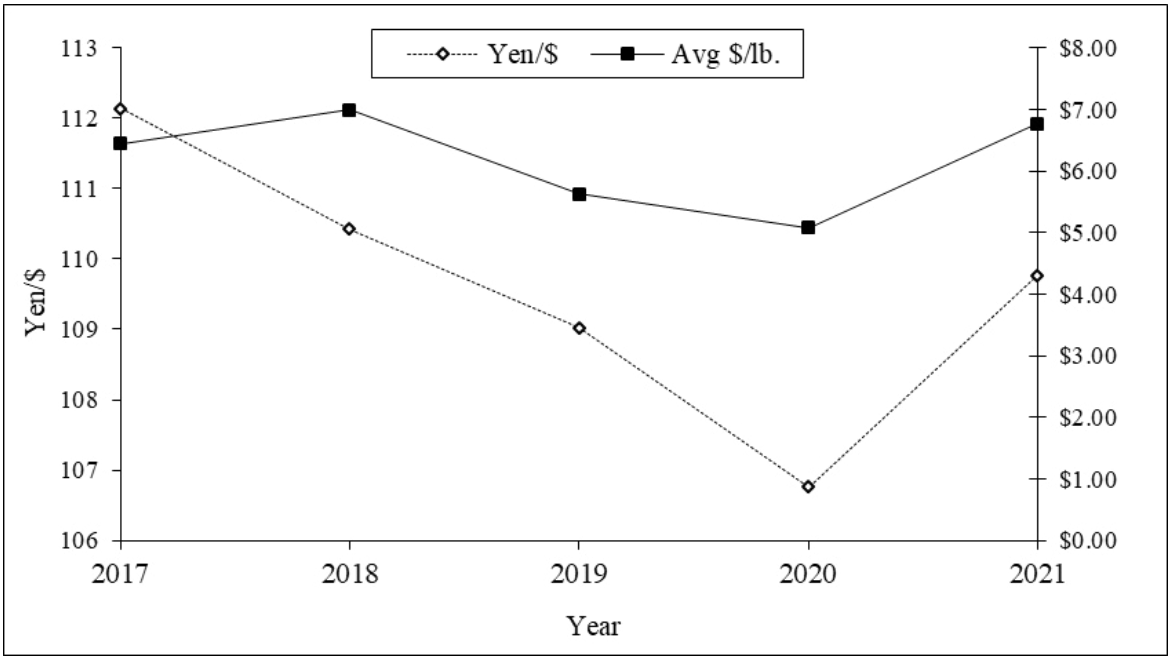

Figure 8.1 **Average Annual Yen/$ Exchange Rate and Average U.S. Bluefin Tuna Ex-Vessel $/lb (dw) for All Gears, 2017-2021**

dw = dressed weight. Source: Federal Reserve Bank (research.stlouisfed.org); NOAA Fisheries.

8.2.2 Revenues

Landings weight and price for most 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 8.3 summarizes the average annual revenues of HMS fisheries based on average ex-vessel prices. These values indicate that the estimated total annual revenue of HMS fisheries increased to $40.1 million for 2021 from $30.9 million in 2020. Total revenue changes over the same time period for individual fisheries.

- Atlantic tuna: Increase of $8.7 million (Table 8.4).
- Atlantic swordfish: Increase of $0.4 million (Table 8.5).
- Atlantic sharks: Increase of $0.2 million (Table 8.6).

Table 8.3 **Estimates of the Total Ex-Vessel Annual Revenues of Atlantic Highly Migratory Species Fisheries, 2017-2021**

Species	2017 ($)	2018 ($)	2019 ($)	2020 ($)	2021 ($)
Total tuna	26,531,264	22,751,128	$22,882,640	$19,473,853	$27,917,311
Total swordfish	9,012,183	7,540,277	$9,435,022	$9,248,741	$9,477,075
Total sharks	2,791,306	2,980,245	$2,280,126	$2,219,348	$2,625,144
Total HMS	38,334,753	33,271,650	$34,597,788	$30,941,942	$40,019,500

Source: eDealer for bigeye, albacore, yellowfin, and skipjack tunas, swordfish, and sharks; eBFT for bluefin tuna.

Table 8.4 **Estimates of the Total Ex-Vessel Annual Revenues of Atlantic Tunas, 2017-2021**

Species	Values	2017	2018	2019	2020	2021
Bluefin	Ex-vessel*	$6.45	$6.99	$5.63	$5.08	$6.77
	Weight**	1,490,321	1,587,794	1,742,863	1,734,230	1,744,740
	Fishery revenue	$9,581,816	$11,010,617	$9,787,551	$8,415,905	$11,814,847
Albacore	Ex-vessel*	$1.63	$1.98	$1.76	$1.57	$2.02
	Weight**	364,723	164,483	334,002	522,062	426,511
	Fishery revenue	$652,948	$335,570	$571,281	$967,736	$1,049,357
Bigeye	Ex-vessel*	$5.33	$5.94	$5.79	$5.63	$7.37
	Weight**	991,718	735,581	1,026,960	879,744	1,207,109
	Fishery revenue	$5,371,772	$4,348,519	$5,934,807	$4,899,997	$8,894,678
Skipjack	Ex-vessel*	$0.92	$0.90	$1.04	$1.06	$1.45
	Weight**	6,216	3,816	3,340	1,572	1,094
	Fishery revenue	$6,633	$3,473	$3,031	$1,415	$1,983
Yellowfin	Ex-vessel*	$3.70	$4.03	$3.93	$3.44	$4.65
	Weight**	2,637,684	1,543,898	1,579,646	1,384,704	1,325,325
	Fishery revenue	$10,918,095	$7,052,949	$6,585,970	$5,188,800	$6,156,446
Total tunas	Fishery revenue	$26,531,264	$22,751,128	$22,882,640	$19,473,853	$27,917,311
Total highly migratory species	Fishery revenue	$38,334,753	$33,271,650	$34,597,788	$30,941,942	$40,019,500

*Dollars per pound dressed weight. **Pounds dressed weight. Source: eDealer for bigeye, albacore, yellowfin, and skipjack tunas; eBFT for bluefin tuna.

Table 8.5 **Estimates of the Total Ex-Vessel Annual Revenues of Atlantic Swordfish, 2017-2021**

Value	2017	2018	2019	2020	2021
Ex-vessel ($/lb dw)	$4.32	$4.10	$4.32	$4.65	$5.26
Weight (lb dw)	2,019,857	1,750,631	2,239,596	2,098,240	1,801,542
Total fishery revenue	$9,012,183	$7,540,277	$9,435,022	$9,248,741	$9,477,075
Total highly migratory species fishery revenue	$38,334,753	$33,271,650	$34,597,788	$30,941,942	$40,019,500

Source: eDealer.

Table 8.6 **Estimates of the Total Ex-Vessel Annual Revenues of Atlantic Sharks, 2017-2021**

Shark Group	Value	2017	2018	2019	2020	2021
Large coastal sharks	Ex-vessel*	$0.72	$0.74	$0.82	$0.93	$0.87
	Weight**	1,311,408	1,634,872	796,415	1,183,515	1,160,357
	Fishery revenue	$746,642	$878,279	$506,112	$973,330	$1,012,749
Pelagic sharks	Ex-vessel*	$1.51	$1.42	$1.35	$1.29	$0.92
	Weight**	251,153	129,885	97,595	97,188	58,949
	Fishery revenue	$386,446	$160,772	$130,664	$115,160	$54,441
Small coastal sharks	Ex-vessel*	$0.74	$0.87	$0.94	$0.97	$1.16
	Weight**	437,094	432,483	456,167	374,730	335,353
	Fishery revenue	$364,181	$375,877	$422,633	$370,447	$390,022
Smoothhound	Ex-vessel*	$0.70	$0.74	$0.78	$0.90	$0.89
	Weight**	832,631	907,277	794,998	590,619	803,414
	Fishery revenue	$567,076	$678,309	$607,971	$481,789	$714,414
Shark fins	Ex-vessel*	$7.97	$8.71	$7.60	$6.37	$5.75
	Weight**	85,877	97,813	63,056	61,138	31,544
	Fishery revenue	$726,961	$887,008	$612,746	$278,622	$453,488
Total sharks	Fishery revenue	$2,791,306	$2,980,245	$2,280,126	$2,219,348	$2,625,114
Total highly migratory species	Fishery revenue	$38,334,753	$33,271,650	$34,597,788	$30,941,942	$40,019,500

*Dollars per pound dressed weight. **Pounds dressed weight. Source: eDealer.

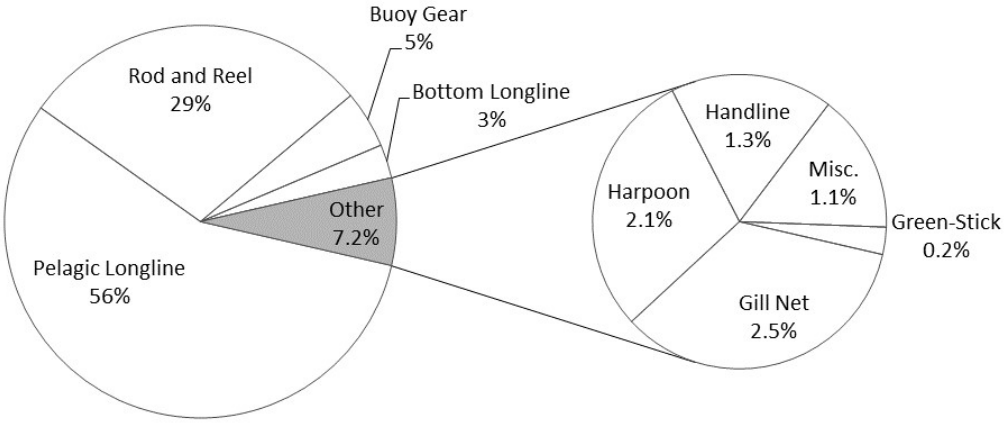

Figure 8.2 Percent of 2021 Total Ex-Vessel Revenues of Atlantic Highly Migratory Species Fisheries by Gear

Source: eDealer; eBFT.

Figure 8.2 displays the percent composition of the $40.1 million ex-vessel annual revenues landed in 2021 by fishing gear category. Based on dealer reports, approximately 56 percent of 2021 total revenues in the fishery were landed by pelagic longline gear. In addition, 29 percent of landings by value were from vessels using commercial rod and reel gear, 5 percent were from buoy gear, 3 percent were from bottom longline, and 7 percent were from other gear categories. These other gear categories include gill net, harpoon, handline, green-stick, and other miscellaneous gears.

8.2.3 Operating Costs

NOAA Fisheries collects operating cost information from commercial permit holders via logbook reporting. Each year, 20 percent of active HMS commercial permit holders are selected to report economic information along with their Atlantic HMS Logbook or Southeast Coastal Fisheries Logbook submissions (see Section 10.3.1 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 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.

8.2.3.1 Pelagic Longline Vessels

Primary expenses associated with operating an 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 8.7.

Fuel costs per gallon increased from 2020 to 2021, while the cost per pound for bait decreased. The unit cost per light stick remained unchanged from 2020 to 2021.

Table 8.7 Pelagic Longline Vessel Median Unit Costs for Fuel, Bait, and Light Sticks, 2017-2021

Input Unit Costs	2017	2018	2019	2020	2021
Fuel ($ per gallon)	2.10	2.50	2.50	2.00	2.50
Bait ($ per pound)	1.55	1.65	1.65	1.85	1.80
Light sticks ($ per stick)	0.35	0.35	0.35	0.37	0.37

Source: United Data Processing.

The median input costs per trip for the major variable inputs associated with HMS trips taken by pelagic longline vessels are provided in Table 8.8. Fuel costs are one of the largest variable expenses. Total median pelagic longline vessel fuel costs per trip increased 2.6 percent from 2020 to 2021.

Table 8.8 Median Input Costs (Dollars) for Pelagic Longline Vessel Trips, 2017-2021

Input Costs	2017	2018	2019	2020	2021
Fuel	2,167	2,466	2,000	1,920	1,969
Bait	2,000	2,079	2,000	2,000	1,475
Light sticks	750	836	636	684	220
Ice costs	1,080	1,173	900	765	195
Grocery expenses	900	900	900	900	900
Other trip costs	885	1,000	965	800	1,225

Source: United Data Processing.

Labor costs are also an important component of operating costs for HMS pelagic longline vessels. Table 8.9 lists the number of crew on a typical pelagic longline trip. The median number of three crew members has been consistent from 2017 through 2021. 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 2021 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 years ranged from a low of $6,368 in 2019 to a high of $9,947 in 2021.

Table 8.9 Median Labor Inputs for Pelagic Longline Vessel Trips, 2017-2021

Labor	2017	2018	2019	2020	2021
Number of crew	3	3	3	3	3
Days at sea	12	11	9	9	9
Owner share (%)	50	50	50	50	50
Captain share (%)	25	25	25	25	25
Crew share (%)	25	25	25	25	25
Total shared costs ($)	6,425	6,889	6,368	6,855	9,947

Source: United Data Processing.

In 2021, median reported total trip sales were $24,393. In 2020, median reported total trip sales were $18,037. In 2019, median reported total trip sales were $17,093. In 2018, median reported total trip sales were $20,051. After adjusting for operating costs, median net earnings per trip were $9,803 in 2018. Median net earnings per trip decreased to $9,443 in 2019. Median net earnings per trip decreased to $9,000 in 2020. Median net earnings per trip increased to $20,985 in 20217

8.2.3.2 Bottom Longline Vessels

The primary expenses associated with operating an 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 8.10 provides the median reported trip input costs from 2017 through 2021.

Table 8.10 Median Input Costs for Bottom Longline Vessel Trips, 2017-2021

Input Costs	2017	2018	2019	2020	2021
Fuel ($)	124	156	144	120	109
Bait ($)	60	50	100	60	73
Ice costs ($)	36	20	24	30	41
Grocery expenses ($)	20	20	10	50	30
Misc. trip costs ($)	20	0	20	52	50
Number of crew	2	2	3	2	2
Days at sea	1	1	1	1	1

Source: United Data Processing.

Median reported total trip sales for vessels using bottom longline gear were as follows: $976 in 2018, $2,000 in 2019, $851 in 2020, and $1,051 in 2021. After adjusting for operating costs, median net earnings per bottom longline trip were $609 in 2018, $1,192 in 2019, $614 in 2020, and $763 in 2021.

Table 8.11 Median Revenue and Net Earnings for Bottom Longline Vessel Trips, 2017-2021

Input Costs	2017	2018	2019	2020	2021
Total Trip Sales	1,110	976	2,000	851	1,051
Net Trip Earnings	801	609	1,192	614	763

Source: United Data Processing.

8.3 Fish Processing and Wholesale Sectors

Consumers spent an estimated $11.2 billion on domestically processed fishery products from domestic and imported products in 2020 (the last year of available data). This includes $11.7 billion on edible fishery products, including fresh, frozen, canned, and cured, and $392.4 million on industrial fishery products. Tuna are in the top five species processed at 391 million pounds valued at $822 million (NOAA Fisheries Office of Science and Technology 2022).

NOAA Fisheries does not currently have specific information regarding the costs and revenues for 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 plants and employees for processors and wholesalers in the United States provided the U.S. Bureau of Labor Statistics (2022). Table 8.12 provides a summary of available information.

Table 8.12 Processors and Wholesalers: Plants and Employment in 2021[1]

Area and State	Region	Processing1 Plants	Processing1 Employment	Wholesale2 Plants	Wholesale2 Employment	Total Plants	Total Employment
Maine	New England	31	705	179	1,291	210	1,996
New Hampshire	New England	4	-	18	116	22	-
Massachusetts	New England	48	3,295	162	2,012	210	5,307
Rhode Island	New England	8	163	30	148	38	311
Connecticut	New England	4	83	21	142	25	225
New England Total	New England	95	4,246	410	3,709	505	7,955
New York	Mid-Atlantic	11	284	266	1,788	277	2,072
New Jersey	Mid-Atlantic	18	434	88	851	106	1,285
Pennsylvania	Mid-Atlantic	4	96	32	637	36	733
Delaware	Mid-Atlantic	3	-	8	12	11	-
District of Columbia	Mid-Atlantic	1	-	4	-	5	-
Maryland	Mid-Atlantic	19	324	53	1,013	72	1,337

Area and State	Region	Processing1 Plants	Processing1 Employment	Wholesale2 Plants	Wholesale2 Employment	Total Plants	Total Employment
Virginia	Mid-Atlantic	34	1,075	80	410	114	1,485
Mid-Atlantic Total	Mid-Atlantic	90	2,213	531	4,711	621	6,924
North Carolina	South U.S. Atlantic	27	751	72	904	99	1,655
South Carolina	South U.S. Atlantic	6	19	26	149	32	168
Georgia	South U.S. Atlantic	10	678	29	623	39	1,301
Florida	South U.S. Atlantic	36	1,721	353	3,002	389	4,723
South U.S. Atlantic Total	South U.S. Atlantic	79	3,169	480	4,678	559	7,847
Alabama	Gulf of Mexico	29	950	14	240	43	1,190
Mississippi	Gulf of Mexico	23	1,966	28	151	51	2,117
Louisiana	Gulf of Mexico	65	1,482	109	704	174	2,186
Texas	Gulf of Mexico	47	1,556	159	1,381	206	2,937
Gulf of Mexico Total	Gulf of Mexico	164	5,954	310	2,476	474	8,430

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. Source: Quarterly Census of Employment and Wages, Bureau of Labor Statistics, 2022.

8.4 International Trade

Several regional fishery management organizations, including ICCAT, use consignment documents to assess international trade in regulated products. Those data are also used to estimate landings in international Atlantic HMS fisheries, and characterize compliance with 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. Census Bureau. NOAA Fisheries provides public access to searchable Census Bureau marine fish product trade data.

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 Atlantic HMS have distinct HTS codes, and some species are further subdivided by the disposition of the product (e.g., fresh or frozen, fillets, 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 generally describes U.S. trade monitoring programs for Atlantic HMS products and the relevant Atlantic HMS trade monitoring programs of regional fishery management organizations. Statistics describing U.S. trade activity for Atlantic HMS products from 2010 through 2020 are provided.

8.4.1 The Use of Trade Data for Management Purposes

Trade data are used in a number of ways to support the international management of Atlantic HMS. When appropriate, the Standing Committee on Research and Statistics uses ICCAT trade data from consignment document programs such as the electronic Bluefin Tuna Catch Document, Swordfish Statistical Document, or frozen Bigeye

Tuna Statistical Document, 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.

8.4.2 Atlantic HMS Trade Documentation Programs

NOAA Fisheries implemented the Atlantic 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 or "consignment" documentation. Under this program, traders in these species and shark fins were required to obtain the International Trade Permit and implement the requirements. On August 3, 2016 (81 FR 51126), 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, 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, among others, 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 at: www.fisheries.noaa.gov/permit/international-fisheries-trade-permit.

8.4.3 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 (Table 8.12) 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 from the high seas must be landed in a U.S. Fish and Wildlife-designated port unless the U.S. Fish and Wildlife Service provided an exception. 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 Atlantic 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: https://www.fws.gov/service/importing-and-exporting.

Table 8.13 Atlantic HMS Species Listed on CITES Appendix II

Atlantic HMS Species on Appendix II	Conference of Parties (CoP)	Meeting Year
Basking shark	CoP13	2004
Whale shark	CoP13	2004
White shark	CoP13	2004
Hammerhead shark, great	CoP16	2013
Hammerhead shark, scalloped	CoP16	2013
Hammerhead shark, smooth	CoP16	2013
Oceanic whitetip shark	CoP16	2013
Porbeagle shark	CoP16	2013
Silky shark	CoP17	2016
Thresher shark	CoP17	2016
Bigeye thresher shark	CoP17	2016
Longfin mako shark	CoP18	2019
Shortfin mako shark	CoP18	2019

CITES = The Convention on International Trade in Endangered Species of Wild Fauna and Flora.

At CoP19, November 14-25, 2022, the remaining species of Sphyrnids, including bonnethead sharks, and almost all remaining species of Carcharhinids, including sandbar, dusky, tiger, bull, lemon, spinner, blacknose, blacktip, and blue sharks, were added to Appendix II. These new listings became effective on February 23, 2023 for the Sphyrnids and will be effective November 25, 2023 for the Carcharhinids. Once these listings are effective, almost every shark species managed by the HMS Management Division will be listed under CITES and will require the appropriate permits from the U.S. Fish and Wildlife Service for any of the products related to the shark in addition to the vessel and dealer permits required by NOAA Fisheries. At this time, sharks are the only species managed by the HMS Management Division that are also listed under Appendix II.

8.4.4 U.S. Exports of Atlantic 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 Atlantic HMS exports is dominated nationally by tuna products. In 2021, fresh and frozen tuna products accounted for 5,435 mt dw of the 926 thousand mt dw of principal fresh and frozen seafood products exported from the United States (NOAA Fisheries Office of Science and Technology 2023). The value of these Atlantic HMS tuna products accounted for $29.4 million out of a national total of $3.2 billion in U.S. seafood product exports. U.S. trade data collected for most Atlantic HMS combine products from both the Atlantic and Pacific Ocean, which are not identified by area of catch. Atlantic-specific trade trends for those species cannot be accurately determined. For swordfish, bluefin tuna, and frozen bigeye tuna, data from international trade-tracking consignment document programs can be used to differentiate area of catch, and determine the amount of product originating from the Atlantic.

8.4.4.1 Atlantic and Pacific Bluefin Tuna Exports

Table 8.14 gives bluefin tuna export data for exports from the United States since 2010 and includes NOAA Fisheries dealer landings data, ICCAT eBCD consignment document 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 ensure 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 eBCD program provides timely access to Atlantic bluefin tuna export data. For several years after the 2016 implementation of the eBCD program, resolution of the export data from Census Bureau and NOAA eBCD improved (Table 8.14). Since then both export amounts and data resolution have generally decreased.

U.S. bluefin tuna exports are destined for the sushi markets in Japan. Exports of Atlantic product as a portion of total Atlantic landings are depicted in Figure 8.3 for each year in the time series. Landings generally increased since 2013 and levelled off for 2019 through 2021. However, exports have decreased since 2019. Figure 8.4 reinforces this observation, showing a decrease in percent of landings exported from 2018 to an all-time low in 2021 at just over 20%. These figures also show that domestic consumption of U.S. landed product has increased in recent years. The import section of this document discusses total annual bluefin consumption (i.e., imports + domestic product).

Table 8.14 U.S. Exports of Atlantic and Pacific Bluefin Tuna, 2010–2021

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)
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	291.1	287.7	578.8	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
2019	802.8	315.2	47.3	362.5	537	5.71
2020	788.5	255.9	1.3	257.1	284	3.69
2021	795.0	175.6	0.0	175.6	306	3.46

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]HMS Management Division; [2]eBCD; [3]U.S. Census Bureau.

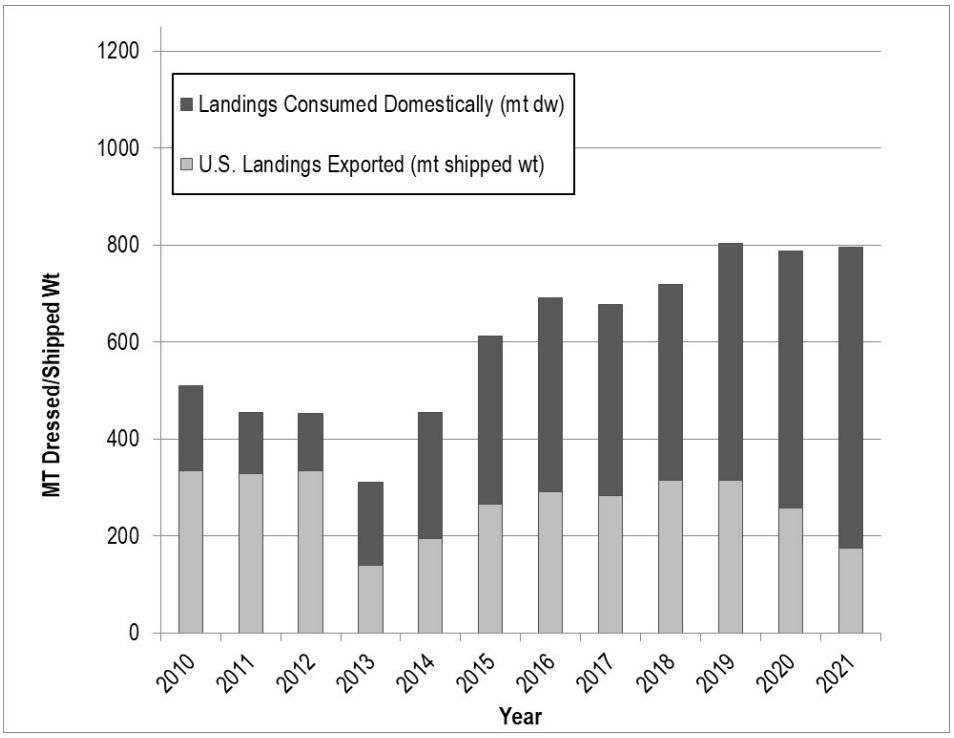

Figure 8.3 Annual U.S. Domestic Landings of Atlantic Bluefin Tuna Divided into U.S. Export and U.S. Domestic Consumption, 2010-2021

mt = Metric tons. dw = Dressed weight. Source: eBCD; U.S. Census Bureau.

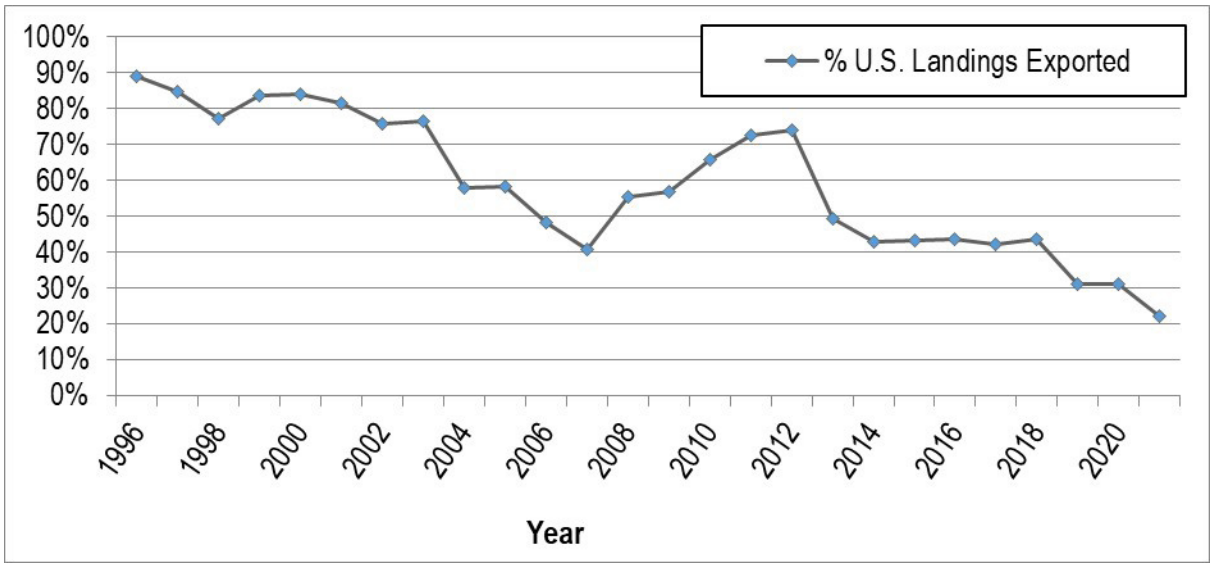

Figure 8.4 Annual Percentage by Weight of Commercially Landed U.S. Atlantic Bluefin Tuna Exported, 1996–2021

Source: eBCD; U.S. Census Bureau.

8.4.4.2 Other Tuna Exports

U.S. Census Bureau export data for albacore, yellowfin, bigeye and skipjack tunas includes landings from all ocean areas of origin (i.e., Atlantic, including the Gulf of Mexico and Caribbean, and Pacific Oceans); exports of Atlantic-only product are not available. However, by comparing national exports to landings of Atlantic product (recorded in the annual NOAA Fisheries report to ICCAT), some inferences can be made about the commerce of Atlantic products, even though the landings data include recreational catch. Figures 8.5 through 8.8 provide charts of Atlantic landings, national exports, and value of national exports, for each tuna species. Each vertical axis for these charts, and similar charts of imports later in this chapter, uses one of three scales, to make the figures more easily comparable across species and trade type.

The amount and value of albacore exports (Figure 8.5) greatly exceeded the exports of other tuna species during the time period (Figures 8.6-8.8). Atlantic landings are much lower than total exports, so it appears that exports are largely comprised of Pacific origin product, which is largely frozen. Landings ranged from about 100 mt (2018) to a peak of 600 mt (2013), and exports ranged from a high of 15,000 mt (2013) to a low of 3,500 mt in 2021. The scale of landings compared to exports makes it difficult to draw any inferences about the effect of Atlantic landings on exports, and it may be a coincidence that the year with the greatest Atlantic landings (2013) did coincide with the year of greatest exports. The greatest export value coincided with the year of the second most exports (2016). Export amount decreased dramatically to about 6,000 mt in 2017, and since then has remained well below the over-10,000 mt values of the early 2010s.

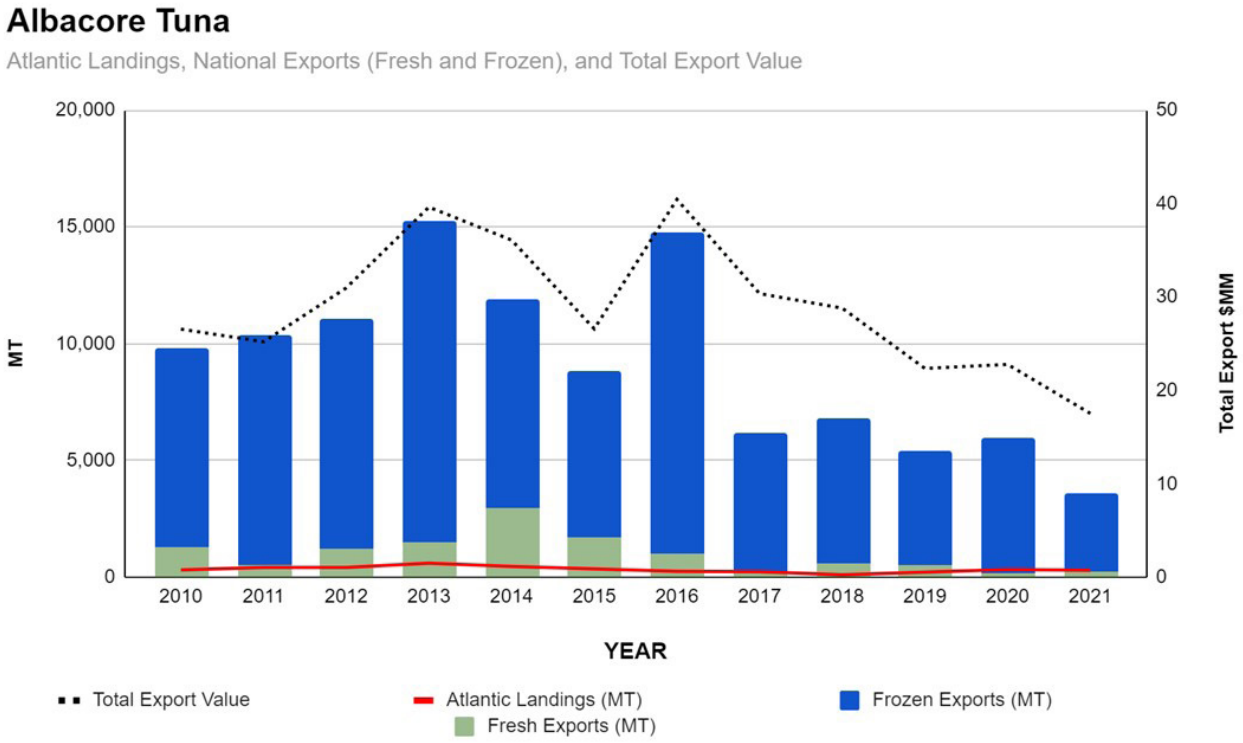

Figure 8.5 Atlantic Landings, Total U.S. Exports (fresh and frozen) and Total Value of U.S. Exports for Albacore Tuna, 2010-2021

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. Data Sources: NOAA Fisheries 2022; U.S. Census Bureau.

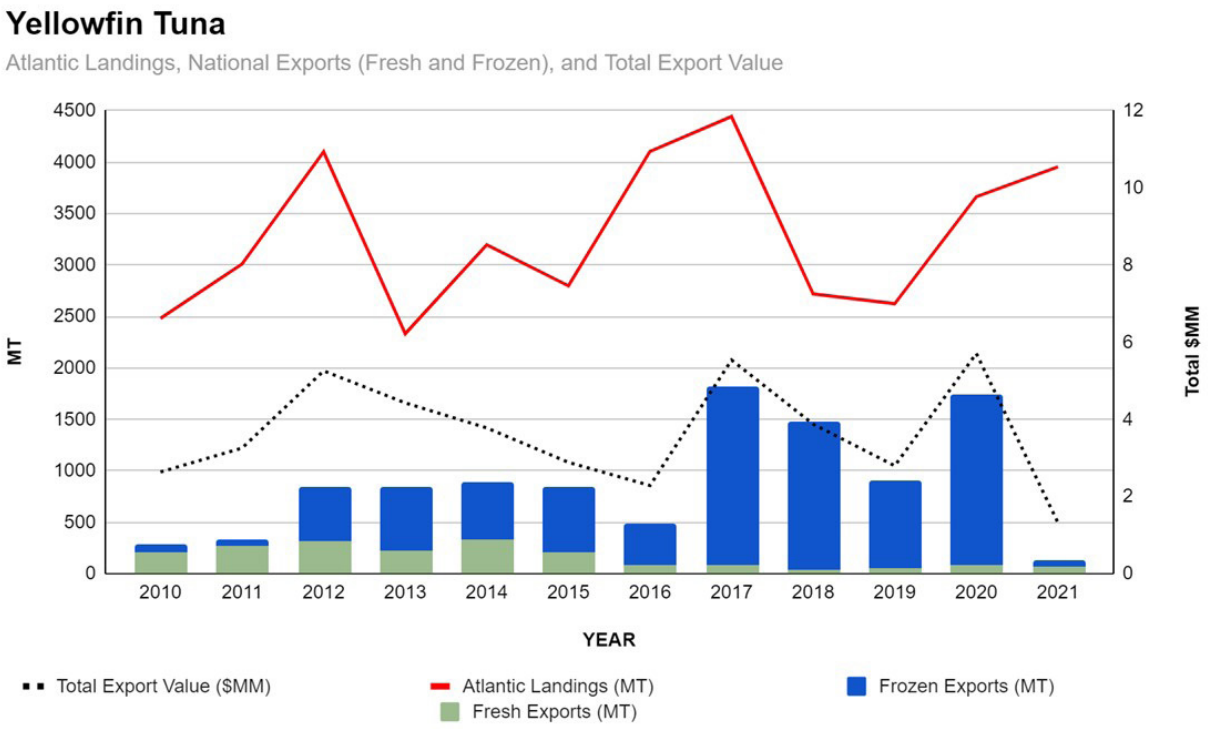

Figure 8.6 Atlantic Landings, Total U.S. Exports (fresh and frozen) and Total Value of U.S. Exports for Yellowfin Tuna, 2010-2021

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: NOAA Fisheries 2022; U.S. Census Bureau.

The scale of the figure for yellowfin tuna (Figure 8.6) covers a smaller range of values compared to Figure 8.5 for Albacore tuna, because of the relative lower amounts and value of exports of yellowfin. This reduced scale is applied to the remaining export trade figures for tuna and swordfish for the same reason.

Unlike albacore tuna, U.S. Atlantic landings of yellowfin tuna are much greater than the amount of national exports, so exports may be primarily Atlantic product. There appears to be a similarity in the trends of landings and exports from 2017-2020, but there is a large decrease in exports in 2021 compared to that year's increase in landings. The limited correlation could in part be the influence of recreational landings in the data. Export value decreased from 2012 through 2015, while amount of export remained fairly constant. Export value seemed to vary with export amount since 2017. Fresh exports during the second half of the 2010 decade were much lower than the first half, and frozen exports much greater.

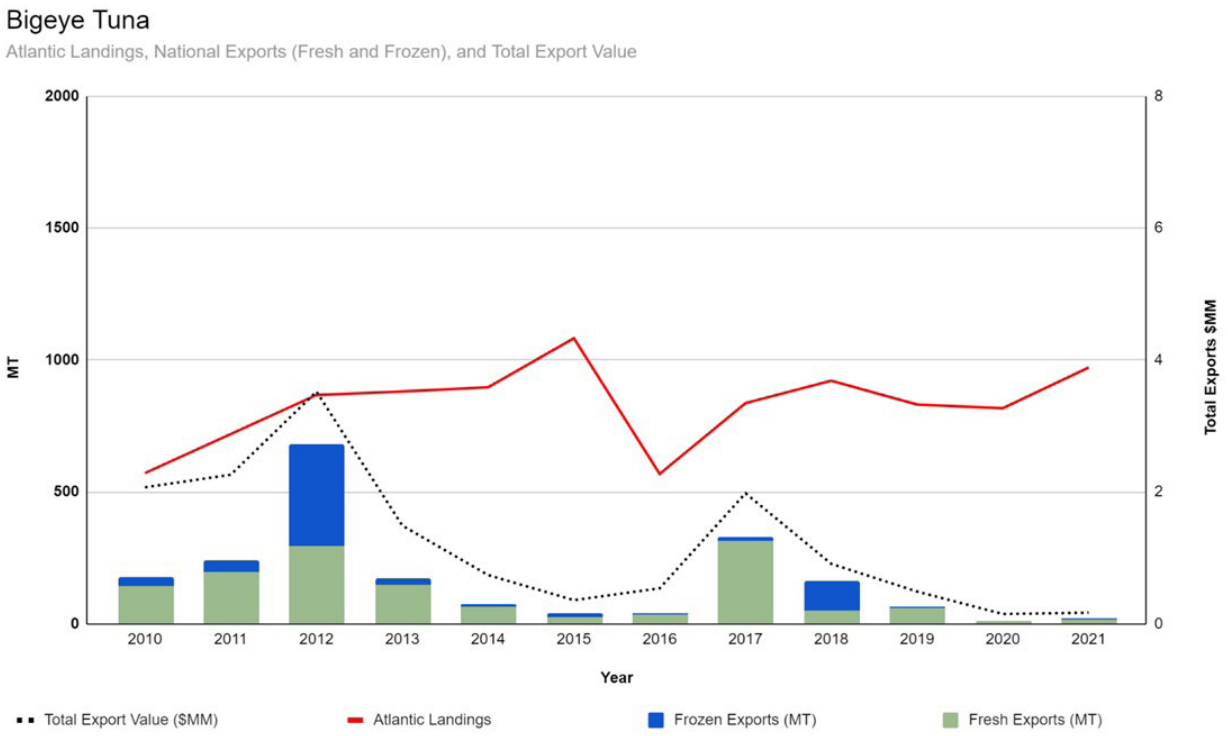

Figure 8.7 Atlantic Landings, Total U.S. Exports (fresh and frozen) and Total Value of U.S. Exports for Bigeye Tuna, 2010-2021

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: NOAA Fisheries 2022; U.S. Census Bureau.

Bigeye tuna exports and Atlantic landings are given in Figure 8.7. Atlantic landings ranged between about 500 mt and 1,000 mt. In 2021 landings came in just under 1,000 mt. Like yellowfin tuna, Atlantic landings for bigeye tuna exceed total U.S. exports annually. Bigeye tuna exports usually included more fresh than frozen product. The total amount and value of exports peaked in 2012 at 679 mt and $3.52 million. In the last four years, export quantity and value have dropped consistently each year, reaching the lowest levels for the 2010-2021 time series.

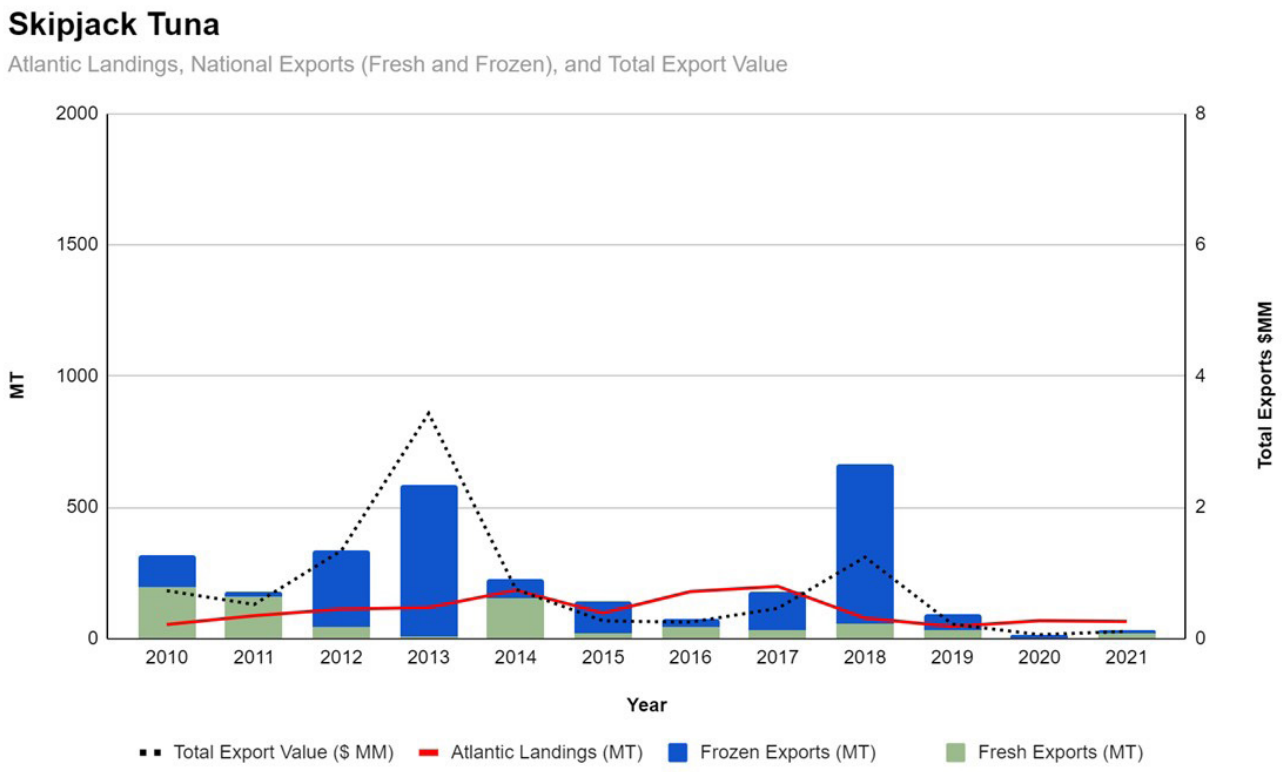

Figure 8.8 Atlantic Landings, Total U.S. Exports (fresh and frozen) and Total Value of U.S. Exports for Skipjack Tuna, 2010-2021

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: NOAA Fisheries 2021; U.S. Census Bureau

Figure 8.8 shows fairly consistent landings of skipjack tuna below 250 mt over the time series. Exports of skipjack frequently exceed Atlantic landings, indicating that at least some of the product is from the Pacific Ocean. Frozen product usually exceeds fresh product, and the value seems to track closely with the amount of product exported. The value per unit was much higher for the peak of exports in 2013 than it was during the second peak in exports in 2018. Landings, exports, and export value were all quite low in 2020-2021.

8.4.4.3 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.

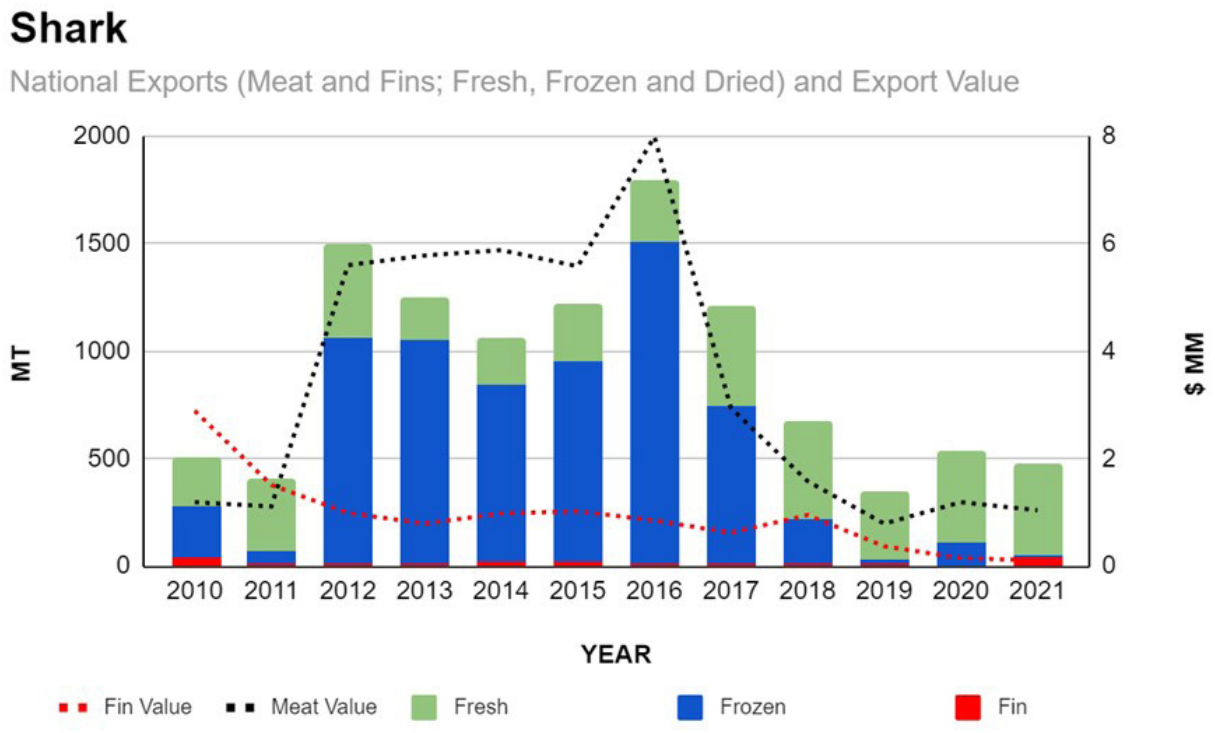

Figure 8.9 Total U.S. Exports (fresh and frozen meat, fins) and Total Value (meat and fins) of U.S. Exports for Sharks (excluding smooth-houd sharks), 2010-2021

Note: Exports may be in whole weight or product weight. Data are preliminary and subject to change. $ MM = Millions of dollars. mt = Metric tons. In 2012, the product classification "shark fin, dried" in the Harmonized Tariff Schedule was renamed "shark fins. **New Harmonized Tariff Schedule codes for shark fins were implemented in 2017, allowing for tracking of fresh and frozen shark fins. †Fresh and frozen shark product not provided to species. Source: U.S. Census Bureau.

Figure 8.9 gives the amount and value of shark exports (excluding smoothhound sharks) from the United States from 2010 through 2021. The export amount is separated into fresh or frozen meat product and fins, and the value is given for meat products (fresh and frozen combined) and fins. The amount and value of shark exports were greatest from 2012 to 2017, consisting of mainly frozen product, and frozen product decreased steadily from 2016 through 2019, although fresh product remained fairly constant during these years. Exports (mainly of fresh product) leveled off for 2020 and 2021. Exports of shark fins were highest in 2010 and 2021, although the value was much higher in 2010 since the product was dried compared to frozen in 2021. Note that on December 23, 2022, the President of the United States signed into law the National Defense Authorization Act, which included provisions on shark fins. NOAA Fisheries is currently reviewing the new legislation to determine next steps.

8.4.4.4 Swordfish Exports

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. Over the time series, landings have decreased but remained above 1,000 mt (Figure 8.10). Exports are well below the amount of Atlantic landings each year. A modest export market for U.S. swordfish product exists, but total exports are low over the entire time series. Export amounts ranged from 269 mt in 2011 to 67 mt in 2021.

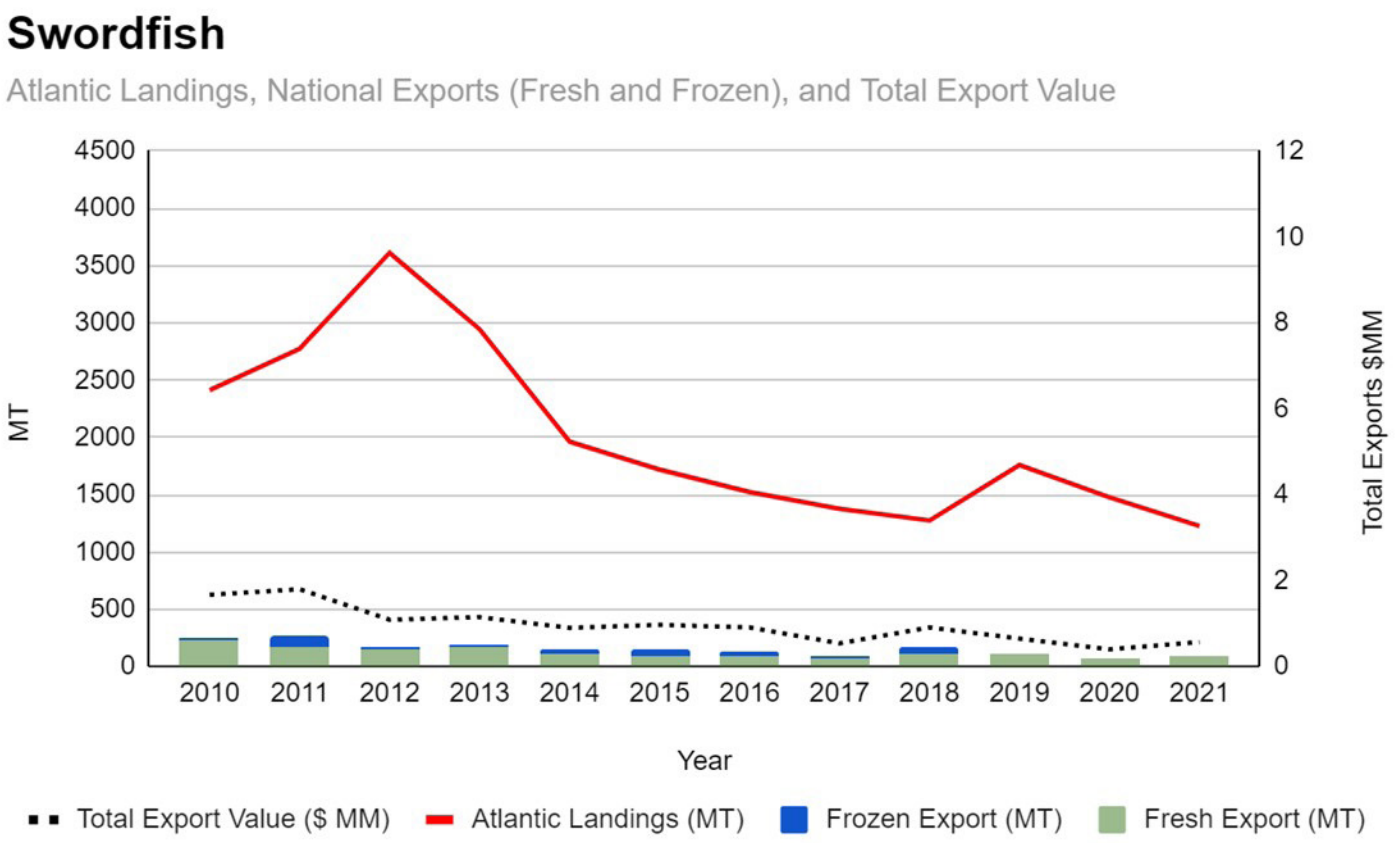

Figure 8.10 Atlantic Landings and Total U.S. Exports (fresh and frozen) and Total Value of U.S. Exports for Swordfish, 2010-2021

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.

8.4.4.5 Re-Exports of Atlantic HMS

For purposes of Atlantic 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 Atlantic HMS). Re-export activity of most Atlantic 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 over the last 10 years. Annual re-export figures in excess of either of these relative reference points, other than for bluefin tuna, are given in Table 8.15. Re-exports of bluefin tuna, alongside bluefin tuna imports, are shown in Section 8.4.5.

Table 8.15 Re-Exports of Highly Migratory Species (Excluding Bluefin Tuna) in Excess of 1,000 mt* and/or $1 Million (U.S.), 2010-2021

Year	Product	Amount (mt)	Value ($ MM)
2010	Yellowfin tuna, fresh	130	1.88
2010	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
2019	None	-	-
2020	Yellowfin tuna, fresh	74	1.8
2020	Yellowfin tuna, frozen	470	1.20
2021	Yellowfin tuna, fresh	74	1.45

$ MM = Millions of dollars. * Atlantic 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.

8.4.5 U.S. Imports of Atlantic HMS

All import shipments must be reported to and cleared by the U.S. 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.

8.4.5.1 Atlantic and Pacific Bluefin Tuna Imports

Atlantic and Pacific bluefin tuna import amounts are recorded by Customs and Border Protection and the Atlantic HMS ITP, which includes data from ICCAT bluefin tuna catch documents. These programs differ in data collection methods and data quality review. A comparison of total annual bluefin import data between the two programs from 2011–2021 is shown in Table 8.16. 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 usually similar.

Imports increased annually from 2012 until 2018 (Figure 8.11), fell for 2019-2020, and increased dramatically in 2021. The recent increase is due in part to a large volume of Pacific bluefin tuna imported from Ensenada, Mexico. Re-exports of bluefin tuna in 2019 and 2021 were particularly high, while in 2020 re-exports were the lowest for the time series. The value of bluefin tuna imports in 2021 is the highest in the time series. Annually, the United States has imported more bluefin tuna than it has exported. This trade gap increased noticeably each year from 2015 through 2018, and again in 2021.

Table 8.16 U.S. Imports and Re-Exports of Atlantic and Pacific Bluefin Tuna from Two Data Collection Programs, 2010-2021

Year	Imports (mt)—Atlantic HMS ITP*	Imports (mt)—CBP Data (Atlantic & Pacific)	Value ($ MM)—CBP Data (Atlantic & Pacific)	Re-Exports (mt)—Atlantic HMS ITP*
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	1,338.0	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
2019	1,859.7	2,542.8	56.34	71.5
2020	1,661.5	1,740.5	36.78	10.7
2021	3355.6	3,632.8	80.44	78.7

CBP = U.S. Customs and Border Protection 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.

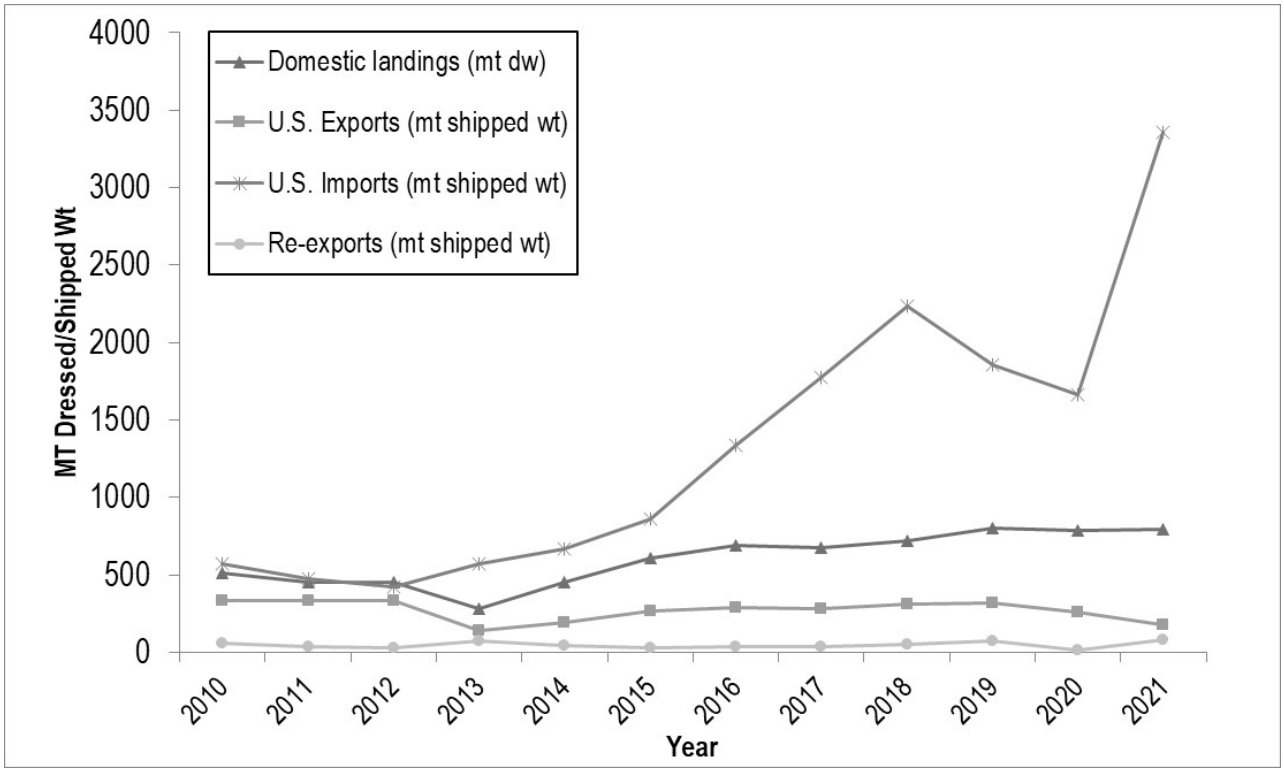

Figure 8.11 U.S. Annual Consumption of Atlantic and Pacific Bluefin Tuna by Imports and U.S. Landings, 2010-2021

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.

The popularity of sashimi in the United States using Atlantic and Pacific bluefin tuna contributes to the robust import market. 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. Figure 8.12 combines these values to show annual domestic bluefin tuna consumption over the time series, with amounts broken out into imported and domestically produced product for each year. U.S. consumption increased to an all-time high for the time series in 2021. Consumption of domestic landings was consistent until 2014, ranging between about 100 and 200 mt per year. Since then, domestic landings consumption has climbed to over 500 mt in 2020, and a little higher in 2021. Consumption of imported bluefin tuna has been more variable but has increased substantially each year from 2013 through 2018 and again in 2021.

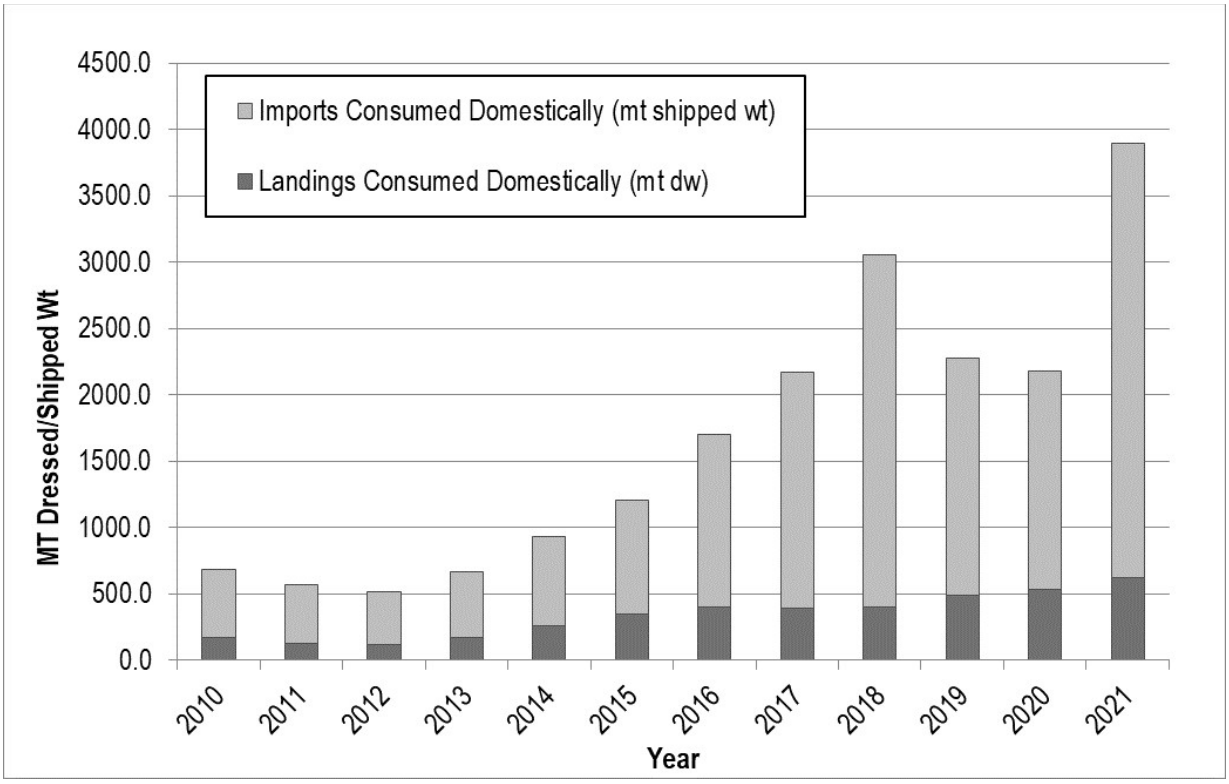

Figure 8.12 **U.S. Domestic Landings of Atlantic Bluefin Tuna, and Exports, Imports and Re-Exports of Atlantic and Pacific Bluefin Tuna, 2010-2021**

mt = Metric tons. wt = Weight. dw= Dressed weight.

8.4.5.2 Other Tuna Imports

Customs and Border Protection collects species-specific import information for bigeye, albacore, yellowfin, and skipjack tunas, grouping all ocean areas. Figure 8.13 shows the total amount and value of bigeye tuna imports from 2010 through 2021. For most years in the time series, total reported annual imports were between 4,000 mt and 5,000 mt. Recent years have shown notable decreases including a drop to < 2000 mt in 2020 and then a small increase to < 3,000 mt in 2021. Frozen imports peaked in 2019, but fell to almost 0 in 2020 and 2021. Value seems to track the amount of fresh product, with recent increases in price per unit value for 2020 and 2021. Bigeye tuna imports far exceed Atlantic landings, which exceed bigeye exports (Figure 8.7). The United States appears to have a robust market for fresh bigeye tuna, second only to that for yellowfin tuna.

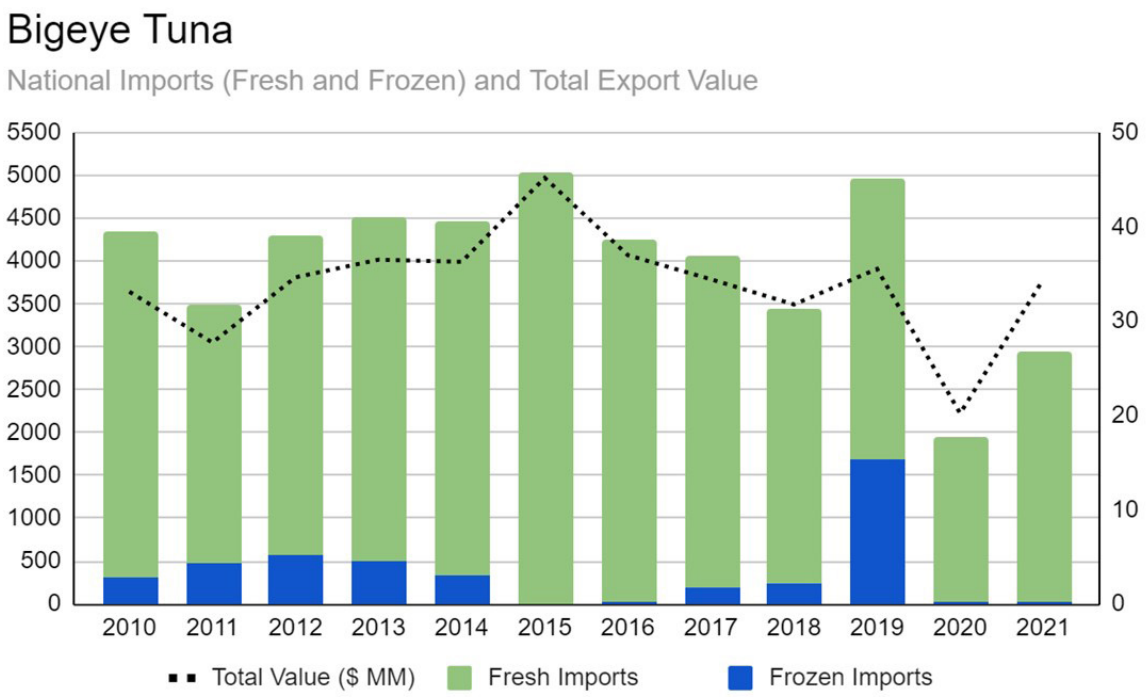

Figure 8.13 National Imports of Bigeye Tuna (Fresh and Frozen) and Total Import Value, 2010-2021

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 United States has a robust market for yellowfin tuna products, which are imported in the greatest quantity of any HMS in this report. Annual yellowfin tuna imports into the United States for all ocean areas combined are shown in Figure 8.14 and include both fresh and frozen products, with a majority of the products imported as fresh. Imports are very consistent over time, ranging between 18,000 to 20,000 mt for the time series, but dropped to a low of 14,604 in 2020, likely due to pandemic trade disruptions. The highest annual level of total yellowfin imports was in 2018 at just over 20,000 mt. Imports far exceed exports (Figure 8.6) in both amount and value.

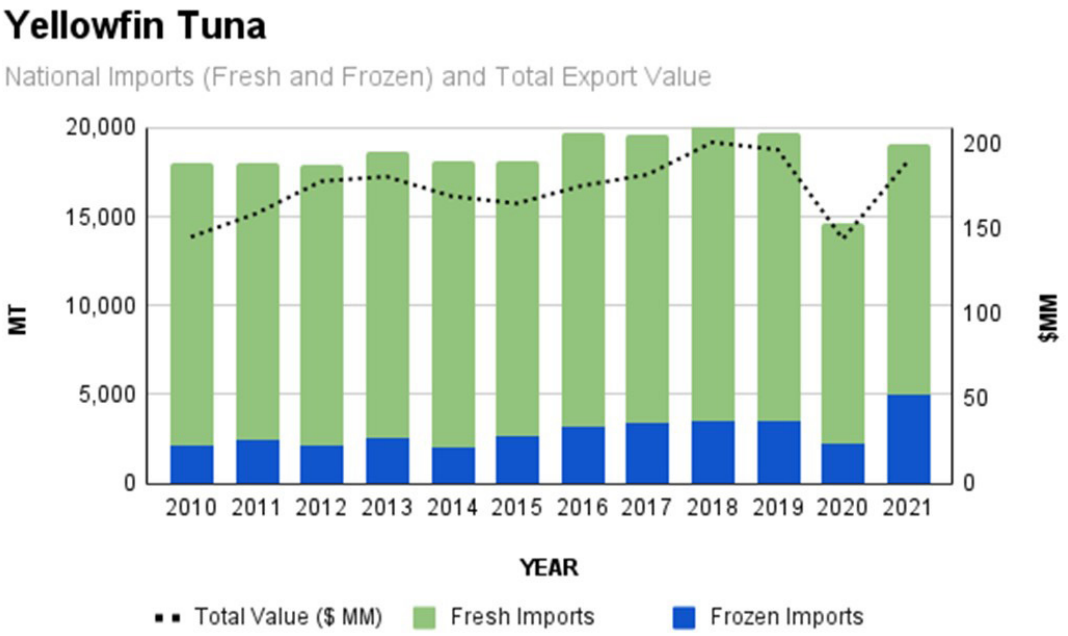

Figure 8.14 National Imports of Yellowfin Tuna (Fresh and Frozen) and Total Import Value, 2010-2021

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.

Albacore tuna imports from all ocean areas into the United States are dominated by frozen products (Figure 8.15), which varied from approximately 4,000 mt in 2011 to < 500 mt in 2020-2021. Fresh product has a lower annual variability, ranging from approximately 1,000 mt in 2016 – 2017 to 200 mt in 2020. The amount of total fresh and frozen albacore imports was greatest in 2011 (4,462 mt) and lowest in 2020 (602 mt). Import amount fell from 2017 through 2020, and increased slightly in 2021. Annual value ranges from approximately $5 million in 2020 to $11.25 million in 2017. When compared to imports, albacore tuna exports (Figure 8.5) are at least twice that of imports for both amount and value, for each year in the time series. Products in airtight containers like cans and foil pouches are not included in these data.

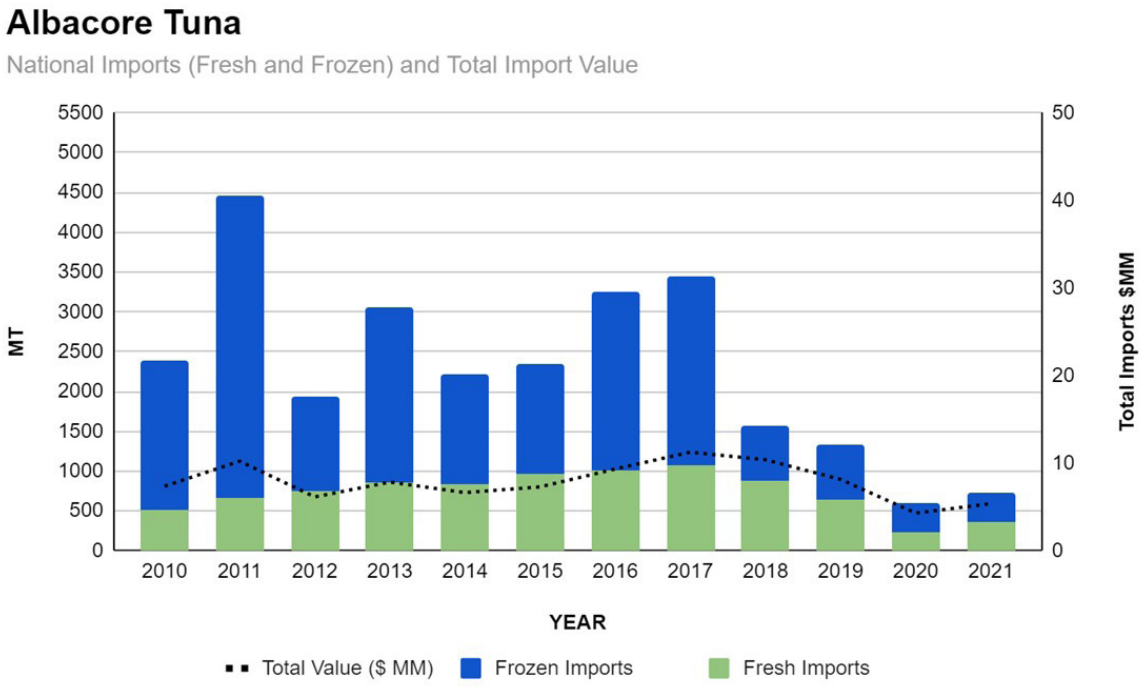

Figure 8.15 U.S. Imports of Albacore Tuna from All Ocean Areas Combined, 2010-2021

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.

Fresh and frozen skipjack tuna are imported into the United States in the lowest amounts of all tuna, and are comprised mainly of frozen product (Figure 8.16). The total amount of annual skipjack imports are variable over time, but have generally decreased from a high in 2012. Since 2017 imports have been approximately 100 mt annually Products in airtight containers like cans and foil pouches are not included in these data.

Skipjack imports and exports (Figure 8.8) are of a similar magnitude, near or below 500 mt per year. Exports are comprised of more fresh products than imports. Recent value is well below $2 million per year for both trade types.

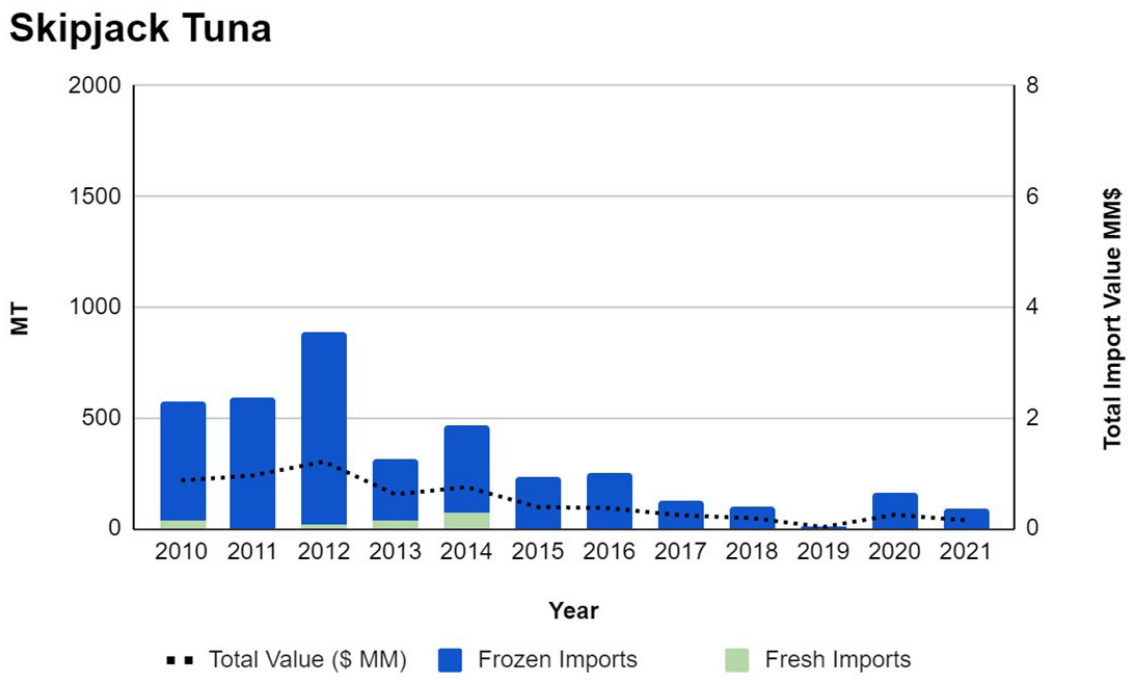

Figure 8.16 U.S. Imports of Skipjack Tuna from All Ocean Areas Combined, 2010-2021

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.

8.4.5.3 Swordfish Imports

Figure 8.17 provides annual amounts and values of swordfish products imported into the United States from all ocean areas combined, 2010 through 2021. Fresh products outweigh frozen products each year, comprising from 55 percent to 75 percent of total imports. Overall, annual totals for products and value are fairly consistent from year to year with a slight increasing trend through 2018 and decreases after that. The strong decrease in 2020 is likely due to trade interruptions from the pandemic.

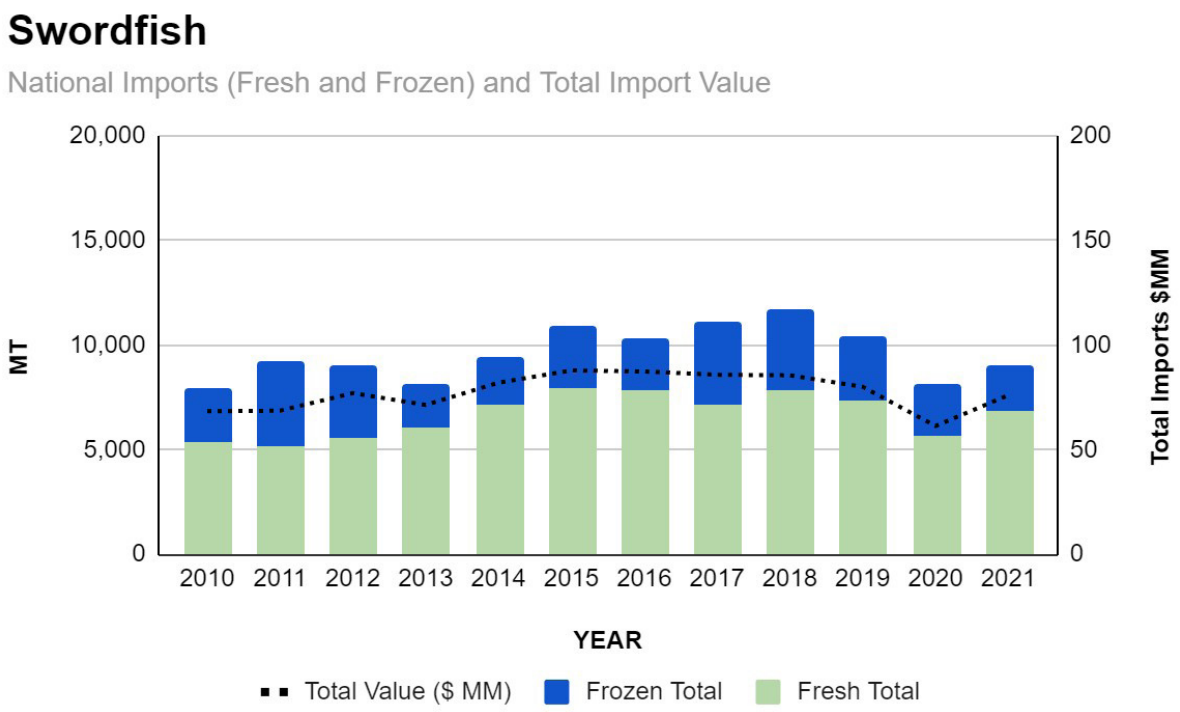

Figure 8.17 Imported Swordfish Products (mt dw*), 2010-2021

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. 1Frozen meat > 6.8 kg. 2 Frozen meat ≤ 6.8 kg. Source: U.S. Census Bureau.

Swordfish imports are much greater than swordfish exports (Figure 8.10). Fresh product comprises the majority of trade for both. Import value for swordfish among trade of all HMS products is second only to import value of yellowfin tuna.

Table 8.17 summarizes 2021 swordfish import data collected by the NOAA Fisheries Swordfish Statistical Document Program. According to these data, most swordfish imports were Pacific Ocean product from Central and South America. Ecuador provided the majority of this product (60 percent), followed by Costa Rica and Panama. 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 labeled as swordfish.

Table 8.17 U.S. Imports (mt dw) of Swordfish by Flag of Harvesting Vessel and Ocean of Origin in 2021

Swordfish Import Data for the 2021 Calendar Year Collected Under the NOAA Fisheries Swordfish Statistical Document Program

Flag of Harvesting Vessel	Ocean Area of Origin							
	Atlantic (mt dw)	North Atlantic (mt dw)	South Atlantic (mt dw)	Pacific (mt dw)	Western Pacific (mt dw)	Indian (mt dw)	Not Provided (mt dw)	Total (mt dw)
Australia					74.73	0.88		75.61
Brazil		39.38	738.66	0.55				778.59
Canada		802.03						802.03
Chile				76.11				76.11
China				11.95		36.40		48.35
Chinese Taipei	4.18	2.25	20.97	124.88		87.45		239.73
Costa Rica				573.25				573.25
Côte d'Ivoir	32.80							32.80
Ecuador				2382.90				2,382.90
Fiji Islands				12.03	0.13			12.16
France						3.88		3.88

Flag of Harvesting Vessel	Ocean Area of Origin							
	Atlantic (mt dw)	North Atlantic (mt dw)	South Atlantic (mt dw)	Pacific (mt dw)	Western Pacific (mt dw)	Indian (mt dw)	Not Provided (mt dw)	Total (mt dw)
French Polynesia				27.75				27.75
Guatemala				0.13				0.13
Guyana		1.45						1.45
Indonesia						319.78		319.78
Malaysia						45.54		45.54
Marshall Islands				7.52				7.52
Mexico				235.47				235.47
Micronesia, Federated States of				5.65				5.65
Mozambique						72.23		72.23
Namibia			6.77			8.76		15.54
New Zealand					124.77			124.77
Nicaragua				26.84				26.84

Flag of Harvesting Vessel	Ocean Area of Origin							
	Atlantic (mt dw)	North Atlantic (mt dw)	South Atlantic (mt dw)	Pacific (mt dw)	Western Pacific (mt dw)	Indian (mt dw)	Not Provided (mt dw)	Total (mt dw)
Panama				319.96				319.96
Senegal			0.64					0.64
Seychelles						8.91		8.91
South Africa			131.15			68.52		199.67
Spain			7.71	22.33		2.60		32.64
Sri Lanka						34.70		34.70
Trinidad & Tobago			1.90					1.90
Vanuatu	4.53			46.72				51.26
Vietnam				65.34				65.34
Total Imports Reported by SDs	41.50	845.12	907.80	3,939.39	199.64	689.60	0.00	6,623.09
U.S. Census Bureau: Economic Indicators Division USA Trade Online. Source: U.S. Import and Export Merchandise trade statistics								9,077.05
Total Imports Not Reported by SDs								2,453.95

mt dw = Metric tons dressed weight. Source: NOAA Fisheries Swordfish Statistical Document Program.

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8.4.5.4 Shark Imports

Shark imports do not include information regarding the ocean area of catch. Further, shark imports are not categorized by species and lack specific product information on imported shark meat, such as the proportion of filets and steaks. Figure 8.18 summarizes Census Bureau data on shark imports for 2010 through 2021. Compared with other HMS imports, shark products barely register on the smallest vertical scales used in this chapter to depict the amount and value of imports over the last ten years, so a new scale was added to accommodate the data in Figure 8.18. It is difficult to observe any trends in import amount and value other than a general decrease from 2017 to 4 mt in 2020 and 2021, and $20,000 and $40,000 in value, respectively. Of the shark products considered here, shark fins have the highest per unit value, and accounted for the greatest portion of the total product value for each year. Beginning in 2008, shark fin importers, exporters, and re-exporters must obtain a permit under NOAA Fisheries Atlantic HMS ITP regulations (73 FR 31380; June 2, 2008). Permitting of shark fin traders assists in enforcement and monitoring of the trade of this valuable commodity. Note that on December 23, 2022, the President of the United States signed into law the National Defense Authorization Act, which included provisions on shark fins. NOAA Fisheries is currently reviewing the new legislation to determine next steps.

Both the amount and value of shark product imports are much lower than shark exports (Figure 8.9), although both have decreased recently, notably since 2017.

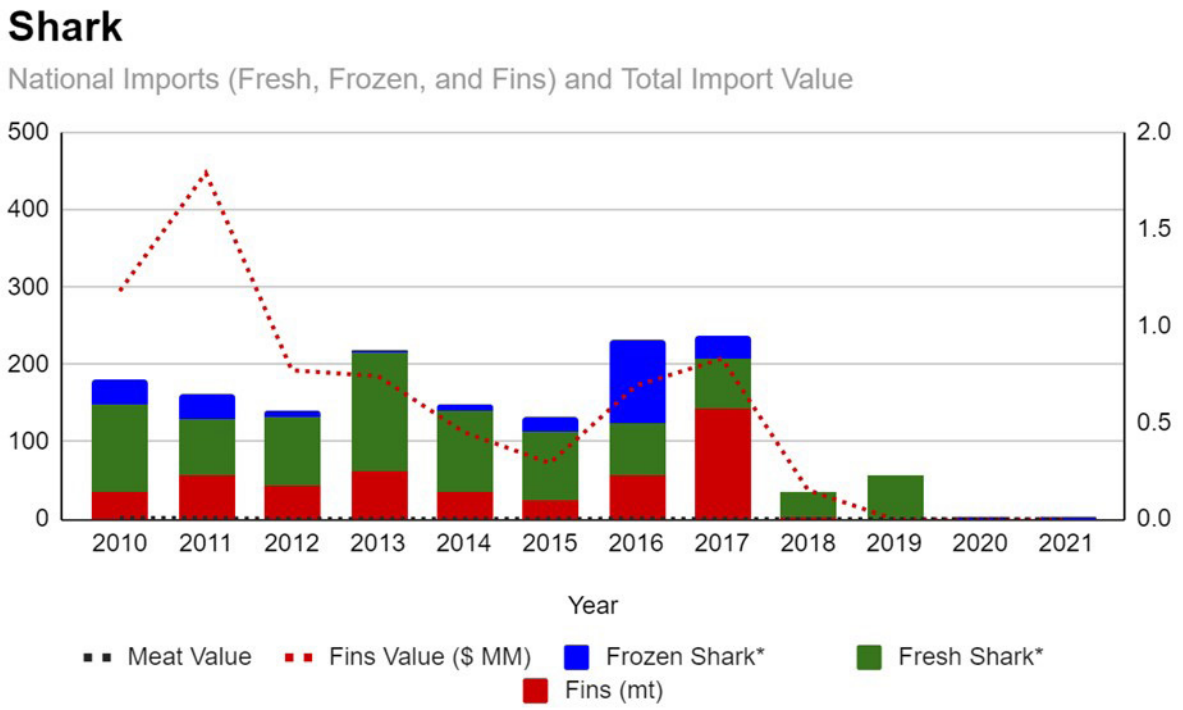

Figure 8.18 Imported Shark Products (mt dw*), 2010-2021

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.

8.5 Recreational Fisheries

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

8.5.1 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 https://www.fws.gov/sites/default/files/documents/fhw16-nat.pdf. USFWS is in the process of updating this survey in 2022.

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, second homes). This survey covered 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 HMS Angling category permit holders from Maine to Texas was conducted in the fall of 2019 and an updated trip expenditure survey was conducted for 2022. A combined report on both surveys enumerating the economic contributions of HMS Angling category permit holders is anticipated in spring 2024.

In 2015, researchers with the Virginia Institute of Marine Sciences funded by NOAA Fisheries conducted a survey of HMS Angling category 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, bait) and $26.6 billion on fishing equipment and durable goods (e.g., fishing rods, tackle, boats). Using regional input-output models, these expenditures were estimated to have generated $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 category permit holders from Maine throughTexas (Hutt and Silva 2019). Estimated non-tournament trip-related expenditures and the resulting economic impacts for HMS recreational fishing trips are presented in Table 8.18. For the HMS Angler Expenditure Survey, randomly selected HMS Angling category 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. An update to the HMS Angler Expenditure Survey is currently being conducted to collect 2022 expenditure data.

Table 8.18 HMS 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.

8.5.2 HMS Tournaments

In 2019, NOAA Fisheries released the results of the 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 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 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 HMS Tournament Economic Study are summarized in Table 8.19.

Table 8.19 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.

8.5.3 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 these 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 bigeye tuna (45 percent), yellowfin tuna (37 percent), swordfish (34 percent), and coastal sharks (33 percent). In the North Atlantic region, the two HMS most commonly targeted on both charter boat and headboat trips 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 on charter boat trips were 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 8.20). 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 8.20 Average Expenditures and Revenues for HMS 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 8.34). 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 toward covering trip expenditures (e.g., fuel, bait, ice, 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 8.35).

In the Southeast, MRIP estimated that there were 3,008 charter trips from July to November of 2013 that targeted HMS (Table 8.34). 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 toward covering trip expenditures (e.g., fuel, bait, ice, 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 8.35).

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 8.34). 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 toward covering trip expenditures (e.g., fuel, bait, ice, 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 8.35).

Table 8.21 Total Costs and Earnings for HMS Charter Boats by Region in July–November 2013

Type	Expenditure	Northeast	Southeast	Gulf of Mexico[2]
Total Atlantic 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 headboat trips.[2]The estimate of HMS for-hire 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 8.35). 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 8.22 **Estimated Total Expenditures and Economic Impacts Generated by HMS 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.

8.6 Economic Impact of Regulations on Small Entities

The Regulatory Flexibility Act (5 U.S.C. 601 et seq.) 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:

- The continued need for the rule.
- The nature of complaints or comments received concerning the rule from the public.
- The complexity of the rule.
- 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.
- 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 will publish a plan for this required periodic review of regulations in the Federal Register in 2023.

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9 Community Profiles

9.1 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). NOAA Fisheries will be conducting an update of the detailed HMS community profiles in the coming year now that the 2022 Census Bureau data has been released.

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 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.

9.2 Community Impacts From Hurricanes

This section is an overview of the impacts on HMS communities caused by hurricanes during 2021 (National Hurricane Center 2021). 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.

The 2021 Atlantic hurricane season was very active. During the 2021 Atlantic hurricane season, 21 named storms formed. Seven of those became hurricanes and four reached major hurricane strength based on the Saffir-Simpson Hurricane Wind Scale (category 3–5). Of the 21 named storms that formed during the 2021 Atlantic hurricane season, 8 made landfall in the continental United States and U.S. territories. Those storms were Tropical Storm Claudette, Tropical Storm Danny, Hurricane Elsa, Tropical Storm Fred, Hurricane Henri, Hurricane Ida, Tropical Storm Mindy, and Hurricane Nicholas.

Claudette

Claudette developed from a broad circulation in Central America near the Bay of Campeche. It was first tracked on June 6, 2021 and the disturbance moved inland over Nicaragua and Honduras by June 10, 2021. It remained stationary for the next few days and produced heavy rainfall over Mexico and Central America. This storm broke off into two disturbances, one which became Tropical Storm Dolores. The second disturbance became a low

meandering in the southern Gulf of Mexico. On June 16, the low moved northwesterly into the central Gulf. By June 18, the convection increased and helped to create a poorly defined center. By late June 18, a closed, cyclonic glow became well defined and gained tropical storm status by the morning of June 19, 80 nm south of Morgan City, LA. Tropical Storm Claudette had peak intensity of 40-kt winds. The storm took a northward trajectory and then northeastward. Claudette made landfall over southeastern Louisiana on the morning of June 19. It continued northeasterly into Mississippi and Alabama. It continued to produce sporadic convection over the next day across Georgia and South Carolina. The storm center moved into the Atlantic Ocean by June 21, accelerating to the northeast, and underwent extratropical transition. The storm dissipated by June 23, 100 nm southeast of Nova Scotia. There were four direct reports of casualties associated with Claudette.

The storm affected the coasts of Louisiana, Mississippi, Alabama, and the Florida panhandle with minor wind damage, downed tree branches, power outages, and minor property damage. Claudette rainfall caused significant flooding of roadways and buildings in Louisiana, Mississippi, and Alabama. Tornadoes also occurred due to Tropical Storm Claudette in Mississippi, Alabama, Georgia, and North Carolina. The NOAA National Centers for Environmental Information (NCEI) estimates damages from Claudette to be approximately $375 million dollars in the United States.

Danny

Tropical Storm Danny started with non tropical origins. An upper-level trough cut off from the jet stream on June 22 and became an upper-level low the next few days. June 24 brought increased shower and thunderstorm activity while the system turned westward over warmer waters. On June 27, satellite images and surface observations indicated a well defined surface low pressure area. A tropical depression formed over the next twelve hours about 400 nm east-southeast of Charleston, South Carolina. Danny reached its peak winds of 40 kts the evening of June 28. Tropical Storm Danny weakened a little bit before making landfall with winds of 35 kts on June 29 on Pritchards Island, SC. The storm quickly weakened more to tropical depression over South Carolina. The storm continued a fast west-northwestward path and dissipated on June 29 over eastern Georgia. There were no reports of casualties associated with Tropical Storm Danny. Minimal damage and power outages occurred over southeastern South Carolina.

Elsa

Hurricane Elsa formed from a tropical wave that came off the west coast of Africa on June 27. The tropical wave produced disorganized showers and thunderstorms as it quickly moved west across the Atlantic the next few days. Deep convection increased along the wave on June 30 and satellites indicated a closed, well defined lower pressure system developed by the evening of June 30 where the tropical depression formed 1000 nm east-southeast of Barbados. Storms forming this far east are unusual for the months of June and July. Six hours after becoming a depression, the storm strengthened into a tropical storm. Elsa moved rapidly westward along the tropical Atlantic on July 1. By early July 2, Elsa strengthened to hurricane strength just south of Barbados. The storm passed through the Virgin Islands and reached peak intensity of 75 kt by the evening of July 2. Elsa weakened to a tropical storm on July 3 about 100 nm south of the Dominican Republic, and it continued to weaken as it passed by Haiti, Jamaica, and eastern Cuba. Elsa made landfall on the southwestern portion of Cuba the evening of July 5. Elsa continued to weaken as it moved across western Cuba before turning northwestward and slowed its speed. On July 6, Elsa moved over the Florida Straits and the center began to reform and passed by the Dry Tortugas midday July 6. Elsa briefly regained hurricane strength early morning of July 7 about 50 nm west of Englewood, Florida, however, the storm became a tropical storm again due to shear and dry air intrusions. Tropical Storm Elsa made landfall in Taylor County in northern Florida midday July 7. Elsa weakened again to 40-kt winds by July 8 as it turned northeastward over southeastern Georgia. The path continued across the southeastern U.S. and Mid-Atlantic states. On July 9, Elsa emerged back over water off New Jersey and continued moving past Long Island and over southeastern New England. Elsa finally dissipated over the Atlantic in Canadian waters on July 10. Elsa had 13 direct deaths with one in the United States andis responsible for an estimated $1.2 billion for damages in the

United States. There was tree damage, tornadoes, and flooding associated with Hurricane Elsa.

Fred

Fred formed from a complex interaction of a series of tropical waves that moved off the west coast of Africa from July 29 to August 2. The combination of the waves caused the development of a broad cyclonic circulation over eastern tropical Atlantic Ocean on August 3. The system continued to move west before developing a well defined center on the evening of August 10. Tropical Storm Fred formed on August 11, 50 nm south-southwest of Puerto Rico. Fred continued west-northwest and slightly strengthened before making landfall just west of Santo Domingo on August 11 with maximum sustained winds of 40kts before moving back offshore. Fred restrengthened to a tropical storm on August 13 northeast of Cuba before weakening and making landfall in Cuba August 13. The remnants moved westward over Cuba and by late August 14 moved back out to the Gulf of Mexico. A new well defined center formed again on August 15 and Fred became a tropical storm again about 160 nm west of Naples. Fred continued to strengthen and move northward along the eastern Gulf of Mexico. Late August 16, Fred reached maximum sustained winds and made landfall later that day on St. Joseph Peninsula, Florida. Fred continued into Alabama and into Georgia where it lost the well defined center of circulation. Remnants of Fred moved through eastern Tennessee and then into southwestern Pennsylvania. It turned northeast moving across New York and New England. Fred finally dissipated near the Massachusetts coast on August 20. Fred produced heavy rainfall near the path across the eastern United States. The highest rainfall totals occurred in North Carolina where 23.11 inches were recorded. Twenty tornadoes were also recorded while Fred was a tropical cyclone. Fred was directly responsible for six deaths and one indirect death. The NCEI estimate total damages to be about $1.3 billion in the United States. The worst damage was in western North Carolina from catastrophic flooding. Winds blew down trees and downed powerlines in Florida, Alabama, and Georgia.

Henri

Henri was a category I hurricane that followed an unusual track over the western Atlantic, and it eventually made landfall in Rhode Island on August 22. Henri had a non tropical origin. A cluster of thunderstorms moved off the U.S. Mid-Atlantic coast on August 11. Thunderstorms increased on August 13 southeast of Massachusetts. The low system slowly moved southeastward, deep convection gradually became better organized and on August 15, the system became a tropical depression centered about 140 nm northeast of Bermuda. The storm moved southward and gradually strengthened into Tropical Storm Henri on August 16. Henri continued to move westerly and then northwesterly until it became a 65-kt hurricane on August 21 with a center about 170 nm southeast of Cape Hatteras, North Carolina. The storm continued a north-northwestward movement on August 21-22 where it weakened below hurricane strength August 22. Henri made landfall on Block Island, Rhode Island the evening of August 22 with 55-kt winds as a tropical storm. Henri weakened rapidly over southern New England and was reduced to a tropical depression over Connecticut on August 23. After moving over New York, the storm circled back to Connecticut, then headed northeast over Rhode Island and Massachusetts before heading out to sea before dissipating on August 24.

Flooding was extensive in the Northeast U.S. due to rainfall. The heaviest rainfall was in southeastern New York and northern New Jersey. Three tornadoes were associated with Henri in Massachusetts. Henri created a mass power outage in the New England states. Henri caused approximately $700 million in damage in the United States.

Ida

Ida was a powerful category 4 hurricane that made landfall near Port Fourchon, Louisiana on August 29, 2021. Ida formed from tropical waves from the coast of Africa on August 14. The wave continued to move west despite being weak and hard to track the next week. The wave finally became a tropical depression on August 26 about 150 nm southwest of Jamaica. By August 27, the storm strengthened to a tropical storm and was moving north-northwest. Later on August 27, the storm became Hurricane Ida and made landfall on mainland Cuba. There was little change of strength as the storm passed over land and moved out into the Gulf of Mexico. Strengthening continued through August 28 and moved in a northwestward motion to the mouth of the Mississippi. Hurricane Ida made landfall on

August 29 in Port Fourchon, Louisiana with maximum sustained winds of 130 kt and central pressure of 931 mb. Hurricane Ida tied for the strongest storm to make landfall in Louisiana. After landfall, Ida moved over Houma and New Orleans. By August 30, the storm was losing intensity and moving past Baton Rouge. Ida moved into southwestern Mississippi and became a tropical depression as it moved to northeast Mississippi. Idea continued into Alabama, Tennessee, Kentucky, and Virginia. September 1 saw Ida become an extratropical low over West Virginia. The storm continued to move to the Mid-Atlantic states and then north to New England. Ida finally degenterated to a trough late on September 4 over Canada.

Ida brought catastrophic conditions to the shores of southeast Louisiana. On the East Bank, reported storm surges of 9 to 14 ft. The Mid-Atlantic states saw rainfall of about 10 inches and major flooding occurred in the area. There were 35 known tornadoes that were directly linked to Hurricane Ida. Ida was directly responsible for 55 deaths in the United States and 32 indirect deaths as well. There was severe, catastrophic damage to the coast of southern Louisiana with the NCEI estimating damages to be a total of $75 billion. The worst hit areas were the coastal portions of coastal Louisiana where almost every building was damaged or destroyed. There was widespread power outages throughout Louisiana and Mississippi.

Mindy

The origins of Mindy are from a tropical wave that emerged off the coast of Africa on August 22. On August 27, the wave fractured and one of the parts went on to form Tropical Storm Kate on August 28. The wave continued westward and split for a second time with a portion forming Hurricane Olaf on September 7 in the eastern Pacific. The wave finally emerged into the Gulf of Mexico on September 5 with disorganized convection. Over the next few days, the storm moved northward . On September 8, the storm got a shot of deep convection to help organize and eventually form a 35kt tropical storm by the evening of September 8, 140 nm southwest of Apalachicola, Florida. The storm was moving northeast quickly with peak winds of 50kt at the center when landfall occurred on September 9 on St. Vincent Island Florida. The storm then skirted the Florida coast and weakened to a Tropical Depression on September 9, as it moved into north Florida and southern Georgia. Mindy moved out over the Atlantic Ocean and continued to weaken before fully merging with the baroclinic zone on September 11.

Tropical Storm Mindy had minimal impacts with its quick movement over Florida and Georgia. There were some power outages and fallen trees. There were no casualties associated with Mindy.

Nicholas

Nicholas was a Category 1 hurricane that made landfall in Texas. It moved slowly and produced heavy rainfall and flooding in the southeastern United States. The origin of Nicholas started as a tropical wave that came off the coast of Africa on August 28. The wave was disorganized as it moved west across the Atlantic. The waves moved into the southwestern Gulf of Mexico by September 11, and by the next day hurricane hunters found the storm was producing tropical storm force winds which designated the storm as Tropical Storm Nicholas. After the formation, Nicholas began to move northwestward with what appeared to be erratic motion. The center of the storm re-formed twice. The warm waters of the gulf helped to strengthen the storm. Nicholas became a 65-kt hurricane on September 14 where the storm was located 25 nm southwest of Matagorda, Texas. The storm continued northeastward and made landfall the morning of September 14. The hurricane weakened quickly as it moved inland and became a tropical storm mid day of September 14. The storm moved northeasterly over Port Arthur and into Louisiana as it became a depression September 15. The storm briefly emerged back onto the Gulf of Mexico on September 16 but the conditions were not favorable to reformation. Nicholas dissipated over southwestern Louisiana on September 17. Two direct deaths were associated with Nicolas after landfall, both were located in Alabama due to flooding. Two more deaths occurred from rip currents in Florida. Damage was caused by winds, storm surge, and high surf in Texas. Heavy rainfall and freshwater flooding widespread in Texas, Louisiana, Mississippi, Alabama, Tennessee, Florida, and Georgia. The preliminary damage estimate from NCEI was $1 billion in the United States.

9.3 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 seafloor. 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, 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 the 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 2021 repose period was set from January 1 to June 30. Participation occurred 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, valid permits required for the pelagic longline fishery, Gulf of Mexico Individual Bluefin Tuna Quota, and no prior violations of applicable regulations. 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. Motorized haulers were authorized for use with buoy gear during the project time under an exempted fishing permit in 2021 for the purpose of data collection on buoy gear configured in this manner. After the 2017 pilot program was completed the project has been fully implemented, including the 2021 repose period.

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.

9.4 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 HMS permits associated with them. These indicators are presented below with discussion in Table 9.1. 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 9 social indices developed by Jepson and Colburn (2013) can be divided into 2 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 (0.5-0.99 standard deviations above the mean score), medium (0-0.49 standard deviations above the mean score), or low (below the mean score) on the index scale.

9.4.1 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 are 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 9.1, fishing reliance and engagement index scores are presented for 25 HMS communities. Fourteen of the 25 HMS communities scored either high or medium high on at least two indicators of fishing reliance and engagement Three communities that scored at least medium high on all four indices included 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. Eight communities scored high or medium high on both fishing engagement indices while scoring medium or low on both fishing reliance indices, indicating that while they have significant fishing communities, it is not a massive component of either city's overall population. Conversely, Orange Beach, Alabama and Islamorada, Florida, both scored high or medium high on the recreational fishing indices while scoring low or medium on both commercial fishing indices, suggesting these communities have greater than normal dependence on the recreational fishing sector for jobs and economic support.

9.4.2 Social Vulnerability Indices

Five indices of social vulnerability developed by Jepson and Colburn (2013) are also presented in Table 9.1. 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.

Communities that scored high or medium high on four indices include New Bedford, Massachusetts; Fort Pierce, Florida; Pompano Beach, Florida; and Freeport, Texas. Three other HMS communities scored high or medium high on three social vulnerability indices: Beaufort, North Carolina; Panama City, Florida; and Dulac, 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.

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Table 9.1 Social Indicators of Resilience and Vulnerability for 25 Highly Migratory Species Communities

Community	Pop. (2020)	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		High	Medium	High	Low	Low	Low	Low	Low	Medium
Nantucket, MA		Medium	Low	Low	Low	Low	Low	Low	Low	Low
New Bedford, MA		High	Medium	Medium	Low	Med high	Med high	High	Low	Med high
Narragansett, RI		High	Medium	High	Medium	Low	Low	Low	Medium	Low
Montauk, NY		High	Medium	High	Med high	Low	Low	Low	Med high	Low
Barnegat Light, NJ		High	High	High	High	Low	Low	Low	High	Low
Brielle, NJ		Medium	Low	Medium	Medium	Low	Low	Low	Low	Low
Cape May, NJ		High	High	High	Med high	Low	Low	Low	Med high	Medium
Ocean City, MD		High	Medium	High	Medium	Low	Low	Low	Medium	Med high
Atlantic Beach, NC		Medium	Medium	High	Medium	Low	Low	Low	Med high	Med high
Beaufort, NC		Medium	Medium	High	Medium	Medium	Low	Med high	Med high	Med high
Morehead City, NC		Medium	Low	High	Medium	Medium	Low	Med high	Medium	Med high
Wanchese, NC		High	Medium	Med high	Medium	Low	Low	Low	Low	Med high
Fort Pierce, FL		High	Low	High	Low	High	High	High	Medium	Med high
Islamorada, FL		Medium	Low	High	Med high	Low	Low	Low	Medium	Low

Community	Pop. (2020)	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]
Pompano Beach, FL	11,202	Medium	Low	Med high	Low	Med high	High	Med high	Medium	Med high
Port Salerno, FL	12,070	Medium	Low	Low	Low	Medium	Low	Low	Med high	Med high
Apalachicola, FL	2,572	Medium	Medium	Low	Low	Medium	Low	Med high	Medium	High
Destin, FL	14,482	Med high	Low	High	Medium	Low	Low	Low	Low	Medium
Madeira Beach, FL	4,303	Med high	Medium	Med high	Medium	Low	Low	Medium	Med high	Medium
Panama City, FL	35,952	High	Low	Med high	Low	Med high	Medium	Med high	Medium	Med high
Orange Beach, AL	6,130	Low	Low	High	Med high	Low	Low	Low	Medium	Med high
Dulac, LA	798	Med high	Medium	Medium	Medium	High	Medium	High	High	N/A
Grand Isle, LA	672	Med high	Med high	High	Med high	Med high	Low	Medium	Medium	Medium
Freeport, TX	12,184	Medium	Low	High	Medium	High	High	High	Low	Med high
Port Aransas, TX	4,203	Medium	Low	High	Medium	Medium	Low	Low	Low	Med high

Note: Social indicator scores are based on the 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 social vulnerability indices. Source: Jepson and Colburn 2013.

9.5 Equity and Environmental Justice (EEJ)

In 2021, NOAA Fisheries convened an EEJ Working Group and released a draft EEJ strategy document. For further information, including the draft EEJ strategy document (2022) and related outreach, see: https://www.fisheries.noaa.gov/feature-story/noaa-fisheries-extends-comment-deadline-draft-equity-and-environmental-justice

9.6 COVID-19 Pandemic Impacts

In 2020, communities across the United States and the world were impacted by a global coronavirus (COVID-19) pandemic that first originated in China in late 2019. The first confirmed cases in the United States appeared in February 2020, and protective measures were instituted in March 2020 across the United States. These included social distancing, "state at home" orders, and the closure of most non-essential businesses. These measures resulted in the temporary shutdown of most restaurants in the United States which resulted in an almost immediate impact on seafood sales that resulted in second quarter ex-vessel revenue from HMS landings to decrease by 36.3 percent compared to 2019 (NOAA Fisheries 2020). The month of April, the first full month impacted by the pandemic, saw the greatest declines in landings revenues with a 66 percent decrease compared to 2019. Although not as drastic, monthly landings revenue continued to show declines through the rest of the spring, summer, and early fall of 2020, with monthly landings revenue declining from 1 to36 percent each month (Figure 9.1). It was only in November that 2020 landings revenue exceeded 2019 revenue with a 21 percent increase. In the first two months of 2021, landings were again below 2019 levels, as well as 2020 levels, but from March 2021 on monthly landings in 2021 exceeded 2020 landings in all months but August, and in most months exceeded 2019 landings. Overall, HMS commercial landings revenue was up 14.5 percent in 2021 as compared to pre-pandemic levels in 2019.

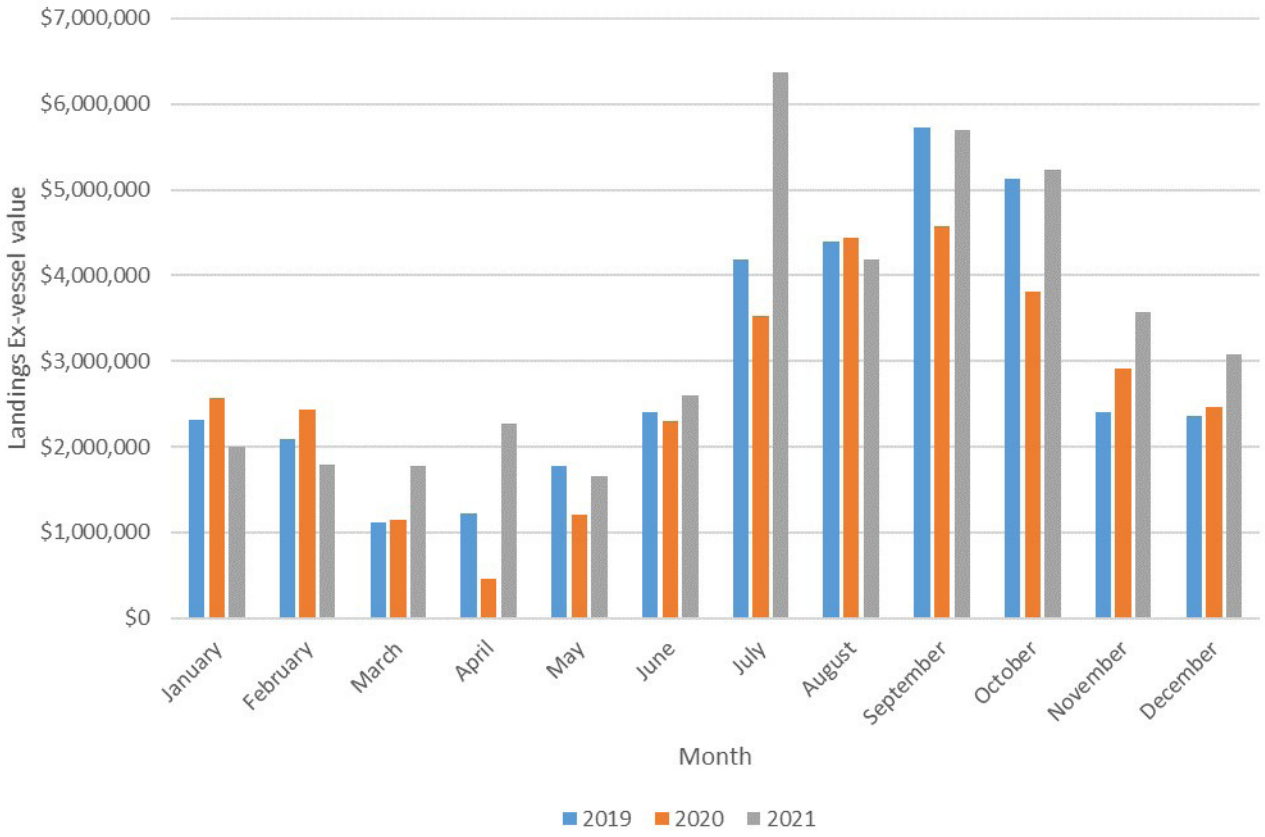

Figure 9.1 Comparison of HMS Commercial Landings (ex-vessel value) by Month for 2019-2021

The impact of the pandemic on HMS recreational fisheries was much more varied throughout 2020. Due to restrictions on public events, there were 55 fewer registered tournaments in 2020 than in 2019, representing a 22-percent decline in total tournaments held. Surveys of 24 HMS for-hire captains conducted in March and April 2020 as part of a rapid assessment revealed that 100 percent of HMS for-hire operations had been impacted by the pandemic, with vessel captains reporting that 97 percent of their April bookings had been canceled and 63 percent reporting having to lay off or reduce the hours of their staff (NOAA Fisheries 2020). However, impacts to the HMS for-hire sector appeared to be short-lived in many states as state pandemic restrictions were eased over the summer months, especially for outdoor activities, which were deemed to be much lower risk for spread of the virus. When the Large Pelagics Survey (LPS) began sampling HMS for-hire captains in June 2020, and continuing through October, in many states they received record reports for the number of trips taken. Overall, the LPS estimated for-hire effort was up 50 percent in 2020 compared to the previous 5-year average (Figure 9.2). This pattern continued in 2021 as LPS estimates of for-hire fishing effort remained high, and only returned to pre-pandemic levels for the month of June. There was a significant rebound in the 2021 HMS tournament fishing season with 232 total registered events being held – only 14 fewer events than were held in 2019.

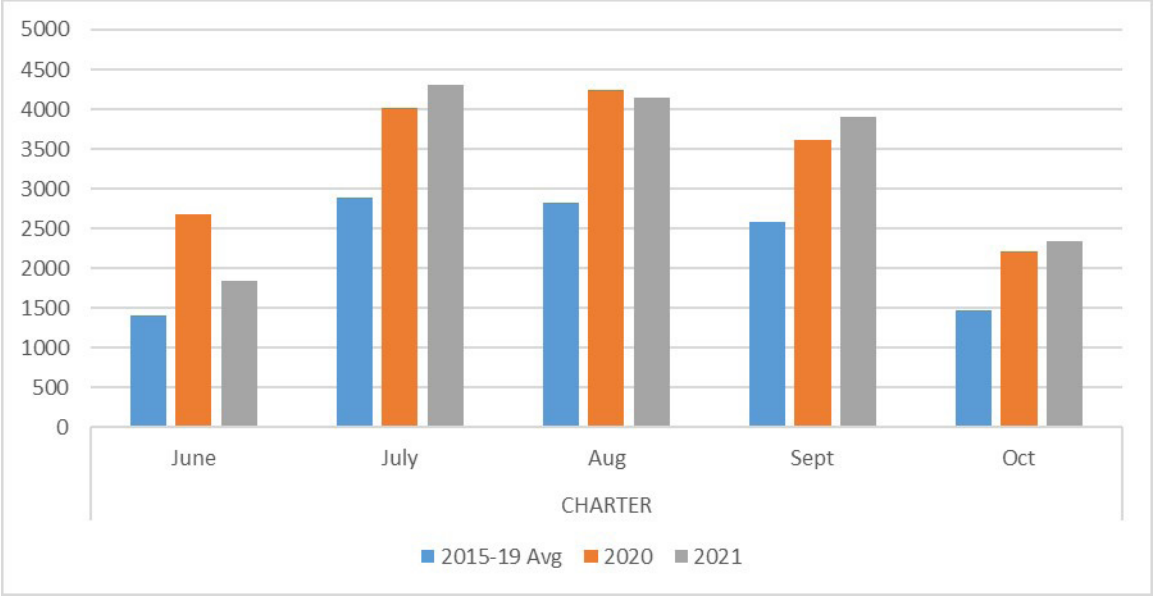

Figure 9.2 **Estimates of Charter Boat Vessel Trips by Month from the LPS, Comparing 2020 and 2021 Estimates to the Previous Five-Year Average (2015-2019)**

10 Appendix

10.1 Descriptions of Gear Used in HMS Fisheries

This section provides descriptions of the gear types used to fish for 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).

10.1.1 Pelagic Longline

Pelagic longline gear is composed of several parts (Figure 10.1). The primary fishing line, or mainline of the longline system, can vary from 5 to40 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 that 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).

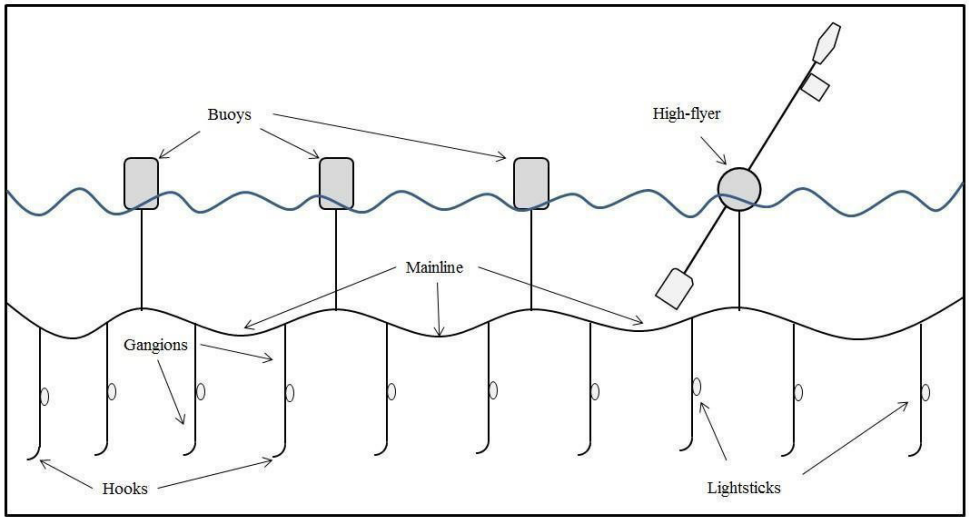

Figure 10.1 Typical U.S. Pelagic Longline Gear

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. Over the past few years, NOAA Fisheries has heard of some fishermen who set their pelagic longline gear much deeper sets than usual. These deep sets focus on catching swordfish and has been in use in the Pacific. See: https://drive.google.com/file/d/1j_tIHA0L9AJwClAEgTVXkNJj9H1whQX/view

Basic differences between shallow swordfish and deep tuna pelagic longline sets are illustrated in Figure 10.2. 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. 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 is available in Chapter 6.

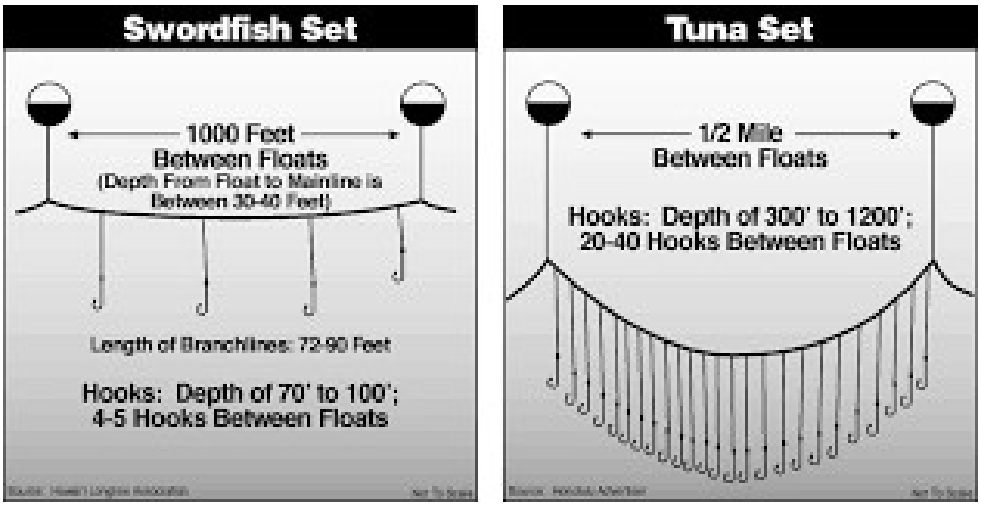

Figure 10.2 Pelagic Longline Gear Deployment Techniques

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.

10.1.2 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 10.3, 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.

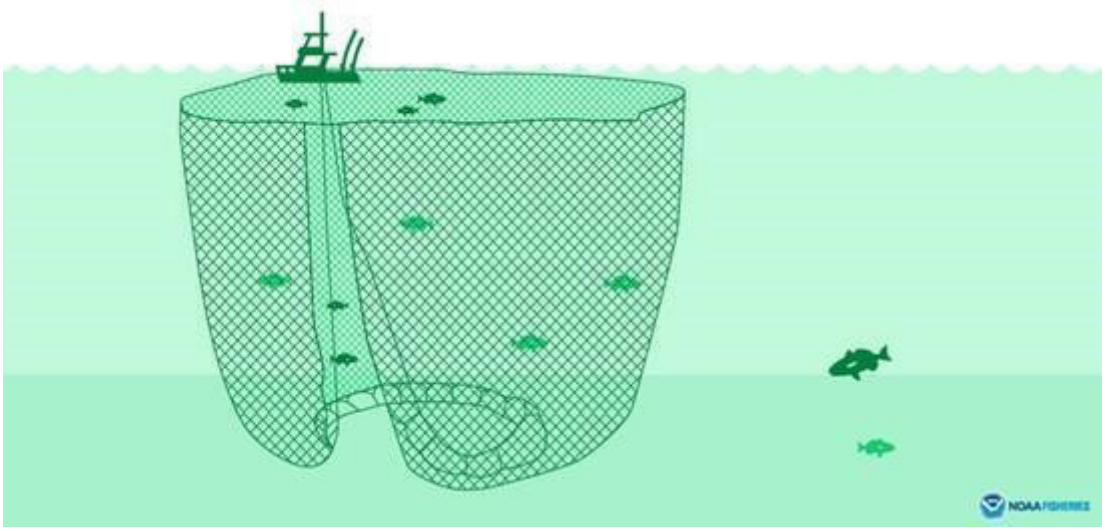

Figure 10.3 Purse Seine Gear Illustration

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.

Information on fishery interactions and reduction measures is available in Chapters 5 and 6.

10.1.3 Handgear

Handgears, including rod and reel, handline, harpoon, and bandit gear are often used to fish for 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 is 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 more than a dozen lines at a time and in some cases more than 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 ballyhoo, 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 tunas 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 1,000 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 overboard 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 tunas and swordfish.

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.

10.1.4 Bottom Longline

Bottom longline gear is a longline that is deployed with enough weights or anchors to maintain contact with the ocean bottom (Figure 10.4). 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.

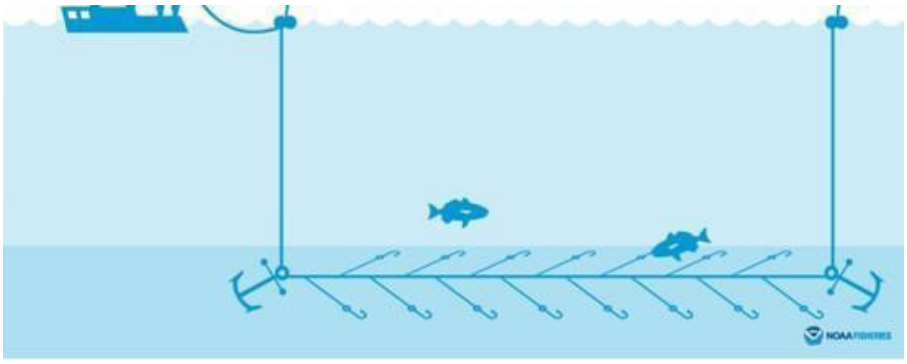

Figure 10.4 Bottom Longline Gear Illustration

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 HMS FMP.

10.1.5 Gillnet

A gillnet is a wall of netting that hangs in the water column, typically made of monofilament or multifilament nylon (Figure 10.5). 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 HMS cannot have a total length of more than 2.5 kilometers (1.5 miles)

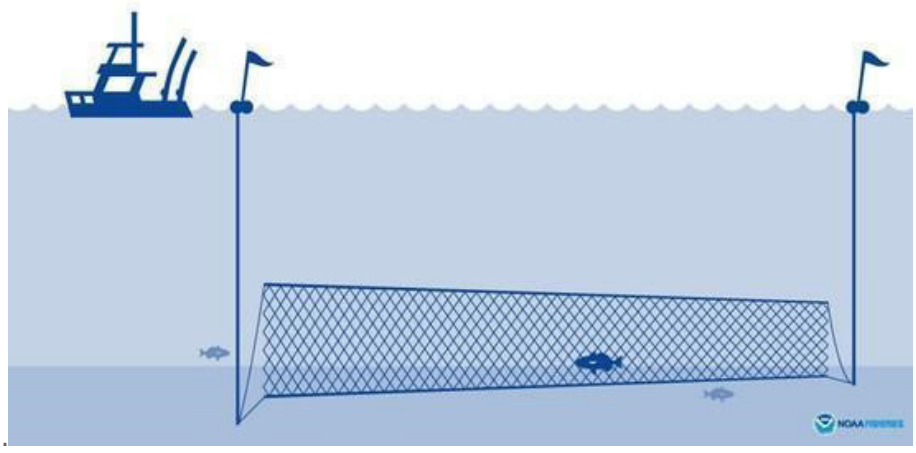

Figure 10.5 Generalized Gillnet Diagram

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 50 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 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 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.

10.1.6 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 10.6). The suspended line, attached gangions and/or hooks, and catch may be retrieved collectively by hand or mechanical means.

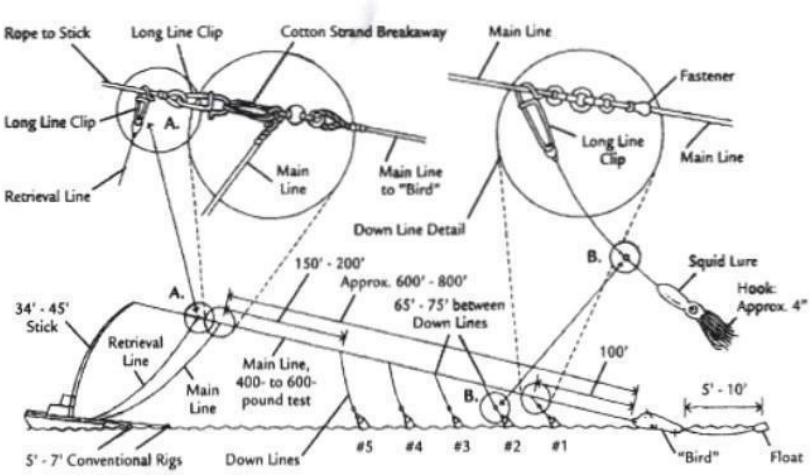

Figure 10.6 Green-Stick Gear Configuration

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, 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.

10.2 HMS Management History

10.2.1 Historical FMPs

During the 1980s, 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 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 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. In 2003, NOAA Fisheries finalized Amendment 1 to the 1999 FMP, which implemented substantial changes to the shark fishery including the time/area closure for sandbar and dusky sharks off North Carolina (68 FR 74746; December 24, 2003). NOAA Fisheries upheld management measures maintained in both the Billfish FMP (Amendment 1) and the Atlantic Tunas, Swordfish, and Sharks FMP until 2006.

10.2.2 Current FMP and Amendments

In 2006, NOAA Fisheries finalized a consolidated FMP for Atlantic tunas, swordfish, billfishes, and sharks. This FMP combined the FMPs for all HMS and amended certain management objectives to the 1999 FMP and the 1999 Billfish FMP amendment. Besides consolidating HMS management into one FMP, some of the major changes in the 2006 Consolidated HMS FMP included time/area closures in the Gulf of Mexico consistent with regulations implemented by the Gulf of Mexico Fishery Management Council, mandatory workshops for commercial fishermen and shark dealers, and modifying the management process of bluefin tuna. Since the finalization of the 2006 Consolidated HMS FMP, NOAA Fisheries has finalized a variety of amendments for HMS. Table 10.1 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 10.1 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.

Amendment	Year	Primary Impact	Actions
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.
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.

Amendment	Year	Primary Impact	Actions
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.
12	2021	All HMS	Responded to revisions to the objectives of the Magnuson-Stevens Act National Standard (NS) guidelines and Policy directives including revisions of the objectives of the 2006 Consolidated HMS FMP; adopted ICCAT stock status determination criteria for ICCAT-managed HMS; reviewed and updated HMS standardized bycatch reporting methodology; establishment of triggers for review of allocations of quota-managed HMS; and modified the timing for release of the HMS SAFE Report.
13	2022	Bluefin tuna	Implemented measures related to the pelagic longline fishery, including modifications to the Individual Bluefin Quota (IBQ) Program, distribution of IBQ shares to active vessels only, implementation of a cap on IBQ shares that may be held by an entity, and implementation of a cost recovery program. This amendment also modified bluefin fisheries by discontinuing the Purse Seine category and reallocated bluefin tuna quota to all of the other bluefin quota categories; capped Harpoon category daily bluefin landings; modified the recreational trophy bluefin areas and subquotas; modified regulations regarding electronic monitoring of the pelagic longline fishery as well as green-stick use; and modified the regulation regarding permit category changes.
14	2023	Sharks	Revises the mechanism or “framework” used in establishing quotas and related management measures for Atlantic shark fisheries. The revised framework modifies the procedures followed in establishing the acceptable biological catch (ABC) and annual catch limits (ACLs) for Atlantic sharks and the process used to account for carryover or underharvests of quotas. It also allows the option to phase-in ABC control rules and to adopt multi-year overfishing status determination criteria in some circumstances. Amendment 14 did not make changes to the current quotas or other management measures.

10.3 Descriptions of HMS Data Collections

This section provides a summary of some of the data sources referenced in this report.

10.3.1 Commercial Vessel Logbook Data

10.3.1.1 Background

With some limited exceptions, all federally permitted commercial vessels are required to report their fishing activities in a logbook. 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 for the different fisheries 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.

10.3.1.2 HMS Logbook

HMS permit holders using pelagic longline gear are required to use the Atlantic HMS logbook; however, 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 an Atlantic HMS 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, economic information, such as the total cost of trip expenses (e.g., groceries, fuel) and which dealers purchased landings. 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. The weigh-out slips, or tally sheets, records the fish purchased by the dealer and must include, at a minimum, the numbers and weights of the fish landed. These tally sheets, provided by the dealer to the fisherman, 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.

10.3.1.3 Southeast Coastal Fisheries Logbook

The coastal fisheries 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 coastal fisheries logbook form includes information specific to the trip, such as vessel name and identification number and dates of the trip. Unlike the reporting forms in the Atlantic HMS Logbook, the Southeast Coastal Fisheries Logbook form collects information on the gear, location, and species encountered for an entire trip rather than on every set of the fishing trip. Gear effort information (e.g., number of hooks, lines fished, length of longline) and location are reported as the average for an entire trip, as opposed to the specific number of hooks or length of line for each set. The "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 this information to the Southeast Coastal Fisheries Logbook program 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 the following: 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", indicating that no individuals of any species were discarded during the fishing trip, when submitting a discard logbook form and remain in reporting compliance.

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.

10.3.1.4 Northeast Vessel Trip Reports

Any fisherman with a permit issued out of the Greater Atlantic Regional Fisheries Office (GARFO) is required to submit the Northeast Vessel Trip Report 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. The gear those fishermen report in this logbook use are primarily trawls, dredges, or gillnet gear and are fishing for non-HMS such as scallops, squid, herring, groundfish, skates, and spiny dogfish. HMS permit holders do not use this logbook, with the exception of 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. 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.

Similar to the Coastal Fisheries Logbook, 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. Information for "Species kept" is reported in total weight for the entire trip, not in numbers of fish for each set like for the Atlantic HMS Logbook.

From 2000 through 2015, fishermen using this logbook were required to submit a monthly no-fishing report if they did not fish. These no-fishing reports are no longer required by GARFO.

10.3.2 Observer Data

10.3.2.1 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.

10.3.2.2 Southeast Shark 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 NorthCarolina 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 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.

10.3.2.3 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.

10.3.2.4 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 to 5 percent of all Gulf of Mexico trips that fish for reef fish.

10.3.2.5 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.

10.3.2.6 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. In recent years, coverage levels have been approximately 10 to 15 percent of vessels, based on the fishing effort of the fleet. There have been times and areas where the agency has required 100-percent coverage over specific times or areas such as during bluefin tuna spawning time period in the Gulf of Mexico for a number of years and in the Mid-Atlantic Bight.

10.3.3 Recreational Data

10.3.3.1 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 Fishing Effort Survey (FES), 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."

The FES is a mail survey of licensed recreational anglers and 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 are 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. The FES fully replaced the historic Coastal Household Telephone Survey in 2018 following three years of both surveys being conducted side by side (2015-2017). Side by side data collection was conducted to facilitate the development of a calibration model used to adjust the historic time series of MRIP catch estimates to preserve their use in stock assessments. 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.

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 FES and FHS. Thus, MRIP estimates are extrapolated estimates of catch. When data are extracted, the MRIP database provides confidence intervals.

Recreational fisheries data are collected under the MRIP survey in Mississippi, Alabama, and Florida for shore, for-hire, and private modes, an activity under the RecFIN(SE). It provides for coordination of the survey, a field intercept survey of shore, for-hire and private boat anglers to estimate angler catch using the existing MRIP methodology, and entry of the data. These data are combined with the NOAA Fisheries effort estimate telephone survey. In addition, the states conduct supplemental sampling of the for-hire mode for charter boats in Mississippi, Alabama, and Florida. The states also conduct the FHS where weekly telephone calls are made to a 10-percent random sample of the Mississippi, Alabama, and Florida charter boat captains to obtain estimates of charter boat fishing effort. Headboat port sampling provides for the sampling of catches, collection of catch reports from headboat personnel, and gathering of effort data on headboats which operate primarily in the Exclusive Economic Zone from ports along the coasts of Texas, Louisiana, Mississippi, Alabama and Florida.

10.3.3.2 Large Pelagics Survey

The LPS, which began in 2001, collects information regarding the recreational fishery directed at large pelagic species (e.g., tunas, billfishes, swordfish, sharks, wahoo, dolphinfish, 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. The LPS includes two independent surveys: the Large Pelagics Telephone Survey (LPTS) and the Large Pelagics Intercept Survey (LPIS). These provide effort and average catch-per-trip estimates needed to estimate total catch by species.

The 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 the APAIS, the LPIS

collects aggregate catch data for all anglers fishing on a given vessel. For the last three years, the Large Pelagic Pilot Survey (LPPS) has been conducted alongside the LPIS in select states each year to collect pilot data to test a more statistically valid and robust intercept-survey redesign for the LPS. NOAA Fisheries will spend 2023 accessing the pilot survey data, and submitting the new design for MRIP certification. Full implementation of the new intercept survey design is targeted for 2024.

The 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 the LPTS, a biweekly survey. The LPTS covers both commercial fishing by vessels with Atlantic Tunas General category permits and true recreational fishing by vessels with Angling category permits.

The 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 the LPIS by estimates of total fishing effort obtained by the LPTS and the FHS. Thus, LPS estimates are extrapolated estimates of catch. As with MRIP, the LPS confidence intervals are generated online when reviewing the extrapolated estimates (www.st.nmfs.noaa.gov/recreational-fisheries/data-and- documentation/queries/index).

10.3.3.3 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.

10.3.3.4 Southeast Region Headboat Survey

The 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.

The 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.

10.3.3.5 Louisiana Recreational Creel Survey

The Louisiana Recreational Creel Survey (LA Creel), implemented by Louisiana in 2014 to replace MRIP data collection, 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.

10.3.3.6 HMS Tournament Registration and Reporting System

The HMS Tournament Registration and Reporting system (ATR) was implemented in August 2017, and is important for the management of swordfish, billfishes, tunas, and sharks, because it characterizes a portion of the recreational fishing effort on these species. This includes the location and targeted species, and provides catch and landings

data that are used in stock assessments and for United States overall catch limit monitoring as established by the International Commission for the Conservation of Atlantic Tunas (ICCAT).

The ATR is the evolution and replacement of the Recreational Billfish Survey (RBS), which was developed as a key element in complying with Phase I of the ICCAT marlin rebuilding plan and improving the monitoring of recreational billfish and swordfish landings by establishing a comprehensive monitoring program for all recreational landings of marlin, sailfish, and swordfish, particularly those landed outside of fishing tournaments.

Tournament operators are required to register tournaments and to report tournament results of all HMS at https://grunt.sefsc.noaa.gov/apex/f?p=127:1:12717210365716

10.3.3.7 Regional For-Hire Logbook and Vessel Trip Reporting Programs

As of November 2021, mandatory electronic logbook reporting requirements have been established for all vessels possessing regional council for-hire or party/charter permits. However, vessels with only HMS charter/headboat permits do not currently have these reporting requirements. Vessels with only HMS charter/headboat permits are required to report certain species (bluefin tuna, billfish, and swordfish) when fishing in a recreational fashion. The Mid-Atlantic Fishery Management Council (MAFMC) began requiring vessel trip reports from all vessels possessing their regional for-hire permits in March 2018. Similar logbook reporting requirements were implemented for South Atlantic Fishery Management Council (SAFMC) and Gulf of Mexico Fishery Management Council (GMFMC) for-hire permit holders in January 2020, and Northeast Fishery Management Council (NEFMC) for-hire permit holders in November 2021. In each case, vessels are required to submit reports for each trip that include details on fishing effort and catch, including fish retained and released. Reporting requirements vary from weekly for SAFMC permit holders, to within 48-hours of trip completion for MAFMC and NEFMC permit holders, to before the vessel reaches the dock for GMFMC permit holders. For-hire vessels have the option to choose between multiple electronic reporting platforms including GARFO's electronic Vessel Trip Reporting (eVTR) platforms. These include Fish Online, ACCSP's Standard Atlantic Fisheries Information System (SAFIS) eTRIPS Mobile and Online platforms, and several platforms offered by private companies. Currently, data elements necessary to meet HMS catch reporting requirements for recreational landings of bluefin tuna, billfish, and swordfish have been integrated into SAFIS eTRIPS Mobile and Online which have been certified as one-stop reporting platforms.

10.3.4 Seafood Dealer Data

10.3.4.1 Pelagic Dealer Compliance System

The collection of purchase data from federally permitted HMS seafood dealers was implemented in 1993 primarily to monitor landings of tunas and swordfish and secondarily to monitor landings of sharks. All commercial HMS fishing 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 Southeast Fisheries Science Center. The collection of these HMS landings are referred to as the Pelagic Dealer Compliance System, after the data collection program used to maintain the data. This system was used until 2013.

This system was replaced by the electronic dealer reporting system on January 1, 2013, as described below.

10.3.4.2 Electronic Dealer Reporting System

Since 2013, all federally-permitted HMS dealers have been required to self-report non-bluefin tuna data electronically to NOAA Fisheries through a NOAA Fisheries-approved electronic reporting program on a weekly basis. The HMS Management Division has an internal database, known as eDealer, which pulls in all federally submitted Atlantic non-BFT HMS landings from other electronic dealer reporting systems from Maine to Texas, including the U.S. Caribbean. These programs include the SAFIS dealer reporting programs from Maine to Virginia, South Carolina, and Georgia; file upload programs by large dealers in the Northeast with their own proprietary software, state trip tickets programs, and an HMS-specific data entry program for Caribbean dealers. The eDealer database provides one complete dataset for all electronically submitted Atlantic non-BFT HMS dealer data. Dealer

reported BFT data are housed in a separate database. Bluefin tuna reporting, with its distinct 24-hour report submission requirement, coast-wide range encompassing the Atlantic Ocean and adjoining seas, and unique data elements such as tags and length, switched from a system in which landing cards were faxed by the dealer to the HMS Management Division to an electronic dealer reporting system in 2016. As of 2020, bluefin tuna dealers can use one of the two types of systems available for electronic dealer reporting: SAFIS and file upload.

NOAA Fisheries regularly cross-validates information like fish weights and purchase dates provided in dealer reports with those provided in logbooks from those HMS fisheries that require logbooks and weigh-out slips, to ensure all HMS fish have been reported. When discrepancies are found, NOAA Fisheries works to ensure the fish are correctly entered in the appropriate dealer reporting system and/or in the logbook report. Similarly for bluefin tuna, information in the dealer landings dataset is compared to the open-access vessel catch report data set for quality assurance of each record.

10.3.4.3 Gulf Fisheries Information Network

The Gulf Fisheries Information Network, or GulfFIN, is a state-federal cooperative program to collect, manage, and disseminate self-reported statistical data and information on the marine and estuarine commercial and recreational fisheries. It includes data for the states from Texas to Florida with the addition of some landings data from Puerto Rico beginning in 1985. Under this program, there are two distinct components: the Commercial Fisheries Information Network (ComFIN) and the Recreational Fisheries Information Network in the Southeast Region [RecFIN(SE)].

Commercial data in GulfFIN include landings by both state-only licensed dealers (purchasing fish caught within the Exclusive Economic Zone) and federally permitted dealers (purchasing fish caught outside the Exclusive Economic Zone). This program originally housed data collected by the states through paper trip tickets, but information is now collected from dealers through both paper and electronic methods.

When combined with the Atlantic Coastal Cooperative Statistics data, GulfFIN information reflect landings across all states from Maine to Texas.

Recreational data in GulfFIN are described in the Recreational Data section of this chapter (See 10.3.3).

10.3.4.4 Atlantic Coastal Cooperative Statistics Program

The Atlantic Coastal Cooperative Statistics Program, or ACCSP, is the Atlantic coast complement to GulfFIN. The ACCSP integrates all fisheries-dependent data, including state and federal reports from seafood dealers, who purchase fish in both state and federal fisheries, vessel data, and recreational data. The program covers landings from Maine to Florida. Data exist since 1950 for HMS; however, not all data are reported to species or were required to be reported with the same data elements that are now collected.

Like GulfFIN, data were originally collected via paper methods through state programs and now are collected either solely through electronic submissions or through a combination of paper and electronic methods. Data undergo a series of quality control measures prior to being made available to the public.

When combined with GulfFIN data, ACCSP information reflect landings across all states from Maine to Texas.

10.3.4.5 Northeast Dealer Database

The Northeast dealer database contains data from federally permitted seafood dealers in the states from Maine through Virginia. Prior to May 2004, northeast landings data were collected directly from federally permitted dealers through federal field agents during dockside interviews, and landings data from state-only dealers were obtained through a state's trip ticket program. After May 2004, regulations mandated that all dealers with a federal permit issued by NOAA Fisheries Greater Atlantic Regional Fisheries Office, or GARFO, to submit their landings data for each trip electronically. GARFO also made available an online reporting application, SAFIS, to all dealers in the northeast region. SAFIS allows these dealers to enter landings information that meet the reporting requirements for both the respective state and NOAA Fisheries. The ACCSP now oversees the SAFIS program and works closely

with the Northeast Fisheries Science Center and NOAA Fisheries GARFO in the maintenance of this program and resulting data.

For each species purchased, dealers are required to provide the following information: fisherman and vessel identification information, trip data (e.g., landing date, purchase date), fishing data (e.g., fishing gear(s) used, area where a fish was caught or removed from the water), the weight, unit and market information, and prices paid to the fisherman.

10.3.5 Exempted Fishing Permits

10.3.5.1 Exempted Fishing Permits Database

Exempted fishing permits (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. Data are entered into an EFP database by NOAA Fisheries staff and the database is stored and maintained on NOAA Fisheries local servers.

10.3.6 Vessel Monitoring Systems

Vessel monitoring systems (VMS) are spatial data collection systems which collect positional data, steaming velocity, and are used as reporting tools as required on pelagic longline, and select bottom longline and gillnet vessels with HMS commercial fishing permits. Pelagic longline vessels are also required to submit bluefin tuna set reports within 12 hours of completing a pelagic longline set.

10.3.7 Electronic Monitoring Systems

Electronic monitoring systems consist of hardware that includes video cameras, sensors, computers, GPS units, and hard drives that collect video, location, and other sensor information of fishing activity. Systems are required on pelagic longline vessels which fish in the Atlantic or Gulf of Mexico for HMS. Video data are reviewed to audit self-reported bluefin tuna interactions by pelagic longline vessels, and for disposition of shortfin mako sharks. Additionally, a pilot study in the shark bottom longline fishery was conducted in 2021 and 2022 using a sensor only system to determine if sensor data can be used to determine gear soak times. The study is expected to continue in 2023; initial results of the study may be available toward the end of 2023.

10.4 Appendix References

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

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