PRE-DRAFT OF THE

ATLANTIC HIGHLY MIGRATORY SPECIES FISHERY MANAGEMENT PLAN

INCLUDING THE

2005 STOCK ASSESSMENT AND FISHERY EVALUATION (SAFE) REPORT FOR ATLANTIC HIGHLY MIGRATORY SPECIES

February 2005

Highly Migratory Species Management Division
Office of Sustainable Fisheries
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF COMMONLY USED ABBREVIATIONS AND ACRONYMS

AA	Assistant Administrator for Fisheries
ACCSP	Atlantic Coastal Cooperative Statistics Program
ACS	Angler consumer surplus
ALWTRP	Atlantic Large Whale Take Reduction Plan
ALWTRT	Atlantic Large Whale Take Reduction Team
ANPR	Advanced Notice of Proposed Rulemaking
AOCTRP	Atlantic Offshore Cetacean Take Reduction Plan
AOCTRT	Atlantic Offshore Cetacean Take Reduction Team
AP	Advisory Panel
APA	Administrators Procedure Act
ASMFC	Atlantic States Marine Fisheries Commission
ATCA	Atlantic Tunas Convention Act
B	Biomass
BAYS	Bigeye, albacore, yellowfin, skipjack tunas
BET	Bigeye tuna
BETYP	Bigeye tuna Year Program
BFT	Bluefin tuna
BiOp	Biological Opinion
BLL	Bottom Longline
B_{MSY}	Biomass expected to yield maximum sustainable yield
B_{OY}	Biomass expected to yield optimum yield
BSD	Bluefin Tuna Statistical Document
BTF	By the fish
BUM	Blue marlin
CBP	Customs and Border Protection
CFDBS	Commercial Fisheries Database System
CFMC	Caribbean Fishery Management Council
CFL	Curved fork length
CFR	Code of Federal Regulations
CHB	Charter/Headboat
CIAT	Spanish for IATTC
CIE	Center for Independent Experts
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COE	Certification of Eligibility
COFI	Committee on Fisheries
CPI	Consumer Price Index
CPUE	Catch per unit effort
CSFOP	Commercial shark fishery observer program
CSR	Center for Shark Research
CSTP	Cooperative Shark Tagging Program
CZMA	Coastal Zone Management Act
DEIS	Draft Environmental Impact Statement
DPS	Distinct population segment
DRG	Dredge
dw	Dressed weight
EA	Environmental Assessment
EEZ	Exclusive economic zone
EFH	Essential fish habitat
EFP	Exempted fishing permit
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act

F	Instantaneous fishing mortality
FAD	Fish aggregating device
FAO	Food and Agriculture Organization
FAS	Free Alongside Ship
FEC	Florida East Coast
FEIS	Final Environmental Impact Statement
FL	Fork Length
FMP	Fishery Management Plan
F_{MSY}	Instantaneous fishing mortality rate expected to yield maximum sustainable yield
FMU	Fishery management unit
F_{OY}	Fishing mortality rate expected to yield optimum yield
FR	Federal Register
FRFA	Final regulatory flexibility analysis
GDP	Gross Domestic Product
GIS	Geographic Information System
GSAFDF	Gulf and South Atlantic Fishery Development Foundation
GMFMC	Gulf of Mexico Fishery Management Council
GSMFC	Gulf States Marine Fisheries Commission
HACCP	Hazard Analysis Critical Control Point
HAPC	Habitat area of particular concern
HBS	Headboat Survey
HMS	Highly migratory species: Atlantic sharks, tunas, swordfish, and billfish
HTS	Harmonized Tariff Schedule
IATTC	Inter-America Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
INP	Instituto Nacional de Pesca
IPOA	International Plan of Action
IRFA	Initial regulatory flexibility analysis
ITP	International Trade Permit
ITQ	Individual transferable quota
ITS	Incidental take statement
IUU	Illegal, Unregulated, and Unreported
LAP	Limited access permit
LCS	Large coastal sharks
LJFL	Lower jaw fork length
LOA	Letter of acknowledgment
LOF	List of Fisheries
LPS	Large Pelagic Survey
LWTRP	Large Whale Take Reduction Plan
LWTRT	Large Whale Take Reduction Team
M	Mortality
MAFMC	Mid-Atlantic Fishery Management Council
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MFMT	Maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MPA	Marine protected area
MRFSS	Marine Recreational Fishing Statistics Survey
MSST	Minimum stock size threshold
MSY	Maximum sustainable yield
mt	Metric tons
NCA	North Central Atlantic
NEC	Northeast Coastal Statistical Area
NED	Northeast Distant Statistical Area

NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NERO	Northeast Regional Office
NGO	Non-governmental organization
NMFS	National Marine Fisheries Service
nmi	Nautical mile
NOA	Notice of Availability
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NPOA	National Plan of Action
NRC	Natural Resources Consultants, Inc.
NS	National Standards
NYB	New York Bight
OSF	Office of Sustainable Fisheries
OY	Optimum yield
PAT	Pop-up archival tag
PFD	Personal flotation device
PLL	Pelagic longline
POP	Pelagic observer program
PPI	Producer price index
PR	Office of Protected Resources
PRA	Paperwork Reduction Act
PRM	Post-release mortality
PSAT	Pop-up satellite archival tag
RBS	Recreational Billfish Survey
Reg Flex Act	Regulatory Flexibility Act
RIR	Regulatory Impact Review
RFMC	Regional Fishery Management Council
RPAs	Reasonable and Prudent Alternatives
RPMs	Reasonable and Prudent Measures
SAFE report	Stock Assessment and Fishery Evaluation report
SAFMC	South Atlantic Fishery Management Council
SAB	South Atlantic Bight
SAR	Sargasso
SBR	Spawning Stock Biomass Ratio
SCRS	Standing Committee for Research and Statistics
SCS	Small coastal sharks
SD	Statistical document
Secretary	Secretary of Commerce
SEFSC	Southeast Fisheries Science Center
SEIS	Supplemental environmental impact statement
SEN	Seines
SERO	Southeast Regional Office
SEW	Stock evaluation workshop
SFA	Sustainable Fisheries Act
SFL	Straight fork length
SK Program	Saltonstall-Kennedy Program
SRP	Scientific research permit
SSB	Spawning stock biomass
TAC	Total allowable catch
TAG	Tag-A-Giant
TAL	Total allowable landings
TCs	Terms and Conditions
TL	Total length

TRP	Traps and pots
TUNS	Tuna North and Tuna South
TWL	Trawls
TXPWD	Texas Parks and Wildlife Department
UNK	Unknown
USFWS	United States Fish and Wildlife Service
VIMS	Virginia Institute of Marine Science
VMS	Vessel monitoring system
WHM	White marlin
WTP	Willingness to pay
ww	Whole weight
YFT	Yellowfin tuna
YOY	Young of the year

1.0 INTRODUCTION

This document is comprised of a Pre-draft of the consolidated Atlantic Highly Migratory Species Fishery Management Plan (HMS FMP) and the 2005 Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic Highly Migratory Species. The pre-draft document is a non-compulsory, but valuable step in the fishery management plan amendment process. The development and unrestricted release of a pre-draft document allows the Agency to informally solicit voluntary inputs from interested stakeholders, fishery participants, state and federal government agencies, and the general public in an effort to evaluate and refine preliminary management alternatives and to obtain additional information on their potential impacts prior to development of the formal draft FMP.

NMFS chose to combine these documents because the information and data that comprise the basis of an FMP or environmental impact statement (EIS) are similar to the information and data included in a SAFE Report, as outlined in the National Standard Guidelines (CFR §600.315 (e)), and the planned release of both documents coincided in this particular instance.

The pre-draft portion of this document includes a summary of the purpose and need (Chapter 1) and a summary, in the form of a pros and cons section, of some of the impacts for management alternatives that NMFS is considering at this time (Chapter 2). The alternatives outlined in Chapter 2 may be modified, removed, or supplemented based on comments received and additional analyses.

Chapter 3 comprises the main SAFE Report section of the document. This Chapter also includes much of the information that will be needed to analyze and compare the different alternatives outlined in Chapter 2. As with the alternatives outlined in Chapter 2, Chapter 3 will likely be revised and modified to reflect new or additional information as the HMS FMP is developed. However, the version of Chapter 3 released in this document will continue to be considered the 2005 SAFE Report.

Under §304(g)(1)(A) of the Magnuson-Stevens Fishery Conservation and Management Act (Magunson-Stevens Act) and under the regulatory process for managing highly migratory species (HMS), the National Marine Fisheries Service (NMFS) is required to consult with affected Fishery Management Councils, International Commission for the Conservation of Atlantic Tunas (ICCAT) commissioners and advisory groups, and the HMS Advisory Panels (APs) established under the Magnuson-Stevens Act. As such, we are requesting comments on this pre-draft document for a consolidated HMS FMP. An electronic version of the pre-draft is also available on the website of the HMS Management Division at: http://www.nmfs.noaa.gov/sfa/hms.

NMFS anticipates that a draft environmental impact statement (DEIS), which will be the draft HMS FMP, and a proposed rule will be available in the summer of 2005 and anticipates completing the consolidated HMS FMP and its related documents by January 1, 2006. Given the short time frame, NMFS requests comments on the pre-draft by **March 31, 2005**.

NMFS specifically solicits comments on whether the range of alternatives is appropriate or if there are additional alternatives that should be addressed. Additionally, please comment on the extent of the impacts described.

Any written comments on the pre-draft should be submitted to Christopher Rogers, Chief, HMS Management Division, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910 or faxed to (301) 713-1917 by **March 31, 2005**. For further information, contact Karyl Brewster-Geisz at 301-713-2347.

1.1 Management History

On November 28, 1990, the President of the United States signed into law the Fishery Conservation Amendments of 1990 (Pub. L. 101-627). This law amended the Magnuson Fishery Conservation and Management Act (later renamed the Magnuson-Stevens Fishery Conservation and Management Act or Magnuson-Stevens Act) and gave the Secretary of Commerce (Secretary) the authority (effective January 1, 1992) to manage HMS in the exclusive economic zone (EEZ) of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea under authority of the Magnuson-Stevens Act (16 U.S.C. §1811). This law also transferred from the Fishery Management Councils to the Secretary, effective November 28, 1990, the management authority for HMS in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea (16 U.S.C. §1854(f)(3)).[1] The Secretary then delegated authority to manage Atlantic HMS to NMFS.

Under the Magnuson-Stevens Act, NMFS must maintain the optimum yield of each fishery by preventing overfishing and rebuilding overfished stocks. To do this, NMFS must, among other things, consider the National Standards, including using the best scientific information and considering impacts on residents of different States, efficiency, costs, fishing communities, bycatch, and safety at sea (16 U.S.C. §1851 (a)(1-10).

In addition to the Magnuson-Stevens Act, Atlantic HMS are also managed internationally by the International Commission for the Conservation of Atlantic Tunas (ICCAT). ICCAT consists of 39 contracting parties (nations), as well as other cooperating parties that fish for tunas and tuna-like species throughout the Atlantic including Canada, the European Community, Japan, and China. Since 1966, ICCAT's stated objective has been to "cooperate in maintaining the populations of these fishes at levels which will permit the maximum sustainable catch for food and other purposes." To achieve this objective, ICCAT requires countries to collect catch data. In 1966, through a resolution, ICCAT urged all countries to begin to collect and process statistics and data on Atlantic tunas fisheries. In 1972, noting data deficiencies, ICCAT again urged countries to improve the collection and efficiency of Atlantic tunas catch-effort data and to make sure data are made available to ICCAT. These types of requests continue to be made, either as resolutions or recommendations, as the management and science needs for each fishery continue to expand.

---

[1] The Magnuson-Stevens Act, at 16 U.S.C. 1802(14), defines the term "highly migratory species" as tuna species, marlin (*Tetrapturus* spp. and *Makaira* spp.), oceanic sharks, sailfishes (*Istiophorus* spp.), and swordfish (*Xiphias gladius*). Further, the Magnuson-Stevens Act, at 16 U.S.C. 1802(27), defines the term "tuna species" as albacore tuna (*Thunnus alalunga*), bigeye tuna (*Thunnus obesus*), bluefin tuna (*Thunnus thynnus*), skipjack tuna (*Katsuwonus pelamis*), and yellowfin tuna (*Thunnus albacares*).

The conservation and management recommendations of ICCAT include total allowable catches, sharing arrangements for member countries, minimum size limits, effort controls, time/area closures, trade measures, compliance measures, and monitoring and inspection programs. If the United States accepts an ICCAT recommendation, the Atlantic Tunas Convention Act (ATCA) provides the Secretary with the necessary statutory authority to issue regulations as may be necessary and appropriate to implement binding ICCAT recommendations to fisheries managed by the United States (16 U.S.C. §971 *et seq*.). However, no regulation promulgated under ATCA may have the effect of increasing or decreasing any allocation or quota of fish or fishing mortality level to which the United States agreed pursuant to a recommendation of ICCAT (16 U.S.C. §971 (c)). ICCAT recommendations can be found on the internet at http://www.iccat.es/.

The following sections give a brief history of the management of HMS, including that which occurred prior to NMFS' assumption of management responsibility. This history is organized by the current FMPs, with Atlantic tunas, swordfish, and sharks in one section and Atlantic billfish in the next section. For more detail regarding the history of management, please see the original documents. Proposed rule, final rules, and other official notices can be found in the Federal Register at http://www.gpoaccess.gov/fr/index.html. Supporting documents can be found on the HMS Management Division's webpage at http://www.nmfs.noaa.gov/sfa/hms. Documents can also be requested by calling the HMS Management Division at (301) 713-2347.

1.1.1 History of Atlantic Tunas, Swordfish, and Shark Management

1.1.1.1 Pre-1999 Atlantic Tunas Management

Bigeye, albacore, yellowfin, and skipjack (BAYS) tunas, as well as bluefin tuna have been exploited in the western Atlantic for many years. In the early 1900s, a sport fishery developed for small and medium tunas off New York and New Jersey, and for giant bluefin tuna in the Gulf of Maine. The rod and reel fishery expanded rapidly during the 1950s and 1960s, as hundreds of private, charter, and partyboats targeted tunas along the mid-Atlantic coast. This recreational fishery continues today from Cape Hatteras to the Canadian border. In addition, it is locally important in the Straits of Florida. Sport catches are also made in the Gulf of Mexico.

Until the late 1950s, the U.S. commercial fishery for tunas employed mostly harpoons, handlines, and traps. There was no commercial market for bluefin tuna, and giant bluefin tuna (greater than 310 pounds (lb)) were regarded as a nuisance because of the damage they caused to fishing gear. Much of the bluefin tuna catch was incidental to operations targeting other species. In 1958, commercial purse seining for Atlantic tunas began with a single vessel in Cape Cod Bay and expanded rapidly into the region between Cape Hatteras and Cape Cod during the early 1960s. The purse seine fishery between Cape Hatteras and Cape Cod was directed mainly at small and medium bluefin tuna, and at skipjack tuna, all for the canning industry. North of Cape Cod, purse seining was directed at giant bluefin tuna. A pelagic longline fishery for Atlantic tunas also developed rapidly during the 1960s, comprised mainly of Japanese vessels fishing in the Gulf of Mexico. Today U.S. pelagic longline vessels target bigeye and yellowfin tuna, but are not allowed to target bluefin tuna.

The U.S. handgear fishery for Atlantic tunas is mainly a summer through early winter fishery. The recreational tuna fishery takes place mainly in the mid-Atlantic region through the Gulf of Mexico (GOM). Private vessels targeting tuna for recreational purposes only are permitted in the Angling category, while the charter/headboats targeting tunas are permitted in the Charter/Headboat category. Many fishermen who might normally consider themselves "recreational" fishermen participate in the General category in New England waters during the summer and fall and a classified as commercial fishermen. Recently, a vibrant commercial bluefin tuna fishery has developed off of some south Atlantic states, particularly the State of North Carolina, in the early winter. General category permit holders may sell tuna, and specifically bluefin tuna greater than 73 inches. A 1998 regulation prohibiting the retention of bluefin tuna less than 73 inches by fishermen in the General category clarified the distinction between the commercial and recreational fisheries. The commercial handgear fishery for bluefin tuna occurs mainly in New England, with vessels targeting fish using handline, rod and reel, and harpoon.

Bluefin Tuna

Peak yields of bluefin tuna from the western Atlantic (about 8,000 to 19,000 metric tons (mt) whole weight (ww)) occurred between 1963 and 1966 when much of the catch was taken by Asian longline vessels off Brazil. During the late 1960s and 1970s, annual yields averaged about 5,000 mt ww. By 1973, the United States and other nations began to express concern about the decrease in the abundance of bluefin tuna. In response to this concern, in 1974, ICCAT recommended a minimum size limit of 6.4 kg (14 lb) and recommended that all countries limit fishing mortality to recent (at that time) levels for one year. High catches of juvenile bluefin tuna were sustained throughout the 1960s and into the early 1970s. These high catch rates by U.S. purse seine and longline vessels, along with the intense longline fishery pursued by Japanese vessels in the 1970s, are believed to have been responsible for the decline in abundance during subsequent years. In the late 1970s, approximately 10,000 giant bluefin tuna were taken in one year alone from the Gulf of Mexico. An international market developed for giant bluefin tuna, with fresh bluefin tuna flown directly to Japan for processing into sushi or sashimi.

After conducting a series of stock assessments, the ICCAT Standing Committee on Research and Statistics (SCRS) recommended in 1981 that catches of western Atlantic bluefin tuna be reduced to as near zero as possible to stop the decline of the stock and established a 800 mt ww total allowable catch (TAC). This recommendation also prohibited fishing effort in the western Atlantic from transferring to the eastern Atlantic (the stocks were split at 45^0 W longitude through 10^0 N latitude before moving to 25^0 W longitude at the equator). At the 1982 meeting, the TAC was increased to 2,660 mt ww, to be split proportionately between the relevant Contracting Parties. This level was maintained through 1991. Also at the 1982 meeting, ICCAT recommended that there be no directed fishery on bluefin tuna spawning stocks in the western Atlantic in spawning areas such as the Gulf of Mexico.

By the late 1980s, high ex-vessel prices and the increased importance of the Japanese market had blurred the distinction between the sport and recreational fisheries for bluefin tuna and much of the traditionally recreational catch for medium and giant bluefin tuna was being sold for shipment to Japan. In 1992, NMFS responded by banning the sale of school, large school, and small medium bluefin tuna (27 inches to less than 73 inches curved fork length).

At the 1991 meeting, ICCAT recommended additional measures to prevent further declines in the western Atlantic bluefin tuna stock, including a ten percent reduction in the total allowable catch. In 1993, the western Atlantic bluefin tuna quota was reduced further from 2,394 mt ww to 1,995 mt ww in 1994 and 1,200 mt ww in 1995. At the 1991 meeting, the United States was allocated 693 mt ww per year for both 1993 and 1994. This 1991 recommendation also increased the minimum size to 30 kg (66 lb) or 115 cm (45 in) fork length with an tolerance level of eight percent. Fishermen who caught fish smaller than this size were encouraged to tag and release them.

In 1992, NMFS established base quotas for each permit category in the bluefin tuna fishery based upon the historical share of catch in each of these categories during the period 1983 to 1991. These quotas were used in 1992, 1993, and 1994, with overharvests and underharvests added and subtracted as required by ICCAT, as well as some inseason transfers. At the 1992 ICCAT meeting, ICCAT recommended that by September 1, 1993, all bluefin tuna imports into a Contracting Party be accompanied by an ICCAT Bluefin Tuna Statistical Document that included, among other things, the area that the fish was harvested in, the gear, and a validation by a government official of the flag state of the vessel that harvested the tuna.

The SCRS projections in 1994 indicated that the stock could support higher quota levels and still begin to rebuild, albeit more slowly. Based on the new stock assessment, ICCAT members adopted a recommendation to increase the annual bluefin tuna total allowable catch in the western Atlantic Ocean from 1,995 to 2,200 mt ww. The share allocated to the United States was set at 1,311 mt ww. This allocation reflected recent trends in fleet size, effort and landings by category, as well as the ICCAT recommendation which specifies that data should be collected for the broadest range of size-classes possible, given size restrictions. At the 1996 meeting, ICCAT recommended an annual western Atlantic bluefin tuna TAC of 2,354 mt ww for 1997 and 1998. The annual quota allocated to the United States for 1997 and 1998 was 1,344 mt ww.

In 1998, the Commission adopted a 20-year Rebuilding Program for the western Atlantic bluefin management area (ICCAT Ref. 98-07) aimed at rebuilding to the stock size that will produce Maximum Sustainable Yield (MSY) by 2018 with a 50 percent or greater probability. The Program states that the TAC for the west would only be adjusted from the 2,500 mt ww level adopted for 2003-2004 if SCRS advises that (a) a catch of 2,700 mt ww or more has a 50 percent or greater probability of rebuilding or (b) a catch of 2,300 t or less is necessary to have a 50 percent or greater probability of rebuilding. According to the Program, the MSY rebuilding target can be adjusted according to advice from SCRS. In 2002, the Commission set the annual Total Allowable Catch, inclusive of dead discards, for the western Atlantic management area to 2,700 mt ww, effective beginning in 2003 (ICCAT Ref. 02-07). The current U.S. share of this quota equals 1,496 mt ww inclusive of 25 mt ww for pelagic longline incidental catch in the Northeast Distant Statistical Reporting area and an allowance for dead discards of an additional 68 mt ww. If there are dead discards in excess of this allowance, they must be counted against the following year's quota. If there are fewer dead discards, then half of the underharvest may be added to the following year's quota while the other half is conserved. The recommendation also allowed four years to balance the eight percent tolerance for bluefin tuna under 115 cm (young school and school bluefin tuna).

Bigeye Tuna

ICCAT adopted a minimum size of 3.2 kg (7 lb) with a 15 percent tolerance level for undersized bigeye tuna in 1979. In 1995, noting the large increases in longline and purse seine catches of bigeye tuna and the large number of undersized fish, ICCAT urged countries to reduce catches below MSY and reduce catches of undersized fish. ICCAT also asked countries that had equatorial fisheries catching undersized fish to place observers on the vessels and allow SCRS to study the data. In 1997, ICCAT issued two resolutions to limit the catch of larger vessels in the Atlantic and the catch of countries that caught more than an average of 200 mt ww between 1992 and 1996 and to collect information on the larger vessels in the fleet (those greater than 80 GRT).

Large numbers of undersized fish are still harvested by the surface fleets operating near the equator. SCRS estimates that approximately 70 percent by number of bigeye tuna landed are smaller than the minimum size, well in excess of the 15 percent tolerance. Total Atlantic bigeye tuna catch has increased substantially since 1990. ICCAT has not recommended Atlantic-wide quotas for bigeye tuna. However, in 1998, ICCAT adopted two new management recommendations that are designed to limit effort in commercial fisheries for bigeye tuna throughout the Atlantic. ICCAT also adopted a resolution in 1998 that tasks SCRS with developing stock rebuilding scenarios for bigeye.

Purse seine fleets in the east Atlantic have developed a fishery that targets schools of tuna near artificial floating objects, also known as fish aggregating devices (FADs). This method of fishing has increased harvesting efficiency and contributed to excessive catch of undersized bigeye tuna. Favorable oceanographic conditions as well as the extensive use of sonar and deeper nets have also contributed to increased bigeye tuna harvest in recent years. In 1998, ICCAT established a mandatory time/area closure for purse seiners using fish aggregating devices in equatorial waters.

Albacore Tuna

Although albacore tuna harvests in the north Atlantic have declined since 1970, catch and effort in newer surface fisheries have increased since 1987. In 1997, SCRS determined that North Atlantic albacore tuna is at or near a level of full exploitation. In 1998, ICCAT adopted a recommendation to limit fishing capacity to the number of vessels in the directed albacore tuna fishery during the years of 1993 to 1995 and for countries to submit a list of vessels fishing for northern albacore. In 2003, ICCAT recommended a TAC of 34,500 mt ww for 2004, 2005, and 2006, of which the United States is allocated 607 mt ww per year.

ICCAT began managing southern Albacore when, in 1994, the SCRS found that catches of southern Albacore exceeded MSY. At this time, ICCAT recommended that countries limit the catch to 90 percent of previous levels. In 1996, ICCAT recommended a 22,000 mt ww quota for all countries fishing below 5º N latitude with the goal of achieving MSY by 2005. In 1998, this TAC was increased to 28,200 mt ww. In 2003, SCRS determined that southern albacore is not overexploited at current fishing levels. Thus, SCRS recommended that the TAC be 29,200 mt ww.

Yellowfin Tuna

Since the early 1970s, ICCAT has expressed concern over the high proportion of juvenile yellowfin tuna that are landed. In 1972, ICCAT passed a recommendation that prohibited the landing of yellowfin tuna less than 3.2 kg (7 lb). This recommendation also included an allowed 15 percent tolerance level on this minimum size. In 1995, an estimated 50 percent by number of yellowfin tuna landed were less than the minimum size. As in the bigeye tuna fisheries, these high catches of juveniles are largely a result of the use of FADs.

Atlantic yellowfin tuna landings reached a record high in 1990, primarily due to increased landings in the east Atlantic. Since 1990, catches across the Atlantic have declined somewhat and then remained stable. In 1993, ICCAT recommended that there be no increase in the level of effective fishing effort over 1992 levels.

Skipjack Tuna

The stock structure of Atlantic skipjack tuna is uncertain; separate management units are maintained in the eastern and western Atlantic. Skipjack tuna fisheries have changed significantly since 1991, with the introduction of fishing on floating objects and the expansion of the purse seine fishery towards the western Atlantic and closer to the equator. SCRS has noted that additional research on skipjack tuna is needed. At this time, there are no ICCAT recommendations or resolutions specific to skipjack tunas.

All Tunas

In April 1999, NMFS published the Final Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks (1999 FMP). This was the first FMP for Atlantic tunas. Some of the specific tunas management measures included:

- Prohibition of pelagic driftnets for tunas;
- Implementation of the ICCAT Rebuilding Program;
- Implementation of a Cap on the Purse Seine category of 250 mt ww for BFT (later rescinded);
- Time/area closure in mid-Atlantic to reduce bluefin tuna dead discards;
- Establishment of the foundation for developing an international 10-year rebuilding program for bigeye tuna;
- Establishment of a recreational retention limit of three yellowfin tuna per person per day; and
- Establishment a fishing year of June 1 to the following May 31.

1.1.1.2 Pre-1999 Atlantic Swordfish Fishery and Management

Unless otherwise specified, the following paragraphs regarding the early history of the swordfish fishery summarize information found in the Source Document to the 1985 Atlantic Swordfish Fishery Management Plan (SAFMC, 1985a). The summary of more recent history is a combination of information from the 1999 Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks and various ICCAT recommendations (http://www.iccat.es).

The recreational fishery for swordfish has existed since the 1920s when the fish were taken mainly by handline trailing a baited hook or occasionally by rod and reel or harpoon. This early fishery was located from Massachusetts to New York and, because it relied on locating the fish and enticing it to strike, occurred mainly during the day. Occasionally, an angler fishing for billfish in the Mid-Atlantic Bight would catch a swordfish.

In the 1970s, a recreational rod and reel fishery developed in Florida. This fishery borrowed techniques from longline fishermen and drifted the bait below the surface at night. Prior to the development of this fishery, fewer than 2,000 swordfish were estimated caught by all recreational fishermen in aggregate. In 1976, approximately 25-30 swordfish were taken off of Florida by rod and reel. By 1977, approximately 400 to 500 swordfish were taken. In 1978, swordfish tournaments were held in Florida, South Carolina, and New Jersey (the first ones ever for South Carolina and New Jersey) using this new technique. Due to a loss of interest by anglers and a relatively poor fishing year in 1979, there was a decrease in recreational effort in the early 1980s. In 1981 and 1982, only 86 and 53 swordfish were reported captured.

The commercial fishery began as a harpoon fishery between New York and Canada. In the 1960s, longline gear was introduced. This new gear expanded the range of the fishery down to the Gulf of Mexico and dramatically increased the amount of fish caught from approximately 2,800 mt ww in 1960 to 8,800 mt ww in 1963. Landings stabilized in the 1970s at around 5,000 mt ww.

In 1971, the U.S. Food and Drug Administration prohibited the sale of swordfish with more than 0.5 parts per million (ppm) tissue mercury content. This decreased landings of swordfish worldwide. In 1978, the permissible level of mercury was raised to 1.0 ppm. This rejuvenated the commercial fishery and landings increased as a result.

In the early years, there were essentially four primary components to the commercial swordfish fleet. There were approximately 25 vessels that used harpoons and spotter aircraft to catch swordfish in northern waters during the summer months. These vessels also participated in other fisheries because of the seasonal nature of the fishery. A mobile New England pelagic longline vessel component was comprised of vessels greater than 50 feet in length, and fished the Florida Straits primarily in winter and spring. Florida longline vessels, approximately 35-50 feet in length, fished mainly between Miami and Cape Canaveral and on the west coast of Florida. There were also Cuban-American vessels, usually between 25 to 40 feet in length, which fished between Key West and Miami. The harpoon fishery usually took female swordfish greater than 200 lb. The longline fleet usually took a mixture of male and female fish weighing between 10 and 300 lb.

By the early 1980s, the early styles of longline gear had been replaced by monofilament style gear. Additionally, the components of the fishery had changed. The larger New England vessels were still highly mobile and were now fishing from the Gulf of Mexico to the Florida Keys. The smaller Florida vessels became more mobile and began expanding into the Carolinas and the mid-Atlantic area. Smaller vessels began to operate up and down the coast and even ventured into the edge of the Grand Banks. Many of these fishermen were either part-time swordfish fishermen who supplemented their income with charter boat fishing or full-time commercial fishermen who also fished for snappers, groupers, tilefish, and tunas.

From the late 1970s until the Atlantic swordfish FMP was approved in 1985, Federal management of swordfish was accomplished through the Preliminary Fishery Management Plan for Atlantic Billfishes and Sharks. This Preliminary FMP (43 FR 3818, January 27, 1978) was prepared by the Department of Commerce and established a number of requirements for foreign vessels fishing within the Atlantic fishery conservation zone (see section 1.1.2 for additional detail on the Preliminary FMP). Starting in June 1984, all vessels intending to catch swordfish by methods other than rod and reel were required to obtain a permit from NMFS Southeast Regional Office. By January 1985, 340 permit applications had been received (SAFMC, 1985b).

The Atlantic Swordfish FMP (February 1985) was prepared by the South Atlantic Fishery Management Council (SAFMC) in cooperation with the Caribbean Fishery Management Council (CFMC), the Gulf of Mexico Fishery Management Council (GOMFMC), the Mid-Atlantic Fishery Management Council (MAFMC), and the New England Fishery Management Council (NEFMC). The final rule implementing the FMP published on August 22, 1985 (50 FR 33952; correction notice 50 FR 35563, September 3, 1985). This plan separated the swordfish fishery from the billfish fishery because by this time virtually all swordfish were taken commercially with longline or harpoon gear, while the majority of billfish were taken recreationally with rod and reel. However, it should be noted that there was a rapidly expanding market for marlin with increasing commercial landings from the late 1970s until the implementation of the Atlantic Billfish Fishery Management Plan in 1988. In the mid-1980s, Atlantic swordfish were considered to be in or near a state of growth overfishing.[2] The plan specified the following five management objectives (SAFMC, 1985b):

(1) Maintaining high landings in the form of the larger fish that are preferred in the market by controlling (reducing) the harvest of smaller swordfish.
(2) Preventing or reducing growth overfishing to create a buffer against possible recruitment overfishing. This was to be done by maintaining a sufficient number of larger fish by controlling the harvest of smaller fish.
(3) Obtaining scientific information to continually monitor and refine the management of the swordfish fishery by an onboard technician program on a sample number of commercial boats.
(4) Monitoring and mitigating user group conflicts using the onboard technician program.
(5) Minimizing the impacts of foreign fishing on the domestic United States swordfish fishery by minimizing the swordfish bycatch of foreign longliners and squid trawls consistent with the requirement to allow opportunities to harvest tuna or catch squid under a Governing International Fisheries Agreement.

Some of the management measures implemented in the Swordfish FMP were: variable season closures to control landings of small swordfish; requiring all commercially-caught swordfish to be landed whole or as carcasses; gear restrictions for closed areas; restrictions to

[2] Growth overfishing occurs when excessive numbers of small fish are harvested from a stock, thereby preventing growth to the size at which the maximum yield-per-recruit would be obtained from the stock.

foreign fishing for tuna longliners and squid trawlers; commercial permit requirement; observer or technician requirements; and reporting requirements for vessels in Puerto Rico or the U.S. Virgin Islands. In September 1986, NMFS published a notice stating that the variable season closures would not be implemented (51 FR 31151, September 2, 1986). In August 1990, a final rule published requiring mandatory dealer reporting (55 FR 35643, August 31, 1990).

In November 1990, ICCAT adopted its first Atlantic swordfish recommendation. This recommendation required members to reduce fishing mortality on fish weighing more than 25 kg (55 lb) by 15 percent from 1988 fishing levels and to prohibit the landing of swordfish less than 25 kg with a 15 percent tolerance level. NMFS implemented this recommendation with an emergency rule (56 FR 26934, June 12, 1991) and later a final rule (56 FR 65007; December 13, 1991).

At its 1994 meeting, ICCAT established specific TAC levels for nations fishing for both North and South Atlantic swordfish stocks. At the 1995 meeting, ICCAT adopted recommendations that allowed nations to maintain the existing minimum size for swordfish with a 15 percent tolerance of smaller fish or alternatively to abide by a smaller minimum size (119 cm or equivalent weight) with no tolerance. ICCAT also adjusted the percentages each country received of the total allowable catch levels for North Atlantic swordfish, and established measures to account for over- and underharvests. Between 1996 and 1999, ICCAT recommendations and NMFS rules modified the existing quotas for Atlantic swordfish.

In 1999, the United States implemented a number of regulations that affected swordfish fishermen, including a prohibition on the use of driftnets in the swordfish fishery, and regulations to aid in tracking swordfish trade including dealer permitting and reporting for all swordfish importers, a documentation scheme that indicated the country of origin and flag of the vessel, and a prohibition on importing swordfish less than the minimum size. These regulations were codified in the first quarter of 1999. In April 1999, NMFS published the 1999 FMP. This FMP replaced the 1985 Swordfish FMP that had been drafted by the Fishery Management Councils. The 1999 FMP maintained a number of the management measures from the previous FMP including reporting requirements, annual quotas, authorized gear, and the minimum size. However, the 1999 FMP also called for the United States to negotiate an international rebuilding plan, required that recreational landings be counted against the U.S. portion of the ICCAT-established TAC, and implemented a limited access program for commercial permits.

In November 1999, ICCAT established a 10-year rebuilding program for Atlantic swordfish. This rebuilding program reduced the North Atlantic TAC, established a dead discard allowance, restated the need for data reporting, and maintained the existing minimum size limits. In 2002, noting the improvement on the stock, ICCAT increased the overall TAC slightly while simultaneously reemphasizing the need to protect juvenile swordfish.

1.1.1.3 Pre-1999 Atlantic Shark Fisheries and Management

Recreational fishing for Atlantic sharks occurs in Federal and state waters from New England to the Gulf of Mexico and Caribbean Sea. In the past, sharks were often called “the poor man’s marlin.” Recreational shark fishing with rod and reel is now a popular sport at all social and economic levels, largely because of accessibility to the resource. Sharks can be caught virtually anywhere in salt water, with even large specimens available in the nearshore area to surf anglers or small boaters. Most recreational shark fishing takes place from small to medium-size vessels. Mako, white, and large pelagic sharks are generally accessible only to those aboard ocean-going vessels. Recreational shark fisheries are exploited primarily by private vessels and charter/headboats although there are some shore-based fishermen active in the Florida Keys.

The commercial shark fishery has been erratic in nature. In the early 1900s, a Pacific shark fishery supplied limited demands for fresh shark fillets and fish meal as well as a more substantial market for dried fins of soupfin sharks. In 1937, the price of soupfin shark liver skyrocketed when it was discovered to be the richest source of vitamin A available in commercial quantities. A shark fishery in the Caribbean Sea, off the coast of Florida, and in the Gulf of Mexico developed in response to this demand (Wagner, 1966). At this time, shark fishing gear included gillnets, hook and line, anchored bottom longlines, floating longlines, and benthic lines for deepwater fishing. These gear types are slightly different than the gears used today and are fully described in Wagner (1966). By 1950, the availability of synthetic vitamin A caused most shark fisheries to be abandoned (Wagner, 1966).

A small fishery for porbeagle existed in the early 1960s off the U.S. Atlantic coast involving Norwegian fishermen. Between the World Wars, Norwegians and Danes had pioneered fishing for porbeagles in the North Sea and in the region of the Shetland, Orkney, and the Faroe Islands. In the late 1940s, these fishermen caught from 1,360 to 2,720 mt yearly, with lesser amounts in the early 1950s (Rae, 1962). The subsequent scarcity of porbeagles in their fishing area forced the Norwegians to explore other grounds, and around 1960, they began fishing the Newfoundland Banks and the waters east of New York. Between 1961 and 1964, their catch increased from 1,800 to 9,300 mt, then declined to 200 mt (Casey *et al*., 1978).

Shark fisheries developed rapidly in the late 1970s due to increased demand for their meat, fins, and cartilage. At the time, sharks were perceived to be underutilized as a fishery resource. The high commercial value of shark fins led to the controversial practice of finning, or removing the valuable fins from sharks and discarding the carcass. Growing demand for shark products encouraged expansion of the commercial fishery throughout the late 1970s and the 1980s. Tuna and swordfish vessels began to retain a greater proportion of their shark incidental catch, and some directed fishery effort expanded as well. The Secretary of Commerce published the Preliminary Fishery Management Plan for Atlantic Billfish and Sharks in 1978, which noted, among other things, the need for international management regarding sharks. As catches accelerated through the 1980s, shark stocks suffered a precipitous decline. Peak commercial landings of large coastal and pelagic sharks were reported in 1989. While organized intensive shark fisheries have fluctuated, more localized shark fisheries have existed for many years.

In 1989, the five Atlantic Fishery Management Councils asked the Secretary of Commerce to develop a Shark FMP. The Councils were concerned about the late maturity and low fecundity of sharks, the increase in fishing mortality, and the possibility of the resource being overfished. The Councils requested that the FMP cap commercial fishing effort, establish a recreational bag limit, prohibit "finning," and begin a data collection system.

In 1993, the Secretary of Commerce, through NMFS, implemented the FMP for Sharks of the Atlantic Ocean. The management measures in the 1993 FMP included:

- Establishing a fishery management unit (FMU) consisting of 39 frequently caught species of Atlantic sharks, separated into three groups for assessment and regulatory purposes (Large Coastal Sharks (LCS), Small Coastal Sharks (SCS), and pelagic sharks);
- Establishing calendar year commercial quotas for the LCS and pelagic sharks and dividing the annual quota into two equal half-year quotas that apply to the following two fishing periods--January 1 through June 30 and July 1 through December 31;
- Establishing a recreational trip limit of four sharks per vessel for LCS or pelagic shark species groups and a daily bag limit of five sharks per person for sharks in the SCS species group;
- Requiring that all sharks not taken as part of a commercial or recreational fishery be released uninjured;
- Establishing a framework procedure for adjusting commercial quotas, recreational bag limits, species size limits, management unit, fishing year, species groups, estimates of maximum sustainable yield, and permitting and reporting requirements;
- Prohibiting finning by requiring that the ratio between wet fins/dressed carcass weight not exceed five percent;
- Prohibiting the sale by recreational fishermen of sharks or shark products caught in the Economic Exclusive Zone (EEZ);
- Requiring annual commercial permits for fishermen who harvest and sell shark (meat products and fins);
- Establishing a permit eligibility requirement that the owner or operator (including charter vessel and headboat owners/operators who intend to sell their catch) must show proof that at least 50 percent of earned income has been derived from the sale of the fish or fish products or charter vessel and headboat operations or at least $20,000 from the sale of fish during one of three years preceding the permit request;
- Requiring trip reports by permitted fishermen and persons conducting shark tournaments and requiring fishermen to provide information to NMFS under the Trip Interview Program; and,
- Requiring NMFS observers on selected shark fishing vessels to document mortality of marine mammals and endangered species.

At that time, NMFS identified LCS as overfished and pelagic and SCS as fully fished. The quotas were 2,436 mt dressed weight (dw) for LCS and 580 mt dw for pelagic sharks. No quota was established for SCS. Under the rebuilding plan established in the 1993 FMP, the LCS quota was expected to increase every year up to the maximum sustainable yield estimated in the 1992 stock assessment.

A number of difficulties arose in the initial year of implementation of the Shark FMP. First, the January to June semi-annual LCS quota was exceeded shortly after implementation of the FMP, and that portion of the commercial fishery was closed on May 10, 1993. The LCS fishery re-opened on July 1, 1993, with an adjusted quota of 875 mt dw. Derby-style fishing, coupled with what some participants observed to be an unusual abundance of sharks, led to an intense and short fishing season for LCS, with the fishery closing within one month. Although fin prices remained strong throughout the brief season, the oversupply of shark carcasses led to reports of record low prices. The closure was significantly earlier than expected, and a number of commercial fishermen and dealers indicated that they were adversely affected. The intense season also complicated the task of monitoring the LCS quota and closing the season with the required advance notice.

To address these problems, a commercial trip limit of 4,000 lb. for permitted vessels for LCS was implemented on December 28, 1993 (58 FR 68556), and a control date for the Atlantic shark fishery was established on February 22, 1994 (59 FR 8457). A final rule to implement additional measures authorized by the FMP published on October 18, 1994 (59 FR 52453), which:

- Clarified operation of vessels with a Federal commercial permit;
- Established the fishing year;
- Consolidated the regulations for drift gillnets;
- Required dealers to obtain a permit to purchase sharks;
- Required dealer reports;
- Established recreational bag limits;
- Established quotas for commercial landings; and
- Provided for commercial fishery closures when quotas were reached.

In 1994, under the rebuilding plan implemented in the 1993 Shark FMP, the LCS quota was increased to 2,570 mt dw. Additionally, a new stock assessment was completed in March 1994. This stock assessment focused on LCS, suggested that recovery to the levels of the 1970s could take as long as 30 years, and concluded that "increases in the [Total Allowable Catch (TAC)] for sharks [are] considered risk-prone with respect to promoting stock recovery." Additionally, declining catch-per-unit-effort (CPUE) and life history characteristics indicated low productivity for pelagic and SCS and suggested a prudent approach for those species as well. A final rule that capped quotas for LCS and pelagic sharks at the 1994 levels was published on May 2, 1995 (60 FR 21468).

In June 1996, NMFS convened another stock assessment to examine the status of LCS stocks. The 1996 stock assessment found no clear evidence that LCS stocks were rebuilding and concluded that "[a]nalyses indicate that recovery is more likely to occur with reductions in effective fishing mortality rate of 50 [percent] or more." In response to these results, in 1997, NMFS reduced the LCS commercial quota by 50 percent to 1,285 mt dw and the recreational retention limit to two LCS, SCS, and pelagic sharks combined per trip with an additional allowance of two Atlantic sharpnose sharks per person per trip (62 FR 16648, April 2, 1997). In this same rule, NMFS established an annual commercial quota for SCS of 1,760 mt dw and prohibited possession of five species. On May 2, 1997, the Southern Offshore Fishing Association (SOFA) and other commercial fishermen and dealers sued the Secretary of Commerce (Secretary) on the April 1997 regulations.

On February 26, 1998, Judge Steven D. Merryday of the U.S. District Court for the Middle District of Florida issued an order in the SOFA case finding that the Secretary "failed to conduct a proper analysis to determine the [April 1997 LCS] quota's economic effect on small businesses." As a result of this finding, Judge Merryday directed NMFS "to undertake a rational consideration of the economic effects and potential alternatives to the 1997 [LCS] quotas" on small businesses engaged in the Atlantic shark commercial fishery. Judge Merryday allowed NMFS to maintain the 1997 quotas pending further order of the court.

In May 1998, NMFS completed its consideration of the economic effects of the 1997 LCS quotas on fishermen and submitted the analysis to the court. NMFS concluded that 1997 LCS quotas may have had a significant economic impact on a substantial number of small entities and that there were no other available alternatives that would both mitigate those economic impacts and ensure the viability of the LCS stocks.

In June 1998, NMFS held another LCS stock assessment. The 1998 stock assessment found that LCS were overfished and would not rebuild under 1997 harvest levels. Based in part on the results of the 1998 stock assessment, in April 1999, NMFS published the 1999 FMP which included numerous measures to rebuild or prevent overfishing of Atlantic sharks in commercial and recreational fisheries. The 1999 FMP replaced the 1993 Atlantic Shark FMP. Management measures related to sharks that changed in the 1999 FMP included:

- Reducing commercial LCS and SCS quotas;
- Establishing ridgeback and non-ridgeback categories of LCS;
- Implementing a commercial minimum size for ridgeback LCS;
- Establishing blue shark, porbeagle shark, and other pelagic shark subgroups of the pelagic sharks and establishing a commercial quota for each subgroup;
- Reducing recreational retention limits for all sharks;
- Establishing a recreational minimum size for all sharks except Atlantic sharpnose;
- Expanding the list of prohibited shark species;
- Implementing limited access in commercial fisheries;
- Establishing a shark public display quota;
- Establishing new procedures for counting dead discards and state landings of sharks after Federal fishing season closures against Federal quotas; and
- Establishing season-specific over- and underharvest adjustment procedures.

The implementing regulations were published on May 28, 1999 (64 FR 29090). On June 25, 1999, SOFA *et al*. sued NMFS again, this time challenging the Atlantic shark commercial measures implemented in the HMS FMP. On June 30, 1999, NMFS received a court order from Judge Merryday relative to the May 1997 lawsuit. Specifically, the order enjoined NMFS from enforcing the 1999 regulations with respect to Atlantic shark commercial catch quotas and fish-counting methods (including the counting of dead discards and state commercial landings after Federal closures), which were different from the quotas and fish counting methods prescribed by the 1997 Atlantic shark regulations. A year later, on June 12, 2000, the court issued an order clarifying that NMFS could proceed with implementation and enforcement of the 1999 prohibited species provisions (64 FR 29090, May 28, 1999).

1.1.1.4 The 1999 Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks

As described, the 1999 FMP replaced the existing Atlantic Shark and Atlantic Swordfish FMPs, and established the first FMP for Atlantic tunas. Before the 1999 FMP, Atlantic tunas were managed only under the ATCA; after the 1999 FMP, Atlantic tunas were managed under both the Magnuson-Stevens Act and ATCA.

NMFS began working on the 1999 FMP shortly after the United States Congress reauthorized the Magnuson-Stevens Act in 1996. The 1996 Magnuson-Stevens Act Amendments added new fishery management requirements including requiring NMFS to halt overfishing; rebuild overfished fisheries; minimize bycatch and bycatch mortality, to the extent practicable; and identify and protect essential fish habitat (EFH). These provisions were coupled with the recognition that the management of HMS requires international cooperation and that rebuilding programs must reflect traditional participation in the fisheries by U.S. fishermen, relative to foreign fleets. Besides the Magnuson-Stevens Act, U.S. fisheries management must be consistent with the requirements of other regulations including the Marine Mammal Protection Act, the Endangered Species Act, the Migratory Bird Treaty Act, and several other Federal laws.

Development of the 1999 HMS FMP began in September 1997 with the formation of the HMS Advisory Panel (AP). The HMS AP was established under a requirement of the Magnuson-Stevens Act, and is composed of representatives of the commercial and recreational fishing communities, conservation and academic organizations, the five regional fishery management councils involved in Atlantic HMS management, the Atlantic and Gulf coastal states, and the U.S. ICCAT Advisory Committee. The HMS AP met seven times during development of the 1999 FMP, including once during the public comment period on the draft FMP, and provided extensive comment and advice to NMFS.

In October 1997, NMFS prepared and distributed a scoping document to serve as the starting point for consideration of issues for the 1999 FMP. The scoping document described major issues in the fishery, legal requirements for management, and potential management measures that could be considered for adoption in the FMP and solicited public comment on these issues. The scoping document was the subject of 21 public hearings that were held in October and November 1997 throughout the management area. The scoping meetings allowed NMFS to gather information from participants in the fisheries, and provided a mechanism by which the public could provide input to NMFS early in the FMP development process.

In October 1998, NMFS announced in the Federal Register the availability of the draft FMP. The comment period on the draft FMP lasted from October 25, 1998, to March 12, 1999. The proposed rule that accompanied the draft FMP was published in the Federal Register on January 20, 1999. The supplemental part that related to the bluefin tuna rebuilding program published in the Federal Register on February 25, 1999. The comment period on the proposed rule and its supplement also went until March 12, 1999. Subsequent to the release of the proposed rule, NMFS held 27 public hearings in communities from Texas to Maine and the Caribbean. During the comment period, NMFS received several thousand comments from commercial and recreational fishermen, scientists, conservationists, and concerned individuals. An HMS AP meeting was held toward the end of the comment period to allow HMS AP members to view most of the comments NMFS had received on the draft FMP and accompanying proposed rule.

The 1999 FMP incorporated all existing management measures for Atlantic tuna and north Atlantic swordfish that have been issued previously under the authority of the ATCA. It also incorporated all existing management measures for north Atlantic swordfish and Atlantic sharks that had previously been issued under the authority of the Magnuson-Stevens Act. South Atlantic swordfish and south Atlantic albacore tuna continue to be managed only under ATCA. In November 2004, ICCAT adopted its first recommendation for Atlantic sharks.

Some of the non-species specific management measures of the 1999 FMP included vessel monitoring systems for all pelagic longline vessels; gear and vessel marking requirements; moving pelagic longline gear after an interaction with a protected species; a requirement for charter/headboats to obtain an annual vessel permit; tournament registration for all HMS tournaments; time limit on completing a vessel logbook; and expanded observer coverage. The 1999 FMP also established the threshold levels to determine if a stock is overfished, if overfishing is occurring, or if the stock is rebuilt. Finally, the 1999 FMP identified essential fish habitat (EFH) for all Atlantic tunas, swordfish, and sharks. As part of the 1999 FMP, the regulations for all Atlantic HMS, including Billfish, were consolidated into one part of the Code of Federal Regulations, 50 CFR part 635. Before then, each species had its own part. This often led to confusion and, in some cases, conflicting regulations.

1.1.1.5 Post 1999 FMP

After issuance of the 1999 FMP, a number of constituents (environmental, commercial fishermen, and recreational fishermen) sued the NMFS (the Agency) over aspects of the plan, including the BFT rebuilding program, the use of vessel monitoring systems in the pelagic longline fleet, the time/area closure for the pelagic longline fleet, the pelagic shark quotas, the shark and yellowfin tuna recreational retention limits, the large and small coastal shark quotas, and the bluefin tuna purse seine allocation. The Agency received favorable court rulings, upholding its actions, in most of these cases and resolved some matters via settlement agreements. All of the briefings and court orders are a matter of the public record.

1.1.1.6 Regulatory Amendments Relating to the Pelagic Longline Fishery

In the 1999 FMP, NMFS committed to implement a closed area that would effectively protect small swordfish. NMFS began to work towards this goal shortly after the publication of the 1999 FMP. After the publication of the 1999 FMP, NMFS was sued by environmentalists who felt, among other things, that the Agency had not done enough to reduce bycatch in HMS fisheries. As a result, NMFS expanded the goal of the rule to reduce all bycatch and bycatch mortality, to the extent practicable, in the HMS pelagic longline fishery. The following objectives were developed to guide agency action for this goal:

- Maximize the reduction in finfish bycatch;
- Minimize the reduction in the target catch of swordfish and other species;
- Consider impacts on the incidental catch of other species to minimize or reduce incidental catch levels; and
- Optimize survival of bycatch and incidental catch species.

NMFS published the final rule implementing the first regulatory amendment to the 1999 FMP on August 1, 2000 (65 FR 47214), which closed three large areas (DeSoto Canyon, Florida East Coast, and Charleston Bump) and prohibited the use of live bait in the Gulf of Mexico.

During the course of this rulemaking, the pelagic longline fleet exceeded the incidental take statement for sea turtles established during the Endangered Species Act (ESA) Section 7 Consultation for the 1999 FMP. That, combined with new information on sea turtles and the uncertainty regarding what the closures would mean for sea turtles, resulted in a new Biological Opinion (BiOp) (June 30, 2000) that concluded that the continuation of the pelagic longline fishery would jeopardize the continued existence of leatherback and loggerhead sea turtles. As a result of the jeopardy finding, NMFS needed to implement certain measures to reduce sea turtle bycatch in the pelagic longline fishery.

Shortly after this conclusion, NMFS decided that further analyses of observer data and additional population modeling of loggerhead sea turtles were needed to determine more precisely the impact of the pelagic longline fishery on turtles. Because of this, NMFS reinitiated consultation on the HMS fisheries on September 7, 2000. In the interim, NMFS implemented emergency regulations, based on historical data on sea turtle interactions, to reduce the short-term effects of the pelagic longline fishery on sea turtles. An emergency rule that closed a portion of the Northeast Distant Statistical Area (NED) and required dipnets and line clippers to be carried and used on pelagic longline vessels to aid in the release of any captured sea turtle published on October 13, 2000 (65 FR 60889).

NMFS issued a BiOp on June 8, 2001 (revised on June 14, 2001), that again concluded that the continued operation of the Atlantic pelagic longline fishery is likely to jeopardize the continued existence of loggerhead and leatherback sea turtles. Accordingly, the BiOp provided a reasonable and prudent alternative (RPA) to avoid jeopardy. This BiOp concluded no jeopardy for other HMS fisheries, but did require additional management measures to reduce sea turtle takes in these fisheries. The RPA included the following elements: closing the NED area effective July 15, 2001 and conducting a research experiment in this area to reduce sea turtle bycatch and bycatch mortality in the PLL fishery; requiring gangions to be placed no closer than twice the average gangion length from the suspending floatlines effective August 1, 2001; requiring gangion lengths to be 110 percent of the length of the floatline in sets of 100 meters or less in depth effective August 1, 2001; and, requiring the use of corrodible hooks effective August 1, 2001. Also, the BiOp included a term and condition for the incidental take statement that required NMFS to issue a regulation requiring that all vessels permitted for HMS fisheries, commercial and recreational, post the sea turtle guidelines for safe handling and release following longline interactions inside the wheelhouse by September 15, 2001. The requirement that all vessels permitted for HMS fisheries post sea turtle handling and release guidelines was modified to specify only bottom and pelagic longline vessels by an August 31, 2001, memorandum from the Office of Protected Resources.

On July 13, 2001, NMFS published an emergency rule (66 FR 36711) to implement several of the BiOp requirements. NMFS published an amendment to the emergency rule to incorporate the change in requirement for the handling and release guidelines that was published in the Federal Register on September 24, 2001 (66 FR 48812).

On July 9, 2002, NMFS published the final rule (67 FR 45393) implementing measures required under the June 14, 2001, BiOp on Atlantic HMS to reduce the incidental catch and post-release mortality of sea turtles and other protected species in HMS Fisheries, with the exception of the gangion placement measure. The rule implemented the NED closure, required the length of any gangion to be 10 percent longer than the length of any floatline if the total length of any gangion plus the total length of any floatline is less than 100 meters, and prohibited vessels from having hooks on board other than corrodible, non-stainless steel hooks. In the HMS shark gillnet fishery, both the observer and vessel operator must look for whales, the vessel operator must contact NMFS if a listed whale is taken and shark gillnet fishermen must conduct net checks every 0.5 to 2 hours to look for and remove any sea turtles or marine mammals from their gear. The final rule also required all HMS bottom and pelagic longline vessels to post sea turtle handling and release guidelines in the wheelhouse. NMFS did not implement the gangion placement requirement because it appeared to result in an unchanged number of interactions with loggerhead sea turtles and an apparent increase in interactions with leatherback sea turtles.

In 2001, 2002, and 2003, NMFS in conjunction with the fishing industry conducted an experiment in the NED to see if certain gear restrictions or requirements could reduce sea turtle captures and mortality. On November 28, 2003, based on the conclusion of this experiment and based on preliminary data that indicated that the Atlantic pelagic longline fishery may have exceeded the ITS in the June 14, 2001 BiOp, NMFS published a Notice of Intent (NOI) to prepare a Supplemental Environmental Impact Statement (SEIS) to assess the potential effects on the human environment of proposed alternatives and actions under a proposed rule to reduce sea turtle bycatch (68 FR 66783).

In January 2004, NMFS reinitiated consultation after receiving data that indicated the Atlantic pelagic longline fishery exceeded the incidental take statement for leatherback sea turtles in 2001 - 2002 and for loggerhead sea turtles in 2002. In the spring of 2004, NMFS released a proposed rule that would require fishermen to use certain hook and bait types and take other measures to reduce sea turtle takes and mortality. The resulting June 1, 2004, BiOp considered these measures and concluded that the pelagic longline fishery was not likely to jeopardize the continued existence of loggerhead sea turtles, but was still likely to jeopardize the continued existence of leatherback sea turtles. NMFS published a final rule implementing many gear and bait restrictions and requiring certain handling and release tools and methods on July 6, 2004 (69 FR 40734). NMFS also published an Advance Notice of Proposed Rulemaking to receive comments on how to further reduce sea turtle mortality (69 FR 49858, August 12, 2004), held several workshops to demonstrate sea turtle release equipment and techniques (69 FR 44513), and released revised sea turtle handling and release placards, protocols, and a video. The placards, protocols, and video are available in English, Spanish, and Vietnamese. NMFS continues to monitor the sea turtle takes in the pelagic longline fishery and may need to take further action if sea turtle takes are not reduced to below the levels specified in the June 2004 BiOp.

1.1.1.7 Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks

After the 1999 FMP, SOFA *et al*. sued the Agency again and in June 1999, the court enjoined the Agency from implementing many of the shark-specific regulations in the 1999 FMP. On November 21, 2000, SOFA *et al*. and NMFS reached a settlement agreement for the May 1997 and June 1999 lawsuits. On December 7, 2000, Judge Merryday entered an order approving the settlement agreement and lifting the injunction. The settlement agreement required, among other things, an independent (i.e., non-NMFS) review of the 1998 LCS stock assessment. The settlement agreement did not address any regulations affecting the pelagic shark, prohibited species, or recreational shark fisheries. Once the injunction was lifted, on January 1, 2001, the pelagic shark quotas adopted in the HMS FMP were implemented (66 FR 55). Additionally, on March 6, 2001, NMFS published an emergency rule implementing the settlement agreement (66 FR 13441). This emergency rule expired on September 4, 2001, and established the LCS and SCS commercial quotas at 1997 levels.

In late 2001, the Agency received the results of the peer review of the 1998 LCS stock assessment. These peer reviews found that the 1998 LCS stock assessment was not the best available science for LCS. Taking into consideration the settlement agreement, the results of the peer reviews of the 1998 LCS stock assessment, current catch rates, and the best available scientific information (not including the 1998 stock assessment projections), NMFS implemented another emergency rule for the 2002 fishing year that suspended certain measures under the 1999 regulations pending completion of new LCS and SCS stock assessments and a peer review of the new LCS stock assessment (66 FR 67118, December 28, 2001; extended 67 FR 37354, May 29, 2002). Specifically, NMFS maintained the 1997 LCS commercial quota (1,285 mt dw), maintained the 1997 SCS commercial quota (1,760 mt dw), suspended the commercial ridgeback LCS minimum size, suspended counting dead discards and state landings after a Federal closure against the quota, and replaced season-specific quota accounting methods with subsequent-season quota accounting methods. That emergency rule expired on December 30, 2002.

On May 8, 2002, NMFS announced the availability of a SCS stock assessment (67 FR 30879). The Mote Marine Laboratory and the University of Florida provided NMFS with another SCS assessment in August 2002. Both of these stock assessments indicate that overfishing is occurring on finetooth sharks while the three other species in the SCS complex (Atlantic sharpnose, bonnethead, and blacknose) are not overfished and overfishing is not occurring. On October 17, 2002, NMFS announced the availability of the 2002 LCS stock assessment and the workshop meeting report (67 FR 64098). The results of this stock assessment indicate that the LCS complex is still overfished and overfishing is occurring. Additionally, the 2002 LCS stock assessment found that sandbar sharks are no longer overfished but that overfishing is still occurring and that blacktip sharks are rebuilt and overfishing is not occurring.

Based on the results of both the 2002 SCS and LCS stock assessments, NMFS implemented an emergency rule to ensure that the commercial management measures in place for the 2003 fishing year were based on the best available science (67 FR 78990, December 27, 2002; extended 68 FR 31987, May 29, 2003). Specifically, the emergency rule implemented the

LCS ridgeback/non-ridgeback split, set the LCS and SCS quotas based on the results of stock assessments, suspended the commercial ridgeback LCS minimum size, and allowed both the season-specific quota adjustments and the counting of all mortality measures to go into place.

In December 2003, NMFS implemented the regulations in Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks (68 FR 74746). These regulations were based on the 2002 small and large coastal shark stock assessments. Some of the measures taken in Amendment 1 included revising the rebuilding timeframe for LCS; re-aggregating the LCS complex; establishing a method of changing the quota based on maximum sustainable yield (MSY); updating some shark EFH identifications; modifying the quotas, seasons, and regions; adjusting the recreational bag limit; establishing criteria to add or remove species to the prohibited shark list; establishing gear restrictions to reduce bycatch and bycatch mortality; establishing a time/area closure off of North Carolina for bottom longline fishermen; and establishing VMS requirements for bottom longline and gillnet fishermen.

1.1.1.8 Other Post-1999 FMP Regulations for Atlantic Tunas, Swordfish, and Sharks

Since the 1999 FMP, there have been a number of other regulatory actions in addition to the rules mentioned above. Below is a short list of some of these actions.

- Removal of the bluefin tuna purse seine category cap: In the 1999 FMP, NMFS finalized an alternative that would have capped the quota for vessels in the purse seine category at 250 mt ww. On November 1, 1999, NMFS published a final rule that removed the purse seine category quota cap (64 FR 58793). In that rule, the purse seine category was given 18.6 percent of the total landings quota available to the United States.
- Change to bluefin tuna incidental category catch limits: In May 2003 (68 FR 32414), NMFS modified the target catch requirements for vessels participating in the Atlantic Tunas Longline category such that pelagic longline vessels would have to land 2,000 lbs. of other fish in order to land one bluefin tuna on a trip, 6,000 lbs. of other fish in order to land two bluefin tuna on a trip, and 30,000 lbs. of other fish to land three bluefin tuna. The rule was designed to reduce the discards of bluefin tuna. This change in the target catch requirements applies to all fishing areas. This rule also maintained separate quotas for the seasonal fisheries, adjusted the Longline category North/South division line to $31^0$00' N. latitude and adjust the Longline category subquotas to allocate 60 percent to the southern area and 40 percent to the northern area.
- Recreational permits and reporting requirements: On December 18, 2002 (67 FR 77434), NMFS published a final rule requiring all vessel owners fishing recreationally (i.e., no sale) for Atlantic HMS, including billfish, to obtain an Atlantic HMS recreational angling category permit. On January 7, 2003 (68 FR 711), a final rule establishing a mandatory reporting system for all non-tournament recreational landings of Atlantic marlins, sailfish, and swordfish was published. These requirements became effective in March 2003.
- International trade permit: On November 17, 2004, NMFS published a final rule that implements the recommendations of ICCAT and the Inter-American Tropical Tuna Commission (IATTC) for bluefin tuna, swordfish, and bigeye tuna. The rule requires all importers and exporters, regardless of ocean basin, of bluefin tuna, swordfish, and bigeye tuna to obtain an HMS International Trade Permit on an annual basis, report imports and

exports on species-specific statistical documents and re-export certificates, and submit biweekly activity reports to NMFS.

- Import restrictions: Due to compliance concerns, ICCAT has recommended numerous import restrictions on countries that have not shown that they are complying with ICCAT recommendations. Current restrictions apply to Bolivia, Cambodia, Equatorial Guinea, Georgia, and Sierra Leone for bigeye tuna, bluefin tuna, or swordfish (69 FR 70396, December 6, 2004). In November 2004, ICCAT recommended lifting these restrictions for Cambodia, Equatorial Guinea, and Sierra Leone. NMFS will propose a rule to lift these restrictions in 2005.
- Quota adjustments: Based on ICCAT recommendations, NMFS has adjusted the quotas for North and South Atlantic swordfish (69 FR 68090, November 23, 2004) and Atlantic bluefin tuna.

Other regulatory actions that have been taken including opening and closing of fisheries and adjustments to quota allocations. All of these actions are not listed here but can be found by searching the Federal Register webpage at http://www.gpoaccess.gov/fr/index.html or by reviewing the annual HMS SAFE reports (http://www.nmfs.noaa.gov/sfa/hms).

1.1.2 History of Atlantic Billfish Fishery Management

Atlantic blue marlin (*Makaira nigricans*), white marlin (*Tetrapturus albidus*), sailfish (*Istiophorus platypterus*), and longbill spearfish *(Tetrapturus pfluegeri)* resources present a unique challenge for fisheries managers in the United States and international fisheries management bodies, such as ICCAT, given their distributional and behavioral patterns. Amplifying billfish management challenges is the incidental nature of most billfish interactions with commercial fishing operations throughout the Atlantic, which creates additional management complexities relative to managing a directed fishery. Atlantic billfish management strategies have been and continue to be guided by international and domestic considerations and mechanisms since the 1970s.

1.1.2.1 Preliminary Fishery Management Plan (PMP) for Atlantic Billfish and Sharks

Domestic management of Atlantic billfish resources has been developed, modified, and implemented in three primary stages and through a series of other rulemakings. In January 1978, the National Marine Fisheries Service (NMFS) published the Preliminary Fishery Management Plan (PMP) for Atlantic Billfish and Sharks (43 FR 3818), which was supported by an EIS (42 FR 57716). This PMP was a Secretarial effort. The management measures contained in the plan were designed to:

1. minimize conflict between domestic and foreign users of billfish and shark resources;
2. encourage development of an international management regime; and
3. maintain availability of billfishes and sharks to the expanding U.S. fisheries.

Primary management measures in the Atlantic Billfish and Shark PMP included:

- Mandatory data reporting requirements for foreign vessels;

- A prohibition on the foreign commercial retention of all billfishes caught within the Fishery Conservation Zone (FCZ) of the United States and stipulated release in a manner that will maximize the probability of survival;
- A hard cap on the catch of sharks by foreign vessels, which when achieved would prohibit further landings of sharks by foreign vessels;
- Permit requirements for foreign vessels to fish in the FCZ of the United States;
- Radio checks by foreign vessels upon entering and leaving the FCZ;
- Boarding and inspection privileges for U.S. observers; and
- Prohibition on intentional discarding of fishing gears by foreign fishing vessels within the FCZ that may pose environmental or navigational hazards.

1.1.2.2 The Fishery Management Plan for the Atlantic Billfishes

Building upon the PMP for Atlantic Billfish and Sharks was The Fishery Management Plan for the Atlantic Billfishes (53 FR 21501). This plan was jointly developed by five regional councils (Caribbean, Gulf, South Atlantic, Mid-Atlantic, New England) and implemented in October 1988 (53 FR 37765). The 1988 FMP defined the Atlantic billfish management unit to include sailfish from the western Atlantic Ocean, white marlin and blue marlin from the North Atlantic Ocean, and longbill spearfish from the entire Atlantic Ocean; described objectives for the Atlantic billfish fishery; and established management measures to achieve those objectives. The objectives identified in the Billfish FMP were to:

1. Maintain the highest availability of billfishes to the U.S. recreational fishery by implementing conservation measures that will reduce fishing mortality;
2. Optimize the social and economic benefits to the nation by reserving the billfish resource for its traditional use, which in the continental United States is almost entirely a recreational fishery; and
3. Increase understanding of the condition of billfish stocks and the billfish fishery.

The primary management measures adopted to achieve the stated objectives of the 1988 Billfish FMP included:

- Defining Optimum Yield (OY) in qualitative terms;
- A prohibition on the sale of Atlantic billfish, with an exemption for small-scale handline (artisanal) fishery in Puerto Rico;
- Establishment of minimum sizes for Atlantic billfish;
- A prohibition on possession of Atlantic billfish by commercial longline and drift net vessels; and
- Establishment of data reporting requirements.

As previously mentioned, passage of the 1996 Magnuson-Stevens Act initiated fundamental changes in U.S. fishery management policy, shifting emphasis to precautionary management strategies. In September 1997, NMFS listed fishery resources considered to be overfished, which included Atlantic blue and white marlin. This Agency action triggered a suite of management requirements, including development of a rebuilding plan for overfished stocks, and reduction in bycatch and bycatch mortality. Further, in 1998, western Atlantic sailfish was added to the list of overfished species. In the international arena, ICCAT made its first-ever binding recommendation for Atlantic blue and white marlin in 1997. ICCAT Recommendation 97-09 required landing reductions of at least 25 percent from 1996 levels by the end of 1999. Improvements in data and monitoring were also included in this recommendation.

1.1.2.3 Interim Rules

On March 24, 1998, NMFS published an interim rule (63 FR 14030) under section 305(c) of the Magnuson-Stevens Act, that increased the minimum size limits for Atlantic blue marlin and Atlantic white marlin to 96 inches lower jaw-fork length (LJFL) and 66 inches LJFL, respectively, and required tournament operators to notify NMFS of tournaments involving any Atlantic billfish at least four weeks prior to commencement. NMFS utilized the increases in size limits to immediately reduce overfishing, and to implement the 1997 ICCAT recommendation, as required by the ATCA. The Agency published an extension and amendment of the interim rule on September 29, 1998 (63 FR 51859), that:

- Further increased the minimum size for Atlantic blue marlin to 99 inches LJFL;
- Restated the minimum size for Atlantic white marlin as 66 inches LJFL;
- Established a recreational bag limit of one Atlantic marlin (blue or white marlin) per vessel per trip;
- Granted the Assistant Administrator for Fisheries (AA) the authority to adjust the bag limit, with a three-day notice, including adjustment to a zero bag limit, if necessary to meet international and domestic management objectives; and
- Continued requirements to notify NMFS of tournaments involving any Atlantic billfish at least 4 weeks prior to commencement. NMFS amended the interim rule on November 13, 1998 (63 FR 63421) by removing the adjustable bag limit provision.

Internationally, ICCAT adopted its second binding recommendation regarding billfish in November 1998. ICCAT Recommendation 98-10 built upon the previously discussed ICCAT Recommendation 97-09 by limiting landings of Atlantic blue and white marlin in the year 2000 to no more than levels required to be achieved by the end of 1999.

1.1.2.4 Amendment One to the Atlantic Billfish Fishery Management Plan

In response to Magnuson-Stevens Act requirements, and concurrent with efforts on the interim rule discussed above, the Agency prepared Amendment One to the Atlantic Billfish Fishery Management Plan and published final regulations on May 28, 1999 (64 FR 29090). Amendment One maintained the objectives of the original 1988 Billfish FMP and identified the following additional objectives:

1. Prevent and/or end overfishing of Atlantic billfish and adopt the precautionary approach to fishery management;
2. Rebuild overfished Atlantic billfish stocks, and monitor and control all components of fishing mortality, both directed and incidental, so as to ensure the long term sustainability of the stocks and promote Atlantic-wide stock recovery to the level where MSY can be supported on a continuing basis;
3. Establish a foundation for the adoption of comparable international conservation and management measures, through international entities such as ICCAT, to rebuild

overfished fisheries and to promote achievement of optimum yield for these species throughout their range, both within and beyond the EEZ;

4. Minimize, to the extent practicable, release mortality in the directed billfish fishery, and minimize, to the extend practicable, bycatch and discard mortality of billfish on gears used in other fisheries;
5. Better coordinate domestic conservation and management of the fisheries for Atlantic tunas, swordfish, sharks, and billfish, considering the multispecies nature of many highly migratory species (HMS) fisheries, overlapping regional and individual participation, international management concerns, and other relevant factors;
6. Provide the data necessary for assessing the fish stocks and managing the fisheries, including addressing inadequacies in collection and ongoing collection of social, economic, and bycatch data on Atlantic billfish fisheries;
7. Coordinate domestic regulations and ICCAT conservation measures for controlling Atlantic-wide fishing mortality;
8. Consistent with other objectives of the amendment, manage Atlantic billfish fisheries for the continuing OY, so as to provide the greatest overall benefit to the Nation, particularly with respect to recreational opportunities and taking into account the protection of marine ecosystems. Optimum yield is the maximum sustainable yield from the fishery, as reduced by any relevant social, economic, or ecological factors;
9. Minimize adverse social and economic effects on recreational and commercial activities to the extent practicable, consistent with ensuring achievement of the other objectives of this plan, and with all applicable laws;
10. Maximize protection of areas identified as essential fish habitat for Atlantic billfish, particularly for critical life stages; and
11. Promote the live release of Atlantic billfish through active outreach and educational programs.

Primary management measures included:

- Adjustment of minimum size regulations for Atlantic billfish;
- A prohibition on the retention of longbill spearfish;
- Maintenance of prohibitions on commercial possession and retention;
- Allowed removal of the hook from Atlantic billfish;
- A requirement for permits and logbook reporting for charterboats targeting billfish, if selected, as part of an HMS charter/headboat system;
- Implementation of billfish tournament notification requirements;
- Implementation of a June 1 to May 31 fishing year;
- Development and implementation of outreach programs; and
- An extension of the management unit for Atlantic marlins.

1.1.2.5 ICCAT 2000

ICCAT adopted additional recommendations (00-13) regarding Atlantic billfish, including an international two-phased rebuilding plan for Atlantic blue and white marlin, in November 2000. Phase I of the plan required that countries (other than the United States) capturing marlins in commercial fisheries reduce white marlin landings from pelagic longline and purse seine fisheries by 67 percent and blue marlin landings by 50 percent from 1999 levels.

ICCAT adopted the marlin rebuilding strategy based on the SCRS' most recent stock assessments that indicated that marlin stocks continued to be severely overfished. ICCAT Recommendation 00-13 also recommended that the United States restrict annual landings by U.S. recreational fishermen to 250 Atlantic blue and white marlin, combined, for 2001 and 2002 (Phase I). This recommendation was subsequently extended through 2006.

1.1.2.6 White Marlin Endangered Species Act (ESA) Listing Review

In September 2001, NMFS received a petition filed pursuant to ESA to list white marlin as endangered or threatened throughout its range and to designate critical habitat. After conducting a comprehensive review of the status of the species, NMFS determined in September 2002 that, while Atlantic white marlin abundance had declined from historical levels, the stock was not at a level that warranted listing under the ESA. The ESA determination specified that another stock status review would occur in 2007. Also, in 2001, the HMS and Billfish Advisory Panels (Billfish AP), a group of state representatives, regional Fishery Management Council members, commercial fishing representatives, recreational fishing representatives, academics, and environmental interest group representatives, indicated that it was necessary to improve the monitoring of recreational swordfish and Atlantic billfish landings.

1.1.2.7 ICCAT 2002

In 2002, Phase 1 of the ICCAT Atlantic marlin rebuilding plan was extended through the year 2005 by adoption of ICCAT Recommendation 02-13. ICCAT amended the rebuilding program by specifying that, through 2005, the annual amount of blue marlin that can be harvested and retained by pelagic longline and purse seine vessels must be no more than 50 percent of the 1996 or 1999 landing levels, whichever is greater. For white marlin, the annual amount allowed to be harvested and retained by pelagic longline and purse seine vessels must be no more than 33 percent of the 1996 or 1999 landing levels, whichever is greater. The United States had already prohibited commercial retention of billfish since the implementation of the 1988 Atlantic Billfish FMP, so it was already compliant with this recommendation. For ICCAT members other than the United States, the plan required the release of all live marlins taken as bycatch in commercial fisheries, but provided an allowance for the landing of fish unavoidably killed, provided that they were not sold. For its part of the rebuilding program, the United States agreed to continue limiting recreational landings of Atlantic blue and white marlin to 250 fish, annually, maintain its regulations prohibiting the retention of marlins by U.S. pelagic longline vessels, and continue monitoring billfish tournaments through scientific observer coverage of at least five percent initially, with the objective of 10 percent coverage by 2002. As recorded in ICCAT compliance tables, the United States remained within its 250 marlin limit in 2001 and 2003, but exceeded the 250 fish limit in 2002. At present, the United States complies with the ICCAT observer requirements by requiring that all HMS tournaments register with NMFS, selecting all billfish tournaments for reporting their results, and assigning observers to many billfish tournaments.

1.1.2.8 Recreational Permitting and Reporting Rules

A key element in complying with Phase I of the marlin rebuilding plan and improving the monitoring of recreational billfish and swordfish landings was establishing a comprehensive monitoring program for all recreational landings of marlin, sailfish and swordfish, particularly those landed outside of fishing tournaments, which are monitored through the Recreational Billfish Survey (RBS).

In early 2002, the HMS and Billfish APs again discussed monitoring U.S. recreational billfish landings, and focused upon both a landings tag program (similar to those operating for the recreational bluefin tuna fisheries in North Carolina and Maryland) and a call-in requirement for all billfish landings.

On December 18, 2002 (67 FR 77434), NMFS published a final rule requiring all vessel owners fishing for Atlantic HMS to obtain an Atlantic HMS recreational angling category permit. On January 7, 2003 (68 FR 711), a final rule establishing a mandatory reporting system for all non-tournament recreational landings of Atlantic marlins, sailfish, and swordfish was published. These requirements became effective in March 2003. These requirements, in combination with mandatory tournament reporting, are improving the ability of the United States to accurately monitor all recreational landings of Atlantic marlins, sailfish, and swordfish, however, non-compliance by recreational anglers remains a significant issue.

1.1.2.9 Proposed Rule to Codify the 250 Marlin Landing Limit

On September 17, 2003, NMFS published a proposed rule (68 FR 54410) to codify an annual landings limit of 250 Atlantic blue and white marlin combined, and to implement a provision to carry forward over- and underharvest of the Atlantic blue and white marlin landing limit into subsequent fishing years, consistent with ICCAT recommendations. To remain in compliance with the landing limit and to maximize allowable landings, NMFS proposed to increase the legal recreational minimum size of Atlantic blue and white marlin for the remainder of a fishing year when 80 percent of the landing limit was projected to be achieved. If the landing limit was attained, NMFS proposed to allow only catch and release fishing for these species for the remainder of the fishing year. The proposed rule was not finalized due to a need to review the methodology of calculating recreational marlin landings. The proposed rule incorporated landings as reported by the Recreational Billfish Survey (RBS), and indicated landings levels of 129 fish for 2002. Application of the new methodology (scalar expansion) resulted in the United States reporting 279 marlin to ICCAT for compliance purposes for 2002, which exceeded the annual 250 fish landings limit by 29 fish. NMFS is continuing to review various methodologies to identify the most appropriate approach for estimating recreational marlin landings.

1.1.2.10 ICCAT 2004

At the November 2004 ICCAT meeting, the United States chose not to apply the scalar expansion methodology for compliance purposes, but rather applied a methodology (RBS + Non-Tournament Reporting System + State Landing Tags) similar, but not identical to that used in the 2001 compliance report and the September 2003 Proposed Rule. Application of this methodology resulted in the United States reporting 131 marlin to ICCAT for compliance purposes in 2004. The United States is continuing to review its methodology to quantify recreationally landed marlins. Further, a new ICCAT Recommendation (as yet unnumbered) was adopted which extended Phase I of the Marlin Rebuilding Plan and delayed the planned

2005 assessment by SCRS of blue and white marlin to 2006 on the basis of inadequate data. This action resulted in an extension of the cap of 250 blue and white marlin, combined, for U.S. recreational landings through 2006.

NMFS intends to withdraw the earlier proposed rule and address the 250 fish landings limit in this current rulemaking.

1.1.3 Combining Management for Atlantic HMS

As previously discussed, NMFS issued two separate FMPs in April 1999 for the Atlantic HMS fisheries. The 1999 Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks, combined, amended, and replaced previous management plans for swordfish and sharks, and was the first FMP for tunas. Amendment One to the Billfish Management Plan updated and amended the 1988 Billfish FMP.

Despite implementation of the PMP for Atlantic billfish and sharks in 1978, which contained only commercial measures for these species, and an increase in commercial billfish landings between 1979 and 1987, which reached over 100 tons (204,215 pounds) (SAFMC, 1988), the 1988 Billfish FMP described the nature and history of the billfish fishery as primarily recreational. Therefore, based on concerns expressed by advisory panel members about consolidating the FMPs for billfish and the other HMS, as well as the unique characteristics of the fishery (described above), NMFS chose to maintain separate FMPs and advisory panels for these species. Nevertheless, over the past five-and-a-half years that these two FMPs have co-existed, there has been a growing recognition by NMFS of the interrelated nature of these fisheries and the need to consider management actions together. In addition, NMFS has identified some adverse ramifications stemming from separation of the plans, including, unnecessary administrative redundancy and complexity, loss of efficiency, and public confusion over the management process. The following examples illustrate the closely intertwined nature of the fisheries and their management: (1) the Magnuson-Stevens Act defines highly migratory species as tuna species, marlin, oceanic sharks, sailfishes, and swordfish; (2) an HMS Angling permit is required to fish for billfish or other HMS recreationally; (3) many of the primary management actions for addressing overfishing and bycatch issues for billfish are already contained in the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks; (4) the regulations for Atlantic billfish and the other Atlantic HMS are all contained in 50 CFR part 635; and (5) the Billfish and HMS Advisory Panels nearly always meet in a combined session.

As such, and consistent with the fifth objective of Billfish Amendment One[3] and the ninth objective listed in the 1999 Tunas, Swordfish, and Sharks FMP[4], NMFS proposes to improve coordination of the conservation and management of the domestic fisheries for Atlantic swordfish, tunas, sharks and billfish by consolidating the management of all HMS into one FMP.

---

[3] To better coordinate domestic conservation and management of the fisheries for Atlantic tunas, swordfish, sharks, and billfish, considering the multispecies nature of many highly migratory species (HMS) fisheries, overlapping regional and individual participation, international management concerns, and other relevant factors.

[4] To better coordinate domestic conservation and management of the fisheries for Atlantic tuna, swordfish, sharks, and billfish, considering the multispecies nature of many HMS fisheries, overlapping regional and individual participation, international management concerns, historical fishing patterns and participation, and other relevant factors.

1.1.3.1 Implications for Management Measures

The 1999 Tunas, Swordfish, and Sharks FMP integrated and replaced preexisting management measures for Atlantic tuna, swordfish, and shark fisheries. Amendment One to the Billfish FMP (1999) was developed in coordination with the Tunas, Swordfish, and Sharks FMP, but augmented rather than replaced the preexisting Billfish FMP, which had been finalized in 1988. The proposed consolidated HMS FMP is intended to augment and combine the 1999 Atlantic Tunas, Swordfish, and Sharks FMP, Amendment One to the 1999 Atlantic Tunas, Swordfish, and Sharks FMP, the 1988 Billfish FMP, and Amendment One to the Billfish FMP into a single fishery management plan. To reiterate, upon issuance of the final rule implementing the consolidated HMS FMP, there will be a single management plan for Atlantic tunas, swordfish, sharks, and billfish. Under the consolidated HMS FMP, the "HMS" would include billfish in all references except where noted otherwise. The regulatory implications of consolidating the FMPs are negligible, as the regulations governing the fisheries for all Atlantic HMS have been consolidated in 50 CFR part 635 since 1999. Thus, unless modifications or additions are specifically discussed in the final consolidated HMS FMP, it will incorporate all existing management measures for Atlantic tunas, swordfish, sharks, and billfish that have been issued previously under the authority of ATCA and the Magnuson-Stevens Act. Should NMFS determine that further changes are necessary, they will be made through the FMP amendment process or through rulemaking as described in the framework provisions. Please see section 1.3 for a discussion of the implications of combining the plans on the plan objectives.

1.1.3.2 Implications for Highly Migratory Species and Billfish Advisory Panels

The HMS and Billfish Advisory Panels (AP) were established in September 1997, pursuant to Magnuson-Stevens Act requirements (16 U.S.C. 1801 et. seq., as amended by the Sustainable Fisheries Act PL 104-297), to assist NMFS in the collection and evaluation of information relevant to the development of the 1999 Tunas, Swordfish, and Sharks FMP and Amendment 1 of the Billfish FMP. Nominations for initial membership on the APs were solicited in March and August of 1997 for the Billfish and HMS APs, respectively, and the first meeting of the APs was held in October of 1997.

Membership for both panels is composed of representatives of the commercial and recreational fishing communities, as well as conservation and academic interests, and attempts to achieve a balance among sector, region, and species. The five regional fishery management councils involved in Atlantic HMS management, the Atlantic and Gulf Coastal States, and the U.S. ICCAT Advisory Committee have *ex-officio* seats. In keeping with operating practices for appointments to Regional Fishery Management Councils, appointments to the 23-member HMS AP have been selected on a staggered, three-year cycle with eight members appointed for a three-year term. For the Billfish AP, which consists of nine appointed members, terms are on a two-year cycle with four members appointed for each two-year term. Staggered terms were implemented to ensure that there is some institutional memory on the APs at all times. The terms of *ex-officio* seats do not expire and assignment and substitution of these AP representatives are at their discretion of the respective agencies. Current AP Members, excluding *ex-officio* seats, are identified in Table 1.1 and Table 1.2.

Table 1.1 Highly Migratory Species Advisory Panel Membership as of February 2005.

Commercial		
Nelson Beideman, New Jersey Term Exp. 12/31/05	William Gerencer, Maine Term Exp. 12/31/07	Dewey Hemilright, N. Carolina Term Exp. 12/31/07
Russell Hudson, Florida Term Exp. 12/31/06	Gail Johnson, Maine Term Exp. 12/31/05	Don Nehls, Florida Term Exp. 12/31/06
Robert McAuliffe, USVI Term Exp. 12/31/07	Richard Ruais, N. Hampshire Term Exp. 12/31/05	Peter Weiss, Massachusetts Term Exp. 12/31/06
Recreational		
James Donofrio, New Jersey Term Exp. 12/31/06	Michael Leech, Florida Term Exp. 12/ 31/06	Joseph Mc Bride, New York Term Exp. 12/ 31/06
Russell Nelson, Florida Term Exp. 12/31/07	Mark Sampson, Maryland Term Exp. 12/31/05	William Utley, Maine Term Exp. 12/31/07
Rom Whitaker, N. Carolina Term Exp. 12/31/05	Richard Stone, North Carolina Term Exp. 12/31/07	
Conservation		
Shana Miller, New York Term Exp. 12/31/07	Roman Bonfil, New York Term Exp. 12/31/07	Sonja Fordham, Wash., DC Term Exp. 12/31/05
Merry Camhi, New York T Term Exp. 12/31/06		
Academic		**ICCAT Advisory Committee Chair**
Dr Phil Goodyear, Florida Term Exp. 12/31/05	Dr. Robert Hueter , Florida Term Exp. 12/31/06	Dr. John Graves, Virginia

Table 1.2 Billfish Advisory Panel Membership as of February 2005.

Commercial		
Jack Devnew, Virginia Term Exp. 12/31/06	William Etheridge, N. Carolina Term Exp. 12/31/05	
Recreational		
Pamela Basco, Texas Term Exp. 12/31/05	Ellen Peel, Florida Term Exp. 12/31/05	
Rick Weber, New Jersey Term Exp. 12/31/06	Robert F. Zales II, Florida Term Exp. 12/31/06	
Environmental	**Academic**	**ICCAT Advisory Committee Chair**
Ken Hinman, Virginia Term Exp. 12/31/05	Dr. Robert Ditton, Texas Term Exp. 12/31/06	Dr. John Graves, Virginia
	Dr. Alvarado Bremer, Texas Term Exp. 12/31/06	

Composition of the existing HMS and Billfish APs, in terms of the number of seats and the percentage of seat allocation, is detailed in Table 1.3. During the FMP consolidation process, the memberships of the two panels will be combined into a single consolidated HMS AP that will advise NMFS on all HMS issues, including billfish. Once the consolidated HMS FMP is finalized, NMFS will review our obligation for balanced representation and re-examine panel membership as appropriate.

Table 1.3 Current Advisory Panel Seat Allocation.

	Current HMS AP		Current Billfish AP	
	# of Seats	% Representation	# of Seats	% Representation
Commercial	9	39.1	2	22.2
Recreational	8	34.8	4	44.4
Conservation	4	17.4	1	11.1
Academic	2	8.7	2	22.2
Totals	23	100	9	99.9

1.2 Need for Action

Since the 1999 FMP and Amendment were implemented, a number of management issues have arisen that either require addressing through an FMP amendment, or that could be implemented more effectively if the action is considered in conjunction with other actions. This section provides a succinct summary of some of the driving forces behind the management measures being considered in this rulemaking. More detail on the individual issues can be found later in the document.

Since the 1999 FMPs, the Agency has determined that overfishing is occurring on finetooth sharks and that Northern Albacore tuna are overfished. The basic requirements of the Magnuson-Stevens Act and of National Standard One are to rebuild overfished stocks and prevent overfishing. In this rulemaking, NMFS intends to address these requirements for these species.

The June 2004 BiOp requires the Agency to conduct training workshops regarding the release sea turtles from pelagic longline gear and certify that fishermen have attended these workshops. Additionally, in Amendment 1 to the Tunas, Swordfish, and Shark FMP, NMFS stated: if shark fishermen can show that they can correctly identify shark species and fish for specific species, that the Agency might consider using species-specific shark quotas in the future. In addition, numerous fishermen and other concerned parties have expressed frustration with interpreting the regulations and finding out about the latest regulations. Many of these needs for workshops and certification problems are beyond what was considered in the 1999 FMPs. Thus, in this rulemaking, NMFS will examine different types of workshops to meet these needs.

In the 1999 Tunas, Swordfish, and Sharks FMP, NMFS established a fishing year for tunas and swordfish that began on June 1 and went to the following May 31. This fishing year was established to allow NMFS time to implement recommendations from ICCAT before the fishing year began. The change to the fishing year, however, has been problamatic given that many of the data infrastructures and reporting requirements both within the Agency and ICCAT are based on calendar year rather than fishing years. Thus, NMFS will revisit this issue during this rulemaking.

In 1999, NMFS published a list of authorized gears for all fisheries across the nation. Occasionally, NMFS receives requests to modify the list of authorized gears. Sometimes these requests include gear that fishermen use in other oceans or elsewhere in the Atlantic to catch the same species; other times the requests are due to additional groups requesting to use a gear that is approved for one permit, but not another. NMFS will consider some of these requests pertaining to HMS in this rulemaking.

Since 1999, NMFS has implemented a number of time/area closures in order to reduce bycatch, to the extent practicable, consistent with National Standard 9. While preliminary analyses have been done to examine the efficacy of these closures, a comprehensive analysis of the impact of the closures on bycatch rates, the fishermen, and the communities has not yet been done. In this rulemaking, NMFS will examine the current time/area closures to determine if these closures are accomplishing the original goals of the closures or if changes are needed. NMFS will also examine the need for additional closures to reduce bycatch in HMS fisheries.

Over the years, BFT management has become increasingly complicated to manage, difficult for the public to understand, and may no longer accurately reflect the needs of the fishery and goals of the FMP. These issues are evident on a daily basis from the number of constituent inquiries addressed by NMFS and the number of inseason management actions necessary throughout the season. In addition, NMFS has received a petition for rulemaking to adjust the quota splits to provide for a General category fishery off of North Carolina in the winter. NMFS will consider these requests and also considering ways of simplifying the complexities of managing the BFT fishery.

A primary concern in the management of Atlantic billfish is to achieve the objectives, rebuilding goals, and ultimately the precautionary management goals established in the Billfish FMP and Amendment One to the Billfish FMP as revised by in this consolidated HMS FMP. Despite implementation of management measures contained in those plans, additional domestic regulations, and internationally recommended management measures, the status and or fishing mortality rate associated with Atlantic blue and white marlin has continued to worsen. Currently, the status of sailfish and spearfish is uncertain. Atlantic white marlin has been identified as the most severely overfished species of any stock under ICCAT's purview for the past four years, but nevertheless continues to be subjected to high and unsustainable levels of fishing mortality throughout the Atlantic. In 2002, the United States undertook a status review of white marlin pursuant to the ESA. While the status review team determined that white marlin stock status did not warrant a listing at that time, it concluded that "unless fishing mortality is reduced significantly and relatively quickly, the stock could decline to a level that would warrant ESA protection" (White Marlin Status Review Team 2002). NOAA did commit to conducting another ESA listing review in 2007. Ultimately, since being identified as overfished in 1997, increasing rates of fishing mortality and the continuing declines in the status of blue and white marlin have diminished the likelihood of achieving domestic rebuilding goals and objectives, as outlined in Table 1.4.

Table 1.4 Billfish Management Benchmarks and Current Stock Status.

	Blue Marlin	White Marlin[1]	Sailfish
Maximum Sustainable Yield	~2,000 mt (~1,000-2,000 mt)	964 mt (849-1070)	N/A
2003 Yield	1,951 mt*	N/A	N/A

	Blue Marlin	White Marlin[1]	Sailfish
Current Status of Atlantic Billfish Stocks			
Relative Biomass (B_{year}/B_{MSY})	0.4 (~0.25-0.6)	0.12 (0.06-0.25)	N/A
Relative Fishing Mortality (F_{year}/F_{MSY})	4.0 (~2.5 – 6.0)	8.28 (4.5-15.8)	N/A
Status Determination Criteria			
Maximum Fishing Mortality Threshold (MFMT)	F_{MSY}	F_{MSY}	F_{MSY}
Minimum Stock Size Threshold (MSST)	$0.9B_{MSY}$	$0.85B_{MSY}$	$0.75B_{MSY}$
Rebuilding Target and Fishing Mortality Levels			
B_{Target}	B_{MSY}	B_{MSY}	B_{MSY}
Precautionary Management: Optimum Yield and Associated Parameters			
Optimum Yield	1.3 B_{MSY}	1.3 B_{MSY}	1.3 B_{MSY}

1 Based on Continuity Case Estimate (80% confidence limits) as presented in SCRS 2004
* Based on Task I Data value, which is likely to be a substantial underestimate of the total catch.

The United States has led billfish conservation efforts internationally over the past decade. The effects of these efforts, while serving to move conservation forward in the policy arena, are as yet uncertain from a biological perspective. Additional information on this issue should be available in 2006 when the next ICCAT stock assessment for Atlantic marlin is scheduled. While the United States cannot unilaterally reverse stock declines for these species given the international nature of the fishery, additional domestic management actions are possible and necessary to augment steps that have thus far been unable to stem long-term downward population trends and or increasing fishing mortality rates for Atlantic marlins. Failure of the United States to continue leading international efforts to rebuild marlin will likely result in this issue losing visibility and priority among international fishery managers, as marlin are generally taken incidentally to directed fishing activities for more commercially valuable species. The rulemaking process and the management measures analyzed are a critical component of demonstrating such leadership. Reinforcing the need for action are new data suggesting that post-release mortality for white marlin from recreational catch and release fishing with traditional J-hooks may be noticeably higher than previous estimates.

In addition, this consolidated HMS FMP will begin to conduct a five-year review of EFH consistent with the Magnuson-Stevens Act. The Magnuson-Stevens Act required the Secretary, through NMFS, to establish guidelines to assist in the description and identification of EFH in FMPs, among other things. The Agency set forth a schedule for the review and update of such EFH identifications based on new scientific evidence or other relevant information. The EFH guidelines articulate processes for determining the extent of EFH that encompasses each species and life-stage in a managed fishery. In addition, the EFH guidelines call for periodic review and revision of EFH identified areas based on available information, as well as a complete review of all EFH information at least once every five years. NMFS originally described and identified EFH for all HMS, including Atlantic Billfish, in 1999, and recently updated the EFH for five shark species (blacktip, dusky, finetooth, nurse, and sandbar) in Amendment 1 to the FMP for

Atlantic Tunas, Swordfish, and Sharks, which was finalized in 2003. For this rulemaking, NMFS will review the information available for all HMS, including billfish, and update such EFH identifications and descriptions, as appropriate. An analysis of the fishing and non-fishing impacts on HMS and other EFH will be done as appropriate.

This rulemaking will also consider a number of corrections and additions to the Atlantic HMS regulations at 50 CFR part 635 and other relevant sections in the CFR (e.g., 50 CFR part 300 contains information regarding international trade) in order to clarify their intent, remove incorrect cross-references, remove dated regulations, as appropriate, and aid enforcement.

1.3 Objectives

Amendment and consolidation of the 1999 Tunas, Swordfish, and Shark and the Billfish FMPs and their amendments provides an opportunity to review the suitability and relevance of the HMS and Billfish FMP objectives. Both plans contain a detailed set of objectives, of which many overlap, complement, or otherwise reinforce each other. At the same time, a small number of objectives are unique to each plan, and may not logically apply to the other plan. NMFS has identified potential changes to the objectives of the existing FMPs that will remove redundancy and update some objectives. In some cases, NMFS is proposing to combine similar objectives, carry unique objectives into the combined HMS FMP unchanged, or modify objectives. Table 1.5 identifies the objectives of the existing HMS and Billfish FMPs as well as the proposed list of objectives for the consolidated HMS FMP.

Table 1.5 Existing and Proposed Objectives of the HMS, BLF, and Consolidated HMS FMPs. Highlighted text indicates the differences in objectives between the two existing FMPs.

Obj. #	Tunas, SWO, and SHK FMP	BLF FMP and BLF A1	Proposed Consolidated FMP
1	To prevent or end overfishing of Atlantic tuna, swordfish, and sharks and adopt the precautionary approach to fishery management	Prevent and/or end overfishing of Atlantic billfish and adopt the precautionary approach to fishery management	Prevent or end overfishing of Atlantic tuna, swordfish, billfish, and sharks and adopt the precautionary approach to fishery management
2	To rebuild overfished fisheries in as short a time as possible and control all components of fishing mortality, both directed and incidental, so as to ensure the long-term sustainability of the stocks and promote stock recovery of the management unit to the level at which the maximum sustainable yield can be supported on a continuing basis	Rebuild overfished Atlantic billfish stocks, and monitor and control all components of fishing mortality, both directed and incidental, so as to ensure the long-term sustainability of the stocks and promote Atlantic-wide stock recovery to the level where MSY can be supported on a continuing basis	Rebuild overfished Atlantic HMS stocks, and monitor and control all components of fishing mortality, both directed and incidental, so as to ensure the long-term sustainability of the stocks and promote stock recovery of the management unit to the level where MSY can be supported on a continuing basis

Obj. #	Tunas, SWO, and SHK FMP	BLF FMP and BLF A1	Proposed Consolidated FMP
3	To minimize, to the extent practicable, bycatch of living marine resources and the mortality of such bycatch that cannot be avoided in the fisheries for Atlantic tuna, swordfish, and sharks	Minimize, to the extent practicable, release mortality in the directed billfish fishery, and minimize, to the extend practicable, bycatch and discard mortality of billfish on gears used in other fisheries	Minimize, to the extent practicable, bycatch of living marine resources and the mortality of such bycatch that cannot be avoided in the fisheries for Atlantic HMS, as well as release mortality in the directed billfish fishery
4	To establish a foundation for international negotiation on conservation and management measures to rebuild overfished fisheries and to promote achievement of optimum yield for these species throughout their range, both within and beyond the exclusive economic zone. Optimum yield is the maximum sustainable yield from the fishery, reduced by any relevant social, economic, or ecological factors	Establish a foundation for the adoption of comparable international conservation and management measures, through international entities such as ICCAT, to rebuild overfished fisheries and to promote achievement of optimum yield for these species throughout their range, both within and beyond the EEZ	Establish a foundation for international negotiation on conservation and management measures to rebuild overfished fisheries and to promote achievement of optimum yield for these species throughout their range, both within and beyond the exclusive economic zone. Optimum yield is the maximum sustainable yield from the fishery, reduced by any relevant social, economic, or ecological factors
5	To minimize, to the extent practicable, economic displacement and other adverse impacts on fishing communities during the transition from overfished fisheries to healthy ones	Minimize adverse social and economic effects on recreational and commercial activities to the extent practicable, consistent with ensuring achievement of the other objectives of this plan, and with all applicable laws	Minimize, to the extent practicable, adverse social and economic impacts on fishing communities and recreational and commercial activities during the transition from overfished fisheries to healthy ones, consistent with ensuring achievement of the other objectives of this plan and with all applicable laws
6	To provide the data necessary for assessing the fish stocks and managing the fisheries, including addressing inadequacies in current collection and ongoing collection of social, economic, and bycatch data about HMS fisheries	Provide the data necessary for assessing the fish stocks and managing the fisheries, including addressing inadequacies in collection and ongoing collection of social, economic, and bycatch data on Atlantic billfish fisheries	Provide the data necessary for assessing the fish stocks and managing the fisheries, including addressing inadequacies in collection and ongoing collection of social, economic, and bycatch data on Atlantic HMS fisheries

Obj. #	Tunas, SWO, and SHK FMP	BLF FMP and BLF A1	Proposed Consolidated FMP
7	Consistent with other objectives of this FMP, to manage Atlantic HMS fisheries for continuing optimum yield so as to provide the greatest overall benefit to the Nation, particularly with respect to food production, providing recreational opportunities, preserving traditional fisheries, and taking into account the protection of marine ecosystems	Consistent with other objectives of this amendment, manage Atlantic billfish fisheries for the continuing optimum yield so as to provide the greatest overall benefit to the Nation, particularly with respect to recreational opportunities and taking into account the protection of marine ecosystems. Optimum yield is the maximum sustainable yield from the fishery, as reduced by any relevant social, economic, or ecological factors.	Consistent with other objectives of this FMP, to manage Atlantic HMS fisheries for continuing optimum yield so as to provide the greatest overall benefit to the Nation, particularly with respect to food production, providing recreational opportunities, preserving traditional fisheries to the extent practicable, and taking into account the protection of marine ecosystems
8	To better coordinate domestic conservation and management of the fisheries for Atlantic tuna, swordfish, sharks, and billfish, considering the multispecies nature of many HMS fisheries, overlapping regional and individual participation, international management concerns, historical fishing patterns and participation, and other relevant factors	Better coordinate domestic conservation and management of the fisheries for Atlantic tunas, swordfish, sharks, and billfish, considering the multispecies nature of many highly migratory species (HMS) fisheries, overlapping regional and individual participation, international management concerns, and other relevant factors	Better coordinate domestic conservation and management of the fisheries for Atlantic tuna, swordfish, sharks, and billfish, considering the multispecies nature of many HMS fisheries, overlapping regional and individual participation, international management concerns, historical fishing patterns and participation, and other relevant factors
9	To provide a framework, consistent with other applicable law, to take necessary action under ICCAT compliance recommendation	Coordinate domestic regulations and ICCAT conservation measures for controlling Atlantic-wide fishing mortality	Provide a framework, consistent with other applicable law, to take necessary action under ICCAT compliance and/or conservation recommendations
10	To promote protection of areas identified as essential fish habitat for tuna, swordfish, and sharks	Maximize protection of areas identified as essential fish habitat for Atlantic billfish, particularly for critical life stages	Promote conservation and enhancement of areas identified as essential fish habitat for Atlantic HMS, particularly for critical life stages
11	To simplify and streamline HMS management while actively seeking input from affected constituencies, the general public, and the HMS AP		To simplify and streamline HMS management while actively seeking input from affected constituencies, the general public, and the HMS AP
12		Promote the live release of Atlantic billfish through active outreach and educational programs	Promote the live release and tagging of Atlantic HMS through active outreach and educational programs

Obj. #	Tunas, SWO, and SHK FMP	BLF FMP and BLF A1	Proposed Consolidated FMP
13		Maintain the highest availability of billfishes to the U.S. recreational fishery by implementing conservation measures that will reduce fishing mortality	Delete. See objective numbers 2, 4, 5, and 7.
14		Optimize the social and economic benefits to the nation by reserving the billfish resource for its traditional use, which in the continental United States is almost entirely a recreational fishery	Delete. See objective numbers 5 and 7.
15		Increase understanding of the condition of billfish stocks and the billfish fishery	To increase understanding of the condition of HMS stocks and HMS fisheries
16	To reduce latent effort and overcapitalization in HMS commercial fisheries		To create a management system to make fleet capacity commensurate with resource status so as to achieve the dual goals of economic efficiency and biological conservation while reducing latent effort and overcapitalization
17	To create a management system to make fleet capacity commensurate with resource status so as to achieve the dual goals of economic efficiency and biological conservation		Combine with objective 16.
18	To develop eligibility criteria for participation in the commercial shark and swordfish fisheries based on historical participation, including access for traditional swordfish handgear fishermen to participate fully as the stock recovers		Delete. See objective number 16.

In addition to the proposed consolidated FMP objectives identified in table 1.5, the objectives of this rulemaking are to:

- Better coordinate domestic conservation and management of the fisheries for Atlantic tunas, swordfish, sharks, and billfish, considering the multi-species nature of many HMS fisheries;
- Reduce mortality of Atlantic billfish in directed and non-directed fisheries;
- Improve data collections;
- Implement, to the extent practicable, the bycatch reduction strategy using the standardized bycatch reduction methodology;
- Review and update EFH identifications for Atlantic HMS, as needed; and,
- Simplify management of Atlantic HMS, to the extent practicable.

1.4 Issues for Future Consideration and Outlook

Beyond the issues identified in the need for action, as discussed in Section 1.2, other new and unresolved matters have been identified by NMFS as important to rebuilding and maintaining fisheries that are economically and biologically sustainable. To this end, the issues identified below were generated by input from the general public during the scoping process for this rulemaking, the HMS and Billfish Advisory Panels, NMFS staff, and other fora. Further consideration of these and other issues in the future may be helpful in improving management. While NMFS was unable to include all the issues in this rulemaking due to time requirements and complexities for some of the issues in this rulemaking (e.g., those that need to be addressed in 2005) and those in this list (e.g., revising limited access could take a number of years to complete), NMFS may consider the issues in this list during future rulemakings, possibly through framework actions. This list is not comprehensive in nature, but rather identifies only a portion of the issues brought to the attention of NMFS that may need to be addressed in the future. The order in which these issues are listed is not in order of priority.

1.4.1 Bluefin Tuna Size Limits and Tolerances

Current regulations limit Purse Seine vessel landings of large medium bluefin tuna (73 inches to less than 81 inches) to no more than 15 percent, by weight, of the total amount of giant bluefin tuna landed during a fishing year. Purse seine fishery participants commented that these restrictions may no longer be appropriate as schools of bluefin appear to be comprised of mixed size classes to a greater degree than in the past, thereby preventing the harvest of the available quota without exceeding bluefin tuna size limit tolerances. Purse seine fishery participants have also commented that it is not possible to predict the total amount of giant bluefin tuna that will be landed during a fishing year, which affects their ability to comply with the percent requirement of large medium bluefin tuna landed by fishing year.

1.4.2 Filleting of Tunas At-Sea

Under current regulations at 50 CFR 635.30(a), "persons who own or operate a fishing vessel that possesses an Atlantic tuna in the Atlantic Ocean or that lands an Atlantic tuna in an Atlantic coastal port must maintain such Atlantic tuna through offloading either in round form or eviscerated with the head and fins removed, provided that one pectoral fin and the tail remain attached." Eviscerated is defined as a fish that has only the alimentary organs removed. The regulations are intended to aid in enforcing the minimum size limit, retention limits, and species identification.

Over the past several years the HMS Charter/Headboat industry, more specifically the headboat sector, has requested that it be exempt from the current regulations and allowed to fillet Atlantic tunas at sea. Industry representatives claim that headboats are adversely impacted by the current regulations in a number of ways. Specifically, because headboats can carry upwards of 40 passengers and because hold capacity on a headboat is limited, the inability to fillet at sea can adversely impact the quality of the fish that are retained (because it cannot be stored properly). Additionally, once a headboat returns to port, crew members may be working under tight timeframes to leave port and embark on another trip and may not have time to fillet tuna for paying passengers. Allowing processing of the catch while the vessel is steaming back to port may allow crew to leave the vessel, passengers to go home, or the vessel to conduct a subsequent trip immediately upon returning to port. Nevertheless, while authorizing filleting at sea may have several economic and social advantages for the industry as set forth above, waiving the current regulations could render enforcement of size limits, retention limits, and species identification difficult.

1.4.3 Pelagic Shark Quotas

Pelagic sharks are subject to exploitation by many different nations and exhibit trans-oceanic migration patterns. Currently, the 1999 Tunas, Swordfish, and Sharks FMP has established species-specific quotas for pelagic sharks, including porbeagle (92 mt dw), blue (273 mt dw), and all other pelagic sharks (488 mt dw), in order to limit expansion in the fishery, pending additional scientific assessment. Given the transboundary/international nature of pelagic shark populations and the fisheries that interact with them, the ICCAT SCRS agreed to conducted a stock assessment in June 2004 for some species of pelagic sharks, with an emphasis on blue and shortfin mako sharks. For assessment purposes the stocks were divided into North and South Atlantic populations. With noticeable caveats pertaining to substantial levels of uncertainty, the assessment concluded that overfishing of blue shark populations in the North and South Atlantic is not occurring. The assessment also stated that based on historical CPUE trends and model outputs, North Atlantic shortfin mako populations are likely to have experienced some level of stock depletion and that overfishing may possibly be occurring. For the South Atlantic stock, current stock biomass may have decreased since 1971, but the magnitude of decline appears to be less than in the North Atlantic (SCRS, 2004). A conclusion as to the stock status relative to MSY for the South Atlantic population could not be made. A range of comments were received on the issue of pelagic shark quotas during the scoping process including, but not limited to, calls to increase quotas, reduce quotas, and to eliminate the pelagic shark quota sub categories.

1.4.4 Large coastal shark trip limits

In 1994, in order to lengthen the fishing season for large coastal sharks and to reduce the derby fishery, NMFS implemented a 4,000 lb trip limit on LCS. This trip limit was maintained for directed shark permit holders after implementation of the limited access program in 1999. Incidental shark permit holders have a lower trip limit, as the this permit is intended to allow limited numbers of sharks taken incidentally to directed fishing activities for other species to be landed, thereby reducing waste and allowing limited economic benefit from what would otherwise be bycatch. Fishermen have commented that the directed trip limit is unnecessary because upgrading restrictions prevent large vessels from re-entering the fleet and that, because fishermen do not weigh sharks until they reach the docks, some latitude of the trip limit is needed. Additionally, some fishermen note that they often exceed the trip limit on one set and need to cut their gear and return to it later, which can reduce safety at sea and increase bycatch. NMFS examined the LCS trip limit issue during scoping for Amendment 1 to the 1999 Tunas, Swordfish, and Sharks FMP. In this process, a number of suggestions were made by the public, including, but not limited to, increasing the trip limit, decreasing the trip limit, eliminating the trip limit, providing a tolerance, and others. However, to address shark issues in a comprehensive rather than piecemeal fashion, the Agency has decided to wait until the issue could be examined with possible adjustments to the limited access program, including upgrading restrictions and the incidental trip limits.

1.4.5 Limited Access Permit Reform

The HMS limited access permit program was established in the 1999 Tunas, Swordfish, and Sharks FMP in order to reduce latent effort and begin the process of rationalizing catch capacity with the available quota, while simultaneously avoiding negative impacts to the livelihood of those who were substantially dependent upon these fisheries. Since its inception, a number of issues pertaining to the program have been identified by constituents, advisory panel members, NMFS staff, and others. These have included, but are not limited to, further rationalizing some segments of the HMS fisheries, streamlining or simplifying the permitting process, altering existing upgrading restrictions, restructuring the permit process to a gear based permit system from the current species based permit system, and reopening some segments of the limited access system to allow for the issuance of additional permits. Addressing these issues in the future will be important to the successful long term stewardship of HMS fisheries.

1.4.6 Observers

Observers provide a baseline of data and biological samples used to estimate the accuracy of data from other data collection programs, including industry based programs such as logbooks or vessel trip reports. Observer data are generally considered to have a high standard of quality, however, observer programs are expensive to operate. Current HMS regulations allow NMFS to select any vessel that has an Atlantic HMS tunas, shark, or swordfish permit for observer coverage. Vessels permitted in the HMS Charter/Headboat and Angling categories can be requested to take observers on a voluntary basis. Recent biological opinions pertaining to HMS fisheries require NMFS to collect observer information specific to sea turtles and marine mammals on pelagic longline vessels and commercial vessels participating in the Atlantic shark fisheries. NMFS continues to explore ways to enhance and improve observer coverage programs.

1.4.7 Recordkeeping and Reporting

Recreational fisheries are a major component of Atlantic HMS fisheries. Because recreational landings of Atlantic HMS are not marketed through commercial channels it is not possible to monitor anglers' catches through ex-vessel transactions as in the commercial fishery. Instead, NMFS collects data through other means including the two primary statistical sampling surveys of the recreational fisheries: the Marine Recreational Fishery Statistics Survey (MRFSS) and the Large Pelagics Survey (LPS). Both surveys consist of a telephone survey to estimate effort and a dockside intercept program to collect CPUE data or landings. The utility and accuracy of both surveys has been questioned in recent years. To improve recreational data collection, NMFS began a pilot program in the Gulf of Mexico to collect data from the for-hire sector as part of the MRFSS in 1999. A similar modification was made to the MRFSS on the Atlantic coast in 2003. NMFS also uses other programs to collect information on recreational fisheries for Atlantic HMS, including tournament registration and reporting and self-reporting systems. Mandatory call-in systems were implemented in 1997 for bluefin tuna, and in 2003 for Atlantic billfish and swordfish. NMFS is also working cooperatively with individual states to develop more effective monitoring of Atlantic HMS recreational fisheries, such as the North Carolina and Maryland catch cards and body tag systems. Despite these data collection systems, NMFS seeks to further enhance its recreational data collection efforts.

Dealers and fishermen provide fishery dependent information that is essential to the management of HMS fisheries. Data on landings and sales provided by dealers and information on catch, landings, location, and effort provided by fishermen are used for biological, social, and economic analyses necessary for fisheries management. Data collection requirements and needs frequently vary from fishery to fishery even within HMS. As a result, dealers and fishermen may be required to report data about different species on different NMFS forms to more than one NMFS office. Different types of information may be collected using different methodologies such as vessel trip reports or vessel logbooks. Most are submitted in hard copies, but some fisheries have instituted electronic reporting. Currently in HMS fisheries, all commercial fishing vessels and charter/headboat vessels are required to submit logbooks for all HMS trips, if they are selected for reporting. Permit holders selected for reporting include all shark and swordfish fishermen and Atlantic tunas longline category vessels. These permit holders are required to submit logbooks to the Southeast Region of NMFS. NMFS believes that better administration and coordination of reporting programs and requirements for dealers and fishermen of HMS species can ultimately streamline reporting requirements and procedures, thereby ensuring that information necessary for the management of HMS species is collected more efficiently.

1.4.8 Billfish COE

Currently, a Billfish Certificate of Eligibility (COE) is required for all first receivers of Pacific billfish for the domestic trade of fresh or frozen billfish shipments. The purpose of the collection of this information is to maintain the nature of the Atlantic billfish fishery as a recreational resource with no commercial trade, as designated in the Atlantic Billfish FMP. The COE augments NMFS' ability to quantify all billfish that enter into the commerce of the United States and to establish that these fish were not harvested in or from the Atlantic billfish management unit. The required COE document provides information on the vessel that caught the billfish and contains a declaration from the dealer or processor that the accompanying billfish was not harvested from the Atlantic Ocean management unit. A dealer or processor who subsequently receives or possesses billfish covered by an original document is only required to complete the Dealer's/Processor's Declaration, and retain a copy of the COE while processing the billfish. Currently, dealers and processors do not have to provide the required Billfish COE information on a specific form, although NMFS provides, on the Internet or upon request, a standard form to facilitate the data collection. Also, NMFS does not collect the information upon final disposition of the billfish. In the scoping process, commentors expressed support for strengthening the Billfish COE program and potentially requiring the use of a standard form and/or submission of the form to NMFS upon final disposition of the billfish. Such action would standardize reporting requirements that may improve compliance, facilitate enforcement, and improve the quality and quantity of information on Pacific billfish shipments.

2.0 PROS AND CONS OF POTENTIAL ALTERNATIVES

2.1 Bycatch Reduction

2.1.1 Workshops

Biological Opinions issued in October 2003 and June 2004 specify that the HMS Management Division of NMFS conduct workshops for participants in the Atlantic shark fisheries and the HMS pelagic longline fishery that address conservation of protected resources, particularly sea turtles and smalltooth sawfish, through safe handling and gear removal training. To that effect, the HMS Management Division proposes to conduct several workshops to address those and related issues. These workshops fall into four categories: (1) sea turtle release and disentanglement workshops for pelagic longline fishermen; (2) HMS and protected resources identification; (3) protected resources and bycatch interactions in commercial HMS fisheries; and (4) **c**ompliance with, and understanding of, HMS regulations.

2.1.1.1 Workshops – Sea Turtle Release and Disentanglement Workshops for Pelagic Longline Fishermen

These workshops are intended to address the problem of incidental capture of loggerhead and leatherback sea turtles in the HMS pelagic longline (PLL) fishery. The workshops would relay information and demonstrate techniques specific to sea turtle release and disentanglement protocols as per the current NMFS standards. Through these workshops, participants would be trained to safely disentangle, resuscitate, and release captured sea turtles. The dissemination of this information is an important element in further reducing sea turtle post release mortality. During these workshops, participants would be given a comprehensive examination, which, upon successful completion, would result in a multi-year certification. These workshops would likely be held at several regional locations, during non-peak fishing times. After the initial series of workshops, NMFS will continue to provide certification opportunities for captains and crewmembers entering the PLL fishery.

Alternatives	Pros	Cons
1. No Action: Voluntary workshops for PLL vessel owners, captains, and crewmembers, continued distribution of wheelhouse placards, safe release protocols, educational videos, as well as additional information being disseminated through the activities of the NMFS PLL Point of Contact (POC).	Travel costs and lost fishing time for participants are discretionary, not mandatory; Would have some positive ecological impact by reducing sea turtle post-release mortality; May improve communication between constituents and the Agency; Continued availability of the PLL POC; Administrative costs and burden would be less than for mandatory workshops.	Some negative economic impacts related to workshop travel and lost fishing time may be incurred by fishery participants who choose to attend; Voluntary workshops would likely not allow the Agency to certify or require that large numbers of fishery participants are trained; May limit the dissemination of information critical to the safe release and disentanglement of sea turtles; In the past, voluntary workshops have not been well attended; Some administrative and cost burden to the Agency; Costs for the creation of educational and certification materials in multiple languages; Costs associated with the use of interpreters for workshops; Does not ensure that fishermen view and/or read distributed materials.
2. Mandatory workshops and certification for all PLL vessel captains, with additional information disseminated through the activities of the NMFS PLL POC.	Would likely have a positive ecological impact by reducing sea turtle post-release mortality; Would allow the Agency to certify at least one individual per vessel; Would give certified captains required skill that may increase their bargaining position for a job; Would increase the Agency's ability to disseminate information critical to the safe release and disentanglement of sea turtles; May improve communication between constituents and the Agency; Continued availability of the PLL POC.	If the captain is busy with the vessel during haulbacks, he may not be available to handle sea turtle catches; Negative economic impacts related to workshop travel and lost fishing time would likely be incurred by fishery participants; Administrative and cost burden to the Agency greater than for voluntary workshops; Costs for the creation of educational and certification materials in multiple languages; Costs associated with the use of interpreters for workshops;

Alternatives	Pros	Cons
3. Mandatory workshops and certification for all PLL vessel captains and one or two crewmembers per permitted vessel, with additional information being disseminated through the activities of the NMFS PLL POC.	Would likely have a positive ecological impact by reducing sea turtle post-release mortality; Would allow the Agency to certify more than one individual per vessel ensuring that at least one trained person is available during each haulback; Would give the certified crewmember and captain a required skill that may increase their bargaining position for a job; Would increase the Agency's ability to disseminate information critical to the safe release and disentanglement of sea turtles; May improve communication between constituents and the Agency; Continued availability of the PLL POC.	Negative economic impacts related to workshop travel and lost fishing time would likely be incurred by fishery participants; Administrative and cost burden to the Agency greater than for voluntary workshops; Costs for the creation of educational and certification materials in multiple languages; Costs associated with the use of interpreters for workshops.
4. Mandatory workshops and certification for all PLL vessel captains, crewmembers, and vessel owners, with additional information being disseminated through the activities of the NMFS PLL POC.	Having all those associated with the vessel and fishing activities vessel trained would likely have a significant positive ecological impact by reducing sea turtle post-release mortality; Would allow the Agency to certify multiple individuals per vessel, ensuring that at least one trained person is available during each haulback; Would maximize the dissemination of information critical to the safe release and disentanglement of sea turtles; May improve communication between constituents and the Agency; Continued availability of the PLL POC.	Negative economic impacts related to workshop travel and lost fishing time would likely be incurred by fishery participants; Administrative and cost burden to the Agency much greater than voluntary or partial mandatory workshops; Requiring that everyone be trained may make it hard for owners to hire crew and go fishing; Requiring that everyone be trained would require many workshops in all locations; Costs for the creation of educational and certification materials in multiple languages; Costs associated with the use of interpreters for workshops.

2.1.1.2 Workshops – HMS and Protected Resources Identification

Proper identification of HMS, both targeted species and bycatch, and threatened and endangered species that fishermen may interact with while pursuing HMS, is paramount to the efficacy of HMS regulations and management. Permitted fish dealers and fishermen are responsible for accurately identifying HMS on the dealer reports and logbooks submitted to NMFS. These reports form the basis of quota monitoring activities and stock assessments; misidentification of certain HMS can negatively impact stock assessments, calculation of season lengths, and the criteria used to designate certain species as prohibited. The HMS Management Division and the Rhode Island Sea Grant office recently produced an identification guide for HMS. Identification workshops involving the HMS Division, the regional Fishery Science Centers, the Office of Protected Resources, academics, aquarium staff, and

NGO representatives may provide a means for those involved with HMS (fishermen, dealers, and law enforcement officials) to improve identification skills. These workshops may be most effective at venues where viewing live and/or freshly dead specimens is an option.

Alternative	Pros	Cons
1. No Action: Improve awareness by advertising the existing HMS identification guide, wheelhouse placards, and dehooking manuals.	No travel costs for fishermen; No additional administrative burden or cost; Enhanced accuracy in species identification by those who have the materials may improve data collection.	Limits the Agency's ability to disseminate information on HMS and protected resources; Limits understanding of identification features of protected resources and HMS bycatch (e.g., it is sometimes difficult to distinguish one shark species from another, species similar in appearance); Reduces accuracy of quota monitoring and stock assessments; Does not ensure that fishermen view and/or read available materials.
2. Conduct voluntary workshops at a scientific facility (e.g., marine laboratory) for all commercial and recreational HMS fishermen and permitted dealers on a first come, first served basis.	Increases the Agency's ability to disseminate information on HMS and protected resources; Hands-on approach enhances understanding of identification features; Scientific expertise of staff available; Live specimens available for observation; Travel costs and lost fishing time for participants are discretionary, not mandatory; Potential for increased rate of survival for protected resources and HMS; Improve data collection in terms of accuracy – beneficial to stock assessments; Improve public relations on behalf of the Agency.	Travel costs and potential lost fishing time for those who wish to attend; Offers reduced geographic flexibility for those who wish to attend; Only a limited number of participants receive training- in the past, voluntary workshops have not been well attended; Some administrative and cost burden for the Agency; Costs for the creation of educational and certification materials in multiple languages; Costs associated with the use of interpreters for workshops.
3. Conduct one or several voluntary workshops at one or several location(s) per region (Gulf of Mexico, South Atlantic, and North Atlantic) for all commercial and recreational HMS fishermen and permitted dealers on a first come, first serve basis	Increases the Agency's ability to disseminate information on HMS and protected resources; Hands-on approach enhances understanding of identification features; Travel costs and lost fishing time for participants are discretionary, not mandatory; Potential for increased rate of survival for protected resources and HMS; Improve data collection in terms of accuracy – beneficial to stock assessments; Improve public relations on behalf of the Agency.	Travel costs and lost fishing time for those who wish to attend; Only a limited number of participants receive training – in the past, voluntary workshops have not been well attended; Administrative and cost burden for the Agency higher than for only one workshop at a scientific facility; Costs for the creation of educational and certification materials in multiple languages; Costs associated with the use of interpreters for workshops.

Alternative	Pros	Cons
4. Develop an interactive, voluntary web-based tutorial for all commercial and recreational HMS fishermen and permitted dealers.	Ensures wide distribution of materials; No travel costs and lost fishing time for those who participate – can be done on down time at their convenience; No additional administrative and cost burden for the Agency – only resources (staff) to create the web site needed; No concern to select appropriate geographic locations for on-site training; Tutorials can be reviewed and revisited.	Lack of specimens and hands on training limits understanding of identification features; Voluntary tutorials would likely not allow the Agency to certify or require that large numbers of fishery participants are trained; May limit the dissemination of information If voluntary, participation may be poor; Limited to those who have access to a computer with an internet connector and to those who have the computer skills to complete the program; Constituents may prefer face to face interaction and have concerns addressed; Web based media may be hard to interpret and fully comprehend.
5. Conduct one or more mandatory workshops for commercial and recreational HMS fishermen and permitted dealers, either one workshop or one workshop per region (Gulf of Mexico, South Atlantic, and North Atlantic)	Maximizes the Agency's ability to disseminate information on HMS and protected resources – positive ecological impact; Hands-on approach enhances understanding of identification features; Large number of constituents receive training - ensures every relevant fisherman and permitted dealer is trained; Potential for increased rate of survival for protected resources and HMS; Improve data collection in terms of accuracy – beneficial to stock assessments; Improve public relations on behalf of the Agency.	Travel costs and potential for lost fishing time for participants are not discretionary, but mandatory; Large administrative and cost burden for the Agency; Costs for the creation of educational and certification materials in multiple languages; Costs associated with the use of interpreters for workshops. .

2.1.1.3 Workshops - Protected Resources and Bycatch Interactions in Commercial HMS Fisheries

Interactions with protected resources and non-target catch in commercial longline and shark gillnet fisheries, and HMS Charter headboat (CHB) operations may have adverse impacts on populations of these species. The intent of the workshop alternatives presented in this section is to expand upon the handling and release techniques presented in section 2.1.1.1 and disseminate this information to other sectors of the HMS fisheries. Workshops would likely include other protected resources (smalltooth sawfish, whales, dolphins, and seabirds) as well as other non-target species (billfish, reef fish, and tarpon) encountered in commercial longline and shark gillnet fisheries and CHB operations. These workshops would likely focus on both handling and release techniques, in addition to alternative fishing gears (e.g., circle hooks), potentially decreasing post-release mortality of protected resources and reducing harvest of undersized catch and bycatch. Representatives from NNMFS (including the Office of Protected Resources and the

Fisheries Science Centers), the fishing industry, and academia could be included as facilitators of these workshops. The workshops would likely take place at several locations per region to ensure an adequate number of participants are included.

Alternatives	Pros	Cons
1. No Action: Continue distribution of videos, wheelhouse cards, and safe handling and release protocol manuals demonstrating these techniques for sea turtles. Continue using VMS as a means of monitoring gillnet (November 15-March 31), pelagic longline (PLL) (year-round), and bottom longline (BLL) (January 1-July 31 in the vicinity of mid-Atlantic time area closure) fishing activities.	Would likely have continued positive ecological impacts due to distribution of handling and release materials and continued use of VMS as a means of monitoring fishing activity; No additional administrative costs and burden to the Agency; No additional travel costs or lost fishing time to fishermen.	May limit the dissemination of information critical to the safe handling, release and/or disentanglement of other protected resources and non-target species; Could result in the ESA listing of additional species that are currently vulnerable such as white marlin; Does not ensure that fishermen watch and/or read distributed materials.
2. Voluntary workshops only for shark gillnet fishermen on protected resource handling and release techniques.	Should not result in excessive administrative costs and burden to the agency as there are few boats fishing for sharks with gillnets and it is restricted geographically; This fishery has the potential for elevated interaction rates with protected resources and workshops could improve knowledge of release and disentanglement tools and techniques; May reduce protected resource and bycatch post-release mortality; May improve communication between constituents and the Agency.	Negative economic impacts related to workshop travel and lost fishing time would likely be incurred by fishery participants; Administrative and cost burden for the Agency greater than for the status-quo; May not reach fishermen that target other species or land large numbers of HMS as bycatch; In the past, voluntary workshops have not been well attended.

Alternatives	Pros	Cons
3. Voluntary workshops for all commercial longline and shark gillnet fishermen on handling and release techniques for protected resources and other non-target catch. Workshop participants would be accommodated on a first-come, first-serve basis.	May reduce protected resource and bycatch interactions in the entire commercial longline and shark gillnet fisheries; May reduce protected resource and non-target catch post-release mortality; Would increase the Agency's ability to disseminate information critical to the safe release and disentanglement of protected resources and bycatch; May improve communication and understanding between constituents and the Agency.	Negative economic impacts related to workshop travel and lost fishing time would likely be incurred by fishery participants; Voluntary workshops would likely not allow the Agency to certify or require that large numbers of fishery participants are trained; May limit the dissemination of information; Administrative and cost burden for the Agency greater than for the status quo; In the past, voluntary workshops have not been well attended. Costs for the creation of educational and certification materials in multiple languages; Costs associated with the use of interpreters for workshops;
4. Voluntary workshops for all commercial longline and shark gillnet fishermen (as above) but also include an extra voluntary session for CHB captains, discussing the merits of alternative gear types (e.g., circle hooks) in recreational fishing, and their effects on post release mortality and fishing efficiency. Workshop participants would be accommodated on a first-come, first-serve basis.	Would increase the Agency's ability to disseminate information critical to the safe release and disentanglement of protected resources and bycatch; May have a positive impact on protected resources and bycatch by decreasing post-release mortality; May improve communication and understanding between constituents and the Agency; May reduce interactions with protected resources in CHB fisheries; Information transfer between CHB captains and clients may increase circle hook use throughout recreational HMS fisheries; Increased use of circle hooks could result in decreased post release mortality of billfish and other HMS; Improved working relations between the Agency, recreational and commercial fishing industries, and interest groups.	Negative economic impacts related to workshop travel and lost fishing time would likely be incurred by fishery participants; Potential problems of combining sessions that would be relevant for both the recreational and commercial sectors; Collaboration and delegation of duties between the Agency and interest groups; In the past, voluntary workshops have not been well attended; Voluntary workshops would likely not allow the Agency to certify or require that large numbers of fishery participants are trained; May limit the dissemination of information Administrative and cost burden for the Agency greater than for the status quo; Costs for the creation of educational and certification materials in multiple languages; Costs associated with the use of interpreters for workshops.

Alternatives	Pros	Cons
5. Mandatory workshops for commercial longline and shark gillnet fishermen (captain and one crew member) combined with voluntary attendance by CHB permit holders. These workshops would include a certification process (commercial fishermen) on handling and release techniques for protected resources and bycatch. Workshops would discuss the use of alternative gear types (e.g., circle hooks).	Reduced interactions/mortality of protected resources and bycatch; Information dissemination to the entire commercial longline and shark gillnet fisheries and a large portion of the CHB fishery; Information transfer between CHB captains and clients; Increased use of circle hooks may result in decreased post release mortality of billfish and/or bycatch; Would increase the Agency's ability to disseminate information.	Negative economic impacts related to workshop travel and lost fishing time would likely be incurred by commercial shark fishermen; Some negative economic impacts incurred by CHB permit holders choosing to attend; Potential for problems in combining sessions for both the recreational and commercial sectors; Certification requirements and duration for mandatory participants; Logistics of certification; Administrative and cost burden to the Agency. Costs for the creation of educational and certification materials in multiple languages; Costs associated with the use of interpreters for workshops.

2.1.1.4 Workshops - Compliance With, and Understanding of, HMS Regulations

Constituents have expressed concern over the complexity of HMS regulations. Workshops providing a thorough explanation of HMS regulations and management history would likely be beneficial and may result in improved public relations on the behalf of the Agency, improved compliance with regulations, and understanding of the HMS regulatory process. These workshops could be either web based or in person. If in person, they could be held in a "town hall" format at regional fishing ports where as many constituents as possible would be able to participate and interact with NMFS staff. Topics for discussion could be interactive and include, among other things: permits, the role of ICCAT in managing HMS, domestic legislation, consultations with Protected Resources, and introduction to the MSA, ESA, ATCA, and other applicable laws. It should be noted that these workshops may not need be presented as stand alone workshops, but could be incorporated into the workshops described in Sections 2.1.1.1, 2.1.1.2, and 0.

Alternatives	Pros	Cons
1. No Action: Continue distributing annual compliance guide, brochures, and other regulatory information as they become available.	Would continue to provide constituents with basic regulatory information; No additional administrative costs and burden by the Agency.	Given the complexity of HMS regulations, current outreach efforts may be inadequate to help constituents understand them.
2. Hold several voluntary "town hall" workshops for recreational, commercial, and NGO stakeholders hosted by NNMFS staff. Participants would be accommodated on a first-come, first-serve basis at several venues and/or dates per region.	May improve understanding, appreciation, and compliance with HMS regulations and processes; May improve communication and understanding between constituents and the Agency.	Some negative economic impacts related to workshop travel and lost fishing time would likely be incurred by fishery participants; Voluntary workshops would likely not allow the Agency to certify or require that large numbers of fishery participants are trained; May limit the dissemination of information Administrative and cost burden to the Agency greater than for the status quo; In the past, voluntary workshops have not been well attended.
3. Develop an interactive, web-based voluntary tutorial on HMS regulations, history, legislative background, and context; Devise recreational (no-sale) and commercial versions of the tutorial.	May improve understanding, appreciation, and compliance with HMS regulations and processes; May improve communication and understanding between constituents and the Agency; Constituents could complete the tutorial at their convenience and spend more time on regulations specific to their needs; Tutorials could be reviewed and revisited as necessary; No travel costs and lost fishing time for those who participate – can be done on down time at their convenience.	Constituents may not have access to a computer with an internet connection or lack the computer skills to complete the tutorial; Some constituents may prefer face to face contact with NMFS officials in order to have their specific concerns addressed; Web based media may be hard to interpret and fully comprehend; Voluntary tutorials would likely not allow the Agency to certify or require that large numbers of fishery participants are trained; May limit the dissemination of information Administrative cost and burden to the Agency.

Alternatives	Pros	Cons
4. Develop an interactive, web-based, mandatory tutorial on HMS regulations, history, and reasoning involved behind controversial or commonly "misunderstood" HMS regulations, providing legislative background and context. Those that complete the tutorial would receive a certificate/confirmation that would be necessary for permit renewal or purchase.	May improve understanding, appreciation, and compliance with HMS regulations and processes among all HMS permit holders; May improve communication and understanding between constituents and the Agency; Constituents could complete the tutorial at their convenience and spend more time on regulations specific to their needs; Tutorials could be reviewed and revisited as necessary.	Some negative economic impacts related to the time required to complete the tutorial, may result in lost fishing time; Administrative and cost burden to the Agency greater than for the status quo; Constituents may not have access to a computer with an internet connection or lack the computer skills to complete the tutorial; Some constituents may prefer face to face contact with NMFS officials in order to have their specific concerns addressed; Web based media may be hard to interpret and fully comprehend.

2.1.2 Time/Area Closures

A number of time/area closures have been implemented to reduce bycatch of protected species, as well as target and non-target HMS in recent years. This rulemaking will examine the issue of time/area closures comprehensively to assess their effectiveness, to determine if they are achieving desired management objectives, if continuation of or modifications to current closures are warranted, and if additional closures may be necessary (see Sections 3.4 and 3.8). NMFS may need to implement additional or modify existing closures to deal with new or existing bycatch related issues. For example, NMFS may propose new time/area closures or modifications to existing time/area closures to address white marlin bycatch. Given the severely overfished status of white marlin and that overfishing continues, time/area closures are one of the management alternatives being considered to reduce bycatch. Any closure(s) would be considered for all gear types, not just pelagic longline. For additional information on white marlin bycatch, see Sections 2.3.3 on alternatives for reducing billfish mortality and 3.2.4 for more information regarding the status of billfish.

Similarly, NMFS may consider time/area closures for smalltooth sawfish, which were listed as endangered under the ESA on April 1, 2003. Historically, smalltooth sawfish occurred commonly in shallow waters of the Gulf of Mexico and eastern seaboard up to North Carolina, and more rarely as far north as New York. Sawfish have historically been caught in various fishing gears including gillnet, otter trawl, trammel net, seine, and to a lesser degree, handline, in waters shallower than 25 m. Recent data suggests that mature animals may regularly be found in water in excess of 50 m. The October 29, 2003, Biological Opinion regarding the Atlantic commercial shark fishery required NMFS to examine potential time/area closures for endangered smalltooth sawfish. Limited bycatch of smalltooth sawfish occurs in the shark bottom longline fishery. Additional research and analysis is needed to determine gear types that are most likely to result in interactions.

NMFS is also considering new time/area closures for HMS fisheries that correspond to those closures proposed in the Gulf of Mexico and Caribbean Council FMP amendments to address concerns related to coral reef areas and bottom longlining. See Section 3.8 for information on existing closures and their effectiveness.

Other alternatives for implementing new or modifying existing time/area closures are described in the following table. Examples of criteria that may be used to modify time/area closures include, but are not limited to, bycatch of ESA listed species; bycatch of multiple species; evidence of reduction in bycatch due to gear restrictions or other management measures; species listed as overfished, species no longer listed as overfished, analysis of all commercial and recreational gear impacts; important spawning or nursery areas; and other relevant ecological and economic considerations. The alternatives described below are not mutually exclusive.

Alternatives	Pros	Cons
1. No Action: Maintain existing time/area closures; no new time/area closures.	Provides positive ecological benefits; Existing time/area closures have been effective at reducing bycatch of protected species and non-target HMS;	Several years have elapsed since the first time/area closures for HMS were implemented and changes to existing time/area closures may be warranted; May result in an economic burden on fishermen if these closures prevent them from fishing in certain areas.

Alternatives	Pros	Cons
2. Time/area closure(s) (gear specific and/or all gears to be considered) for white marlin in important habitat areas.	Decreases bycatch of overfished white marlin; May reduce bycatch of other species caught in area(s) such as blue marlin and protected species. Gear-Specific: *Pelagic longline*: may reduce bycatch thus helping to stop overfishing and rebuild white marlin populations; *Bottom longline*: may provide little benefit since bottom longline gear is not fished in areas where white marlin are present and does not have large bycatch of white marlin (only allowable gear is rod and reel); *Recreational rod and reel*: may help reduce recreational fishing effort on white marlin and help rebuild white marlin populations; *All other gear (handline, harpoon)*: may help reduce fishing effort and help rebuild white marlin.	May result in an economic burden on fishermen and related businesses; Could displace or shift fishing effort into area(s) adjacent to the closure(s) with potential increase in bycatch of other species; May reduce safety at sea by requiring fishermen to travel further offshore in pursuit of target species such as swordfish. Gear-Specific: *Pelagic longline*: would likely impose an economic burden on fishermen; anticipate significant adjustments may be necessary; several time/area closures are already in place; *Bottom longline*: may impose little or no economic burden since bottom longline gear does not have large bycatch of white marlin; *Recreational rod and reel*: could increase economic burden on fishing communities; could result in tournament cancellations and restrictions on recreational fishing areas; *All other gear*: may increase economic burden on fishermen.

Alternatives	Pros	Cons
3. Time/area closure for smalltooth sawfish (gear specific and/or all gears to be considered).	May decrease the bycatch of endangered smalltooth sawfish; <u>Gear-Specific</u>: *Pelagic longline*: may not reduce sawfish bycatch because this gear does not capture sawfish; thus minimal adverse economic impacts; *Bottom longline*: may reduce potential interactions; *Gillnet*: may have positive ecological impacts by reducing potential interactions; *Recreational rod and reel*: may help reduce the impact of recreational fishing effort on sawfish populations if such interactions occur; *All other gear (handline, harpoon)*: will reduce the impact of these gears if such interactions occur.	May not provide noticeable benefit because most areas may be outside of NMFS' jurisdiction; Sawfish interaction rates with most gears are very low, and the economic burden of a time/area closure in nearshore habitat could be substantial; Most interactions occur in fisheries other than those targeting HMS. <u>Gear-Specific</u>: *Pelagic longline*: may impose additional economic burden; several time/area closures are already in place; *Bottom longline and gillnet*: could increase economic burden if closures areas are implemented in areas used by BLL or gillnet gear; *Recreational rod and reel*: could increase economic burden; could result in tournament cancellations and restrictions on recreational fishing areas. *All other gears*: could increase economic burden.
4. Make modifications to existing time/area closures	May help further reduce bycatch; May reduce economic burden if time/area closures are reduced in size, thus allowing access to previously closed areas; Long-term economic and ecological benefit if closures are effective at helping rebuild stocks;	May increase economic burden if the size of time/area closures is increased;
5. Implement Complementary HMS Management Measures in Madison-Swanson and Steamboat Lumps Marine Reserves	Would provide consistency between HMS and Gulf of Mexico Fishery Management Council regulations; Would apply to all gears except surface trolling gear from May through October; Would reduce bycatch of non-targeted species, including Gulf Council-managed gag grouper; Could improve enforcement of the marine reserves; Could provide some conservation benefits for HMS.	Could have year-round economic burden on commercial HMS fisheries in these areas, including the shark BLL fishery, PLL fishery and handgear fishery; Could have year-round burden on the non-trolling sector of the recreational HMS fishery; Could impact the surface trolling sector of the HMS recreational fishery in these areas from November through April; May be difficult to enforce seasonal allowance on surface trolling because of difficulties distinguishing between surface trolling and other types of trolling.

Alternatives	Pros	Cons
	Description of the Alternative: The Gulf of Mexico Fishery Management Council has implemented two marine reserves to protect spawning aggregations of gag grouper: Madison-Swanson and Steamboat Lumps. Both of these reserves are located just shoreward of the Desoto Canyon Closed Area. The Madison-Swanson reserve is 115 sq. nautical miles in size, rectangular-shaped, and is positioned southwest of Apalachicola, FL (29° 17' N. Lat., 85° 50' W. Long. to 29° 17' N. Lat., 85° 38' W. Long. to 29° 06' N. Lat., 85° 38' W. Long. to 29° 06' N. Lat., 85° 50' W. Long.). The Steamboat Lumps reserve is 104 sq. nautical miles in size, rectangular-shaped, and is positioned due west of Clearwater, FL (28° 14' N. Lat., 84° 48' W. Long. to 28° 14' N. Lat., 84° 37' W. Long. to 28° 03' N. Lat., 84° 37' W. Long. to 28° 03' N. Lat., 84° 48' W. Long.). These reserves prohibit all fishing from November through April, and allow surface trolling only from May through October. This alternative would prohibit all fishing for HMS in the Madison-Swanson and Steamboat Lumps Marine Reserves consistent with the GOMFMC regulations.	

2.2 Essential Fish Habitat

As part of this rulemaking, NMFS is conducting the five-year EFH review and update for all Atlantic HMS that were not updated in Amendment 1 to the 1999 FMP. For further information on regulatory requirements for identifying and describing EFH see Section 3.3.1. NMFS will review all new information and data available for HMS and update such EFH identifications and descriptions, as appropriate. A number of fishery dependent and independent databases, as well as data from individual researchers are being used to update EFH data, including but not limited to data from the Pelagic Longline and Coastal Fisheries Logbooks (Fisheries Logbook System), Pelagic Observer Program, Cooperative Tagging Center, Shark Bottom Longline Observer Program, Cooperative Shark Tagging Program, Virginia Institute of Marine Science Longline Survey, Mote Center for Shark Research, South Carolina Department of Natural Resources Marine Game Fish Tagging Program, American Littoral Society, The Billfish Foundation, NMFS Cooperative Shark Tagging Program, and NMFS Northeast and Southeast Longline Shark Surveys. At a minimum, these databases include the species, sex, length, date of capture, and latitude and longitude coordinates of the capture location.

2.2.1 Updating Essential Fish Habitat Identifications

All new data collected since the 1999 FMP and Amendment 1 to the Billfish FMP, as well as existing data used to identify and describe the 1999 EFH boundaries, are being compiled and analyzed in a Geographic Information System (GIS). In addition to collecting new information, NMFS will be consulting with experts in the field to help identify any revisions to existing EFH areas that may be warranted. As part of this process, any new and existing distribution data are being mapped and sent to technical reviewers who will check for accuracy and provide guidance on any proposed modification to existing EFH boundaries. Maps for the three lifestages of Atlantic swordfish (eggs and larvae, juveniles, and adults) are provided as examples in Figure 2.1, Figure 2.2, and Figure 2.3. The source data for these figures include: POP = Pelagic Observer Program; CTS = Cooperative Tagging System; CST = Cooperative Shark Tagging Program; SCM = South Carolina Marine Fish Tagging Program; and SOP = Shark Observer Program.

To identify areas with the highest concentration of particular species and life stage, individual distribution points were superimposed on a regional grid covering coastal waters in the U.S. Exclusive Economic Zone (EEZ). The grid was constructed of ten-minute squares where one minute equals one nautical mile (nm) resulting in squares that represent 100 nm^2. The grid and individual data points were spatially joined and each square was given a summary of the numeric attributes and a count of the points that fell inside it. Depending on the species, the number of observations per square ranged from zero to several thousand. The squares containing observations were color-coded depending upon the number of observations per square, and scaled to reflect the frequency of occurrence.

The distribution points may be interpreted in a number of different ways, and the resulting boundary for each species and life stage may differ depending upon which alternative listed in the Pros and Cons table below is utilized. Thus, the alternatives represent a range of options available for updating existing EFH boundaries, as necessary. Any proposed modifications to existing EFH boundaries will be provided in both map and text form in future documents.

Alternatives	Pros	Cons
1. No Action: Maintain current EFH identifications	EFH identifications have already been established in the 1999 FMPs and for 5 shark species in Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks FMP, and changes may not be warranted; Current areas provide sufficient protection.	Complete review of updated EFH data for managed species is required by the EFH guidelines at least once every 5 years.
2. Identify EFH for the fishery management unit (FMU) based on the entire geographic range of the species	Represents the most precautionary approach, with the greatest protection being afforded; New distribution data is available and has been updated since the 1999 FMPs; Could have ecological benefit if areas are subsequently closed to commercial/recreational fishing or if other fishing restrictions are implemented.	Could result in large areas being identified as EFH that may not necessarily be essential; Could create an economic burden if additional fishing restrictions are implemented in these areas; May be based on a limited number of observations; May be based upon projections of where species are present rather than actual observations; May be difficult to target conservation efforts due to large areas.

Alternatives	Pros	Cons
3. Update EFH identifications to include individual species in the FMU to include those habitats necessary for spawning, breeding, feeding, or growth to maturity.	Although not as precautionary as the second alternative, this alternative may also result in large EFH areas; Distribution data has been updated since 1999 HMS FMPs; Distribution data and some tagging/recapture data is available for most HMS species; Could have ecological benefit if areas are subsequently closed to commercial/recreational fishing or if other fishing restrictions are implemented.	May result in large areas being identified as EFH; Lack of conclusive data for many species regarding specific locations important for spawning, feeding, or growth to maturity; Could have negative economic impacts if fishing activity is restricted in these areas.
4. Update EFH identifications for individual species in the FMU to include those habitats necessary for spawning, breeding, feeding, or growth to maturity, and modify the extent of EFH based upon special needs of individual species.	Adjusts EFH to specific needs of overfished or prohibited species, potentially resulting in greater protection for those species; Provides flexibility to managers to adjust EFH areas as necessary; May help refine and narrow the scope of existing EFH areas; May help reduce future restrictions or economic burden on fishermen; Distribution data and some tagging/recapture data are available for most HMS species.	Difficult to develop consistent and transparent standards for decreasing the size of existing EFH; May reduce protection for healthy or rebuilt stocks.

2.2.2 Identifying Habitat Areas of Particular Concern

Description of the Issue. To further the conservation and enhancement of EFH, the EFH guidelines encourage FMPs to identify Habitat Areas of Particular Concern (HAPCs). HAPCs are areas within EFH that meet one or more of the following criteria: they are ecologically important, particularly vulnerable to degradation, undergoing stress from development, or they are a rare habitat type. HAPCs can be used to focus conservation efforts on specific habitat types that are particularly important to the managed species. Currently, only one area, for sandbar sharks off of North Carolina, Chesapeake Bay, MD, and Great Bay, NJ, has been identified as a HAPC for HMS (1999 FMP). Although no new HAPCs have been identified since the 1999 FMP, this FMP may consider alternatives for HAPC identifications for areas that meet one or more of the criteria for HAPCs, as articulated in the EFH guidelines, based upon information provided by the Technical Review Team or from other information gathered during this review. Once additional information is compiled and analyzed for the five-year EFH review, additional HAPC alternatives may be proposed.

Alternative	Pros	Cons
1. No Action: Maintain current HAPC identifications	EFH already encompasses HAPCs; Difficult to distinguish or define HAPCs with HMS and may result in overly large areas identified; Current EFH and HAPCs provide sufficient protection.	May fail to include new HAPCs identified since 1999, particularly those identified for overfished or prohibited species; May not provide the level of protection necessary for certain species or stocks.
2. Maintain current HAPCs; identify new HAPCs within HMS EFH consistent with the EFH guidelines and taking into consideration special needs within the fishery	More precautionary approach may provide necessary additional protection; Could be used to identify future time/area closures; May be beneficial to overfished stocks.	Difficult to distinguish or define HAPCs with HMS; May have negative economic impacts if areas are closed to commercial and/or recreational fishing.

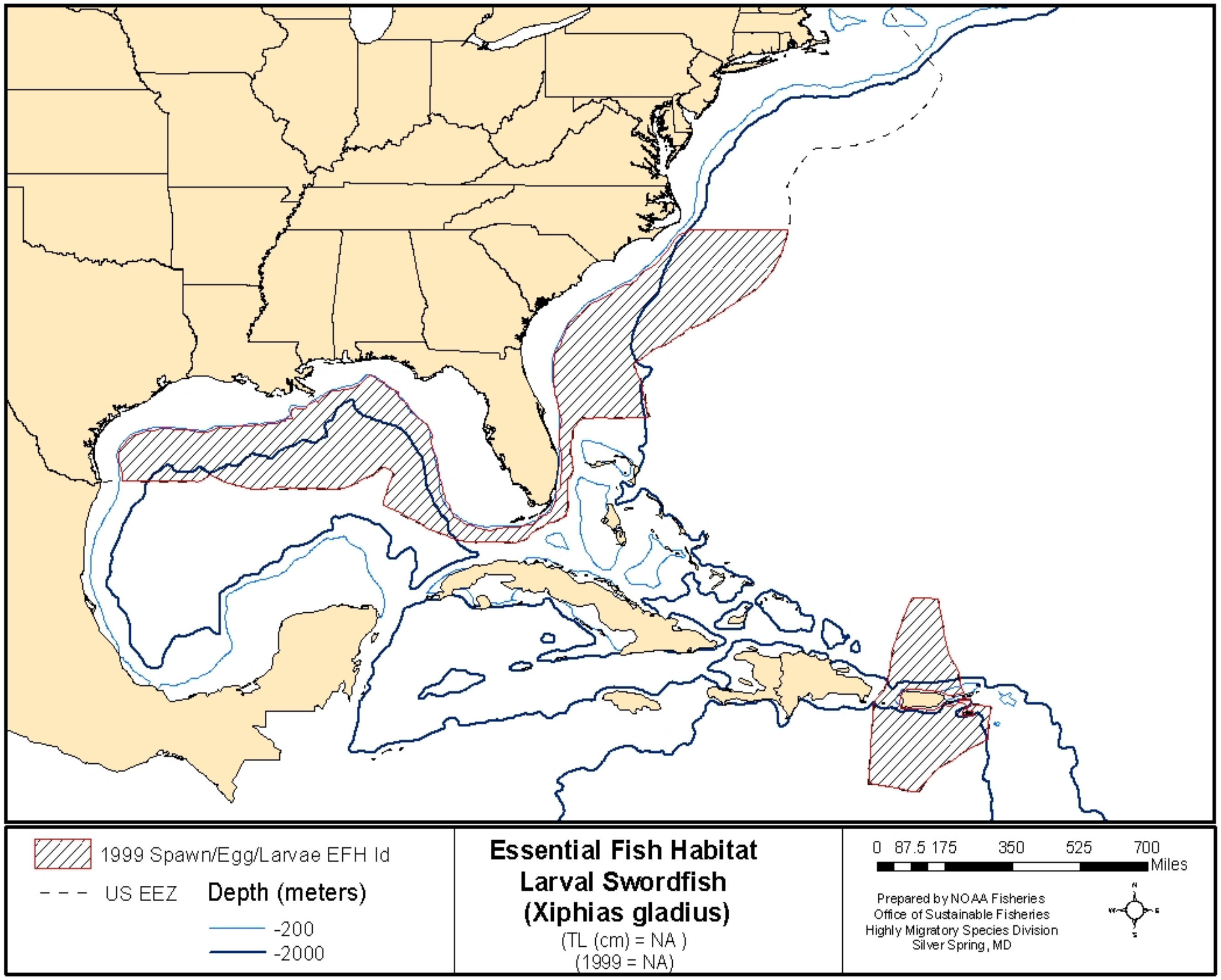

Figure 2.1 1999 Essential Fish Habitat for Swordfish – Eggs, Larvae, and Spawning.

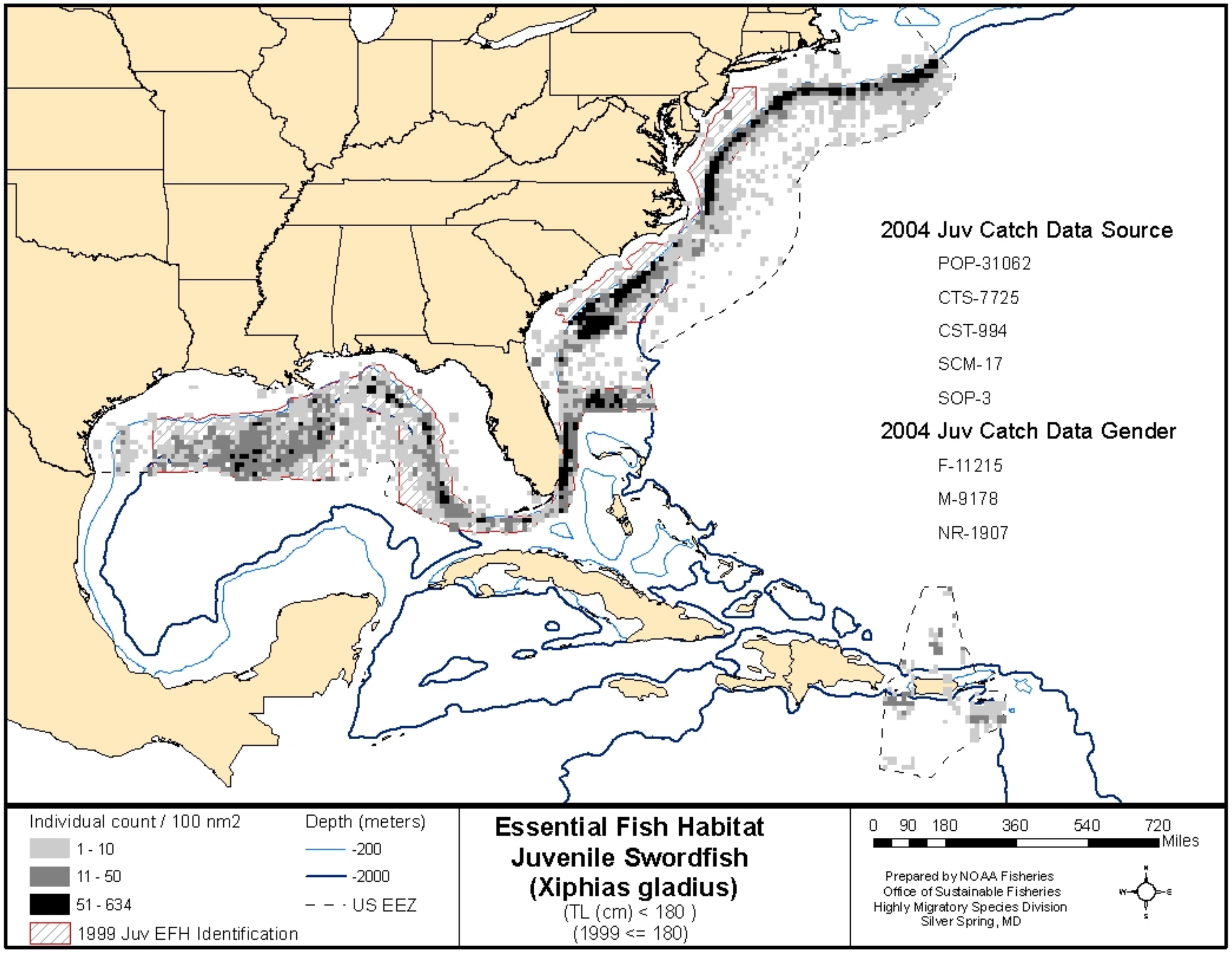

Figure 2.2 **1999 Essential Fish Habitat for Swordfish – Juvenile, Overlayed with Type 1 Distribution Data.**

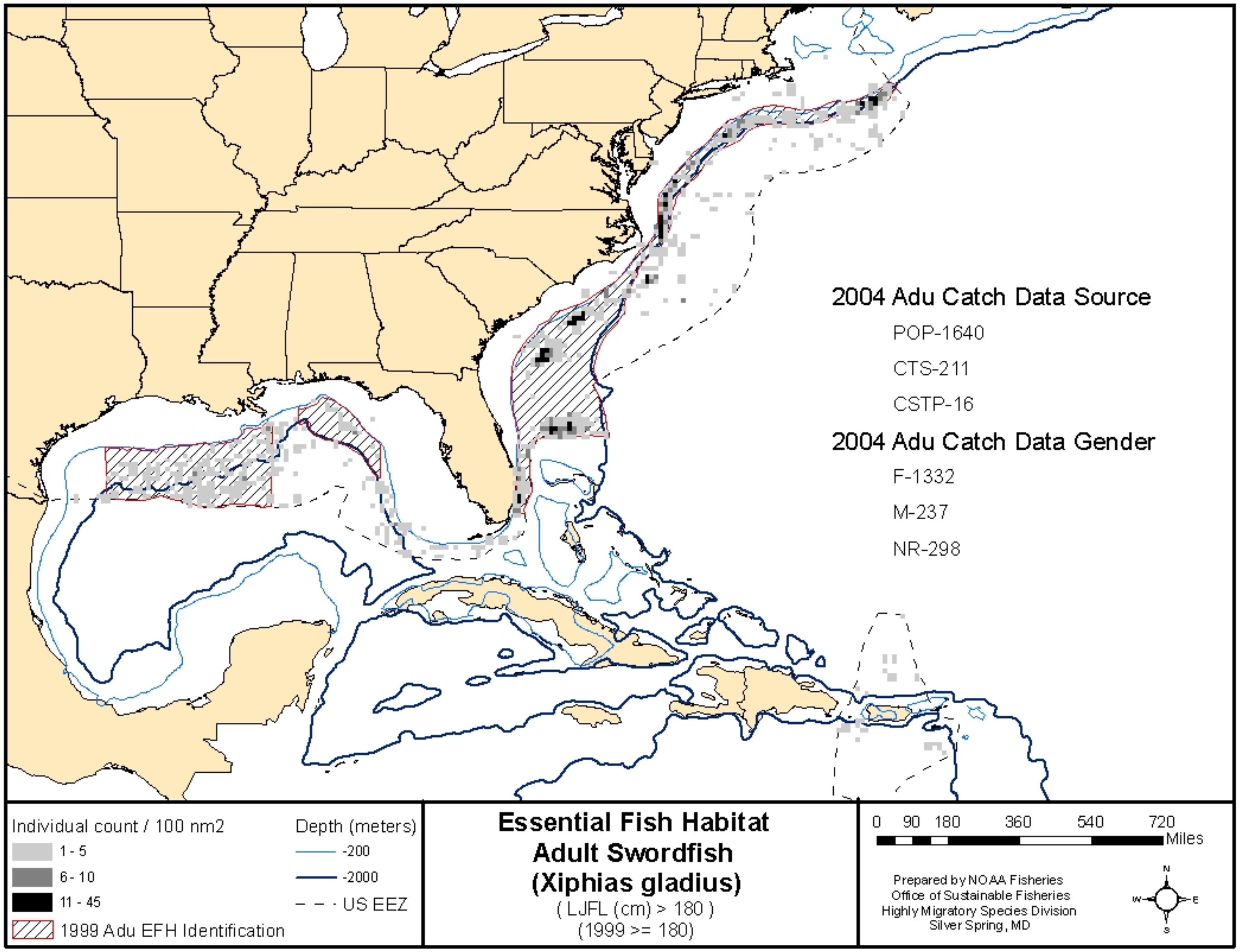

Figure 2.3 **1999 Essential Fish Habitat for Swordfish – Adult, Overlayed with Type 1 Distribution Data.**

2.3 Rebuilding and Preventing Overfishing

2.3.1 Northern Albacore Tuna

As described in Section 3.2.3.3 of this document, for assessment purposes ICCAT assumes the existence of three albacore stocks: northern and southern Atlantic stocks (separated at 5° N latitude) and a Mediterranean stock. ICCAT's SCRS last conducted a stock assessment for the northern stock in 2000, using data from 1975 through 1999. Based on the results of this stock assessment, at its November 2000 meeting, ICCAT recommended a TAC of 34,500 mt ww with an allocation to the United States of 607 mt ww, based on recent average U.S. catches. Subsequent ICCAT recommendations at its 2001, 2002, 2003 annual meetings, have extended the 34,000 mt ww TAC, and the U.S. share of 607 mt ww, through 2006.

In 2004, SCRS attempted to update the assessment, but concluded that it was not appropriate to proceed using 2003 catch-at-age data until the data could be reviewed and validated. Consequently, advice was based on the 2000 assessment as updated with CPUE trends through 2003. SCRS concluded that the northern stock is probably below B_{MSY}, but the possibility of being above it could not be dismissed. It was further concluded that northern albacore was not being growth overfished (SCRS, 2004). Management advice noted a stable stock at annual catches of 34,500 mt ww, while spawning stock biomass could be increased if catches do not exceed 31,000 mt ww. SCRS shall conduct the next stock assessment in 2007.

In the October 1999 Report to Congress on the Status of U.S. Fisheries, NMFS identified the northern albacore tuna stock as overfished. Alternatives for developing a rebuilding plan for northern albacore were presented in a proposed rule issued on May 24, 2000 (65 FR 33519), and were discussed in the EA/RIR/IRFA prepared for that proposed rule. The alternatives considered included no action, a ten-year international rebuilding program negotiated through ICCAT, and a unilateral U.S. action plan. NMFS requested comment on those albacore rebuilding alternatives and commenters noted that a rebuilding program for northern albacore must reflect the magnitude of current landings and consider year-to-year variability in the U.S. commercial and recreational fisheries. In the final rule, NMFS indicated that, in establishing the foundation for an international rebuilding program, it would work through ICCAT to adopt a target stock size together with a time frame for rebuilding that included flexibility (65 FR 77523, December 12, 2000). Based on the final rule, NMFS has presented albacore proposals to ICCAT at several meetings. In this rulemaking, NMFS intends to formally incorporate the northern albacore rebuilding program into the consolidated HMS FMP. As noted above, NMFS previously took comment on the following northern albacore rebuilding alternatives but welcomes further public comment at this time.

Alternative	Pros	Cons
1. No Action	No economic impact in the short term.	Spawning stock not likely to increase due to continued fishing at replacement yield.

Alternative	Pros	Cons
2. Unilateral 10-year rebuilding program	Could allow for increased catch in 10 years, following rebuilding.	Unilaterally rebuilding in 10 years could require a reduction in U.S. quota; Short term but significant reduction in revenues for the commercial and charterboat fisheries, and in angler consumer surplus for the recreational fishery; A unilateral plan may not result in Atlantic-wide rebuilding.
3. Establish the foundation for developing an international rebuilding program. Such a rebuilding program would ensure rebuilding to a level capable of producing MSY within the shortest period possible.	Could allow for increased catch following rebuilding; If rebuilding program is longer than 10 years, quota reductions might be smaller than under unilateral plan; If rebuilding program is split proportionally across relevant nations, quota reductions might be smaller than under unilateral plan; International rebuilding program more likely to rebuild stock successfully.	Some reductions in revenues possible for the commercial and charterboat fisheries, and reductions possible in angler consumer surplus for the recreational fishery.

2.3.2 Finetooth Sharks

NMFS is obligated to reduce fishing mortality of finetooth sharks (*Carcharhinus isodon*) as the 2002 stock assessment indicated that overfishing was occurring. This section provides background information on the current situation, a description of some of the management complexities involved, and alternatives that may be considered to reduce fishing mortality for finetooth sharks. Section 3.2.5 - Status of the Stocks – Atlantic Sharks, provides further information on the life history of finetooth sharks and more detail on the conclusions of the 2002 stock assessment.

Finetooth sharks attain a larger size than other SCS (up to 1.8 m (5.9 feet)) and are harvested mainly for their flesh, as their fins are still relatively small compared to most adult LCS. Over 80 percent of finetooth sharks harvested commercially with gillnet gear are landed with either drift gillnets that are typically 546-2,280 m (498-2,493 yards) long and 6.1-15.2 m (6.7-16.6 yards) deep or striknets that are 364.8 m (398 yards) long and 30.4 (33.2 yards) deep. Finetooth sharks are susceptible to this type of gear as they have a tendency to “roll” upon contact with gillnets, becoming entangled by a wide range of gillnet mesh sizes. Mesh sizes currently employed range from 12.7-22.9 cm (5-9 inches). They are also harvested with handline, longlines, otter trawls, and as bycatch in the shrimp trawl fishery. Between 1997 and 2003, 95 and 99 percent of the finetooth landings reported via the General Canvass and Coastal Fisheries logbooks, respectively were from the South Atlantic region (Table 2.1). There is no trip limit for SCS harvested by directed shark permit holders, however, incidental shark permit holders are limited to 16 SCS and Pelagic sharks, combined. Currently, gillnets are banned in most states’ waters (to 5.6 km (3 nm) except Texas and the west coast of Florida which are 16.6 km (9 nm)) throughout their range, including: South Carolina, Georgia, Florida, Texas, and Louisiana.

Most recreational landings of finetooth sharks are in the South Atlantic region. Between 2000 and 2003, 6,732 and 5,742 finetooth sharks were reported landed by the Marine Recreational Fisheries Statistics Survey (MRFSS) in the South Atlantic and Gulf of Mexico, respectively. Anglers in Florida, Georgia, Mississippi, and Louisiana accounted for the majority of the landings. Current Federal regulations allow anglers to retain one finetooth shark over 137 cm (54 inch) fork-length, per vessel, per trip, and require the release of any fish under this limit. Finetooth sharks are sexually mature at this size.

Currently, observers in the Gulf of Mexico shrimp trawl fishery do not identify, or record, shark by species and bycatch levels for all shark species are unknown in this fishery. Since 2000, Texas has implemented state time/area closures, prohibiting fishing activities in the southern and northern shrimp zones at different times of year, to allow for shrimp spawning. Furthermore, since 1981, federal waters (16.7-370.4 km (9-200 nm)) have been closed to shrimp trawling between May 15 and July 15 each year, which may be reducing finetooth shark bycatch. NMFS is interested in launching a collaborative effort with observers on shrimp trawl vessels to improve the shark identification skills of observers and attain a more accurate representation of shark bycatch in this fishery.

Reducing fishing mortality of finetooth sharks in fisheries that are directly managed by the HMS Management Division is complicated because that the number of vessels actively targeting SCS and finetooth sharks with gillnet gear are few and decreasing. Currently, there are only five active gillnet vessels (Carlson and Baremore, 2003). Furthermore, the rest of the SCS complex is not experiencing overfishing and is not overfished. These five vessels are already subject to 100 percent observer coverage between November 15 and March 31 because of the northern Right Whale calving season and approximately 30-50 percent coverage outside of this time period. These five vessels generally only account for approximately 10 percent of commercial finetooth landings, depending on the year, and relative abundance of finetooth sharks in Federal waters. In 2003, 620 finetooth sharks were observed in the strikenet and driftnet fisheries. Because of the fact that finetooth sharks are likely to become entangled in gillnet gear regardless of the mesh size due to their susceptibility to this gear, prohibiting commercial retention of finetooth sharks may simply result in additional dead discards. However, a directed trip limit for SCS and the reduced soak times (gillnets in the water for a shorter period of time) that may occur as a result could potentially reduce fishing mortality. As mentioned above, gillnets are already banned in state waters throughout most of the finetooth sharks' range. The majority of commercial landings of finetooth sharks may be harvested by fishermen that fish with gillnet gear and possess a directed shark fishing permit, but are not "targeting" sharks. This allows them to possess more finetooth sharks per trip than an incidental shark permit, and since they are "targeting" other species that are outside of the purview of HMS (e.g., bluefish, croaker, Spanish mackerel, and whiting), they are currently excluded from participating in the Directed Shark Gillnet Observer Program.

Starting in 2004, vessels that had a directed shark permit and gillnet gear on board were required to have a functioning VMS unit on-board during the Northern Right Whale calving season. NMFS had some units available for loan to fishermen who met these criteria, and 18 vessels participated in this program. In an effort to determine the impact of fishermen targeting non-HMS species, on finetooth shark landings, NMFS intends to include some of these vessels that are currently not subject to observer coverage, in its Directed Shark Gillnet Observer program in the future and will observe a few vessels in early 2005 as a pilot program. There may be extensive landings of finetooth sharks in these non-HMS fisheries since these participants possess directed shark permits they are not limited by the incidental trip limits and could therefore be responsible for a much larger proportion of the finetooth shark catch than the directed shark gillnet vessels. Including these additional vessels in observer coverage will provide a more accurate representation of commercial finetooth shark landings in the South Atlantic Ocean.

Another source of finetooth shark mortality that may be impacting stocks in U.S. waters is the illegal Mexican gillnet and longline fishery originating just south of the U.S./Mexican border in the Gulf of Mexico. This fishery consists of 6-10 m (22-30 feet) “ponga” boats with tiller-drive, outboard motors that travel into the U.S. EEZ to fish for sharks with gillnet gear. The U.S. Coast Guard has confiscated gillnets from these fishermen and game wardens with the Texas Parks and Wildlife Department (TXPWD) have identified finetooth sharks, in addition to others sharks, entangled in these gillnets. NMFS is interested in working with the U.S. Coast Guard and TXPWD to increase enforcement efforts to curb these illegal landings and collect biological information on seized catches. Furthermore, bilateral meetings with officials in the Mexican government may also be appropriate to address this issue.

In Amendment 1 to the 1999 Atlantic Tunas, Swordfish, and Shark FMP (December 24, 2003, 68 FR 74746), NMFS committed to expanding efforts to identify other sources of finetooth shark mortality by investigating what other fisheries may be interacting with, and/or landing these fish. This rulemaking will continue these efforts to identify possible sources of mortality and initiate necessary action to minimize finetooth shark mortality and prevent further overfishing. The next step in identifying possible courses of actions to address finetooth shark overfishing is to seek public comment on potential management alternatives that could achieve these goals. The next stock assessment for finetooth sharks will likely be conducted in 2007, at which time other management actions may be deemed necessary to address this issue.

Table 2.1 **Finetooth shark landings (lb dw) by gear type in the Gulf of Mexico and South Atlantic (SA), 1997-2003, as reported in the General Canvass (CN) and Coastal Fisheries (CL) Logbooks**. Source: Enric Cortes, personal communication.

Year	Gillnet Gear				Longline Gear				Other				Total
	GOM		SA		GOM		SA		GOM		SA		
	CN	CL	CN	CL	CN	CL	CN	CL	CN	CL	CN	CL	
1997	--	--	168,402	13,976	1,147	217	13,353	9,585	--	--	1,243	--	207,923
1998	--	3,255	263,995	64,159	505	358	12,657	10,100	--	--	880	--	355,909
1999	2,560	--	269,685	17,837	671	--	12,897	7,435	565	--	3,250	--	314,900
2000	--	--	185,907	29,241	11	2,820	17,678	5,847	11	--	633	--	242,148
2001	--	--	296,897	50,389	600	--	4,919	6,392	83	--	889	--	360,169
2002	--	--	152,507	70,388	894	1,704	7,708	6,780	--	--	732	129	240,842
2003	--	--	123,791	28,717	2,654	6,994	7,449	5,437	--	14	4,181	4	179,241

Alternative	Pros	Cons
1. No Action: Maintain current regulations, including: trip limits for incidental permit holders, observer coverage, limited access permit system to control fishing effort, and limiting recreational anglers to one finetooth shark greater than 54” per vessel, per day.	Prohibits new entrants from targeting finetooth sharks; May prevent significant increases in fishing mortality.	Overfishing is occurring and current harvest levels are certain; Majority of fishing mortality occurs outside of HMS directed fisheries.

Alternative	Pros	Cons
2. Commercial management measures to reduce directed fishing mortality of finetooth sharks. Possible options include, but are not limited to: directed trip limits for finetooth/SCS, gillnet gear restrictions (i.e. mesh size and soak times), prohibiting commercial landings of finetooth sharks**,** and reducing the SCS quota	Possibly less bycatch and fewer interactions with protected resources due to reduced gillnet soak times**;** Directed trip limits for finetooth sharks may reduce fishing mortality of finetooth sharks; Prohibiting commercial landings of finetooth sharks would enable participants to fish for other SCS while reducing finetooth shark landings.	Mis-identification of finetooth sharks may decrease ecological benefits; Directed shark gillnet vessels only comprise a small portion of total catch of finetooth sharks, and are already subject to high levels of observer coverage, resulting in extensive economic impacts if they are further restricted; Commercial restrictions may result in negative economic impacts on vessels targeting other SCS when only finetooth sharks are experiencing overfishing, Potential economic impacts of reduced harvests resulting from having to modify gear or decrease soak times; Finetooth sharks have a tendency to get caught in any gillnet regardless of mesh size, so mesh size restrictions may not reduce landings and may simply result in more dead discards with limited conservation benefits to stock; Difficult to selectively exclude finetooth sharks in commercial gillnet fisheries which may undermine conservation benefits.
3. Recreational management measures to reduce fishing mortality of finetooth sharks. Potential options include, but are not limited to: preventing retention of finetooth sharks in recreational fisheries, requiring the use of circle hooks, and increasing the minimum size for finetooth sharks.	Post release mortality may be decreased with circle hooks; Reduced finetooth shark mortality in recreational fisheries as a result of prohibiting landings or increasing minimum size; Minimal impacts on the recreational fishing industry as a whole as few vessels *target* finetooth sharks and these vessels could still continue to practice catch-and-release.	Possible impacts to CHB boats that target finetooth sharks; Use of circle hooks, and their impact on post release mortality are not documented for this species, and therefore may not reduce post-release mortality; Potential economic burden of requiring mandatory circle hook use on all recreational vessels targeting sharks and difficulties enforcing this requirement; Recreational harvest levels are relatively small in comparison to commercial landings so these management measures may have negligible impacts on stocks.

Alternative	Pros	Cons
4. Expand efforts to identify and reduce finetooth shark fishing mortality in other (non-HMS) fisheries. Potential options include, but are not limited to: expanding observer coverage in South Atlantic gillnet fisheries, improving shark ID in shrimp trawl fisheries, adding finetooth sharks to the select species list for shrimp trawl observer program, coordination with USCG and TXPWD to address illegal fishing by Mexican gillnet vessels in the Gulf of Mexico. Initiate further action as necessary contingent upon the 2007 finetooth shark stock assessment.	Increase knowledge and awareness of mortality in other fisheries as these other fisheries are likely largest source of mortality; Minimal economic burden on HMS managed fisheries compared to other alternatives; Observer programs already in place in shrimp-trawl and South Atlantic gillnet fisheries; Mexican gillnet vessels likely having a negative impact on other fisheries/stocks; Expansion of observer coverage may result in additional catch-series data to be used in 2007 SCS stock assessment.	Additional burden on observers; Logistics and administrative burden of expanding current observer coverage; Potential difficulties coordinating efforts with fishery management councils responsible for non-HMS fisheries; and May not reduce fishing mortality in the most expedient manner.
5. Add finetooth sharks to prohibited species list for commercial and recreational fisheries.	May reduce fishing mortality of finetooth sharks in HMS recreational and commercial fisheries.	Finetooth sharks do not meet at least two of the criteria necessary for their addition to the prohibited species list as identified in Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks FMP; May increase regulatory discards in commercial fishery because most finetooth sharks already dead by the time they are caught; Finetooth sharks are vulnerable to gillnets used to target other SCS which may negate ecological benefits; Potential economic impacts on commercial fishermen targeting other SCS; Potential economic impacts on recreational fisheries targeting finetooth sharks; Difficult to selectively exclude finetooth sharks in commercial gillnet fisheries which may undermine conservation benefits; Identification problems (may be confused with Blacktip, Lemon, and Spinner sharks which are not overfished)

2.3.3 Atlantic Billfish

As discussed in detail in Section 3.2.4, Atlantic blue and white marlin have been identified as overfished with overfishing continuing. The status of both species is characterized by reduced or severely reduced biomass levels and high fishing mortality rates. United States' landings of Atlantic blue and white marlin (combined) represent just over one percent of reported aggregate Atlantic-wide marlin landings, and less than three percent of reported Atlantic-wide sailfish landings. In 2002, NMFS conducted an Endangered Species Act (ESA) status listing review for Atlantic white marlin and determined that a listing was not warranted at that time. A new ESA status listing review for Atlantic white marlin is anticipated and additional conservation steps taken in advance of that review would be relevant to status review deliberations. Domestically, directed billfish fishing effort has been reserved for the recreational fishing sector since 1988, when possession by pelagic longline and sales of Atlantic billfish species were prohibited. The inherent nature of the recreational fishery, more than 20,000 permitted recreational angling and charter vessels embarking from thousands of marinas or private moorings, significantly complicates data collection and the development of reliable catch and effort estimates. At this time, the most reliable source of data on the directed billfish fishery is NMFS' Recreational Billfish Survey (RBS), which primarily collects data from Atlantic coast and Gulf of Mexico fishing tournaments. The following pros/cons table is split into two sections; alternatives addressing mortality issues in the directed fishery (recreational) and alternatives addressing monitoring and reporting issues. Please see Section 2.1 (Bycatch Reduction) for alternatives addressing commercial bycatch and bycatch mortality of billfish.

Alternatives	Pros	Cons
Draft Alternatives For Directed Atlantic Billfish Fishing		
1. No Action: Retain current regulations regarding directed billfish fishing, including permit requirements, minimum size limits, landing form, allowable gear, and reporting requirements.	No anticipated short-term adverse economic burden on fishery participants or fishing communities; Continues current positive ecological impact of reducing potential fishing mortality levels of Atlantic billfish.	No additional protections for white and blue marlin (WHM and BUM, respectively), *e.g.* would not reduce the current fishing mortality rate for these severely overfished stocks; Risks future implementation of stringent measures if stock status does not improve.

Alternatives	Pros	Cons
Draft Alternatives For Directed Atlantic Billfish Fishing		
2. When using natural baits or artificial lure/natural bait combinations, limit all Atlantic HMS Angling permitted vessels at all times, all Charter/Headboat permitted vessels on for-hire trips, and General Category permitted vessels participating in HMS tournaments, to using only circle hooks with an offset not to exceed 10 degrees (This alternative would allow the use of "J"-hooks with artificial lures).	May reduce post-release mortality (PRM) of billfish and other species that HMS anglers interact with and help slow further declines in the stock; May help avert future implementation of more stringent management measures by slowing further stock declines; Demonstrates United States' commitment to addressing recreational marlin conservation issues to the international community; No anticipated disproportionate geographical/temporal impacts on fishery participants.	May have limited impact on overall Atlantic-wide white marlin mortality levels; Difficult to estimate conservation benefits and impacts of circle hooks on target catches for ALL HMS -- little data on PRM impacts and catches of tunas, swordfish and sharks; Does not allow mortality reduction efforts to be specifically targeted to billfish; Little conservation imperative to impose circle hooks on non-overfished HMS with low billfish interaction rate; May be difficult to enforce if both "J"-hooks and circle hooks are permitted to be onboard; May limit gear choices for HMS permit holders on non-HMS trips; Potential adverse economic impact on fishery participants and fishing communities including charter/headboat operators, manufacturers, distributors and tackle shops; Difficult to define range of allowable circle hook sizes that would allow targeting of the full range of HMS (small skipjack tuna to large blue marlin); Post-release mortality benefit may be diminished by angler actions including, increasing drop-back time and offsetting hooks; Would allow "J" hooks in some but not all HMS fisheries: mandatory circle hooks in PLL fishery, mandatory circle hooks in recreational fishery, "J"-hooks in general category fishery.

Alternatives	Pros	Cons
Draft Alternatives For Directed Atlantic Billfish Fishing		
3. When using natural baits or artificial lure/natural bait combinations, limit all Atlantic billfish tournament participants to using only circle hooks with an offset not to exceed 10 degrees (This alternative would allow the use of "J"-hooks with artificial lures).	May reduce PRM of Atlantic billfish and other species that Atlantic HMS recreational tournament fishermen interact with; Would focus mortality reductions on known directed fishing effort for Atlantic billfish, without imposing gear restrictions on other segments of the HMS fishery where imposition of such measures may not currently be warranted; May help avert future implementation of more stringent management measures by slowing further stock declines; Demonstrates United States' commitment to addressing recreational marlin conservation issues to the international community; Should not disadvantage any particular billfish tournaments in terms of angler participation, as all tournaments would have to operate under uniform regulations; No anticipated disproportionate geographical/ temporal impacts on fishery participants.	May have some adverse impact on overall billfish tournament participation; May have limited impact on overall Atlantic-wide white marlin mortality levels; Post-release mortality benefit may be diminished by angler actions including increasing drop-back time and offsetting hooks; May result in some tournaments shifting operations to the Bahamas in an effort to circumvent regulations, thereby reducing anticipated mortality reduction benefits; May be difficult to enforce with allowance for both "J"-hooks and circle hooks onboard; Difficult to define range of allowable circle hook sizes that would allow targeting of the full range of HMS (small skipjack tuna to large blue marlin).
4. Increase the minimum legal size limit for white and/or blue marlin	May provide a small mortality reduction benefit for marlin; May allow fishery to continue with little disruption, minimizing economic burden on fishery; Easy to enforce; Demonstrates United States' commitment to addressing recreational marlin conservation issues to the international community; No anticipated disproportionate geographical/temporal impacts on fishery participants.	May have limited conservation/mortality reduction benefit Atlantic-wide given 1) small number of known landings, and 2) new higher marlin "J" hook PRM estimates; May have some adverse economic impact on CHB operators and tournament operators if angler participation declines.

Alternatives	Pros	Cons
Draft Alternatives For Directed Atlantic Billfish Fishing		
5. Implement a recreational bag limit of one Atlantic billfish per vessel per trip	May provide a small mortality reduction benefit; Allows fishery to continue with little disruption, minimizing economic impact on fishery; Easy to enforce; Demonstrates United States' commitment to addressing recreational marlin conservation issues to the international community; Can serve as backstop to other regulations; Can prevent excessive landings in areas and times when marlin may be abundant.	May have limited conservation/mortality reduction benefit given 1) few vessels currently land more than one fish per trip, 2) new higher PRM estimates, and 3) the small number of known landings; Potential adverse economic impacts on CHB operators if angler participation declines; May adversely impact tournament participation; Difficult to establish landings reduction goal given reported compliance with landings cap; May have disproportionate socio-economic impact on areas with higher concentrations of marlin landings.
6. Establish an annual U.S. recreational landings limit of 250 Atlantic blue and white marlin, combined, with a carryover provision for landings above/below the marlin landing limit, and in-season adjustment of minimum sizes, possession limits, or other management measures as necessary. (See Chapter 1 for additional information on the history of this draft alternative.)	Codifies binding obligation to ICCAT; Facilitates ability to comply with ICCAT landing limit and carryover provisions; Provides flexibility in addressing catches approaching the cap; Provides flexibility in managing fishery for compliance with ICCAT recommendations; May provide mortality benefit by limiting/preventing future increase in marlin mortality; Demonstrates United States' commitment to addressing recreational marlin conservation issues to the international community.	Increased administrative burden of continuous in-season monitoring and verification; May result in some adverse economic burdens, particularly on late season tournaments and CHB operators, if stringent measures are enacted mid-season; May lead to derby fishery conditions early in fishing year season.

Alternatives	Pros	Cons
Draft Alternatives For Directed Atlantic Billfish Fishing		
7. Prohibit non-tournament landings of Atlantic white marlin	May help reduce fishing mortality and slow overfishing of Atlantic white marlin by reducing landings and possibly discouraging directed effort; Should allow some level of mortality/effort reduction to be focused on Atlantic WHM without adversely impacting fishing opportunities for other HMS; Should facilitate compliance with ICCAT landings limit for United States recreationally landed marlin; Should reduce uncertainty in quantifying U.S. marlin landings; May reduce possibility of an ESA listing for white marlin; May help avert future implementation of more stringent management measures by slowing further stock declines; Demonstrates United States' commitment to addressing recreational marlin conservation issues to the international community; May only minimally impact angler participation in HMS fisheries as anglers claim to release between 74 and 99 percent of marlin and allows for continued possession of other HMS.	May have adverse economic burden on CHB operators stemming from potential decrease in angler participation; May have limited Atlantic-wide white marlin mortality benefit; May decrease non-tournament angler satisfaction by eliminating ability to land trophy or world record outside of tournaments white marlin; May result in public perception that fishery is being reserved for wealthy/elite fishermen; May shift some effort and attendant fishing mortality to other overfished stocks, *e.g*. blue marlin

Alternatives	Pros	Cons
Draft Alternatives For Directed Atlantic Billfish Fishing		
8. Prohibit landings of Atlantic white marlin in tournaments	May help reduce fishing mortality and slow overfishing of Atlantic white marlin by reducing landings and possibly discouraging directed effort; Eliminates largest verified source of white marlin landings stemming from directed effort; Should allow some level of mortality/effort reduction to be focused on Atlantic WHM without adversely impacting fishing opportunities for other HMS; Should facilitate compliance with ICCAT landings limit for United States recreationally landed marlin; Should reduce uncertainty in quantifying United States marlin landings; May help avert future implementation of more stringent management measures by slowing further stock declines; Demonstrates United States' commitment to addressing recreational marlin conservation issues to the international community; May only minimally impact angler participation in HMS fisheries as anglers currently claim to release between 74 and 99 percent of marlin and allows for continued possession of other HMS; Regulations apply uniformly to all tournaments;	May place adverse economic burden on a number of tournaments, particularly WHM specific tournaments, and CHB operators stemming if angler participation decreases; May have limited Atlantic-wide white marlin mortality benefit; Would decrease available biological and landings data on white marlins (size, weight, etc.); May decrease available catch (releases) and effort data on white marlin; May decrease angler satisfaction by eliminating ability to land trophy or world record fish in tournaments; May shift some effort and attendant fishing mortality to other overfished stocks, *e.g*. blue marlin.

Alternatives	Pros	Cons
Draft Alternatives For Directed Atlantic Billfish Fishing		
9. Prohibit possession, retention, and landings of Atlantic blue and white marlin	May help reduce fishing mortality of blue and white marlin and contribute to slowing of overfishing; Facilitates compliance with ICCAT landings limit for U.S. recreationally landed marlin. Should eliminate uncertainty in quantifying U.S. marlin landings; May help avert future implementation of more stringent management measures by slowing further stock declines; Demonstrates United States' commitment to addressing recreational marlin conservation issues to the international community; May only minimally impact angler participation in HMS fisheries as anglers currently claim to release between 74 and 99 percent of marlin and allows for continued possession of sailfish and other HMS; Should not disadvantage any particular billfish tournament, as all tournaments would have to operate under uniform regulations; No anticipated disproportionate geographical/temporal impacts on fishery participants.	Potential socio-economic burden on businesses associated with billfishing including tournaments and CHB operators if angler participation decreases; Limited impact on Atlantic-wide marlin mortality levels; Would decrease available biological and landings data on marlins (size, weight, etc.); Would likely decrease available catch (release) and effort data on marlins; May decrease angler satisfaction by eliminating ability to land trophy or world record fish.

Alternative	Pro	Con
Draft Alternatives For Atlantic Billfish Monitoring and Reporting		
1. No Action: Continue current registration and reporting requirements for Atlantic HMS tournaments, including four week advance registration requirement for all tournaments and seven day post-tournament reporting deadline, if selected.	Allows Agency to survey significant portion of HMS tournament universe and collect data as appropriate; No change in administrative burden for the public or the Agency; No new costs associated with development, implementation, or compliance with new permitting and/or reporting requirements for Agency or the public.	Would not reduce continuing public confusion regarding registration and reporting procedures. Would not address existing uncertainties in recreational effort or landings of Atlantic billfish;

Alternative	Pro	Con
Draft Alternatives For Atlantic Billfish Monitoring and Reporting		
2. Clarify that Atlantic HMS tournaments must be registered with the Highly Migratory Species Management Division (or its designee) and require tournament operators to be in receipt of a tournament confirmation number from the Highly Migratory Species Management Division (or its designee) before registration is considered complete -- current tournament reporting requirements would remain unchanged, unless selected in conjunction with alternative four below.	May eliminate confusion regarding the registration process, including where and how to register a tournament, as well as confirming when a tournament is deemed in compliance with registration requirements; May improve enforceability of registration requirements; May allow for better quantification of the universe of HMS tournaments, which could lead to improved catch and effort data collection for Atlantic HMS recreational fisheries.	*De minimus* adverse administrative/social/economic impacts on public. Small adverse administrative impact on Agency
3. Implement a mandatory Atlantic HMS tournament permit -- current tournament reporting requirements would remain unchanged, unless selected in conjunction with alternative four below.	May improve enforcement of tournament registration/permitting requirements; May allow for better quantification of the universe of HMS tournaments, which could lead to improved catch and effort data collection for Atlantic HMS recreational fisheries; Allows substantial sanctions (e.g. revocation/denial of permit) for various violations.	Significant additional administrative and fiscal burdens on the Agency; Additional administrative burden on tournament operators; May be difficult to effectively enforce.
4. Mandatory reporting of all Atlantic HMS billfish tournaments.	Improves enforcement of tournament reporting regulations by increasing consistency in application of reporting requirements; Decrease administrative burden and costs to the Agency (e.g. eliminate need to send certified mail to notify billfish tournament operators that they must report); Eliminate public confusion regarding whether or not a given billfish tournament is required to report; May improve data on billfish landings leading to overall improvement in management capability.	Continues some minor adverse social/economic impacts associated with current reporting requirements; There would be no increase in the administrative burden for the public, as all Atlantic billfish tournaments are currently selected for reporting, per NMFS policy.

2.4 Management Program Structure

2.4.1 Bluefin Tuna Quota Management

2.4.1.1 Alternatives For BFT Time-Period Subquotas in the General and Angling Categories

Atlantic BFT are managed under a strict quota program in accordance with recommendations from the International Commission for the Conservation of Atlantic Tunas (ICCAT) and domestic legislation, including the Atlantic Tunas Convention Act (ATCA) which requires NMFS to allocate the quota from ICCAT to domestic fisheries. Allocation of BFT subquotas within the General and Angling categories were formally established by percentage allocation in the 1999 Atlantic Tunas, Swordfish, and Sharks FMP based on traditional participation and use of quota. Since the implementation of the Atlantic Tunas, Swordfish, and Sharks FMP in 1999, various aspects of these fisheries have changed that warrant a re-examination of the distribution of BFT quota, within each category, to determine if the current percentage sub-allocations best meet the objectives of the 1999 Atlantic Tunas, Swordfish, and Sharks FMP and attainment of optimum yield. NMFS has received a Petition for Rulemaking from the State of North Carolina to redistribute General category quota and specifically allocate quota for a late season, south Atlantic commercial handgear fishery (67 FR 69502, November 18, 2002). Not all alternatives are mutually exclusive.

Alternatives	Pros	Cons
1. No Action: General category time periods and subquotas are as follows: June - Aug (60 % of General category quota), Sept (30 % of General category quota), Oct - Jan (10 % of General category quota), percentages applied after New York Bight (NYB) set-aside is accounted for (10 mt). Complex Angling category subquota allocation scheme. Time-periods and/or sub-allocations are codified in regulatory text.	Maintains historical subquota allocation patterns for the General and Angling categories; Frontloads quota early in the fishing year and allows for underharvest to roll to subsequent time periods.	May not reflect the current BFT fishery patterns; May not provide reasonable fishing opportunities for southern Atlantic states/winter fishery (issues raised in North Carolina Department of Marine Fisheries' (NCDMF) Petition for Rulemaking); NYB set-aside may not provide fair and equitable geographic opportunities to harvest quota; Lack of timely inseason monitoring of recreational fishery does not support North/South (N/S) line as an effective management tool; Currently requires an FMP Amendment to adjust in future; May be affected by potential revisions regarding calendar year vs. fishing year (see section 2.4.2); Lack of transparency in Angling category subquota allocation.

Alternatives	Pros	Cons
2. Remove codified General category time-periods, associated subquota allocations, and geographic set-aside. Establish annually via framework action/regulatory amendment.	May be adjusted on an annual basis to account for shifts in fishery patterns; Provides increased flexibility in management; Allows for additional flexibility in managing a limited amount of quota.	Rulemaking must be finalized prior to season commencement on June 1; May introduce uncertainty to fishery constituents; May be affected by potential revisions regarding calendar year vs. fishing year (see section 2.4.2); May increase rulemaking and administrative burden.
3. Adjust the General category time-periods and associated subquota allocations (either under the codified regulations as in Alternative 1 or under the framework action/regulatory amendment authority of Alternative 2).	May incorporate more recent information on BFT fishery patterns to warrant adjustments and provide more equitable fishing opportunities; May address concerns over reasonable fishing opportunities through whole fishery (issue raised in NCDMF's Petition for Rulemaking; Minimizes uncertainty regarding quota availability.	Does not maintain historical subquota allocation patterns identified in the 1999 Atlantic Tunas, Swordfish and Sharks FMP; May be affected by potential revisions regarding calendar year vs. fishing year (see section 2.4.2); FMP amendment to adjust in the future.
4. Simplify Angling category subquota allocation scheme. Remove the N/S management line.	May reduce confusion over available quota; Reduces administrative burden; Timeliness of current recreational data does not support N/S line as an effective management tool.	Real time recreational data collection methods, if devised, may revive usefulness of N/S line in the future.
5. Implement an Individual Transferable Quota (ITQ) system to the General category BFT fishery.	Typically works well for single long lived species fisheries with minimal annual fluctuations; Reduces potential for overcapitalization; May increase safety and constituents ability to plan by reducing 'derby-style' fisheries; May provide participants more control over fishery, potentially increasing profits; Minimizes administrative burden (long-term).	May be complex and timely to implement; May be controversial; May consolidate business among few corporations, without appropriate safeguards.

2.4.1.2 Alternatives For Inseason BFT Quota Transferability

Under the implementing regulations at 50 CFR 635.27(a)(8), NMFS has the authority to transfer quotas among categories, or, as appropriate, subcategories, of the fishery, after considering the following factors: (1) The usefulness of information obtained from catches in the particular category for biological sampling and monitoring of the status of the stock; (2) the catches of the particular category quota to date and the likelihood of closure of that segment of the fishery if no allocation is made; (3) the projected ability of the vessels fishing under the particular category quota to harvest the additional amount of BFT before the end of the fishing year; (4) the estimated amounts by which quotas established for other gear segments of the fishery might be exceeded; (5) the effects of the transfer on BFT rebuilding and overfishing; and (6) the effects of the transfer on accomplishing the objectives of the HMS FMP. If it is determined, based on the factors listed here and the probability of exceeding the total quota, that vessels fishing under any category or subcategory quota are not likely to take that quota, NMFS may transfer inseason any portion of the remaining quota of that fishing category to any other fishing category or to the Reserve quota. NMFS is concerned that the current list of criteria may not account for variations in seasonal distribution, abundance, or migration patterns of BFT, or the catch rate in one area precluding anglers in another area from reasonable fishing opportunities.

Alternatives	Pros	Cons
1. No Action: NMFS may transfer quota, or subquotas to/from any category; Determination based on analyzing the six criteria mentioned above.	Allows for flexible inseason management adjustments; Assists in providing reasonable fishing opportunities; Assists in achieving Optimum Yield.	Current criteria may not address all relevant fishery variables; Leads to uncertainty regarding availability of quota; May be perceived unfair if quota is consistently removed from one category and provide to another; Data availability not consistent across all categories.
2. Adjust/amend the six criteria.	Allows for consideration of more/fewer fishery related variables; May assist in achieving Optimum Yield; Allows for inseason management adjustments; May assist in providing reasonable fishing opportunities; May be drafted to address differences in data availability among commercial and recreational categories.	Too many criteria can become burdensome and lose relevance; Too few criteria may fail to incorporate important information; Criteria may not address all relevant fishery variables; May lead to uncertainty regarding availability of quota; May be perceived unfair if quota is consistently removed from one category and provide to another.
3. Eliminate inseason quota transfers and rely on annual adjustments.	Solidifies each category's quota allocation for fishing year; Reduces uncertainty regarding quota availability; Reduces administrative burden Reduces fairness concerns among participants.	Eliminates flexibility adjust management to current fishery conditions; May reduce agency's ability to provide equitable fishing opportunities coastwide if migration pattern doesn't match allocation shares.
4. Implement ITQ system to the entire BFT fishery	Typically works well for single long lived species fisheries with minimal annual fluctuations; Reduces potential for overcapitalization; May increase safety and constituents ability to plan by reducing 'derby-style' fisheries; May provide participants more control over fishery, potentially increasing profits; Minimizes administrative burden (long-term).	May be complex and timely to implement; May be controversial; May consolidate business among few corporations, without appropriate safeguards.

2.4.1.3 Alternatives For Annual BFT Quota Adjustments

Under the implementing regulations at 50 CFR 635.27(a)(9), NMFS has the authority, based on landings statistics and other available information, that a BFT quota in any category or, as appropriate, subcategory has been exceeded or has not been reached, with the exception of the Purse seine category, NMFS shall subtract the overharvest from, or add the underharvest to, that quota category for the following fishing year, provided that the total of the adjusted category quotas and the Reserve is consistent with ICCAT recommended quotas, the take of school BFT, and the allowance for dead discards. For the Purse seine category, if NMFS determines, based on landings statistics and other available information, that a purse seine vessel's allocation, as adjusted, has exceeded or has not been reached, NMFS shall subtract the overharvest from, or add the underharvest to, that vessel's allocation for the following year. Due to various fishery conditions in the past couple of years, the Purse seine category, as a whole, has not harvested it's annual allocated quota, which in turn has carried from one fishing year to the next. This has resulted in unprecedented accumulation of quota in the Purse seine category. NMFS has concerns regarding large amounts of unharvested quota in the Purse seine category rolling over multiple consecutive fishing years and the lack of authority to address them annually.

Alternatives	Pros	Cons
1. No Action: Annual under/over harvests remain within each individual category for the subsequent fishing year. For the Purse seine category, annual under/over harvests remain within each individual vessel's allocation for the subsequent fishing year.	Categories retain unharvested quota for the subsequent fishing year; Reduces conflicts between fishermen in different categories; Each category is responsible/accountable for their own catch; Purse seine category vessels retain unharvested quota for the subsequent fishing year.	May lead to stockpiling of quota in Purse seine category if annual allocations are not harvested in multiple consecutive years; May lead to the elimination of a fishery in a given fishing year if severe overharvests take place in the previous fishing year.
2. Authorize quota transfers among any category, including the Purse seine category, to/from the Reserve.	Minimizes the chance of stockpiling of quota in a particular category; Assists in providing maximum fishing opportunities; Reserve may cover potential overharvests.	May conflict with ITQ management system of Purse seine category; May provide incentive to overharvest allocated quota; May be viewed as penalizing categories for not attaining annual quota.
3. Eliminate carryover provisions for unharvested quota from one year to the next. Unharvested quota would be returned to resource. Overharvest would be deducted from the baseline quota allocation in the subsequent fishing year.	May enhance BFT rebuilding; Provides certainty regarding each category's quota availability; Eliminates the chance of stockpiling of quota in a particular category.	May lead to international reallocation pressure at ICCAT level; May be viewed as penalizing categories for not attaining annual quota; May lead to fishing in unfavorable weather conditions to harvest quota, leading to safety concerns.
4. Annual under/over harvests carried over to subsequent fishing year and applied to overall U.S. BFT Quota allocation.	Assists in eliminating stockpiling of quota in a specific category; Assists in providing maximum fishing opportunities.	May be viewed as penalizing categories for not attaining annual quota; May lead to redistribution of overall quota category allocations.

2.4.1.4 Alternatives For BFT Closure/Reopening Criteria

Under the implementing regulations at 50 CFR 635.28(a)(1), NMFS has the authority to close a BFT fishery, except for the Purse seine category which is managed via ITQs, when the quota category is reached, or is projected to be reached. Under the implementing regulations at 50 CFR 635.28(a)(3), NMFS also has the authority to close all or part of the Angling category fishery, if NMFS determines that variations in seasonal distribution, abundance, or migration patterns of BFT, or catch rates in one area, precludes anglers in another area from a reasonable fishing opportunity to harvest a portion of the Angling quota. NMFS may reopen that fishery at a later date if it is determined that BFT have migrated into the other area. To make this determination, NMFS considers the following: (i) The usefulness of information obtained from catches of a particular geographic area of the fishery for biological sampling and for monitoring the status of the stock; (ii) The current year catches from the particular geographic area relative to the catches recorded for that area during the preceding 4 years; (iii) The catches from the particular geographic area to date relative to the entire category and the likelihood of closure of that entire category of the fishery if no interim closure or area closure is effected; and (iv) The projected ability of the entire category to harvest the remaining amount of BFT before the anticipated end of the fishing season. NMFS is concerned that limiting the flexibility articulated in § 635.28(a)(3) to the Angling category may adversely effect the agencies ability to provide reasonable fishing opportunities in the other quota categories, especially the General category.

Alternatives	Pros	Cons
1. No Action: When a quota is reached or is projected to be reached, a closure notice is filed for all categories except for the Purse seine category. Purse seine category fishing based on individual vessel landings/allocation.	Assists in preventing overharvest of available quota; Allows Purse seine category to regulate itself; Facilitates providing reasonable recreational fishing opportunities; Allows Angling category flexibility.	May not account for shifts in fishery patterns in all categories; May constrain agency's ability to manage fishery in real time; May hinder constituents ability to plan in advance; Categories, other than the Angling, may be restrained due to lack of additional flexibility; No formal reopening criteria except for Angling category.
2. Establish closure criteria for all categories to include flexibility regarding fishery variability.	Allows for more flexibility due to variable fishery conditions; May facilitate advanced planning by constituents; May require additional oversight of Purse seine category.	May increase administrative burden; Too many criteria can become burdensome and lose relevance; Too few criteria may fail to incorporate important information; May not allow Purse seine category to regulate itself.
3. Establish reopening criteria.	Allows for more flexibility due to variable fishery conditions; Formalizes reopening procedures for all categories.	Too many criteria can become burdensome and lose relevance; Too few criteria may fail to incorporate important information; May increase administrative burden.

2.4.1.5 Alternatives For General and Angling Category BFT Retention Limit Adjustments

Under the implementing regulations at 50 CFR 635.23(a)(4) and 635.23(b)(3), NMFS has the authority to increase or decrease the BFT daily retention limits in the General and Angling categories to provide maximum utilization of the available quota in each respective category throughout the season. NMFS continues to explore ways to balance having the ability to adjust daily retention limits while providing constituents with as much advance notice as possible.

Alternatives	Pros	Cons
1. No Action: Increase or decrease General category retention limits, between 0 and 3 fish, providing a minimum of 3-calendar day notification time. Increase or decrease Angling category retention limits (by vessel or person), no constraints on number of fish, providing a minimum 3-calendar day notification time.	Assists in achieving Optimum Yield; Assists in collecting a broad range of stock information/data; Provides maximum utilization of a limited quota; Provides for adjustments based on most recent fishery conditions; Provides a minimum 3-day notification prior to being implemented.	May hinder constituents ability to plan trips/charters well in advance; Real time recreational data limitations may limit the effectiveness of retention limit adjustments; Minimal data regarding impacts of adjustments to the recreational and charter sectors of the fishery.
2. Establish firm retention limits with annual specifications. No adjustments during the season.	Vessel owner/operators would know retention limits for entire season, thus facilitating advanced planning; Minimizes administrative burden; Allows for public to provide comment on adjustments prior to implementing; Allows for transparency in setting retention limits.	Does not allow for any flexibility to adapt retention limits to real time fishery conditions; May not provide reasonable fishing opportunities to harvest available quota; May lead to premature closures or overharvests if catch rates are higher than anticipated; May hinder achieving Optimum Yield; May hinder collecting a broad range of stock information/data.
3. Establish criteria to be considered prior to adjusting retention limits.	Allows for the flexibility to adapt retention limits to real time fishery conditions; May assist in providing reasonable fishing opportunities; Formalizes adjustment procedures; May assist in achieving Optimum Yield; May assist in collecting a broad range of stock information/data; May provide maximum utilization of a limited quota.	Too many criteria can become burdensome and loose relevance; Too few criteria may fail to incorporate important information.

2.4.2 Timeframe for Annual Management of HMS Fisheries

Many aspects of HMS fisheries are managed on an annual basis, including, but not limited to, annual quota distribution, permit issuance, and fishery specifications. Currently, sharks are managed on a calendar year (January 1 – December 31) basis while tunas, swordfish and billfish are managed on a fishing year (June 1 through May 31) basis. NMFS is considering options to adjust the annual management year for HMS species to either a calendar year or fishing year.

Alternatives	Pros	Cons
1. No Action: Fishing Year (June 1- May 31): tunas, swordfish, and billfish Calendar Year (Jan. 1- Dec. 31): sharks	No potential for constituent confusion or disruption of markets and vessel permit issuance that could occur with a change in fishing year; Provides approximately six months between adoption of ICCAT recommendations and initiation of the fishing year for tunas, swordfish, and billfish; Initiates swordfish fishing year during early summer, ensuring ample quota availability during summer market should quota become limited; Fisheries and tournaments for tunas, swordfish, or billfish that occur later in the (calendar) year should have sufficient quota available; Provides consistency in shark management since first shark FMP (1993); Should ICCAT become more involved in managing sharks, provides consistency in timing of domestic and international management programs; No impact to domestic bluefin tuna sub-quota/time period management.	Inconsistency in timing of domestic tunas, swordfish, and billfish programs and ICCAT (calendar year) management program resulting in: Complex U.S. reports to ICCAT, with confusing structure of analyses in the U.S. National Report, thus limiting basis for assertive action during international compliance review; Complexity in preparation of analyses for U.S. reports to ICCAT; Fishing year management regime may be confusing to constituents; Different fishing years for HMS species may be confusing and arduous for fishermen targeting more than one HMS species; Fisheries and tournaments for tunas, swordfish, or billfish that occur early in the (calendar) year may not have sufficient quota available when quota is limited.

Alternatives	Pros	Cons
2. Change tuna, swordfish and billfish fishing year to calendar year (All HMS fisheries on calendar year)	Provides consistency in timing of domestic and international (ICCAT) management programs which will: Reduce complexity of U.S. reports to ICCAT, resulting in more transparent structure of analyses in U.S. National Report, providing a firmer basis for assertive action during international compliance review; Reduce complexity in preparation of U.S. reports to ICCAT; Provides all constituents, including those that fish for any combination of HMS, with consistent HMS fishing years on a simple, calendar year basis, resulting in an overall less complex management regime; Fisheries and tournaments for tunas, swordfish, or billfish that occur earlier in the (calendar) year should have sufficient quota available, if quota is limited; Provides consistency in shark management since first shark FMP (1993).	Potential short-term confusion as tuna, swordfish, and billfish quotas/limits and annual Atlantic tunas, charter/headboat, and HMS angling vessel permits are adjusted to a calendar year basis (six month bridge period); Provides approximately two months between adoption of ICCAT recommendations and initiation of the fishing year, which may be insufficient time to enact new regulations prior to start of fishing year; Since swordfish fishing year begins in January, may result in a lack of quota availability during summer market, if quota becomes limited; Domestic bluefin tuna sub-quotas/time period may need to be adjusted; Fisheries and tournaments for tunas, swordfish, or billfish that occur later in the (calendar) year may not have sufficient quota available, if quota is limited.
3. Change shark calendar year fisheries to a June 1 – May 31 fishing year basis (All HMS fisheries on fishing year)	Provides approximately six months between adoption of ICCAT recommendations and initiation of the fishing year; may become important for sharks if ICCAT becomes more involved in managing sharks; Initiates swordfish fishing year during early summer, ensuring ample quota availability during summer market should quota become limited; Fisheries and tournaments for tunas, swordfish, or billfish that occur later in the (calendar) year should have sufficient quota available, if quota is limited; Provides fishermen that fish for any combination of HMS and other constituents with consistent fishing years among HMS species; No impact to domestic bluefin tuna sub-quota/time period management or vessel permits; Shark fishery would not open until June, after the April pupping season.	Inconsistency in timing of domestic tunas, swordfish, and billfish programs and ICCAT (calendar year) management program resulting in: Complex U.S. reports to ICCAT, with confusing structure of analyses in the U.S. National Report, thus limiting any basis for assertive action during international compliance review; Complexity in preparation of analyses for U.S. reports to ICCAT; Potential disruption to shark wholesale & retail markets because of change to fishing year and trimester seasons; Potential general disruption and confusion for shark fishermen and other constituents that could occur with change to fishing year, and need to re-adjust shark trimester seasons and vessel permits (e.g. six month bridge period); Fisheries and tournaments for tunas, swordfish, or billfish that occur early in the (calendar) year may not have sufficient quota available, if quota is limited.

2.4.3 Authorized Gears

Innovative fishing gears and techniques are essential to increasing efficiency and reducing bycatch in fisheries for Atlantic HMS. As current or traditional gears are modified and new gears are developed, NMFS needs to be cognizant of these advances in order to gauge their potential impacts on target catch rates, bycatch rates, or protected species interactions, all of which can have important management implications. New gears and techniques need to be evaluated by NMFS for qualification as authorized gear types.

Anecdotal information suggests that one unclassified gear type, referred to as "green-stick gear", may be being used with increased frequency and success in certain segments of the HMS fisheries. The commercial configuration of the gear generally consists of a 10.7 - 13.7 m (35 - 45 feet) fiberglass pole mounted to the vessel. A mainline housed in a spool is hoisted by a tether-rope mounted to the top of the pole. The mainline is connected to the tether-rope with a cotton breakaway cord. At the end of the mainline, a floating decoy is attached. This decoy provides drag as the vessel moves forward and puts tension on the mainline. Several leaders hang down from the mainline at regularly spaced intervals and suspend lures so that they brush across the top of the water. As this gear is towed, the lures attached to the mainline skip across the water's surface and flex in the fiberglass pole produces a "jigging" action that attracts fish. This gear was designed so that the mainline breaks away from the tether rope when one or more fish are hooked. The mainline and fish are then retrieved using the spool (Wescott, 1996).

Commercial fishermen have found that tuna caught on the green-stick offer little resistance, as they are subjected to the pull of the mainline in one direction, the pull of the decoy in the other, as well as the pull from other hooked fish. Because tunas caught on the green-stick are landed quickly and with minimal fight, the fish may be less stressed and the meat may be of better quality. The commercial green-stick fishing gear has also been modified for recreational sportfishing, allowing multiple anglers to fish individually tended lines hoisted by the green-stick's single line (Wescott, 1996).

Recreational spearfishermen have expressed interest in participating in the Atlantic tuna fishery since the late 1990s. Speargun fishing gear is not currently authorized for use in HMS fisheries. Generally, speargun fishing gear includes a muscle-powered speargun equipped with a trigger mechanism, a spear with a tip designed to penetrate and retain fish, and terminal gear. Terminal gear generally includes trailing line or reels, as well as floats. Muscle-powered spearguns store potential energy provided from the operator's muscles. Muscle-powered spearguns only release that amount of energy that the operator has provided to it from his/her own muscles. Common energy storing methods for muscle-powered spearguns include compressing air and springs, and the stretching of rubber bands (IBSRC, 2005).

Alternatives	Pros	Cons
1. No Action: Maintain current authorized gears in the HMS fisheries.	Fishing effort and fishing mortality (F) would not likely increase as there would be no new authorized gears/participants; Bycatch and discard levels would not likely increase due to new authorized gears/participants; The recreational use of green-stick gear , using individually tended rods and reels (as described by Wescott, 1996) would continue to be allowed.	Speargun fishing gear would continue to not be an authorized gear in the Atlantic tunas fishery; Commercial vessels (non-pelagic longline (PLL)) would not be allowed to harvest tunas with the commercial configuration of green-stick fishing gear as described by Wescott, 1996; Continued confusion over allowable cockpit (e.g. dart-harpoon, gaff, flying gaff).
2. Authorize speargun fishing gear as a permissible gear-type only in the recreational Atlantic tuna fishery (No sale).	Recreational spearfishermen would be allowed to participate in the recreational tuna fishery; Likely relatively few fish would be taken (minor increase in F for BAYS, BFT F accounted for by quota); Possible increase in revenues for CHB vessels due to chartering; Likely increased angler consumer surplus for spearfishermen*; Low bycatch/discard levels expected; Would allow new type of recreational tuna fishing "experience".	Potential small but unquantifiable increase in F for BAYS tuna species; Potential shortened BFT season with some potential adverse economic impacts; Potential decrease in angler consumer surplus for rod and reel fishermen*; Potential gear conflicts (rod and reel and speargun); Potential safety concerns; Potential small increase in BFT/BAYS dead discards; Unknown effort increase once activity is authorized; Recreational fishermen would not be able to fish for or retain any HMS, other than Atlantic tunas, if speargun fishing gear was aboard.

Alternatives	Pros	Cons
	Description of the Alternative: Authorize the use of speargun fishing gear in the recreational Atlantic tunas fishery. Under this alternative, no HMS, other than Atlantic tunas could be possessed onboard a vessel with speargun fishing gear onboard. Also under this alternative, tunas taken with speargun fishing gear would not be eligible for sale, regardless of fishing category. Fishermen using speargun fishing gear would be required to be completely submerged when they fire their speargun. Only free-swimming fish, not those restricted by fishing lines or any other devices, could be taken. The use of powerheads for taking tunas with speargun fishing gear would not be allowed.	
3. Authorize speargun fishing gear as a permissible gear-type in the commercial handgear and recreational Atlantic tuna fisheries.	Potential benefits for CHB and General category fishermen from the sale of speared tunas, as well as for fish houses, gear supply houses, and other associated businesses; Would allow recreational spearfishermen to participate in the recreational tuna fishery and allow new type of recreational tuna fishing "experience"; Likely relatively few fish would be taken (minor increase in F for BAYS, BFT F accounted for by quota); Potential increase in revenues for CHB vessels due to chartering; Likely increased angler consumer surplus for recreational spearfishermen*; Low bycatch/discard levels expected.	Potential unquantifiable increase in F for BAYS tuna species; Potential shortened BFT season with some potential adverse economic impacts; Potential decrease in angler consumer surplus for recreational rod and reel fishermen*; Potential gear conflicts (rod and reel and speargun); Potential safety concerns; Potential small increase in BFT/BAYS dead discards; Unknown effort increase once activity is authorized; Recreational fishermen would not be able to fish for or retain any HMS, other than Atlantic tunas, if speargun fishing gear was aboard; Potential increase in administrative burden to monitor and enforce.
	Description of the Alternative: Authorize the use of speargun fishing gear in the commercial handgear and recreational Atlantic tunas fisheries. Under this alternative, no HMS, other than Atlantic tunas, may be possessed onboard any CHB vessel (on a for hire trip) or on any Angling category vessel which is carrying speargun fishing gear. Fishermen using speargun fishing gear would be required to be completely submerged when they fire their speargun. Only free-swimming fish, not those restricted by fishing lines or any other devices, could be taken. The use of powerheads for taking tunas with speargun fishing gear would not be allowed.	
4. Authorize the commercial use of green-stick gear (as described by Wescott, 1996) for the commercial harvest of Atlantic tunas.	May increase landings of some tuna species, creating positive benefits for consumers, fishermen, fish houses, supply houses, and other associated businesses; Potential increase in domestic BAYS tunas landings; May decrease interactions with protected species by reducing PLL effort.	Potential unquantifiable increase in F for some tuna species; Vessels with PLL gear onboard would only be able to use commercial green-stick gear (as described by Wescott, 1996) if it were rigged with 16/0 or larger circle hooks, consistent with existing PLL regulations – this would likely reduce effectiveness of the gear and associated benefits; Potential increase in bycatch and discards of other species, including other HMS species.

Alternatives	Pros	Cons
	Description of the Alternative: Authorize the use of green-stick fishing gear for the commercial harvest of Atlantic tunas. Vessels employing the commercial configuration of green-stick gear would be subject to the General category regulations, including Restricted Fishing Days and retention limits. In addition, vessels with PLL gear onboard would be subject to all current PLL regulations.	
5. Authorize the use of hand-held cockpit gears (e.g. dart-harpoon, gaff, flying gaff) at boat side for subduing HMS captured on other authorized gears.	Could promote safety at sea; May reduce confusion over allowable cockpit gears; May reduce numbers of fish lost at boat side; Many of these gears are currently used in other large-fish fisheries.	May increase bycatch mortality if undersized fish or non-target species are gaffed or harpooned and subsequently released/discarded; May raise enforcement issues.
	Description of the Alternative: Authorize the use of hand-held cockpit gears at boat side for subduing HMS captured on other authorized gears. Cockpit gears would not be allowed to be thrown or used in any way to capture free-swimming HMS.	

* Consumer surplus is the difference between the amounts consumers are willing to pay for products or services and the amounts they actually pay.

2.4.4 Regulatory Housekeeping

This section addresses several items in the HMS regulations that need to be "cleaned up," including minor corrections, clarifications, the removal or modification of obsolete cross-references, and minor changes to definitions and prohibitions that will improve the enforcement of HMS regulations. Several of these items have been identified by constituents over the past few years or raised during scoping hearings. The development of a consolidated HMS FMP provides an appropriate mechanism to implement these regulatory changes. Most of the corrections, clarifications, changes in definitions, and modifications to remove obsolete cross-references are consistent with the intent of previously analyzed and approved management measures. These proposed changes would have no effect either individually or cumulatively upon the human environment. Under NOAA Administrative Order 216-6, actions that modify previously analyzed actions and that do not affect the human environment, minor technical additions, corrections, or changes to existing regulations are categorically excluded from the requirements of an EA or EIS. Proposed changes that meet these criteria, and that are therefore exempt from the NEPA requirements, are described in Section 2.4.4.1, with the current regulation in the left column and the proposed amendment in the right column. Other, more substantive, changes that may require the development and analysis of alternatives pursuant to NEPA, the Regulatory Flexibility Act, or other applicable laws are discussed in Section 2.4.4.2.

2.4.4.1 Proposed Regulatory Changes That Do Not Need Alternatives

Table 2.2 presents a list of the current regulations and the proposed amendments to those regulations that NMFS is considering. A description of why the change is being considered is included in the last column.

Table 2.2 List of Proposed Regulatory Changes.

Item Number	Current Regulation	Proposed Amendment	Rationale for Proposed Amendment
1	§ 635.2 Definitions. *ILAP* means an initial limited access permit issued pursuant to §635.4.	§ 635.2 Definitions. Remove the definition for ILAP.	Removes the definition of Initial Limited Access Permits (ILAPs), which are no longer issued.
2	§ 635.2 Definitions. *Management unit* means in this part: * * * (5) For sharks, means all fish of these species in the western north Atlantic Ocean, including the Gulf of Mexico and the Caribbean Sea, excluding those species listed in Table 2 of Appendix A.	§ 635.2 Definitions *Management unit* means in this part: * * * (5) For sharks, means all fish of the species listed in Table 1 of Appendix A to this part, in the western north Atlantic Ocean, including the Gulf of Mexico and the Caribbean Sea.	Specifies species that are part of the management unit, rather than those that are not part of the management unit.
3	§ 635.2 Definitions. *Northeast Distant closed area* * * *	§ 635.2 Definitions. *Northeast Distant gear restricted area* * * *	Amends title of the Northeast Distant closed area to reflect recent amendments to the regulations governing this area.
4	§ 635.2 Definitions. *Shark* means one of the oceanic species, or a part thereof, listed in tables 1 and 2 in Appendix A to this part.	§ 635.2 Definitions. *Shark* means one of the oceanic species, or a part thereof, listed in Table 1 in Appendix A to this part.	Links the definition of “shark” to the definition of “management unit.”
5	Table 2 in Appendix A - List of Deepwater and other sharks	Remove Table 2 in Appendix A.	Removes the table of species that are not in the management unit. NMFS will continue to collect data on these species and may add them to the management unit in the future.

Item Number	Current Regulation	Proposed Amendment	Rationale for Proposed Amendment
6	§ 635.4(d)(4) A person can obtain an Atlantic Tunas Longline category permit for a vessel only if the vessel has been issued both a limited access permit for shark and a limited access permit for swordfish. NMFS will issue Atlantic Tunas Longline category permits to qualifying vessels in calendar year 1999. Thereafter, such permits may be obtained through transfer from current owners consistent with the provisions under paragraph (l)(2) of this section.	§ 635.4(d)(4) A person can obtain an Atlantic Tunas Longline category permit for a vessel only if the vessel has been issued both a limited access permit for shark and a limited access permit other than handgear for swordfish. Atlantic Tunas Longline category permits may be obtained through transfer from current owners consistent with the provisions under paragraph (l)(2) of this section.	Removes a reference to a date that has passed. Also, clarifies hat handgear permit holders cannot have an Atlantic Tunas Longline category permit because they cannot use longline gear to catch swordfish.
7	§ 635.4(e)(1) As of July 1, 1999, the only valid Federal commercial vessel permits for sharks are those that have been issued under the limited access criteria specified in §635.16.	§ 635.4(e)(1) The only valid Federal commercial vessel permits for sharks are those that have been issued under the limited access program consistent with §635.4(l) and (m).	Removes a date that has passed, and a cross-reference that has been removed.
8	§ 635.4(e)(2) The owner of each vessel used to fish for or take Atlantic sharks or on which Atlantic sharks are retained, possessed with an intention to sell, or sold must obtain, in addition to any other required permits, only one of two types of commercial limited access shark permits: Shark directed limited access permit or shark incidental limited access permit. See §635.16 regarding the initial issuance of these two types of permits. It is a rebuttable presumption that the owner or operator of a vessel on which sharks are possessed in excess of the recreational retention limits intends to sell the sharks.	§ 635.4(e)(2) The owner of each vessel used to fish for or take Atlantic sharks or on which Atlantic sharks are retained, possessed with an intention to sell, or sold must obtain, in addition to any other required permits, only one of two types of commercial limited access shark permits: Shark directed limited access permit or shark incidental limited access permit. It is a rebuttable presumption that the owner or operator of a vessel on which sharks are possessed in excess of the recreational retention limits intends to sell the sharks.	Removes a cross-reference that has been removed.
9	§ 635.4(f)(1) The owner of each vessel used to fish for or take Atlantic swordfish or on which Atlantic swordfish are retained, possessed with an intention to sell, or sold must obtain, in addition to any other required permits, only one of three types of commercial limited access swordfish permits: swordfish directed limited access permit, swordfish incidental limited access permit, or swordfish handgear limited access permit. See §635.16 regarding the initial issuance of these three types of permits.	§ 635.4(f)(1) The owner of each vessel used to fish for or take Atlantic swordfish or on which Atlantic swordfish are retained, possessed with an intention to sell, or sold must obtain, in addition to any other required permits, only one of three types of commercial limited access swordfish permits: swordfish directed limited access permit, swordfish incidental limited access permit, or swordfish handgear limited access permit.	Removes a cross-reference that has been removed.

Item Number	Current Regulation	Proposed Amendment	Rationale for Proposed Amendment
10	§ 635.4(f)(2) As of July 1, 1999, the only valid Federal vessel permits for swordfish are those that have been issued under the limited access criteria specified in §635.16.	§ 635.4(f)(2) The only valid Federal vessel permits for swordfish are those that have been issued under the limited access program consistent with §635.4(l) and (m).	Removes a date that has passed, and a cross-reference that has been removed.
11	§ 635.4(h)(2) *Limited access permits for swordfish and shark*. See §635.16 for the issuance of ILAPs for shark and swordfish. See paragraph (l) of this section for transfers of ILAPs and LAPs for shark and swordfish. See paragraph (m) of this section for renewals of LAPs for shark and swordfish.	§ 635.4(h)(2) *Limited access permits for swordfish and shark*. See paragraph (l) of this section for transfers of LAPs for shark and swordfish. See paragraph (m) of this section for renewals of LAPs for shark and swordfish.	Removes references to Initial Limited Access Permits (ILAPs), which are no longer issued. Also, removes a cross-reference that has been removed.
12	§ 635.4(l)(2)(i) Subject to the restrictions on upgrading the harvesting capacity of permitted vessels in paragraph (l)(2)(ii) of this section and to the limitations on ownership of permitted vessels in paragraph (l)(2)(iii) of this section, an owner may transfer a shark or swordfish ILAP or LAP or an Atlantic Tunas Longline category permit to another vessel that he or she owns or to another person. Directed handgear ILAPs and LAPs for swordfish may be transferred to another vessel but only for use with handgear and subject to the upgrading restrictions in paragraph (l)(2)(ii) of this section and the limitations on ownership of permitted vessels in paragraph (l)(2)(iii) of this section. Incidental catch ILAPs and LAPs are not subject to the requirements specified in paragraphs (l)(2)(ii) and (l)(2)(iii) of this section.	§ 635.4(l)(2)(i) Subject to the restrictions on upgrading the harvesting capacity of permitted vessels in paragraph (l)(2)(ii) of this section and to the limitations on ownership of permitted vessels in paragraph (l)(2)(iii) of this section, an owner may transfer a shark or swordfish LAP or an Atlantic Tunas Longline category permit to another vessel that he or she owns or to another person. Directed handgear LAPs for swordfish may be transferred to another vessel but only for use with handgear and subject to the upgrading restrictions in paragraph (l)(2)(ii) of this section and the limitations on ownership of permitted vessels in paragraph (l)(2)(iii) of this section. Incidental catch LAPs are not subject to the requirements specified in paragraphs (l)(2)(ii) and (l)(2)(iii) of this section.	Removes references to Initial Limited Access Permits (ILAPs), which are no longer issued.
13	§ 635.4(l)(2)(ii)(B) The vessel's horsepower may be increased only once subsequent to the issuance of a limited access permit, whether through refitting, replacement, or transfer. * * *	§ 635.4(l)(2)(ii)(B) The vessel's horsepower may be increased only once, relative to the baseline specifications of the vessel originally issued the LAP, subsequent to the issuance of a limited access permit, whether through refitting, replacement, or transfer. * * *	Clarifies that the one allowable horsepower upgrade for vessels with limited access permits is relative to the baseline specifications of the vessel originally issued the LAP.

Item Number	Current Regulation	Proposed Amendment	Rationale for Proposed Amendment
14	§ 635.4(l)(2)(ii)(C) The vessel's length overall, gross registered tonnage, and net tonnage may be increased only once subsequent to the issuance of a limited access permit, whether through refitting, replacement, or transfer. * * *	§ 635.4(l)(2)(ii)(C) The vessel's length overall, gross registered tonnage, and net tonnage may be increased only once, relative to the baseline specifications of the vessel originally issued the LAP, subsequent to the issuance of a limited access permit, whether through refitting, replacement, or transfer. * * *	Clarifies that the one allowable vessel size upgrade for vessels with limited access permits is relative to the baseline specifications of the vessel originally issued the LAP.
15	§ 635.4(l)(2)(viii) As specified in paragraph (f)(4) of this section, a directed or incidental ILAP or LAP for swordfish, a directed or an incidental catch ILAP or LAP for shark, and an Atlantic Tunas commercial category permit are required to retain swordfish. Accordingly, a LAP for swordfish obtained by transfer without either a directed or incidental catch shark LAP or an Atlantic tunas commercial category permit will not entitle an owner or operator to use a vessel to fish in the swordfish fishery.	§ 635.4(l)(2)(viii) As specified in paragraph (f)(4) of this section, a directed or incidental LAP for swordfish, a directed or an incidental catch LAP for shark, and an Atlantic Tunas commercial category permit are required to retain swordfish. Accordingly, a LAP for swordfish obtained by transfer without either a directed or incidental catch shark LAP or an Atlantic tunas commercial category permit will not entitle an owner or operator to use a vessel to fish in the swordfish fishery.	Removes references to Initial Limited Access Permits (ILAPs), which are no longer issued.
16	§ 635.4(l)(2)(ix) As specified in paragraph (d)(4) of this section, a directed or incidental ILAP or LAP for swordfish, a directed or an incidental catch ILAP or LAP for shark, and an Atlantic Tunas Longline category permit are required to retain Atlantic tunas taken by pelagic longline gear. Accordingly, an Atlantic Tunas Longline category permit obtained by transfer without either a directed or incidental catch swordfish or shark LAP will not entitle an owner or operator to use the permitted vessel to fish in the Atlantic tunas fishery with pelagic longline gear.	§ 635.4(l)(2)(ix) As specified in paragraph (d)(4) of this section, a directed or incidental LAP for swordfish, a directed or an incidental catch LAP for shark, and an Atlantic Tunas Longline category permit are required to retain Atlantic tunas taken by pelagic longline gear. Accordingly, an Atlantic Tunas Longline category permit obtained by transfer without either a directed or incidental catch swordfish or shark LAP will not entitle an owner or operator to use the permitted vessel to fish in the Atlantic tunas fishery with pelagic longline gear.	Removes references to Initial Limited Access Permits (ILAPs), which are no longer issued.

Item Number	Current Regulation	Proposed Amendment	Rationale for Proposed Amendment
17	§ 635.4(m)(2) *Shark, swordfish, and tuna longline LAPs*. As of June 1, 2000, the owner of a vessel of the United States that fishes for, possesses, lands or sells shark or swordfish from the management unit, or takes or possesses such shark or swordfish as incidental catch or that fishes for Atlantic tunas with longline gear must have the applicable limited access permit(s) issued pursuant to the requirements in §635.4, paragraphs (e) and (f). However, any ILAP that expires on June 30, 2000, is valid through that date. Only valid limited access permit holders in the preceding year are eligible for renewal of a limited access permit(s). Limited access permits that have been transferred according to the procedures of paragraph (l) of this section are not eligible for renewal by the transferor.	§ 635.4(m)(2) *Shark, swordfish, and tuna longline LAPs*. The owner of a vessel of the United States that fishes for, possesses, lands or sells shark or swordfish from the management unit, or takes or possesses such shark or swordfish as incidental catch or that fishes for Atlantic tunas with longline gear must have the applicable limited access permit(s) issued pursuant to the requirements in §635.4, paragraphs (e) and (f). Only persons holding a non-expired limited access permit(s) in the preceding year are eligible for renewal of a limited access permit(s). Limited access permits that have been transferred according to the procedures of paragraph (l) of this section are not eligible for renewal by the transferor.	Removes a date that has passed, and references to Initial Limited Access Permits (ILAPs), which are no longer issued. Also, replaces the word "valid" with "non-expired" to better clarify the intent of the paragraph.
18	§ 635.5(a)(4) *Pelagic longline sea turtle reporting*. The operators of vessels that have pelagic longline gear on board and that have been issued, or are required to have, a limited access swordfish, shark, and tuna longline category permit for use in the Atlantic Ocean including the Caribbean Sea and the Gulf of Mexico are required to report any sea turtles that are dead when they are captured or that die during capture to the NOAA Fisheries Southeast Fisheries Science Center Observer Program, at a number designated by NOAA Fisheries, within 48 hours of returning to port, in addition to submitting all other reporting forms required by this part and 50 CFR parts 223 and 224.	Remove § 635.5(a)(4), and redesignate subsequent sections as needed.	Removes a duplicative reporting requirement. Captured sea turtles would still be required to be reported in PLL logbooks, so no information is lost.
19	§ 635.21(a)(2) If a billfish is caught by a hook, the fish must be released by cutting the line near the hook or by using a dehooking device, in either case without removing the fish from the water.	§ 635.21(a)(2) If a billfish is caught by a hook and not retained, the fish must be released by cutting the line near the hook or by using a dehooking device, in either case without removing the fish from the water.	Clarifies that billfish caught by a hook *and not retained* must be released using specified protocols.

Item Number	Current Regulation	Proposed Amendment	Rationale for Proposed Amendment
20	§ 635.21(c)(1) From August 1, 1999, through November 30, 2000, no person may deploy a pelagic longline that is more than 24 nautical mile (44.5 km) in length in the Mid-Atlantic Bight.	§ 635.21(c)(1) [Reserved] or Remove and replace paragraph.	Removes a requirement that has expired.
21	§ 635.21(c)(2)(ii) In the Charleston Bump closed area from March 1 through April 30, 2001, and from February 1 through April 30 each calendar year thereafter;	§ 635.21(c)(2)(ii) In the Charleston Bump closed area from February 1 through April 30 each calendar year;	Removes dates that have passed.
22	§ 635.21(c)(2)(iii) In the East Florida Coast closed area at any time beginning at 12:01 a.m. on March 1, 2001;	§ 635.21(c)(2)(iii) In the East Florida Coast closed area at any time;	Removes dates that have passed.
23	§ 635.21(c)(2)(iv) In the Desoto Canyon closed area at any time beginning at 12:01 a.m. on November 1, 2000;	§ 635.21(c)(2)(iv) In the Desoto Canyon closed area at any time;	Removes dates that have passed.
24	§ 635.21(c)(2)(v) In the Northeast Distant closed area at any time, unless persons onboard the vessel comply with the following: * * *	§ 635.21(c)(2)(v) In the Northeast Distant gear restricted area at any time, unless persons onboard the vessel comply with the following: * * *	Amends title of the Northeast Distant closed area to reflect recent amendments to the regulations governing the area.
25	Second sentence of § 635.21(e)(1) currently reads, "When fishing for Atlantic tunas other than BFT, fishing gear authorized for any Atlantic Tunas permit category may be used, except that purse seine gear may only be used on board vessels permitted in the Purse Seine category and pelagic longline gear may be used only on board vessels issued an Atlantic Tunas Longline category tuna permit as well as ILAPs or LAPs for both swordfish and sharks."	Second sentence of § 635.21(e)(1) proposed to be amended as, "When fishing for Atlantic tunas other than BFT, fishing gear authorized for any Atlantic Tunas permit category may be used, except that purse seine gear may only be used on board vessels permitted in the Purse Seine category and pelagic longline gear may be used only on board vessels issued an Atlantic Tunas Longline category tuna permit and a LAP other than handgear for swordfish, and a LAP for sharks."	Removes references to Initial Limited Access Permits (ILAPs), which are no longer issued. Also, clarifies that vessels issued swordfish handgear permits cannot be issued an Atlantic Tunas Longline category permit because the vessel cannot use longline gear to catch swordfish.
26	§ 635.21(e)(4)(iii) A person aboard a vessel issued a directed handgear ILAP or LAP for Atlantic swordfish may not fish for swordfish with any gear other than handgear. * * *	§ 635.21(e)(4)(iii) A person aboard a vessel issued a directed handgear LAP for Atlantic swordfish may not fish for swordfish with any gear other than handgear. * * *	Removes references to Initial Limited Access Permits (ILAPs), which are no longer issued.

Item Number	Current Regulation	Proposed Amendment	Rationale for Proposed Amendment
27	The third sentence of §635.22(c)(2) currently reads, "No prohibited sharks from the management unit, which are listed in table 1(d) of Appendix A to this part, may be retained."	The third sentence of §635.22(c)(2) is proposed to be amended as, "No prohibited sharks, including parts or pieces of prohibited sharks, which are listed in table 1(d) of Appendix A to this part, may be retained."	Clarifies that parts and pieces of prohibited sharks may not be retained.
28	§ 635.23(f)(3) – For pelagic longline vessels fishing in the Northeast Distant closed area, as defined under §635.2, under the exemption specified at §635.21(c)(2)(v), all BFT taken incidental to fishing for other species while in the Northeast Distant closed area may be retained up to a maximum of 25 mt for all vessels so authorized, notwithstanding the retention limits and target catch requirements specified in paragraph (f)(1) of this section.	§ 635.23(f)(3) – For pelagic longline vessels fishing in the Northeast Distant gear restricted area, as defined under §635.2, under the exemption specified at §635.21(c)(2)(v), all BFT taken incidental to fishing for other species while in the Northeast Distant gear restricted area may be retained up to a maximum of 25 mt for all vessels so authorized, notwithstanding the retention limits and target catch requirements specified in paragraph (f)(1) of this section.	Changes the title of the NED closed area to reflect recent amendments to the regulations governing the area.
29	§ 635.24(a)(1) Persons who own or operate a vessel that has been issued a directed ILAP or LAP for shark may retain, possess or land no more than 4,000 lb (1,814 kg), dw, of LCS per trip.	§ 635.24(a)(1) Persons who own or operate a vessel that has been issued a directed LAP for shark may retain, possess or land no more than 4,000 lb (1,814 kg), dw, of LCS per trip.	Removes references to Initial Limited Access Permits (ILAPs), which are no longer issued.
30	§ 635.24(a)(2) Persons who own or operate a vessel that has been issued an incidental catch ILAP or LAP for sharks may retain, possess or land no more than 5 LCS and 16 SCS and pelagic sharks, combined per trip.	§ 635.24(a)(2) Persons who own or operate a vessel that has been issued an incidental catch LAP for sharks may retain, possess or land no more than 5 LCS and 16 SCS and pelagic sharks, combined per trip.	Removes references to Initial Limited Access Permits (ILAPs), which are no longer issued.
31		Add a new paragraph at §635.24(a)(3) to read as follows, "Persons who own or operate a vessel that has been issued an incidental or directed LAP for sharks may not retain, possess, sell, or purchase a prohibited shark, including parts or pieces of prohibited sharks, which are listed in table 1(d) of Appendix A to this part."	Clarifies existing regulations regarding the retention, possession, sale and purchase of prohibited sharks by also including parts and pieces of prohibited sharks.

Item Number	Current Regulation	Proposed Amendment	Rationale for Proposed Amendment
32	§ 635.24(b)(1) Persons aboard a vessel that has been issued an incidental ILAP or LAP for swordfish may retain, possess, or land no more than two swordfish per trip in or from the Atlantic Ocean north of 5° N. lat.	§ 635.24(b)(1) Persons aboard a vessel that has been issued an incidental LAP for swordfish may retain, possess, or land no more than two swordfish per trip in or from the Atlantic Ocean north of 5° N. lat.	Removes references to Initial Limited Access Permits (ILAPs), which are no longer issued.
33	§ 635.24(b)(2) Persons aboard a vessel in the squid trawl fishery that has been issued an incidental ILAP or LAP for swordfish may retain, possess, or land no more than five swordfish per trip in or from the Atlantic Ocean north of 5° N. lat. * * *	§ 635.24(b)(2) Persons aboard a vessel in the squid trawl fishery that has been issued an incidental LAP for swordfish may retain, possess, or land no more than five swordfish per trip in or from the Atlantic Ocean north of 5° N. lat. * * *	Removes references to Initial Limited Access Permits (ILAPs), which are no longer issued.
34	§ 635.27(a)(3) * * * In addition, 25 mt shall be allocated for incidental catch by pelagic longline vessels fishing in the Northeast Distant closed area, as defined under §635.2, under the exemption specified at §635.21(c)(2)(v).	§ 635.27(a)(3) * * * In addition, 25 mt shall be allocated for incidental catch by pelagic longline vessels fishing in the Northeast Distant gear restricted area, as defined under §635.2, under the exemption specified at §635.21(c)(2)(v).	Changes title of the NED closed area to reflect recent regulatory changes to the area.
35	§ 635.71(a)(7) Fail to allow an authorized agent of NMFS to inspect and copy reports and records, as specified in § 635.5(e) or § 635.32.	§ 635.71(a)(7) Fail to allow an authorized agent of NMFS to inspect and copy reports and records, as specified in § 635.5(e), § 635.5(f), or § 635.32.	Adds an additional reference in this prohibition to § 635.5(f) – *Additional data and inspection.*
36	§ 635.71(a)(8) Fail to make available for inspection an Atlantic HMS or its area of custody, as specified in § 635.5(g).	§ 635.71(a)(8) Fail to make available for inspection an Atlantic HMS or its area of custody, as specified in § 635.5(f).	Corrects an obsolete reference to § 635.5(g) and replaces with § 635.5(f).
37	§ 635.71(a)(37) Fail to report to NMFS, at the number designated by NMFS, the incidental capture of listed whales with shark gillnet gear and sea turtle mortalities associated with pelagic longline gear as required by § 635.5.	§ 635.71(a)(37) Fail to report to NMFS, at the number designated by NMFS, the incidental capture of listed whales with shark gillnet gear as required by § 635.5.	Removes a duplicative reporting requirement. Captured sea turtles would still be required to be reported in PLL logbooks, so no information is lost.
38	§ 635.71(b)(22) As the owner or operator of a purse seine vessel, fail to comply with the requirements for weighing, measuring, and information collection specified in § 635.30(a)(2).	§ 635.71(b)(22) Remove paragraph. Replace with new paragraph or redesignate successive prohibitions, as appropriate.	Removes language referencing a paragraph that has been removed.

Item Number	Current Regulation	Proposed Amendment	Rationale for Proposed Amendment
39	§ 635.71(d)(10) Retain, possess, sell, or purchase a prohibited shark, as specified under § 635.22(c) and § 635.27(b)(1) or fail to disengage any hooked or entangled prohibited shark with the least harm possible to the animal as specified at § 635.21(d)(3).	§ 635.71(d)(10) Retain, possess, sell, or purchase a prohibited shark, including parts or pieces of prohibited sharks, as specified under § 635.22(c), § 635.24(a)(3), and § 635.27(b)(1) or fail to disengage any hooked or entangled prohibited shark with the least harm possible to the animal as specified at §635.21(d)(3).	Adds a reference to a new paragraph at § 635.24(a)(3), which includes parts and pieces of prohibited sharks.
40	§ 635.71(d)(11) Falsify information submitted under § 635.16(d)(2) or (d)(4) in support of an application for an ILAP or an appeal of NMFS's denial of an ILAP for shark.	Remove § 635.71(d)(11) and redesignate §§ 635.71(d)(12) and 635.71(d)(13) as §§ 635.71(d)(11) and 635.71(d)(12), respectively.	Removes a cross-reference that has been removed. ILAPs are no longer being issued.
41	§ 635.71(e)(11) Falsify information submitted under §635.16(d)(2) or (d)(4) in support of an application for an ILAP or an appeal of NMFS's denial of an initial limited access permit for swordfish.	Remove § 635.71(e)(11) and redesignate §§ 635.71(e)(12), (e)(13), (e)(14), and (e)(15) as §§ 635.71(e)(11), (e)(12), (e)(13), and (e)(14), respectively.	Removes a cross-reference that has been removed. ILAPs are no longer being issued.

2.4.4.2 Proposed Regulatory Changes That May Require Consideration of Alternatives

The items being addressed in this section include changes in definitions, clarifications, and amendments that may require the development and analysis of alternatives. The items under consideration are relatively minor, but they are more substantive than the proposed amendments that were described above in Section 2.4.4.1. A description is provided for each issue, followed by a table describing the alternatives and discussing the pros and cons associated with each.

Issue 1: Definitions of Pelagic and Bottom Longline

NMFS may reconsider the definitions for pelagic and bottom longlines at §§ 635.2; 635.21(c); and 635.21(d). Any revisions to these definitions would necessarily take into consideration the implementation of any new or revised time/area closures that are discussed in 2.1.2. The VMS regulations and many of the time/area closures currently contained in the HMS regulations are specific to either pelagic or bottom longline gear (*i.e.*, Desoto Canyon, East Florida Coast, Charleston Bump, Mid-Atlantic Shark, and Northeastern United States Closed Areas). Thus, enforcement of these closed areas and the VMS regulations depends largely upon the ability to differentiate between longline gear types. The differences between current bottom/pelagic longline definitions are based primarily upon the presence of weights/floats capable of anchoring/supporting the mainline on/in the seafloor/water column. Problems have arisen because some bottom longline vessel operators may possess and utilize floats on bottom longlines, and some pelagic longline vessel operators may possess and utilize weights on pelagic longlines.

Alternative	Pros	Cons
1. No Action	Current definitions are concise and uncomplicated; Revising the regulations could increase costs and impose additional restrictions.	Sometimes difficult to precisely determine if a longline is fishing pelagically or on the bottom under the current regulations.
	Description of Alternative: Retain current pelagic and bottom longline definitions.	
2 Define gear based on the number of floats and/or weights onboard.	Would provide flexibility for vessel operators to have some floats or weights onboard; Would not require adjustment of VMS regulations; May help to better differentiate between gears.	Adding or eliminating one float/weight could thwart the intent of the closure regulations, even while a vessel remains compliant; May reduce the amount of spare floats/weights allowed on BLL/PLL vessels, which could impact overall length of longline, the vessel's CPUE, or revenues.
	Description of Alternative: Specify an allowable number of floats for use onboard bottom longline vessels. Specify an allowable number of weights for pelagic longline vessels.	
3. Define gear based on the species composition of the catch onboard.	Defining gear based on the species possessed would effectively indicate how and where the gear is being fished; Would not require adjustment of VMS regulations; May help to better differentiate between gears.	Could create administrative, enforcement, and economic burden to determine catch composition and compliance (% demersal vs. % pelagic species), especially at sea; If gear were fishing, enforcement would have to request that longline be retrieved to determine catch composition and compliance; Could impact fishermen's ability to target both pelagic and demersal species on same set or trip.
	Description of Alternative: Specify an allowable % of pelagic species onboard bottom longline vessels. Specify an allowable % of demersal species onboard pelagic longline vessels.	
4. Require data loggers on all longlines.	Requiring data loggers could provide an effective method to determine the depth/time that a longline was fishing; Would not require adjustment of VMS regulations; May help to better differentiate between gears.	Data loggers would impose an additional economic burden on vessel owners; If data logger does not transmit information while fishing, it would be necessary to retrieve the device while fishing to determine compliance; Depending on the number of data loggers required, placing them could reduce the efficiency of fishing operations; Interpretation of data could be difficult. Would require precise vessel location and water depth information.
	Description of Alternative: Require data loggers at pre-specified intervals on all HMS longlines.	

Alternative	Pros	Cons
5. Base HMS time/area closures on all longlines (pelagic and bottom).	Would eliminate any confusion resulting from difficulties in differentiating between pelagic and bottom longlines.	Basing closures on all longlines could preclude vessels from fishing in areas where protection for certain species is not needed; Would require bottom longline vessels that do not currently need a VMS to obtain and utilize one; Increased economic costs for vessels and fishing related businesses associated with the implementation of new time/area closures for those gears.
	Description of Alternative: Base current and future HMS closures on all longlines (pelagic and bottom).	

Issue 2: Shark Identification

Species identification of sharks, particularly dressed (*i.e.*, headed, gutted, and finned) sharks, can be enhanced by the presence of the 2nd dorsal and anal fins. Because these fins are usually small, they are often referred to as "chips" when removed from the shark itself. NMFS is considering requiring, possibly at § 635.30(c)(2) and at § 635.71(d)(6), that the 2nd dorsal fin and the anal fin remain on all sharks through landing to facilitate shark identification for enforcement and data collection purposes.

Alternative	Pros	Cons
1. No Action	Current regulations allow for the removal of all fins at sea , if the fins are retained with the dressed carcasses and do not exceed 5% of the dressed weight of the carcasses. This may provide some economic benefits.	Fails to correct problems associated with shark species identification. This makes data collection and enforcement of some shark regulations more difficult.
	Description of Alternative: Retain current regulations regarding shark landing requirements.	
2. Require that the 2nd dorsal fin and the anal fin remain on all sharks through landing.	Would facilitate shark identification and assist with enforcement of trip limits and prohibited species regulations; Any negative economic impacts are expected to be minor, as these two fins on most sharks are small.	Could be some minor economic burden if all fins cannot be removed and iced onboard, as the price of fins is high.
	Description of Alternative: Require, possibly at § 635.30(c)(2) and § 635.71(d)(6), that the 2nd dorsal fin and anal fin remain on all sharks through landing.	
3. Require that the 2nd dorsal fin and the anal fin remain on all sharks through landing, except for lemon and nurse sharks.	Would facilitate shark identification and assist with enforcement of trip limits and prohibited species regulations; Could lessen any economic burden, if any, as the two fins on lemon and nurse sharks are larger than on other sharks, and these species are easily identifiable without the two fins.	Could be some minor negative economic impacts if all fins on all sharks cannot be removed and iced onboard; Could create a potential loophole whereby the 2nd dorsal and anal fins are removed from sharks other than lemon and nurse sharks, thus thwarting enforcement.

Alternative	Pros	Cons
	Description of Alternative: Require, possibly at § 635.30(c)(2) possibly, at § 635.71(d)(6), that the 2nd dorsal fin and anal fin remain on all sharks through landing, except for lemon and nurse sharks.	

Issue 3: Commercial Retention Limits

Currently, dockside enforcement of commercial retention limits is less effective because the regulations are specific only to vessel owners and operators. Therefore, NMFS is considering adding a new prohibition at § 635.71(a)(41) making it illegal for any person to, "Purchase any HMS from an individual vessel in excess of the retention limits specified in §§ 635.23 and 635.24." Similarly, NMFS is considering adding a new prohibition at § 635.71(a)(42) making it illegal for any person to, "Sell any HMS from an individual vessel in excess of the retention limits specified in §§ 635.23 and 635.24."

Alternative	Pros	Cons
1. No Action	Would not require dealers to be aware of commercial retention limits for vessels.	Without a new prohibition, dockside enforcement of commercial retention limits is less effective because current regulations are specific only to vessel owners and operators.
2. Add new prohibition at § 635.71(a)(41) making it illegal for any person to, "Purchase any HMS from an individual vessel in excess of the retention limits specified in §§ 635.23 and 635.24."	May improve compliance with commercial retention limits by enhancing dockside enforcement; Would discourage purchase of fish in excess of retention limits and facilitate conservation.	Potential burden on dealers who may not be aware of commercial retention limits for vessels, especially those that may be specific to permit type (incidental, directed, etc.); Dealers would need to learn and remain current with commercial vessel retention limits.
3. Add new prohibition at § 635.71(a)(42) making it illegal for any person to, "Sell any HMS from an individual vessel in excess of the retention limits specified in §§ 635.23 and 635.24."	May improve compliance with commercial retention limits by facilitating dockside enforcement.	None. Vessels cannot currently retain more than the commercial retention limits, so there should be no negative impacts associated with prohibiting the sale of HMS in excess of the commercial retention limits.

Issue 4: Definition of East Florida Coast Closed Area

NMFS is considering amending the definition of the East Florida Coast closed area at § 635.2 by replacing the second coordinate (28° 17' N. lat., 79° 12' W. long.) with 28° 17' 10" N. lat., 79° 11' 24" W. long., so that the outer boundary of the closed area corresponds with the EEZ, depending upon any revisions to the current closed areas. It was recently brought to the Agency's attention that the current outer coordinates do not correspond exactly with the EEZ boundary, thus leaving a small area open between the closed area and the EEZ . The outer coordinate being considered is approximately 1.02 km (0.55 nm) seaward (eastward) of the current coordinate. This modification would better comply with the intent of the closed area to extend out to the EEZ.

<table>
<tr><th>Alternative</th><th>Pros</th><th>Cons</th></tr>
<tr><td rowspan="2">1. No Action</td><td>No additional negative social or economic impacts on PLL vessels.</td><td>Would not comply with intent of the closed area to extend outward to the EEZ boundary.</td></tr>
<tr><td colspan="2">Description of Alternative: Retain same definition and coordinates for the East Florida Coast closed area.</td></tr>
<tr><td rowspan="2">2. Amend the second coordinate of the East Florida Coast closed area.</td><td>Would better comply with intent of the closed area to extend outward to the EEZ boundary.</td><td>May result in minor burden on PLL vessels by slightly increasing the size of the East Florida Coast closed area.</td></tr>
<tr><td colspan="2">Description of Alternative: Amend the definition of East Florida Coast closed area at § 635.2 by replacing the second coordinate (28° 17' N. lat., 79° 12' W. long.) with 28° 17' 10" N. lat., 79° 11' 24" W. long,</td></tr>
</table>

Issue 5: Definition of Handline

Currently, a "handline" is defined as fishing gear consisting of a mainline to which no more than two leaders (gangions) with hooks are attached, and that is released and retrieved by hand, rather than by mechanical means. It has been brought to the Agency's attention that some vessel operators may be deploying numerous handlines that are not attached to a vessel, effectively fishing with miniature, hand-operated longlines, in areas that are closed to pelagic longlines. While these vessels may be technically compliant with current regulations, this practice may circumvent the original concept of handline gear and could potentially diminish the conservation benefits associated with the PLL closed areas. Therefore, NMFS is considering amending the definition of "handline" at §635.2. As an alternative, NMFS is also considering retaining the current "handline" definition, but limiting the number of handlines that may be deployed. Comments are specifically being requested on what would constitute a reasonable number of handlines.

<table>
<tr><th>Alternative</th><th>Pros</th><th>Cons</th></tr>
<tr><td rowspan="2">1. No Action</td><td>Provides an opportunity for vessel operators to deploy numerous unattached handlines in areas closed to PLL fishing, thus creating economic benefits.</td><td>Provides an opportunity for a vessel operator to deploy numerous unattached handlines in areas closed to PLL fishing, thereby potentially diminishing the conservation benefits associated with the closed areas.</td></tr>
<tr><td colspan="2">Description of Alternative: Retain current definition for "handline" at §635.2.</td></tr>
</table>

Alternative	Pros	Cons
2. Amend the definition of "handline" at §635.2 by requiring that it be attached to vessel.	Could close a potential loophole whereby vessel operators may circumvent the intent of PLL closed areas by deploying numerous unattached handlines in areas closed to PLL fishing; May better comply with intent of the "handline" definition.	May result in some burden on vessel operators currently deploying numerous unattached handlines in PLL closed areas; May be difficult to effectively utilize handgear resulting in lost opportunity costs for vessels operators currently deploying unattached handlines..
	Description of Alternative: Amend the definition of "Handline" at §635.2 as follows, "*Handline* means fishing gear with at least at one end of the gear attached to or in contact with the vessel, and consists of a mainline to which no more than two leaders (gangions) with hooks are attached, and that is released and retrieved by hand, rather than by mechanical means."	
3. Retain the current "handline" definition, but limit the number of handlines that may be deployed, either in PLL closed areas or everywhere.	Could close a potential loophole whereby vessel operators may circumvent the intent of PLL closed areas by deploying several unattached handlines in areas closed to PLL fishing; Would retain current "handline" definition, but limit the number that may be deployed thereby potentially preserving the conservation benefits associated with the PLL closed areas and/or the intent of the handline definition.	May result in some economic burden on vessel operators currently deploying numerous unattached handlines in PLL closed areas.
	Description of Alternative: Add a regulation, possibly at §635.21(f), as follows, "*Handlines*. No more than X handlines may be deployed from an individual vessel at any one time."	

Issue 6: Possession of Billfish on Vessels with Bottom Longline or Gillnet Gear Onboard

The Atlantic billfish fishery is a recreational fishery, thus the sale of billfish is prohibited. The billfish no-sale provision and minimum size and retention limits apply to billfish harvested from the management unit, regardless of where caught. Billfish may only be harvested by rod and reel. Furthermore, persons may not possess, take, or retain billfish if pelagic longline gear is onboard the vessel. NMFS is considering several amendments that would reinforce the recreational nature of the billfish fishery by eliminating some minor loopholes that currently exist, whereby persons on bottom longline or gillnet vessels may potentially fish for and possess billfish for non-commercial purposes when conditions favor their availability, or may incidentally capture a billfish with these gears and illegally retain or possess the fish by indicating that it was caught using rod and reel. NMFS is considering prohibiting the possession or retention of billfish on all vessels having a bottom longline or gillnet onboard, similar to the current prohibition impacting pelagic longline vessels. Also, an amendment is being considered to clarify that only vessel owners possessing an HMS Angling, HMS Charter/headboat, or Atlantic Tunas General category (when fishing in a registered HMS tournament) permit may possess or retain billfish from its management unit.

<table>
<tr><th>Alternative</th><th>Pros</th><th>Cons</th></tr>
<tr><td rowspan="2">1. No Action</td><td>Amendments may not be necessary as the sale of billfish is already prohibited.</td><td>Under current regulations, the possession of billfish on PLL, BLL, and gillnet vessels is treated differently.</td></tr>
<tr><td colspan="2">Description of Alternative: Retain current regulations.</td></tr>
<tr><td rowspan="2">2. Amend regulations to prohibit vessels with either bottom longline or gillnet gear on board from possessing, retaining or taking billfish from the management unit, and amend regulations to clarify that billfish may only be retained if the vessel owner possesses either: an HMS Angling category permit; an HMS Charter/headboat category permit; or, an Atlantic Tunas General category permit while fishing in a registered HMS tournament.</td><td>Eliminates the potential for BLL or gillnet vessels to capture and illegally retain billfish caught on these gears;
Closes potential loophole whereby vessels with more than one gear type on board could opportunistically catch billfish on rod and reel when available;
Not likely to create significant economic burden because billfish may not be sold.</td><td>May result in minor negative social impacts, as billfish could not be caught by rod and reel on vessels with BLL and gillnet gear onboard.</td></tr>
<tr><td colspan="2">Description of Alternative:

Amend § 635.21(e)(2)(i) as follows, “Persons may possess a blue marlin or white marlin in, or take a blue marlin or a white marlin from, its management unit only if it is harvested by rod and reel and the vessel owner has been issued either an HMS Angling category permit; HMS Charter/headboat category permit; or, an Atlantic Tunas General category permit if the vessel issued the Atlantic Tunas General Category permit is fishing in a registered HMS tournament. Regardless of how taken, persons may not possess a blue marlin or a white marlin in or take a blue marlin or a white marlin from its management unit on board a vessel using or having on board a pelagic longline, bottom longline, or gillnet.”

Amend § 635.21(e)(2)(ii) as follows, “Persons may possess or take a sailfish shoreward of the outer boundary of the Atlantic EEZ only if it is harvested by rod and reel and the vessel owner has been issued either an HMS Angling category permit; HMS Charter/headboat category permit; or, an Atlantic Tunas General category permit and is fishing in a registered HMS tournament. Regardless of how taken, persons may not possess or take a sailfish shoreward of the outer boundary of the Atlantic EEZ on board a vessel using or having on board a pelagic longline, bottom longline, or gillnet.”

Amend § 635.71(c)(1) as follows, “Retain a billfish on board a vessel with a pelagic longline, bottom longline, or gillnet on board, or harvested by gear other than rod and reel, or if not in possession of either an HMS Angling category permit; HMS Charter/headboat category permit; or, an Atlantic Tunas General category permit and is fishing in a registered HMS tournament, as specified in § 635.21(e)(2).”</td></tr>
</table>

Issue 7: Bluefin Tuna Dealer Reporting

NMFS is currently developing a system that would enable Atlantic tunas dealers to submit electronic BFT landing reports, bi-weekly BFT reports, and BFT statistical documents using the Internet. As such, it is necessary to amend the HMS regulations to specify that BFT dealers may submit these reports either electronically over the Internet, or using currently approved methods of transmission (fax for landing reports; fax or standard mail for bi-weekly reports; fax or standard mail for statistical documents accompanying imported BFT; standard mail for statistical documents accompanying exported BFT).

Alternative	Pros	Cons
1. No Action	Would maintain established reporting system.	Would not facilitate electronic submittal of required BFT documents.
	Description of Alternative: Retain current regulations at §§ 635.5(b)(2)(i)(A); 635.5(b)(2)(i)(B); 635.5(b)(3); 635.42(a)(3); and 635.42(b)(3).	
2. Amend HMS regulations to provide an option for Atlantic tunas dealers to submit required BFT reports over the Internet.	Would provide additional flexibility for BFT dealer reporting; May provide net reductions in paperwork reporting burden.	None on public, as this modification would retain currently approved BFT reporting procedures while providing an additional option to report electronically using the Internet; May increase costs on Agency associated with development and implementation of new reporting systems.
	Description of Alternative: Amend the regulations at §§ 635.5(b)(2)(i)(A); 635.5(b)(2)(i)(B); 635.5(b)(3); 635.42(a)(3); and 635.42(b)(3).	

Issue 8: No Fishing Reporting Forms

Presently, if commercial HMS permit holders (*i.e.*, HMS Charter/headboat, Atlantic Tunas, and commercial shark and swordfish permit holders) are selected for reporting, they are required to submit logbooks to NMFS postmarked within seven days of offloading all Atlantic HMS. NMFS supplies logbook forms to all selected vessels. The forms consist of a fishing report (catch, discards, effort and fishing area data), and a “No Fishing Reporting Form” if no fishing took place during the preceding month. The reported information is used to conduct stock assessments, monitor quotas, and to prevent overfishing. There has been some confusion as to whether the “No Fishing Reporting Form” is a required component of the logbook, and exactly when it must be submitted. Therefore, NMFS is considering clarifying the regulations to require the submission of a “No Fishing Reporting Form” postmarked no later than seven days after the end of the month. This reporting burden has already been approved under the Paperwork Reduction Act submission for Atlantic HMS vessel logbooks (OMB Control Number 0648-0371). A requirement to the submit the “no-fishing” report within seven days after the end of the month would be new, however, it is consistent with current requirements to submit logbooks within seven days after the end of a fishing trip, and with NMFS’ Southeast Region regulations which specify that “No Fishing Reporting Forms” must be submitted within seven days after the end of the month. These regulatory modifications are being considered to better clarify the logbook reporting requirements.

Alternative	Pros	Cons
1. No Action	Would maintain established logbook reporting system.	Difficult to determine compliance with logbook reporting requirement for selected vessels, because it is not known whether the vessel is not fishing or not sending in the logbooks.
	Description of Alternative: Maintain existing regulations at § 635.5(a)(1).	
2. Require submission of "No Fishing Reporting Forms" for selected vessels if no fishing trips occurred during the preceding month, postmarked no later than seven days after the end of the month.	Would enhance enforcement of logbook reporting requirement for selected vessels; Would clarify that the "No Fishing Reporting Form" is a required component of the logbook, and when it must be submitted; Would be consistent with currently approved PRA submission and Southeast Region reporting requirements.	Could impose a minor reporting burden on vessel owners that did not fish during a particular month.
	Description of Alternative: Add a sentence at the end of § 635.5(a)(1) as follows, "*Logbooks.* * * * If no fishing trips occurred during a calendar month, a report so stating must be submitted on a form specified by NMFS postmarked no later than seven days after the end of that calendar month."	

Issue 9: Non-tournament Recreational Landings Reporting

Currently, HMS regulations specify that anglers are required to report non-tournament recreational landings of billfish and swordfish, whereas other HMS regulations specify that vessel owners are required to report recreational landings of bluefin tuna under the Angling category. NMFS is considering clarifying that owners of vessels permitted, or required to be permitted, in the Atlantic HMS Angling or Atlantic HMS Charter/headboat category must report all non-tournament recreational landings of billfish and swordfish. This action is being considered to remove these inconsistencies and to clarify NMFS' intent that the vessel owner, rather than the angler, is responsible for reporting non-tournament recreational landings of Atlantic billfish and swordfish.

Alternative	Pros	Cons
1. No Action	Would maintain recreational non-tournament billfish and swordfish reporting requirements for anglers; Anglers who caught the fish may be more familiar with the fish caught and provide more accurate information, especially if the vessel owner is absent during fishing activities; Absentee vessel owners may not know if a fish is caught on their vessel.	Vessel owners are the permitted entity, not anglers. Therefore, reporting requirements would be incumbent upon the permit holder (*i.e.*, the vessel owner) who would likely be more familiar with HMS reporting requirements; Difficult to impose sanctions on non-permitted anglers for failing to comply with reporting requirements; Anglers may be less familiar with HMS regulations, especially if they are fishing on a charter boat or another person's vessel.
	Description of Alternative: Retain existing regulations at § 635.5(c)(2) requiring anglers to report non-tournament recreational landings of swordfish and billfish.	

<table>
<tr><th>Alternative</th><th>Pros</th><th>Cons</th></tr>
<tr><td rowspan="2">2. Require vessel owners to report non-tournament recreational landings of billfish and swordfish.</td><td>Would be consistent with recreational reporting responsibilities for Atlantic bluefin tunas;
Would place HMS recreational reporting responsibility upon the permitted entity, who may be more familiar with HMS regulations.</td><td>Would shift reporting burden from anglers to HMS Angling and CHB permit holders.
Absentee vessel owners may not know if a fish is caught on their vessel.</td></tr>
<tr><td colspan="2">Description of Alternative: Modify § 635.5(c)(2) as follows, “Billfish and North Atlantic Swordfish. The owner of a vessel permitted, or required to be permitted, in the Atlantic HMS Angling or Charter/Headboat category must report all non-tournament landings of Atlantic blue marlin, Atlantic white marlin, Atlantic sailfish and North Atlantic swordfish, including those landed on a charter/headboat, at a number designated by NMFS within 24 hours of the landing. For telephone reports, a contact phone number must be provided so that NMFS can call the vessel owner back for follow-up questions and provide a confirmation of the reported landing. * * *</td></tr>
</table>

3.0 DESCRIPTION OF AFFECTED ENVIRONMENT

3.1 Introduction

This year, NMFS has combined the annual HMS SAFE Report with the Predraft to the Consolidated HMS FMP as many of the requirements of a SAFE report are needed to conduct the analyses for an EIS. Additionally, consideration of many of the alternatives in Chapter 2 requires knowledge of the state of the fishery and the stocks. As described in Chapter 1 of this document, this Chapter comprises the main SAFE Report section of the document. This Chapter also includes much of the information that will be needed to analyze and compare the different alternatives outlined in Chapter 2. As with the alternatives outlined in Chapter 2, Chapter 3 will likely be revised and modified as the HMS FMP is developed, new information becomes available, and/or new analyses are conducted. However, the 2005 SAFE Report will continue to be the same version of Chapter 3 released in this document.

Under the National Standard Guidelines for National Standard 2, NMFS prepares a SAFE Report annually to summarize the best available information. It provides a summary of the best available scientific information on the condition of stocks, marine ecosystems, and fisheries being managed under Federal regulation. It also provides updated information regarding the economic status of fisheries, fishing communities, and industries, as well as the socio-economic and environmental impacts of recently implemented regulations. Cumulatively, this information establishes the effectiveness of the management programs for Atlantic HMS, and provides the basis for future management decisions.

This chapter, as with past SAFE reports, is divided into different sections including recent management actions, the current status of the stocks, habitat research, fishery catch data, economic status, community status, fish processing and trade, bycatch, and permits. Unlike past SAFE Reports, because this chapter is also an early draft of the information that will be in the EIS for the consolidated HMS FMP, many of the sections will include more than just an update from the 2004 SAFE Report.

3.1.1 Summary and Update on HMS Management Division Activities During 2004

A summary of the management history for HMS can be found in Chapter 1 of this document. A full listing of all the Federal Register documents for each year can be found in previous SAFE reports or on the Federal Register webpage at http://www.gpoaccess.gov/fr/index.html. During the calendar year 2004, the HMS Management Division completed numerous rulemakings and inseason actions. Each of these regulatory actions is consistent with the existing HMS stock rebuilding plans, and is supported by a regulatory analysis, as required, of the action's socio-economic and/or ecological effects. These analyses are updates to previous environmental and regulatory impact analyses and are found in supporting documents including but not limited to EAs, EISs, and/or RIRs. As reflected in these supporting documents, which are available upon request, these actions are not expected to have adverse ecological impacts on target, non-target, or protected species, but are expected to have overall positive cumulative impacts. Similarly, while individual actions may have social and/or economic impacts, particularly in the short term, the final actions minimize the economic and social impacts, to the extent practicable, and in the long-term should aid in rebuilding overfished stocks, preventing overfishing, and meeting domestic obligations/laws. Table 3.1 provides a list of all the Federal Register actions taken in 2004 that affect HMS fisheries.

A number of significant actions were completed during 2004. On February 9-11, 2004, a combined HMS and Billfish Advisory Panel meeting was held in Silver Spring, Maryland. This meeting established much of the background and need for amendments to the FMPs. A summary and transcript of the discussion can be found on the HMS website at: http://www.nmfs.noaa.gov/sfa/hms/. On April 30, 2004, NMFS released an Issues and Options paper and scheduled numerous scoping meetings to discuss the amendments and what issues should be included. A summary of all the comments received during the scoping process was released in December 2004.

In June 2004, NMFS released a Biological Opinion under the ESA for the pelagic longline fishery that has specific goals for reducing sea turtle bycatch and bycatch mortality for the fleet over the next few years. If those goals are not met, NMFS may need to close the fishery. In July 2004, NMFS published a final rule that affected any vessel that has, or is supposed to have, an HMS permit and pelagic longline gear onboard. That rule was designed to reduce sea turtle bycatch and bycatch mortality by requiring vessels to use specific hooks, bait, and release equipment. The rule also allowed fishing in the Northeast Distant Statistical Areas for vessels with specified gear on board.

In July through September 2004, NMFS released an Advance Notice of Proposed Rulemaking to gather ideas to further reduce sea turtle bycatch in the pelagic longline fishery and held a number of workshops to demonstrate how to use the required sea turtle handling and release equipment. NMFS also mailed copies of a video demonstrating the equipment, a revised sea turtle handling and release laminated placard, and the sea turtle handling and release protocols on waterproof paper and in aluminum binders to all shark and swordfish permit holders. These documents are now also available in Spanish and Vietnamese.

NMFS also published several final rules in 2004. Several of those rules implemented ICCAT recommendations regarding quotas or trade monitoring. Another rule adjusted the shark quotas for different regions and seasons.

Currently, there is one active lawsuit relating to an HMS management action. In the summer of 2004, environmental groups challenged the July 2004 sea turtle bycatch mitigation rule that NMFS implemented for the Atlantic pelagic longline fishery and the accompanying BiOp. The Ocean Conservancy v. Evans, Civ. No. 1:04-cv-1155 (D.D.C.). Parties are in the briefing stage of litigation.

Table 3.1 Summary of 2004 Federal Register Notices Related to HMS.

Action type NMFS ID#	CFR Part	Action Description	Action Pub Info
Proposed Rule; Request for Comments; Public Hearings ID 112403A RIN 0648-AR80	223, 635	Atlantic Highly Migratory Species; Pelagic Longline Fishery	69 FR 6621 02/11/04

Action type NMFS ID#	CFR Part	Action Description	Action Pub Info
Regional Fisheries Closure ID 030304A	635	Atlantic Highly Migratory Species; Small Coastal Shark Fishery	69 FR 10936 03/09/04
Proposed Rule; Request for Comments ID 103003A RIN 0648-AQ37	300, 635	International Fisheries; Atlantic Highly Migratory Species	69 FR 16211 03/29/04
Notice ID 032904E		Proposed Information Collection; Comment Request; Billfish Certificate of Eligibility	69 FR 17649 04/05/04
Notice ID 032904F		Proposed Information Collection; Comment Request; Atlantic Highly Migratory Species Implementation and Recovery of Archival Tags	69 FR 17650 04/05/04
Notice of Public Hearings ID 040604C	300, 635	International Fisheries; Atlantic Highly Migratory Species	69 FR 19147 04/12/04
Notice of Availability, Notice of Public Scoping Meetings, Notice of Public Comment Period ID 060603D		Atlantic Highly Migratory Species; Issues and Options Paper for Amendment 2 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks (HMS FMP) and Amendment 2 to the Atlantic Billfish Fishery Management Plan (Billfish FMP)	69 FR 23730 04/30/04
Proposed Rule; Request for Comments, Notice of Public Hearing ID 051403A RIN 0647-AR10	635	Atlantic Highly Migratory Species; Atlantic Trade Restrictive Measures	69 FR 25357 05/06/04
Proposed Rule; Request for Comments ID 042204C RIN 0648-AS28	635	Atlantic Highly Migratory Species Fisheries; Adjustment of the Semi-annual Quotas for Large Coastal Sharks (LCS) in the North Atlantic Region	69 FR 26540 05/13/04
Proposed Rule; Request for Comments ID 042204B RIN 0648-AS07	635	Atlantic Highly Migratory Species; Vessel Monitoring System Requirement; Effective Date for Atlantic Shark Fisheries	69 FR 28106 05/18/04
Notice of Additional Public Scoping Meeting; Extension of Comment Period ID 060303D		Atlantic Highly Migratory Species; Issues and Options Paper for Amendment 2 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks (HMS FMP) and Amendment 2 to the Atlantic Billfish Fishery Management Plan (Billfish FMP); Additional Public Scoping Meeting and Extension of Comment Period	69 FR 29927 05/26/04
Fishing Season Notification ID 052004D	635	Atlantic Highly Migratory Species; Shark Fishing Season	69 FR 30837 06/01/04

Action type NMFS ID#	CFR Part	Action Description	Action Pub Info
Final Rule ID 042204C RIN 0648-AS28	635	Atlantic Highly Migratory Species Fisheries; Adjustment of the Semiannual Quotas for Large Coastal Sharks in the North Atlantic Region; Shark Fishing Season	69 FR 33321 06/15/04
Adjustment of Angling and Charter/Headboat Retention Limits ID 061604A	635	Atlantic Highly Migratory Species; Bluefin Tuna Catch Limit Adjustment	69 FR 34960 06/23/04
Announcement of Availability		Environmental Impact Statements; Notice of Availability	69 FR 35599 06/25/04
Notice of Receipt of a Request for Exempted Fishing Permits; Request for Comments ID 061604D		Atlantic Highly Migratory Species; Exempted Fishing Permits	69 FR 39435 06/30/04
Final Rule ID 112403A RIN 0648-AR80	223, 635	Atlantic Highly Migratory Species; Pelagic Longline Fishery	69 FR 40734 07/06/04
Atlantic Bluefin Tuna Retention Limit Adjustment ID 071504A	635	Atlantic Highly Migratory Species; Atlantic Bluefin Tuna Fisheries	69 FR 43535 07/21/04
Notice of Public Workshops ID 071404A		Atlantic Highly Migratory Species; Notice of Sea Turtle Release/ Protocol Workshops	69 FR 44513 07/26/04
Final Rule; Amendment ID 072804A RIN 0648-AS52	635	Atlantic Highly Migratory Species Fisheries; Pelagic and Bottom Longline Fisheries; Correction	69 FR 47797 08/6/04
Advanced Notice of Proposed Rulemaking; Request for Comments ID070804B RIN 0648-AS49	635	Atlantic Highly Migratory Species; Reducing Sea Turtle Interactions With Fishing Gear	69 FR 49858 08/12/04
Final Rule ID 042204B RIN 0648-AS07	635	Atlantic Highly Migratory Species Fisheries; Vessel Monitoring System Requirement; Effective Date for Atlantic Shark Fisheries	69 FR 51010 08/17/04
Adjustment of Recreational Fishery Retention Limits ID 072104B	635	Atlantic Highly Migratory Species; Atlantic Bluefin Tuna Fisheries	69 FR 51608 08/20/04
Notice of Receipt of a Request for Exempted Fishing Permits; Request for Comments ID 080904E		Atlantic Highly Migratory Species; Exempted Fishing Permits	69 FR 51636 08/20/04
Notice of Highly Migratory Species and Billfish Advisory Panel meetings; Request for Nominations ID 081204B		Atlantic Highly Migratory Species; Advisory Panels	69 FR 52235 08/25/04
Proposed Rule; Request for Comments ID 072704A RIN 0648-AS08	635	Atlantic Highly Migratory Species; Atlantic Commercial Shark Management Measures	69 FR 56024 09/17/04

Action type NMFS ID#	CFR Part	Action Description	Action Pub Info
Atlantic Bluefin Tuna Retention Limit Adjustment ID 091604A	635	Atlantic Highly Migratory Species; Atlantic Bluefin Tuna Fisheries	69 FR 56719 09/22/04
Rescheduling of Public Hearings ID 072704A	635	Atlantic Highly Migratory Species; Atlantic Commercial Shark Management Measures; Rescheduling of Public Hearings	69 FR 56741 09/22/04
Issuance of 2005 Exempted Fishing, Scientific Research, Display, and Chartering Permits; Request For Comments ID 110104B		Magnuson-Stevens Act Provisions; Atlantic Highly Migratory Species; Exempted Fishing, Scientific Research, Display, and Chartering Permits	69 FR 65421 11/12/04
Final Rule ID 103003A RIN 0648-AQ37	300, 635	International Fisheries; Atlantic Highly Migratory Species;	69 FR 67268 11/17/04
Final Rule ID 030403C RIN 0648-AQ90	635	Atlantic Highly Migratory Species; Atlantic Swordfish Quotas	69 FR 68090 11/23/04
Closure ID 111804A	635	Atlantic Highly Migratory Species; Bluefin Tuna Fisheries	69 FR 68094 11/23/04
Final Rule ID 072704A RIN 0648-AS08	635	Atlantic Highly Migratory Species; Atlantic Commercial Shark Management Measures	69 FR 69537 11/30/04
Final rule ID 051403A RIN 0648-AR10	635	Atlantic Highly Migratory Species; Atlantic Trade Restrictive Measures	69 FR 70396 12/6/04
Quota Transfer; Fishery Reopening; Catch Limit Adjustment ID 120704C	635	Atlantic Highly Migratory Species; Bluefin Tuna Fisheries	69 FR 71732 12/10/04
Final rule; fishing season notification; correction ID 072704A RIN 0648-AS08	635	Atlantic Highly Migratory Species; Atlantic Commercial Shark Management Measures; Correction	69 FR 71735 12/10/04
Proposed Rule; Request for Comments ID 072304B RIN 0648-AR86	635	Atlantic Highly Migratory Species; Bluefin Tuna Quota Specifications, General Category Effort Controls, and Catch-and-Release Provision	69 FR 71771 12/10/04

3.1.2 ICCAT Accomplishments in 2004

Information in this section is summarized from the NOAA Public Affairs Press Release (NOAA 04-115) summarizing the results of the 2004 ICCAT Meeting held in New Orleans, Louisiana in November 2004. Information regarding past ICCAT meetings or ICCAT management actions can be found in the management histories described in Chapter 1 of this document or in previous SAFE reports.

After a week of deliberations, 63 ICCAT-member countries unanimously adopted the U.S. proposal to ban the wasteful practice of shark finning – the removal of fins from sharks and discarding of the shark carcasses to save space on a fishing vessel. The United States has long condemned shark finning, which threatens future food security in many countries as well as the delicate balance of marine ecosystems. The United States banned finning in the Atlantic in 1993, and this binding agreement will require other countries fishing in the Atlantic Ocean and Mediterranean to do the same.

This historic agreement came just days after the United Nations General Assembly passed a resolution urging nations to work together through regional fisheries management organizations to manage sharks. It includes adoption of additional shark management practices already in place in the United States, such as data collection on catches of sharks, research on shark nursery areas and a provision to encourage the release of live sharks, especially juveniles. Other countries that co-sponsored the shark proposal included Canada, the European Community, Japan, Mexico, Panama, South Africa, Trinidad and Tobago, and Venezuela.

ICCAT also adopted important measures for other species and addressed additional issues:

- Bluefin Tuna

Another priority for the United States was to seek integrated management of bluefin tuna in the eastern and western Atlantic. Countries fishing in the eastern area agreed to adopt a higher minimum size with no tolerance, a significant step for the protection of juvenile bluefin in the Mediterranean – bringing them closer to conservation steps already taken in the United States. Japan will host a meeting in April 2005 to discuss integrated management of bluefin tuna and issues relating to bluefin tuna farming.

- Bigeye Tuna

ICCAT adopted a multi-year total allowable catch for bigeye tuna, including allocations for major players with payback provisions for past overharvests. There are some concerns about changes to a time/area closure in the Gulf of Guinea that could weaken protection for juvenile bigeye. However, ICCAT will conduct a scientific review of the closure in 2005 and recommend other alternatives to protect juvenile bigeye. The United States is a relatively minor player in this fishery; nonetheless, this species is very important to U.S. recreational and commercial fishermen.

- Marlin

Conservation measures that are part of Phase I of the rebuilding plan for white marlin and blue marlin were extended through 2006. This extension was very important to the United States as it will allow NOAA to complete Congressionally funded research on marlin and have the results available for the next stock assessments in 2006.

- Driftnets

In response to direction given by the Commission at last year's meeting, Morocco presented a four-year plan for eliminating the use of driftnets in their fisheries, through public education and assistance to fishermen. The United States highlighted the urgency of this action and offered to work with Morocco to help them expedite the implementation of this plan.

- Vessel Monitoring Systems

ICCAT members agreed to implement a requirement to have vessel monitoring systems onboard large-scale longline vessels (> 24 m) by November 1, 2005. This requirement has already been implemented in the United States.

- Addressing Non-cooperation with Existing Agreements

In light of compliance problems with vessels from Taiwan, including insufficient monitoring and control, ICCAT took the first step toward implementing trade sanctions against Taiwan. A similar step was taken toward Singapore, which in spite of being the world's largest importer and re-exporter of swordfish, has refused to adopt ICCAT's swordfish trade tracking scheme. Taiwan and Singapore must take corrective action before next year's ICCAT meeting if they wish to avoid further steps toward punitive action by the Commission.

3.1.3 Existing State Regulations

The HMS Management Division primarily manages HMS fisheries in Federal waters and the high seas while individual States establish regulations for HMS in their own waters. There are exceptions to this generalization. For example, Federal bluefin tuna regulations apply in all waters, including State waters, and Federal shark and swordfish fishermen, as a condition of their permit, are required to follow Federal regulations in all waters unless that State has more restrictive regulations. The HMS Management Division intends to continue improving its communication and coordination with State agencies. Table 3.2 outlines the existing State regulations as of February 16, 2004, with regard to HMS species. The HMS Management Division updates this table periodically throughout the year.

Table 3.2 **State Rules and Regulations Pertaining to Highly Migratory Species as of February 16, 2004. State regulations are subject to change; contact the appropriate state personnel to ensure that the regulations listed below remain current. ✓ = Regulation in effect; ✱ = Regulation in development; ✕ = Regulation repealed; FL = Fork Length; CL = Carcass Length; TL = Total Length; LJFL = Lower Jaw Fork Length; CFL = Curved Fork Length; DW = Dressed Weight; SCS = Small Coastal Sharks; LCS = Large Coastal Sharks.**

State	**HMS Rules and Regulations**					**Regulatory Details**	**Contact Information**
	Regulations				***Cite Reference***		
	Tuna	***Swords***	***Billfish***	***Sharks***			
ME	✓			✓	Tuna -ME Rev. Stat. Ann. tit. 12, §§ 6001, 6502, and 6551 Sharks - Code ME R. 13-188 § 50.02	**Tuna** - Retention limit - 1 tuna/year - non resident special tuna permit holder; Unlawful to fish for tuna with gear other than harpoon or hook and line or possess tuna taken in unlawful manner. No minimum size limits. **Sharks** - Regulations apply to Spiny dogfish only	ME Department of Marine Resources George Lapointe Phone: 207/624-6553 Fax: 207/624-6024
NH	✕		✓	✓	Tuna - FIS 603.10 (REPEALED) Billfish - FIS 603.13 Sharks - FIS 603.19	**Billfish** - Possession limit - 1 billfish/trip; Minimum size - Blue marlin - 99"; White marlin - 66"; Sailfish - 57"; May be taken by hook and line only; Unlawful to sell billfish **Sharks** - Regulations apply to Spiny dogfish only	NH Fish and Game Clare McBane Phone: 603/868-1095 Fax: 603/868-3305
MA	✓		✓	✓ * prohition on attempt to harvest certain coastal shark species; complements	Tuna - MA Regs. Code tit. 322 § 6.04 Billfish - MA Regs. Code tit. 322, § 6.11 Sharks – www.mass.gov/dfwele/dmf/commercialfishing/regssummary_012005.pdf; MA Marine Fisheries Regulation Summaries 2005	**Tuna** - Reference to ATCA and Federal regulations Billfish - Possession limit - 1fish/trip; Recreational minimum size - Blue marlin - 86"; Sailfish - 57"; White marlin - 62"; Billfish may be taken by hook and line only; spearing, netting, snagging are prohibited; Sale of billfish is prohibited **Sharks** - Regulations apply to Spiny dogfish only	MA Division of Marine Fisheries David Pierce Phone: 617/626-1530 Fax: 617/626-1509
RI				✓	Sharks - RIMFC Regulations § 7.15	**Sharks** - Regulations apply to spiny dogfish only	RI Department of Environment Management Brian Murphy Phone: 401/783-2304

State	HMS Rules and Regulations					Regulatory Details	Contact Information
	Regulations				*Cite Reference*		
	Tuna	*Swords*	*Billfish*	*Sharks*			
CT				✓	Dogfish – Regulations of Connecticut State Agencies § 26-159a-19	**Sharks** - Regulations apply to spiny dogfish only	CT Department of Environmental Protection Eric Smith Phone: 860/434-6043 Fax: 860/434-6150
NY			✓	✓	Billfish -NY Environmental Conservation § 13-0339 (5) Sharks - NY Environmental Conservation § 13-0338; State of New York Codes, Rules and Regulations (Section 40.1)	**Billfish** - Blue marlin, White marlin, Sailfish, and Longbill spearfish shall not be bought, sold or offered for sale; Striped marlin, Black marlin, Shortbill spearfish shall not be bought, sold or offered for sale Sharks - Shark finning prohibited; Reference to the Federal regulations 50 CFR part 635; Prohibited sharks listed	NY Department of Environmental Conservation Byron Young Phone: 631/444-0435 Fax: 631/444-0449
NJ				✓	Sharks -NJ Administrative Code tit. 7, §§ 25-18.1 - 25-18.2	**Sharks** - Commercial/Recreational possession limit - 2 fish/vessel; Finning prohibited; May be eviscerated; Dorsal fin to pre-caudal pit must be at least 23" in length; Total length must be 48" in length	NJ Fish, Game and Wildlife Bruce Freeman Phone: 609/292-2083
DE			✓	✓	Billfish - DE Code Ann. tit. 7, § 1310 Sharks - DE Code Regulations 3541	**Billfish/Sharks** - Reference to Federal regulations for sharks; Prohibition on sale of Atlantic Sailfish and Blue/White/Striped marlin **Sharks** - Creel limit on regulated sharks 1fish/vessel/day; Creel limit for sharpnose is 2/day; Minimum size on regulated sharks - 54 in FL. Prohibition against possessing fins without them being attached naturally to the body.	DE Division of Fish and Wildlife Roy Miller Phone: 302/739-3441

State	HMS Rules and Regulations					Regulatory Details	Contact Information
	Regulations				***Cite Reference***		
	Tuna	***Swords***	***Billfish***	***Sharks***			
MD	✓	✓	✓	✓	Tuna - Code of Maryland Regulations tit. 8, § 02.12.01 and tit. 8, § 02.05.23 Swordfish - Code of Maryland Regulations tit. 8, § 02.12.01 and tit. 8, § 02.05.27 Billfish - Code of Maryland Regulations tit. 8, § 02.12.01 and tit. 8, § 02.05.26 Sharks - Code of Maryland Regulations tit 8, § 02.05.17	**Tuna** - Reference to listing Bluefin Tuna as "in need of conservation"; Federal regulations used to control size and seasons and recreational catch required to be tagged Swordfish - Reference to listing Swordfish as "in need of conservation"; Federal regulations used to control size and seasons and recreational catch required to be tagged **Billfish** (blue and white marlin and sailfish) - Reference to listing Billfish as "in need of conservation"; Federal regulations control size and seasons and recreational catch required to be tagged **Sharks** - Minimum size - 54" FL; 31" carcass; Finning prohibition; Recreational catch limit - 1 fish/person/day; Commercial catch limit - 4,000 lbs/day; Reference to 50 CFR 635	MD Department of Natural Resources Harley Speir Phone: 410/260-8303
VA			✓	✓	Billfish - 4 VA Administrative Code 20-350 Sharks - 4 VA Administrative Code 20-490	**Billfish** - Prohibition on sale of billfish **Sharks** - Possession limit - 1 fish/person; 1 fish for each person on board boat with common hold; Minimum size - 58" FL (Commercial Only); 31" CL (Commercial Only); 7500 lb/vessel/day limit; 200 lb limit on shark carcasses less than 31" minimum CL taken within VA state waters; Finning prohibited; Spiny dogfish regulations as well.	VA Marine Resources Commission Jack Travelstead Phone: 757/247-2247 Fax: 757/247-2020
NC			✓	✓ * Modify closed area off NC to allow fishing outside 15 fathoms during 1st trimester (Jan 1 - Feb 15)	Billfish -NC Administrative Code tit. 15A, r.3M.0507 Sharks -NC Administrative Code tit. 15A, r.3M.0505; Proclamation FF-24-2004	**Billfish** - Recreational possession limit - 1 Blue or White marlin/vessel/trip; 1 Sailfish/person/day; Minimum size - Blue marlin - 99"; White marlin - 66"; Sailfish - 63"; unlawful to sell or offer for sale Blue or White marlin and Sailfish **Sharks** - Director may impose restrictions for size, seasons, areas, quantity, etc.; Proclamations consistent with closures for LCS, SCS, and Pelagics; Closure to directed shark harvest since 1997; proclamation smooth dogfish may be dressed at sea	NC Division of Marine Fisheries Preston Pate Phone: 252/726-7021 Fax: 252/726-0254

State	HMS Rules and Regulations					Regulatory Details	Contact Information
	Regulations				*Cite Reference*		
	Tuna	*Swords*	*Billfish*	*Sharks*			
SC	✓		✓	✓	Tuna -SC Code Ann. § 50-5-2730 Billfish - SC Code Ann. § 50-5-1700 Sharks -SC Code Ann. § 50-5-2725	**Tuna** - Reference to ATCA and MSA regulations for Tuna **Billfish** - Unlawful to sell billfish; hook and line gear only; unlawful to possess while transporting gillnets, seines, or other commercial gear **Sharks** - Retention limit - 2 Atlantic sharpnose/per/day and 1 Bonnethead/person/day; No minimum size for recreationally caught bonnethead sharks; No need for Federal recreational angler permit to fish for shark in state waters; Reference to Federal commercial regulations and closures	SC Department of Natural Resources David Cupka Phone: 843/953-9050 Fax: 912/262-2318
GA			✓	✓	Gear Restrictions/Prohibitions - GA Code Ann. § 27-4-7; Billfish - GA Code Ann. § 27-4-130.2; GA Comp. R. & Regs. § 391-2-4-.04 Sharks - GA Code Ann. § 27-4-130.1; OCGA § 27-4-7(b); GA Comp. R. & Regs. § 391-2-4-.04	Gear Restrictions/Prohibitions - Use of gillnets is prohibited in state waters. **Billfish** - Possession prohibited in state waters, except for catch and release. **Sharks** - Daily limit 2; Possession limit 2 person/vessel (whichever less); Minimum size 48"; Limit 1 shark less than 84"; Sand tiger sharks – all harvest is prohibited; SCS (including Atlantic sharpnose and bonnethead) - 2/day/person; Minimum size 30"TL; All species must be landed head and fins intact. Sharks may not be landed in Georgia if harvested using gill nets.	GA Department of Natural Resources Henry Ansley Phone: 912/264-7218 Fax: 912/262-3143

State	HMS Rules and Regulations					Regulatory Details	Contact Information
	Regulations				*Cite Reference*		
	Tuna	*Swords*	*Billfish*	*Sharks*			
FL		✓	✓	✓	Sharks -FL Administrative Code Ann. r.68B-44, F.A.C Swordfish/ Billfish - FL Administrative Cod Ann. r. 68B-33 F.A.C	**Billfish** – Longbill/Mediterranean/roundscale spearfish – harvest/possession/landing/purchase/sale/exchange prohibited. Blue/White Marlin and Sailfish – Sale prohibited; Aggregate possession of 1 fish/person; Gear restriction (hook and line only); Minimum size limit (Blue Marlin – 99" LJFL; White Marlin – 66" LJFL; Sailfish – 63" LJFL); Recreational catch reporting requirement (all non-tournament landings must be reported NOAA within 24 hours); Must land in whole condition (gutting allowed) **Swordfish** - Minimum size - 47 in LJFL/29" cleithrum to keel/33 lbs. dw; Possession limit 1 fish/person/day or 3 fish/vessel/day (with 3 or more persons onboard); Commercial harvest and sale allowed only with Florida saltwater products license and a federal LAP for swordfish; Recreational catch reporting requirement (all non-tournament landings must be reported NOAA within 24 hours) **Sharks** – No size limit; Retention limit (rec and com) - 1 shark/person/day; Maximum of 2 sharks/vessel (with two or more persons on board); Reference to Federal regulations regarding commercial season, closures, and prohibition on sale; Federal regulatory permits for sale of sharks and swordfish; Finning & Filleting prohibited	FL Fish and Wildlife Conservation Commission Robert Kramer Phone: 850/488-6058 Fax: 850/488-7152
AL	✓	✓	✓	✓	Sharks - AL Administrative Code r. 220-2-.46, r.220-3-.30, r.220-3-.37	**Tuna/Swordfish/Billfish/Sharks** - Reference to Federal regulations **Sharks** - Recreational daily bag limit - 2 sharpnose/person/day; all other species - 1fish/person/day; Recreational minimum size all sharks (except sharpnose) - 54" FL; Reference to shark commercial season and bycatch provisions	AL Department of Conservation and Natural Resources Major Jenkins jjenkins@dcnr.state.al.us Phone: 251 861 2882

State	HMS Rules and Regulations					Regulatory Details	Contact Information
	Regulations				***Cite Reference***		
	Tuna	***Swords***	***Billfish***	***Sharks***			
LA	✓	✓	✓	✓	Tuna -LA Administrative Code tit. 76, § 361 Swords/Billfish - LA Administrative Code tit. 76, § 355 Sharks - LA Administrative Code tit. 76, § 357	**Tuna** - Recreational bag and possession limit Yellowfin (3 fish/person); Rec/Commercial minimum size - Yellowfin, Bigeye and Bluefin (27 in CFL) **Billfish/Swordfish** - Minimum size - Blue marlin (99 in LJFL), White marlin (66" LJFL), Sailfish (63 in LJFL), Swordfish (29 in carcass length or 33 lbs dw); Recreational creel limit - 5 swordfish/vessel/trip **Sharks** - Minimum size - 54" except sharpnose; Possession limit - 1 fish/vessel/trip; Trip limit 4,000 lbs dw LCS; Reference to Federal regulations; State waters closed to rec/commercial April 1 through June 30	LA Department of Wildlife and Fisheries Harry Blanchet 225 765-2889 fax (225) 765-2489 hblanchet@wlf.louisiana.gov
MS	✓		✓	✓	Tuna/Billfish/Sharks - MS Code R. 43 000 040, Ord. 7.025	**Tuna** - Minimum size - Bigeye (27 in CFL); Yellowfin (27 in CFL); Bag limit none in commercial; Bag limit of 3 yellowfin tuna/person in recreational **Billfish** - No take provisions for commercially harvested Blue and White marlin and Sailfish; Recreational minimum size - Blue marlin (99 in LJFL); White marlin (66 in LJFL); Sailfish (63 in LJFL) **Sharks** - Recreational minimum size - LCS/Pelagics (37 in TL); SCS (25 in TL); Recreational bag limit - LCS/Pelagics (1/person up to 3/vessel); SCS (4/person); Commercial - Reference to Federal regulations.	MS Department of Marine Resources Kerwin Cuevas Phone: 228/374-5000

State	HMS Rules and Regulations					Regulatory Details	Contact Information
	Regulations				***Cite Reference***		
	Tuna	***Swords***	***Billfish***	***Sharks***			
TX		✓	✓	✓	Billfish/Swordfish/Sharks - TX Administrative Code Title 31, Part 2, Parks and Wildlife Code Title 5, Parks and Wildlife Proclamations 65.3 and 65.72	**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** - Bag limit none; Minimum size (Blue Marlin - 131 in TL; White Marlin - 86 in TL; Sailfish - 84 in TL); **Sharks** - Commercial/Recreational retention limit 1 fish/person/day; Commercial/Recreational possession limit is twice the daily bag limit (i.e., 1 fish/person/day); Commercial/Recreational minimum size 24 in TL.	TX Parks & Wildlife Randy Blankinship Phone: 956/350-4490 Fax: 956/350-3470
Puerto Rico	✓	✓	✓	✓	Regulation #6768 Article 8 – General Fishing Limits Article 13 – Limitations Article 17 – Permits for Rec Fishing (March 2004)	Sell, offer for sale, or traffic in any billfish or swordfish, either whole or processed, captured in jurisdictional waters of Puerto Rico. Swordfish or billfish, tuna and shark are covered under the federal regulation known as Highly Migratory Species of the United States Department of Commerce (50 CFR, Part 635). Fishers who capture these species shall comply with said regulation. Billfish captured incidentally with long line must be released by cutting the line close to the fishhook, avoiding the removal of the fish from the water. In the case tuna and swordfish fishers shall obtain a permit according to the requirements of the Federal government.	Puerto Rico Department of Natural and Environmental Resources Craig Lileystrom Phone: 787-724-8774 x4042 craig@caribe.net
U.S. Virgin Islands	✓	✓	✓	✓	US VI Commercial and Recreational Fisher's Information Booklet Revised June 2004	Federal regulations and federal permit requirements apply in territorial waters.	www.caribbeanfmc.com http://www.caribbeanfmc.com/usvi%20booklet/fisher%20booklet%20final.pdf

3.2 Status of the Stocks

The methods used to determine the status of Atlantic HMS are fully described in Chapter 3 of the 1999 Tunas, Swordfish, and Shark FMP and Amendment 1 to the Tunas, Swordfish, and Shark FMP and in a paper describing the technical guidance for implementing National Standard 1 of the Magnuson-Stevens Act (Restrepo et al., 1998). These methods will not change as a result of combining the FMPs. In summary, a species is considered overfished when the current biomass (B) is less than the minimum stock size threshold ($B < B_{MSY}$). The minimum stock size threshold is determined based on the natural mortality of the stock and the biomass at Maximum Sustainable Yield (B_{MSY}). The MSY is the maximum long-term average yield that can be produced by a stock on a continuing basis. Furthermore, overfishing may also be occurring on a species if the current fishing mortality (F) is greater than the fishing mortality at MSY (F_{MSY}) ($F > F_{MSY}$). If a species is declared overfished, action to rebuild the stock and/or prevent further overfishing is needed within one year. A species is considered rebuilt when B is greater than B_{MSY} and F is less than F_{MSY}. A species is considered healthy when B is greater than or equal to the biomass at optimum yield (B_{OY}) and F is less than or equal to the fishing mortality at optimum yield (F_{OY}).

3.2.1 Atlantic Swordfish

3.2.1.1 Life History/Species Biology

Swordfish are members of the family *Xiphiidae*, in the suborder *Scombroidei*. Atlantic swordfish (*Xiphias gladius*) are one of the largest and fastest predators in the Atlantic Ocean, reaching a maximum size of 530 kg (1165 lbs). Like other highly migratory species, they have developed a number of specialized anatomical, physiological, and behavioral adaptations (Helfman *et al*., 1997). Swordfish are distinguished by a long bill that grows forward from the upper jaw. This bill differs from that of marlins (family *Istiophoridae*) in that it is flattened rather than round in cross section, and smooth rather than rough. Swordfish capture prey by slashing this bill back and forth in schools of smaller fish or squid, stunning or injuring their prey in the process. They may also use the bill to spear prey, or as a defense during territorial encounters. Broken swordfish bills have been found embedded in vessel hulls and other objects (Helfman *et al.*, 1997).

Atlantic swordfish are usually found in surface waters but occasionally dive as deep as 650 meters. These large pelagic fishes feed throughout the water column on a wide variety of prey including groundfish, pelagics, deep-water fish, and invertebrate. Swordfish show extensive diel migrations and are typically caught on pelagic longlines at night when they feed in surface waters (SCRS, 2004). They are capable of migrating long distances to maximize prey availability and, as noted above, can prey upon various trophic levels during their daily vertical migrations (NMFS, 1999). As adults and juveniles, swordfish feed at the highest levels of the trophic food chain, implying that their prey species occur at low densities. The foraging behavior of swordfish reflects the broad distribution and scarcity of appropriate prey; they often aggregate in places where they are likely to encounter high densities of prey, including areas near current boundaries, convergence zones, and upwellings (Helfman *et al*., 1997).

Swordfish move thousands of kilometers annually and are distributed globally in tropical and subtropical marine waters. Their broad distribution, large spawning area, and prolific nature have contributed to the resilience of the species in spite of the heavy fishing pressure being exerted on it by many nations. During their annual migration, north Atlantic swordfish follow the major currents which circle the north Atlantic Ocean (including the Gulf Stream, Canary and North Equatorial Currents) and the currents of the Caribbean Sea and Gulf of Mexico. The primary habitat in the western north Atlantic is the Gulf Stream, which flows northeasterly along the U.S. coast, then turns eastward across the Grand Banks. North-south movement along the eastern seaboard of the United States and Canada is significant (NMFS, 2003). They are found in the colder waters during summer months and all year in the subtropical and tropical area (SCRS, 2003). Additional information on life history relating to habitat can be found in Section 3.3, Essential Fish Habitat, as well as the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks.

Like most large pelagic species, swordfish have adapted body contours that enable them to swim at high speeds. Their streamlined bodies are round or slightly compressed in cross section (fusiform), and their stiff, deeply forked tails minimize drag. This streamlined physical form is enhanced by depressions or grooves on the body surface into which the fins can fit during swimming. The extremely small second dorsal and anal fins of the swordfish may function like the finlets of tuna, reducing turbulence and enhancing swimming performance. Their method of respiration, known as ram gill ventilation, requires continuous swimming with the mouth open to keep water flowing across the gill surfaces, thereby maintaining an oxygen supply. This respiratory process is believed to conserve energy compared to the more common mechanism whereby water is actively pumped across the gills (Helfman *et al*., 1997). In addition to the benefits of speed and efficiency, their search for prey is aided by coloring that provides camouflage in pelagic waters. This shading is darker along the dorsal side and lighter underneath, enhanced by silvery tones.

Swordfish exhibit other physiological characteristics that enable them to extend their hunting range. For example, swordfish can maintain elevated body temperatures, conserving the heat generated by active swimming muscles. Swordfish have developed a heat exchange system that allows them to swim into colder, deep water in pursuit of prey. Because warm muscles contract faster than cool ones, heat conservation is believed to enable these predatory fishes to channel more energy into swimming speed. The internal temperatures of these fishes remains fairly stable even as they move from surface waters to deep waters. Swordfish have also adapted specialized eye muscles for deep water hunting. Because their eye muscles do not have the ability to contract, they produce heat when stimulated by the nervous system, locally warming both the brain and eye tissues (Helfman *et al*., 1997). With this modification, swordfish are able to hunt in the frigid temperatures of deep-water ocean environments without experiencing a decrease in brain and visual function that might be expected under such harsh conditions.

Juvenile swordfish are characterized as having exceptionally fast growth during the first year (NMFS, 1999). Swordfish exhibit dimorphic growth, where females show faster growth rates and attain larger sizes than males. Young swordfish grow very rapidly, reaching about 130 cm lower jaw-fork length (LJFL) by age two. Swordfish are difficult to age, but 53% of females are considered mature by age 5, at a length of about 130 cm LJFL (SCRS, 2003; SCRS, 2004). Approximately 50 percent of males attain maturity by 112 cm LJFL (Arocha, 1997). All males are mature by 145 to 160 cm LJFL (37 to 50 kg ww), approximately age five, and all females are mature by 195 to 220 cm LJFL (93 to 136 kg ww), approximately age nine. In general, swordfish reach 140 cm LJFL (33 kg ww) by age three and are considered mature by age five. Individual females may spawn numerous times throughout the year (NMFS,1999).

Swordfish stocks consist of several age classes, a condition that may serve as a buffer against adverse environmental conditions and confer some degree of stability on the stocks. Swordfish are also at a high trophic level which may make the species less vulnerable to short-term fluctuations in environmental conditions (NMFS, 1999).

When ICCAT's Standing Committee on Research and Statistics (SCRS) scientists assess the status of Atlantic swordfish, the stock is split between the North Atlantic, South Atlantic, and Mediterranean Sea. The SCRS continues to examine existing information, including spawning data, tagging information, genetic studies, and abundance indices to better define stock structure. For the purposes of domestic management, the swordfish population is considered to consist of two discrete stocks divided at 5 degrees N.

3.2.1.2 Effect of ICCAT Regulations

ICCAT Catch limits (all weights in this section are given in whole weight)

The total allowable catch in the North Atlantic in 2002 was 10,400 mt (10,200 mt retained and 200 mt discarded). The reported landings were about 9,000 mt and the estimated discards were about 600 mt. The total allowable catch in the North Atlantic in 2003 was 14,000 mt (13,900 mt retained and 100 mt discarded). The reported landings in 2003 were about 10,600 mt and the estimated discards were about 460 mt. Reports for year 2003 are considered provisional and subject to change. The total allowable catch in the South Atlantic in 2002 was 14,620 mt. The reported landings for 2002 were about 13,660 mt and reported discards were 1 mt. The total allowable catch in the South Atlantic in 2003 was 15,631 mt. The reported landings for 2003 were about 10,900 mt and reported discards were <1 mt. Reports for year 2003 are considered provisional and subject to change (SCRS, 2004).

ICCAT Minimum size limits (all weights in this section are given in whole weight)

There are two minimum size options that are applied to the entire Atlantic: 125 cm LJFL with a 15 percent tolerance for undersized fish, or 119 cm LJFL with zero tolerance and evaluation of the discards. In the absence of size data, these calculations could not be updated or examined for 2003. In 2000, the percentage of swordfish reported landed (throughout the Atlantic) less than 125 cm LJFL was about 21 percent (in number) overall for all nations fishing in the Atlantic. If this calculation is made using reported landings plus estimated discards, then the percentage less than 125 cm LJFL would be about 25 percent. The SCRS noted that this proportion of small fish did not increase very much even though recruitment in the North has been at a high level in recent years (SCRS, 2004).

3.2.1.3 Stock Status and SCRS Outlook

No new assessment was conducted in 2003 or 2004; the most recent assessment of North and South Atlantic swordfish stocks was conducted in 2002. In that assessment, updated CPUE and catch data through 2001 were examined. Sex and age-specific (North Atlantic) and biomass standardized catch rates (North and South Atlantic) from the various fleets were updated. The updated North Atlantic CPUE data showed similar trends to previous years, and also showed signs of improvement in stock status since 1998. In particular, the recruitment index (1997 - 2001) and the catch-at-age used in the 2002 North Atlantic assessment showed signs of substantially improved recruitment (age one), which has manifested in several age classes and the biomass index of some fisheries, and have allowed for increases in spawning biomass and a more optimistic outlook. The strong recruitments of the late 1990s promoted improvement in spawning stock biomass and should result in further improvement, if these year-classes are not heavily harvested. The CPUE patterns in the South Atlantic by fleet showed contradictory patterns. Lack of important CPUE information from some fleets fishing in the South Atlantic prevented the SCRS from reconciling these conflicts (SCRS, 2004).

North Atlantic Swordfish (all weights are given in whole weight)

An updated estimate of maximum sustainable yield from production model analyses is 14,340 mt (range 11,500 to 15,500 mt). Since 1997, North Atlantic swordfish catches have been below 14,340 mt; preliminary estimates (reported plus carried over) of catches in 2001, 2002, and 2003 were about 9,980, 9,550, and 11,020 mt, but the most recent years are provisional and probably underestimates. The biomass at the beginning of 2002 was estimated to be 94 percent (range: 75 to 124%) of the biomass needed to produce MSY. This estimate is up from an estimate of 65 percent of MSY in the 1998 assessment. The 2001 fishing mortality rate was estimated to be 0.75 times the fishing mortality rate at MSY (range: 0.54 to 1.06). The replacement yield for the year 2003 was estimated to be about the MSY level. As the TAC for North Atlantic swordfish for 2002 was 10,400 mt, it was considered likely that biomass would increase further under those catch levels. The TAC set for 2003 - 2005 is 14,000 mt (ICCAT Recommendation 02 - 02). Given recent fishing mortality patterns, the spawning biomass likely will increase largely owing to the very large recruitments estimated for 1997 - 2000. Further, given that recent (2002 - 2003) reported catch has been below estimated replacement yield, the North Atlantic swordfish biomass may have already achieved the B_{MSY} level. However, noting the uncertainties inherent in the assessment, the SCRS warned against large increases over the current TAC (SCRS, 2004). The next assessment is scheduled for 2006.

South Atlantic Swordfish

The SCRS noted that reported total catches have been reduced since 1995, as was recommended by the SCRS. SCRS had previously expressed serious concern about the trends in stock biomass of South Atlantic swordfish based on the pattern of rapid increases in catch before 1995 that could result in rapid stock depletion, and in declining CPUE trends of some by-catch fisheries. Standardized CPUE series were available for three fleets, the targeted fishery of European Community (EC)-Spain, and the bycatch fisheries of Chinese Taipei and Japan. There was considerable conflict in trends among the three CPUE series and it is unclear which, if any, of the series tracks total biomass. It was noted that there was little overlap in fishing area among the three fleets, and that the three CPUE trends could track different components (or cohorts) of the population. To address this possibility, an age-structured production model was run as a sensitivity test. For the base case production model, the Committee selected the bycatch CPUE series combined using a simple unweighted mean and the targeted CPUE series. Due to some inconsistencies in the available CPUE trends reliable stock assessment results could not be obtained (SCRS, 2004).

Reported catches of Atlantic swordfish, including discards for the period 1950 – 2003 can be found in Figure 3.1. Estimated fishing mortality rate relative to the F_{MSY} for the period 1959 – 2001 can be found in Figure 3.2. Annual yield for North Atlantic swordfish relative to the estimated MSY can be found in Figure 3.3. A summary of Atlantic swordfish stock status can be found in Table 3.3

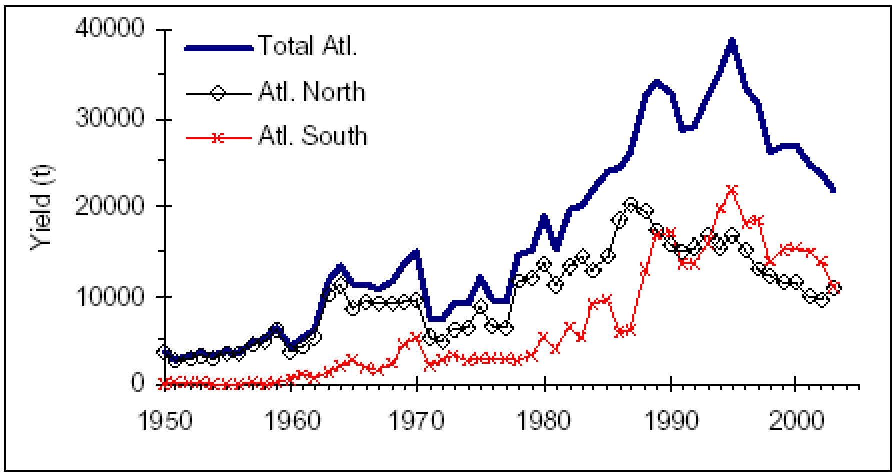

Figure 3.1 **Reported catches (mt whole weight) of Atlantic Swordfish, including discards for 1950 – 2003.** Source: SCRS, 2004.

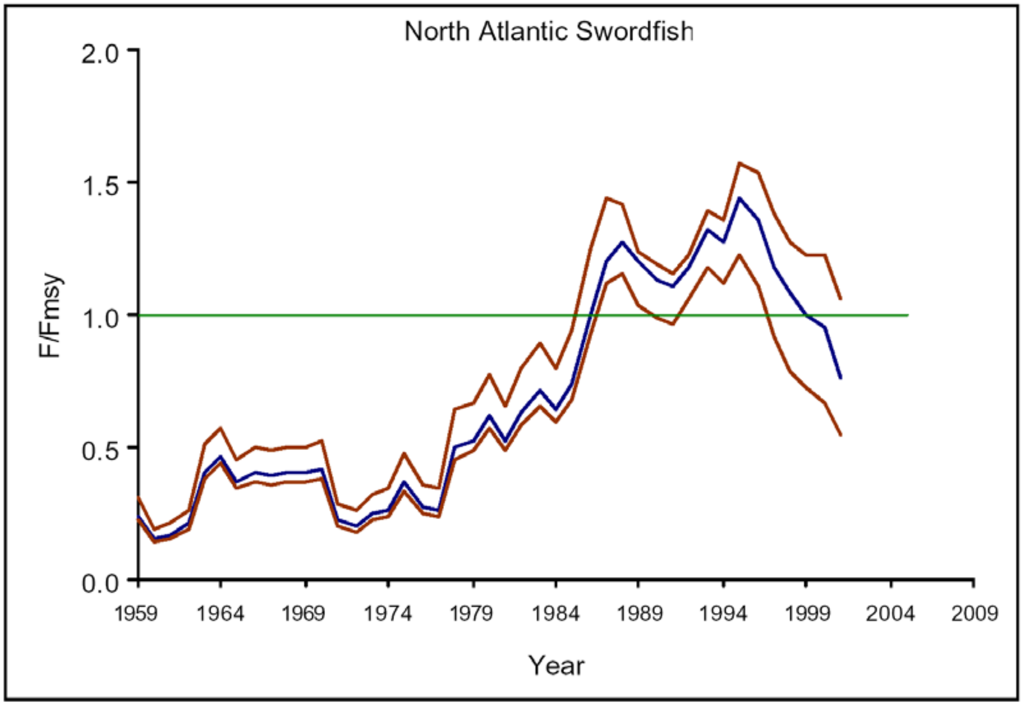

Figure 3.2 **Estimated fishing mortality rate relative to FMSY (F/FMSY) for the period 1959-2001 (median with 80% confidence bounds based on bootstrapping are shown).** Source: SCRS 2004.

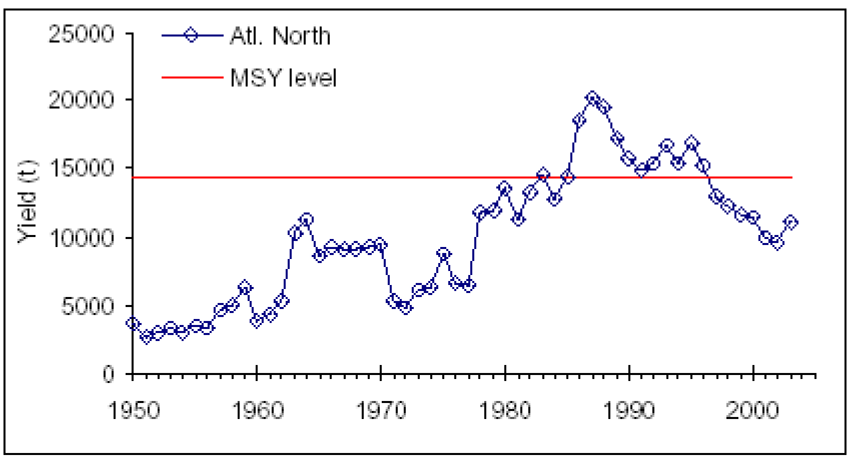

Figure 3.3 **Annual yield (mt) (whole weight) for North Atlantic swordfish relative to the estimated MSY level.** Source: SCRS 2004

Table 3.3 Atlantic Swordfish Stock Summary (weights given in mt ww). Source: SCRS, 2004.

ATLANTIC SWORDFISH SUMMARY	North Atlantic	South Atlantic
Maximum Sustainable Yield[1]	14,340 t (11,580-15,530)[4]	Not estimated
Current (2003) Yield[2]	11,028 t	10,919 t
Current (2002) Replacement Yield[3]	about MSY	Not estimated
Relative Biomass (B_{2002}/B_{MSY})	0.94 (0.75 - 1.24)	Not estimated
Relative Fishing Mortality		
F_{2001}/F_{MSY}[1]	0.75 (0.54 - 1.06)	Not estimated
F_{2000}/F_{max}	1.08	Not estimated
$F_{2000}/F_{0.1}$	2.05	Not estimated
$F_{2000}/F_{30\%SPR}$	2.01	Not estimated
Management Measures in Effect	Country-specific TACs [Ref. 02-02]; 125/119 cm LJFL minimum size [Ref. 99-02].	TAC target [Ref. 01-02]; 125/119 cm LJFL minimum size [Refs. 90-2 & 95-10].

[1] Base Case production model results based on catch data 1950-2001.
[2] Provisional and subject to revision, see footnote on SWO-ATL-Table 1.
[3] For next fishing year.
[4] 80% confidence intervals are shown.

Table 3.4 Stock Assessment Summary Table. Source: SCRS 2004.

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Fishing Mortality Rate	Maximum Fishing Mortality Threshold	Outlook**
West Atlantic Bluefin Tuna	SSB_{01}/SSB_{MSY} = 0.31 (low recruitment); 0.06 (high recruitment) SSB_{01}/SSB_{75} = 0.13 (low recruitment); 0.13 (high recruitment)	*$0.86SSB_{MSY}$*	F_{01}/F_{MSY} = 2.35 (low recruitment scenario) F_{01}/F_{MSY} = 4.64 (high recruitment scenario)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
East Atlantic Bluefin Tuna	SSB_{00}/SSB_{70} = 0.80	*Not estimated*	F_{00}/F_{max} = 2.4	*Not estimated*	Overfished; overfishing is occurring.*
Atlantic Bigeye Tuna	B_{03}/B_{MSY} = 0.85-1.07	*$0.6B_{MSY}$ (age 2+)*	F_{02}/F_{MSY} = 0.73-1.01	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
Atlantic Yellowfin Tuna	B_{01}/B_{MSY} = 0.73 - 1.10	*$0.5B_{MSY}$ (age 2+)*	F_{01}/F_{MSY} = 0.87-1.46	F_{year}/F_{MSY} = 1.00	Approaching an overfished condition.
North Atlantic Albacore Tuna	B_{00}/B_{MSY} = 0.68 (0.52-0.86)	*$0.7B_{MSY}$*	F_{00}/F_{MSY} = 1.10 (0.99 - 1.30)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
South Atlantic Albacore Tuna	B_{02}/B_{MSY} = 1.66 (0.74-1.81)	*Not estimated*	F_{02}/F_{MSY} = 0.62 (0.46-1.48)	*Not estimated*	Not overfished; overfishing not occurring.*

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Fishing Mortality Rate	Maximum Fishing Mortality Threshold	Outlook**
West Atlantic Skipjack Tuna	*Unknown*	*Unknown*	*Unknown*	F_{year}/F_{MSY} = 1.00	Unknown

* South Atlantic albacore and East Atlantic bluefin tuna are not found in the U.S. EEZ.
** Based on “Sustaining and Rebuilding”, National Marine Fisheries Service, 2003, - Report to Congress - The Status of U.S. Fisheries, May 2004.

3.2.2 Atlantic Bluefin Tuna

All text, figures and tables for this Section are from the SCRS 2004 Report and the United States National Report to ICCAT, 2004. All weights are reported as whole weights unless indicated as otherwise.

Life History/Species Biology

Atlantic bluefin tuna are distributed from the Gulf of Mexico to Newfoundland in the West Atlantic, from roughly the Canary Islands to south of Iceland in the East Atlantic, and throughout the Mediterranean Sea. Historically, catches of bluefin were made from a broad geographic range in the Atlantic and Mediterranean.

Atlantic bluefin tuna can grow to over 300 cm and reach more than 650 kg. The oldest age considered reliable is 20 years, based on an estimated age at tagging of two years and about 18 years at liberty, although it is believed that bluefin tuna may live to older ages. Bluefin tuna are, thus, characterized by a late age at maturity (thus, a large number of juvenile classes) and a long life span. These factors contribute to make Bluefin tuna well adapted to variations in recruitment success, but more vulnerable to fishing pressure than rapid growth species such as tropical tuna species. Bluefin tuna in the West Atlantic generally reach a larger maximum size compared to bluefin caught in the East Atlantic.

Bluefin in the west Atlantic are assumed to first spawn at age eight compared to ages four to five in the east Atlantic. Distribution expands with age; large bluefin are adapted for migration to colder waters. Bluefin tuna are opportunistic feeders, with fish, squid, and crustaceans common in their diet. In the West Atlantic, bluefin tuna are thought to spawn from mid-April into June in the Gulf of Mexico and in the Florida Straits. Juveniles are thought to occur in the summer over the continental shelf, primarily from about 35 N to 41 N and offshore of that area in the winter. In the East Atlantic, bluefin tuna generally spawn from late May to July depending on the spawning area, primarily in the Mediterranean, with highest concentrations of larvae around the Balearic Islands, Tyrrhenian Sea, and central and eastern Mediterranean where the sea-surface temperature of the water is about 24^0C. Sexually mature fishes have also been recently observed in May and June in the eastern Mediterranean (between Cyprus and Turkey).

Distribution and Migration

In 1982, ICCAT established a line for separating the eastern and western Atlantic management units based on discontinuities in the distribution of catches at that time in the Atlantic and supported by limited biological knowledge. The United States is allocated quota from the western Atlantic management unit where the U.S. fisheries primarily occur. However, the overall distribution of the catch in the 1990s is much more continuous across the North Atlantic than was seen in previous decades. Tagging evidence indicates that movement of bluefin across the current east/west management boundary in the Atlantic does occur, that movements can be extensive (including transatlantic) and complex, that there are areas of concentration of electronically tagged fish (released in the west) in the central North Atlantic just east of the management boundary, and that fisheries for bluefin tuna have developed in this area in the last decade. At least some of these fish have moved from west of the current boundary (see below for a brief summary of highlights of United States research).

Complementary studies, which might show east to west movement, are less advanced. The composition, and natal origin of these fish in the central North Atlantic area are not known. The SCRS emphasizes that "it is clear that the current boundary does not depict our present understanding of the biological distribution and biological stock structure of Atlantic bluefin tuna." The SCRS also notes that "the current boundary is a *management* boundary and its effectiveness for management is a different issue."

There has been an accumulation of evidence on bluefin tuna mixing in the last few years through the collection of tagging data and its examination through the modeling of mixing scenarios for evaluating their effect on management. However, the origin of fish older than one year still remains unknown. Mixing results were reviewed in 2001 by the Workshop on Bluefin Tuna Mixing. This research led to a long-term plan for modeling finer scale spatial mixing and to short-term strategies for assessment to assist the advice for management. The data and research were reviewed again in 2002.

ICCAT, at its 2002 Meeting in Bilbao, called for a *Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies* which met in 2003 and again in 2004. In response to the recommendations from these meetings, the SCRS is developing a revised proposal for initiating a coordinated Bluefin Tuna Research Program, to address priority research and data needs for providing scientific advice to ICCAT related to revised management procedures for Bluefin tuna. Uncertainty exists regarding the importance and impacts of mixing on western stocks. The most important uncertainty regarding management advice by the SCRS for the eastern stock is the uncertainty in the catch data that is being taken.

Recent Updates on United States Bluefin Tuna Research

As part of its commitment to the Bluefin Program, research supported by the United States has concentrated on ichthyoplankton sampling, reproductive biology, methods to evaluate hypotheses about movement patterns, spawning area fidelity, stock structure investigations and population modeling analyses.

Ichthyoplankton surveys in the Gulf of Mexico during the bluefin spawning season were continued in 2003 and 2004. Data resulting from these surveys which began in 1977 are used to develop a fishery-independent abundance index of spawning west Atlantic bluefin tuna. This index has continued to provide one measure of bluefin abundance that is used in SCRS assessments of the status of the resource. During 2003 a U.S. scientist participated in the Spanish TUNIBAL project studying the relationships between bluefin larval and adult distributions and hydrography in waters near the Balaeric Islands in the Mediterranean Sea. During the 2004 U.S. ichthyoplankton survey, a plankton net of a type used in the Spanish surveys was fished in addition to the nets normally used to determine the impact of using a wider net mouth and larger mesh on the size and catch rates of bluefin in the Gulf of Mexico.

Scientists at Virginia Institute of Marine Science and Texas A&M University have used nuclear and mitochondrial DNA to investigate the population structure of bluefin tuna in the Mediterranean Sea (SCRS/2004/165). Young of the year bluefin were studied to reduce possible migratory effects. Their results indicate homogeneity within the western Mediterranean basin (Balaeric Islands and Tyrrhenian Sea) and differences between the eastern (Ionian Sea) and western basins. Samples collected for these studies were obtained by, or in cooperation with, European scientists from multiple locations including Spain and several locations in Italy; financial and logistical assistance was also provided by the ICCAT bluefin year program.

Since 1998, researchers from Texas A & M University and the University of Maryland with assistance of researchers from Canada, Europe, and Japan have studied the feasibility of using otolith chemical composition (microcontituents and isotopes) to distinguish bluefin stocks. Recent research has investigated the value of using additional microconstituent elements (transitional metals) to enhance classification success. By themselves the transitional metals provided little discriminatory power, but when combined with the other trace elements (for 13 elements in all), the classification success was improved to about 80-90 percent. Studies of classification success using oxygen isotopes continue.

Scientists at University of Maryland, Virginia Institute of Marine Science, and Texas A&M University have continued to sample specimens for genetic and otolith chemistry studies of stock structure. Roughly 10-20 young-of-the-year were collected in 2003. In addition, limited sampling of ages one and older continues. Efforts are also continuing to obtain samples from juveniles and mature bluefin from the Mediterranean Sea and adjacent waters.

In response to ICCAT's request for options for alternative approaches for managing mixed populations of Atlantic bluefin tuna, SCRS/2003/108 examined approaches to developing more complex models of bluefin population dynamics including detailed spatial information and methods for assessing the resources and examining management procedures. SCRS/2003/105 proposed the evaluation of possible age structured assessment using more complex geographic stratification and movement scenarios than have been used in recent assessments. Document SCRS/2004/166 further extends that work and shows that, under the proposed model structure, west Atlantic bluefin population trends from the conventional ICCAT assessments can be replicated while the most recent east Atlantic assessment trends cannot. It also corroborated earlier results that showed that estimated west Atlantic population trends are influenced by assumptions about movement rates and patterns.

In May 2004, scientists from (1) Stanford University and the Monterey Bay Aquarium and (2) the New England Aquarium and the University of New Hampshire made presentations on their research findings to the SCRS meeting on bluefin tuna management strategies held in France. Researchers at the Imperial College, London are working with the University of Miami, the University of New Hampshire, and NOAA/NMFS to develop methods to estimate bluefin movement and fishing mortality rate patterns (SCRS/2004/164). An operational model is being developed which will use conventional and electronic tagging data and fishing effort by management area. The operational model will be used to examine possible harvest control rules and the evaluation of possible management procedures.

A thorough review of recreational catch estimation procedures for HMS species, including but not limited to BFT, was conducted during 2004, focusing on a survey program covering the rod and reel fishery along the Atlantic Coast of the U.S. from Virginia northward. U.S. scientists also worked cooperatively with scientists in Brazil, instructing a course on CPUE standardization methods and applications to stock assessment (Recife, Brazil, June 7-12 2004).

SCRS Recent Stock Assessment Results

The last full stock assessments for western Atlantic Bluefin tuna were conducted in 2002 with the next scheduled for 2006. The assessment results are similar to those from previous assessments (see Figure 3.4). They indicate that the spawning stock biomass (SSB) declined steadily from 1970 (the first year in the assessment time series) through the late 1980s, before leveling off at about 20 percent of the level in 1975 (which has been a reference year used in previous assessments). A steady decline in SSB since 1997 is estimated and leaves SSB in 2001 at 13 percent of the 1975 level. The assessment also indicates that the fishing mortality rate during 2001 on the spawning stock biomass (SSB) is the highest level in the series.

Estimates of recruitment of age one fish have been generally lower since 1976. However, recruitment of age one fish in 1995 and 1998 is estimated to be comparable in size to some of the year-classes produced in the first half of the 1970s. While the large decline in SSB since the early 1970s is clear from the assessment, the potential for rebuilding is less clear. Key issues are the reasons for relatively poor recruitment since 1976, and the outlook for recruitment in the future. One school of thought is that recruitment has been poor because the SSB has been low. If so, recruitment should improve to historical levels if SSB is rebuilt. Another school of thought is that the ecosystem changed such that it is less favorable for recruitment and thus recruitment may not improve even if SSB increases. To address both schools of thought, the SCRS considered two recruitment scenarios as described below and summarized in Table 3.5. (East Atlantic Bluefin tuna summary data is also provided for comparison purposes). For both scenarios, the assessment indicates that the fishing mortality on the western Atlantic bluefin resource exceeds F_{MSY} and the SSB is below B_{MSY} (thus overfished according to ICCAT's objective of maintaining stocks at the MSY-biomass level and as indicated in the NMFS 2003).

Table 3.5 Summary Table for the Status of West Atlantic Bluefin Tuna

Age/size at Maturity	Age 8/~ 200 cm fork length
Spawning Sites	Primarily Gulf of Mexico and Florida Straits
Current Relative Biomass Level ***Minimum Stock Size Threshold***	SSB_{01}/SSB_{75} (low recruitment) = .13 (.07-.20) SSB_{01}/SSB_{75} (high recruitment) = .13 (.07-.20) SSB_{01}/SSB_{msy} (low recruitment) = .31 (.20-.47) SSB_{01}/SSB_{msy} (high recruitment) = .06 (.03-.10) $0.86B_{MSY}$
Current Relative Fishing Mortality Rate ***Maximum Fishing Mortality Threshold***	F_{01}/F_{MSY} (low recruitment) = 2.35 (1.72-3.24) F_{01}/F_{MSY} (high recruitment) = 4.64 (3.63-6.00) F/F_{MSY} = 1.00
Maximum Sustainable Yield	Low recruitment scenario: 3,500 mt (3,300-3,700) High recruitment scenario: 7,200 mt (5,900-9,500)
Catch (2003) including discards	2,146 mt
Short Term Sustainable Yield	Probably > 3,000 mt
Outlook	Overfished; overfishing continues to occur

Table 3.6 Summary Table for the Status of East Atlantic Bluefin Tuna

Age/size at Maturity	Age 4-5
Spawning Sites	Mediterranean Sea
Current Relative Biomass Level	SSB_{00}/SSB_{1970} = .80
Current Relative Fishing Mortality Rate	F_{00}/F_{MAX} = 2.4
Maximum Sustainable Yield	Not estimated
Current (2001) Yield	34,557 mt
Yield (long term)	23,543 to 24,649 mt
Outlook	Overfished; overfishing continues to occur.

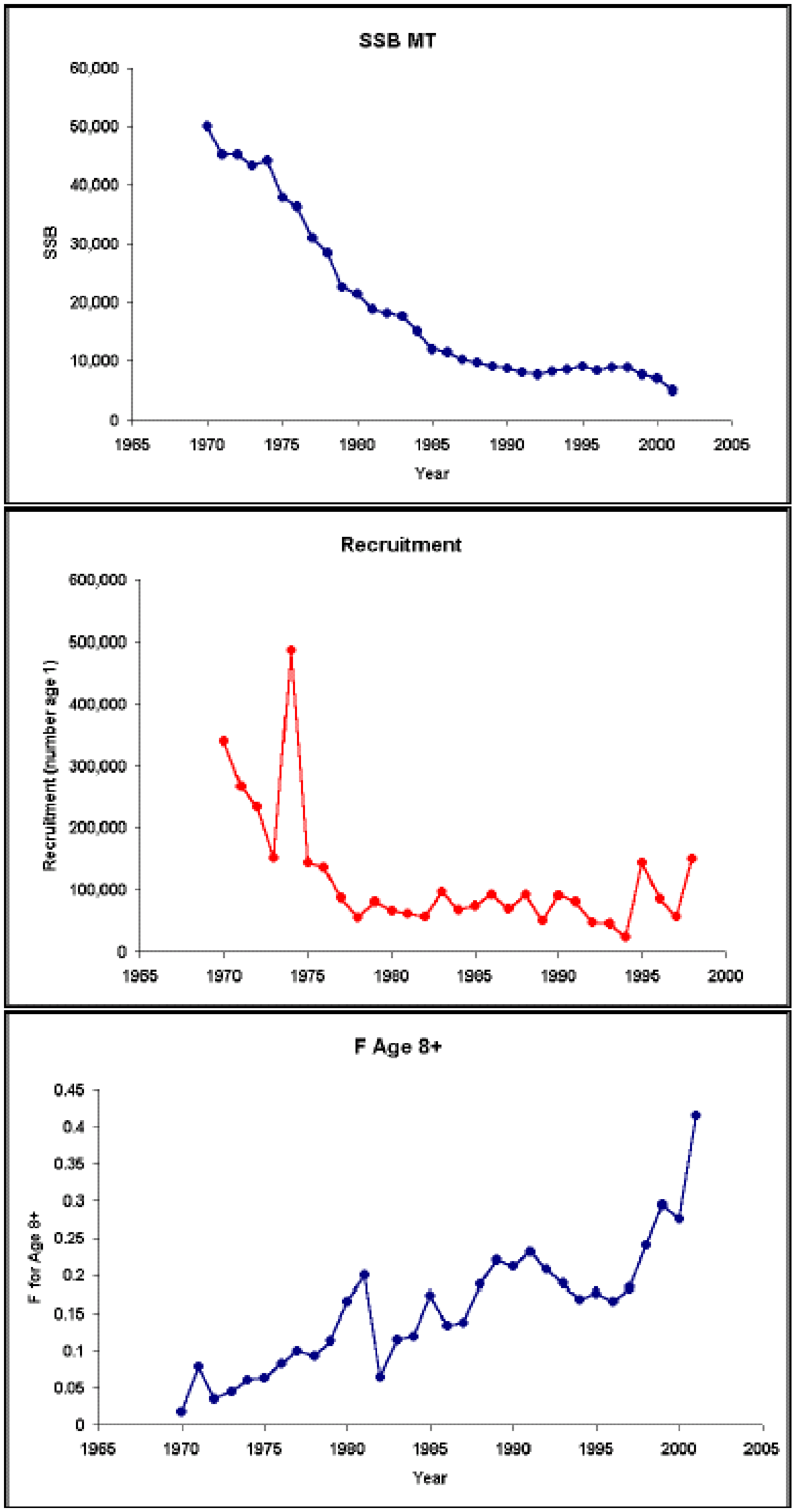

Figure 3.4 **West Atlantic bluefin tuna spawning biomass (t), recruitment (numbers) and fishing mortality rates for fish of age 8+ , estimated by the Base Case VPA run.**

SCRS Advice and Management Actions

The SCRS's management recommendation for the western Atlantic bluefin tuna management area is directed at the Rebuilding Program adopted by ICCAT in 1998. According to the Program, the MSY rebuilding target can be adjusted according to advice from SCRS. In 2002, ICCAT set the annual Total Allowable Catch (TAC), inclusive of dead discards, for the western Atlantic management area to 2,700 mt, effective beginning in 2003. The Program states that the TAC for the west would only be adjusted from the 2,500 mt level adopted for 2003-2004 if SCRS advises that (a) a catch of 2,700 mt or more has a 50 percent or greater probability of rebuilding or (b) a catch of 2,300 mt or less is necessary to have a 50 percent or greater probability of rebuilding.

The Program is designed with the intent to rebuild with 50 percent probability by 2018 to the spawning biomass level associated with MSY. In light of the uncertainty in the assessment, the choice between recruitment scenarios and rebuilding targets, and assumptions about mixing, the weight of scientific opinion within the SCRS favored no change from the current TAC of 2,500 mt per year. Projections based on the low recruitment scenario indicate that the TAC could be increased without violating the Rebuilding Program, assuming that relatively large recruitment estimates for some recent year-classes are realistic. The high levels of recruitment estimated for some recent year-classes are consistent with a higher biomass level as a rebuilding target. In previous assessment sessions, the spawning biomass level in 1975 was considered a useful rebuilding target. The 1975 biomass is more than twice the MSY spawning biomass level associated with the low recruitment scenario. The projections indicate a 35-60 percent probability of rebuilding to the 1975 spawning biomass level for a catch of 2,500 mt per year, depending on the recruitment scenario assumed. It seems likely that a recruitment scenario corresponding to a SSB_{MSY} equal to the level in 1975 would indicate a probability of rebuilding by 2018 for a catch of 2,500 mt per year within the range of 35-60 percent.

The MSY spawning biomass associated with the high recruitment scenario, which is nearly twice the 1975 level, is unlikely to be reached by 2018 if the recent level of catch (and TAC) is maintained. However, the SCRS does not recommend the sharp reduction in TAC that would be necessary to comply with the rebuilding Program based on the high recruitment scenario because of:

- Uncertainty about which recruitment scenario is most appropriate;
- Recognition that for the high recruitment scenario the spawning biomass associated with MSY is not well determined (because estimation leads to extrapolation beyond biomass levels included within the current assessment); and
- The generally positive outlook for the resource according to the current assessment regardless of the recruitment scenario assumed.

As emphasized in previous assessments, mixing across management unit boundaries of fish of western and eastern origin could be important for management of the resource in both areas. In particular, the condition of the eastern Atlantic stock and fishery could adversely affect recovery in the West Atlantic, which was also noted in the SCRS's 1998, 2000, and 2001 reports.

Therefore, the SCRS stressed the importance of continuing efforts to manage the fisheries in both the East and West Atlantic according to ICCAT's objectives.

SCRS Evaluation of Management Measures

The first regulatory measure for a scientific monitoring level was adopted for western Atlantic bluefin catches in 1981. Since then, monitoring levels have been changed in various years. Until 1987, both estimated catches and landings were below or equal to the level of the catch limits. However, from 1988 to 1997, estimated landings were very close to the level of the limits and, for some years, exceeded the limit by a maximum of 100 mt. Estimated catches (including discards) were higher than the limits every year during this period (by about 200 to 300 mt) with the exceptions of 1992 and 1997. The estimated catches exceeded the 2,500 mt limit in 2000 by 165 mt, by 218 mt in 2001, and by 715 mt in 2002. It should be pointed out that for compliance purposes, some countries (including the United States) are using fishing years that do not correspond to calendar years. Also, according to the ICCAT regulatory measure, the amount of catch that exceeded quota or was left over from the quota can be carried over to succeeding years. Hence, the catch limit set for each year could have been adjusted accordingly. The SCRS notes that the excess of the catch limits in most recent years is due to some new fisheries that operated without a quota.

For the West Atlantic, a size limit of 6.4 kg with 15 percent allowance, in number of fish, has been in effect since 1975. In addition, a prohibition on the taking and landing bluefin tuna less than 30 kg (or 115 cm) with an 8 percent tolerance, by weight on a national basis, became effective in 1992. The SCRS notes that, since 1992, the proportion of undersized fish for all catches combined has been below the allowance level (e.g., 1 percent and 3 percent <115cm in 2000 and 2001, respectively). In 2002, ICCAT set the annual TAC, inclusive of dead discards, for the western Atlantic management area to 2,700 mt, effective beginning in 2003. The reported 2003 catches were 2,146 mt.

SCRS Outlook

In general, the outlook for bluefin tuna in the West Atlantic is similar to the outlook reported based on the 2000 western Atlantic bluefin tuna assessment session. The assessment and projection results for the present assessment are somewhat less optimistic than in 2000 but the confidence in the strength of the 1994 year-class has increased. Therefore, the increases associated with different levels of future catch projected for the short-term are smaller but are estimated more confidently. It should be noted that the 1995 year-class was estimated to be strong in 2000, but it is now estimated to be only of average strength.

As noted by the previous assessment session, western Atlantic bluefin tuna catches have not varied very much since 1983 (the range over this period is 2,106 to 3,011 mt), and the estimated spawning stock size (Spawning Stock Biomass (SSB) measured as the biomass of fish age 8+) has been relatively stable, notwithstanding the indication of a decline in the most recent years. Thus, over an extended period of time, catches around recent levels have maintained stock size at about the same level, in spite of several past assessments that predicted the stock would either decline or grow if the current catch was maintained. This observation highlights the challenge of predicting the outlook for this stock.

In order to provide advice relative to rebuilding the western Atlantic bluefin resource, the SCRS conducted projections for two scenarios about future recruitment. One scenario assumed that future average recruitment will approximate the average estimated recruitment (at age one) since 1976, unless spawning stock size declines to low levels (such as the current level estimated in the assessment, but generally lower than estimates during most of the assessment history). The second scenario allowed average recruitment to increase with spawning stock size up to a maximum level no greater than the average estimated recruitment for 1970 to 1974. These scenarios are referred to as the low recruitment and high recruitment scenarios, respectively. The low and high recruitment scenarios implied that the B_{MSY} (expressed in SSB) is 42 percent and 183 percent of the biomass in 1975, respectively. With the current information the SCRS could not determine which recruitment scenario is more likely, but both are plausible, and recommended that management strategies should be chosen to be reasonably robust to this uncertainty.

Table 3.7below summarizes the results of projections of both scenarios at different catch levels. The projections for the low recruitment scenario estimated that a constant catch of 3,000 mt per year has an 83 percent probability of allowing rebuilding to the associated SSB_{MSY} by 2018. A constant catch of 2,500 mt per year has a 35 percent probability of allowing rebuilding to the 1975 SSB by 2018.

The results of projections based on the high recruitment scenario estimated that a constant catch of 2,500 mt per year has a 60 percent probability of allowing rebuilding to the 1975 level of SSB, and there is a 20 percent chance of rebuilding SSB to SSB_{MSY} by 2018. If the low recruitment scenario is valid, the TAC could be increased to at least 3000 mt without violating ICCAT's rebuilding plan. If the high recruitment scenario is valid, the TAC should be decreased to less than 1,500 mt to comply with the plan.

Table 3.7 Probability of western Atlantic bluefin tuna achieving rebuilding target by 2018.

Catch	Low Recruitment Scenario		High Recruitment Scenario	
(MT)	SSB_{1975}	SSB_{MSY}	SSB_{1975}	SSB_{MSY}
500	95 %	100 %	98 %	73 %
1,000	89 %	100 %	96 %	62 %
1,500	77 %	100 %	87 %	47 %
2,000	60 %	99 %	75 %	30 %
2,300	45 %	98 %	66 %	24 %
2,500	35 %	97 %	60 %	20 %
2,700	26 %	95 %	52 %	17 %
3,000	14 %	83 %	38 %	11 %
5,000	0 %	1 %	2 %	0 %

The estimate of SSB_{MSY} for the high recruitment scenario is critical to inferences regarding the probability of achieving rebuilding under different future levels of catch, and also less well determined by the data than SSB_{MSY} for the low recruitment scenario. In particular, the estimates of SSB_{MSY} based on the high recruitment scenario are substantially larger than the largest spawning stock size included in the assessment. This extrapolation considerably increases the uncertainty associated with these estimates of SSB_{MSY}. Previous meetings have used SSB_{1975} as a rebuilding target in the context of interpreting projections. Arguably SSB_{1975} is appropriate as a target level for interpreting the implications of projections based on the high recruitment scenario. Under such a target level for the high recruitment scenario, a TAC of 2,700 mt has an estimated probability of reaching the rebuilding level of about 50 percent.

The SCRS cautioned that these conclusions do not capture the full degree of uncertainty in the assessments and projections. An important factor contributing to uncertainty is mixing between fish of eastern and western origin. Furthermore, the projected increases in stock size are strongly dependent on estimates of recent recruitment, which are a particularly uncertain part of the assessment. A sensitivity test in which the estimates of the below average 1996 and the strong 1997 year-classes were excluded from the analysis gave somewhat less optimistic results in terms of the estimated probabilities of recovery by 2018. However, these projections still predicted increases in spawning biomass for both recruitment scenarios, except for extreme increases in catch.

3.2.3 Atlantic Bays Tuna

All text, figures and tables for this Section are from the SCRS 2004 Report and the United States National Report to ICCAT, 2004. All weights are reported as whole weights unless indicated as otherwise.

3.2.3.1 Atlantic Bigeye Tuna

Biology/Life History

The geographical distribution of bigeye tuna is very wide and covers almost the entire Atlantic Ocean between 50 N and 45 S. This species is able to dive deeper than other tuna species and exhibits extensive vertical movements. Similar to the results obtained in other oceans, pop-up tagging and sonic tracking studies conducted on adult fish in the Atlantic has revealed that they exhibit clear diurnal patterns being much deeper in the daytime than at night. Spawning takes place in tropical waters when the environment is favorable. From the nursery areas in tropical waters, juvenile fish tend to diffuse into temperate waters as they grow larger. Catch information from the surface gears indicate that the Gulf of Guinea is a major nursery ground for this species.

Dietary habits of bigeye tuna are varied such that various prey organisms like fish, mollusks, and crustaceans are found in stomach contents. A growth study based on otolith and tagging data resulted in the adoption by the SCRS of a new growth curve. The curve shows bigeye tuna exhibit relatively fast growth: about 105 cm in fork length at age three, 140 cm at age five and 163 cm at age seven. Bigeye tuna become mature at about age three and a half. Young fish form schools mostly mixed with other tunas such as yellowfin and skipjack. These schools are often associated with drifting objects, whale sharks and sea mounts. This association appears to weaken as bigeye tuna grow larger. An estimate of natural mortality (M) for juvenile fish was provided based on the results of a tagging program. According to this study, mortality for juvenile fish only is at a similar level of M as that currently used for the entire Atlantic stock as well as the level of M used for all other oceans. Various evidence including; a genetic study, the time-area distribution of fish, and movements of tagged fish, suggest an Atlantic-wide single stock for this species, which is currently accepted by the SCRS. However, the possibility of other scenarios, such as north and south stocks, should not be disregarded.

Recent Updates on United States Bigeye Tuna Research

During 2004, U.S. scientists participated in both the Bigeye Tuna Year Program (BETYP) Symposium (Madrid, Spain, March 8 – 9, 2004) and the Second World Bigeye Tuna Meeting (Madrid, Spain, March 10 - 13, 2004). Contributed papers included SCRS/2004/038, describing the simulated aggregation of bigeye tuna in free schools versus those associated with fish aggregating devices, and SCRS/2004/059, which reviewed published work on yellowfin tuna growth and compared parameter estimates in the context of potential impact on the catch-at-age matrices used for stock assessment. U.S. scientists took part in the 2004 ICCAT Bigeye Tuna Stock Assessment (Madrid, Spain, June 28 - July 3, 2004). For this meeting, relative abundance patterns based on U.S. pelagic longline data from 1982 to 2003 were presented in SCRS/2004/133.

SCRS Recent Stock Assessment Results

A new stock assessment was conducted for bigeye tuna in July 2004. Due to the early date of the meeting, the catch information for 2003 was incomplete and could not be incorporated in the assessment. The 2004 stock assessment was conducted using various types of models. However, there were considerable sources of uncertainty arising from the lack of information regarding (a) reliable indices of abundance for small bigeye from surface fisheries, (b) the species composition of Ghanaian fisheries that target tropical tunas, and (c) details on the historical catch and fishing activities of Illegal, Unregulated, Unreported (IUU) fleets (e.g., size, location and total catch).

Three indices of relative abundance were available to assess the status of the stock (Figure 3.5). All were from longline fisheries conducted by Japan, Chinese Taipei and United States. While the Japanese indices have the longest duration since 1961 and represent roughly 20-40 percent of the total catch, the other two indices are shorter and generally account for a smaller fraction of the catch than the Japanese fishery. These three indices primarily relate to medium and large-size fish.

Various types of production models were applied to the available data and the SCRS notes that the current year's model fits to the data were better than in past assessments, although they required similar assumptions regarding stock productivity. The point estimates of MSY obtained from different production models ranged from 93,000 mt to 113,000 mt. The lower limit of this range is higher than the one estimated in the 2002 assessment, probably due to the revised indices and the addition of a new index. An estimate obtained from another age-aggregated model was 114,000 mt. The inclusion of estimation uncertainty would broaden this range considerably.

These analyses estimate that the total catch was larger than the upper limit of MSY estimates for most years between 1993 and 1999, causing the stock to decline considerably, and leveling off thereafter as total catches decreased. These results also indicate that the current biomass is slightly below or above (85 – 107 percent) the biomass at MSY (Figure 3.6), and that current fishing mortality is also in the range of 73 percent to 101 percent of the level that would allow production of MSY (Table 3.8). However, indications from the most targeted and wide-ranging fishery are of a more pessimistic status than implied by these model results. Several types of age-structured analyses were conducted using the above-mentioned longline indices from the central fishing grounds and catch-at-age data converted from the available catch-at-size data. In general, the trajectories of biomass and fishing mortality rates are in accordance with the production model analyses. Model fits appeared improved over those of past assessments, apparently as a result of using a new growth curve for the calculation of catch at age.

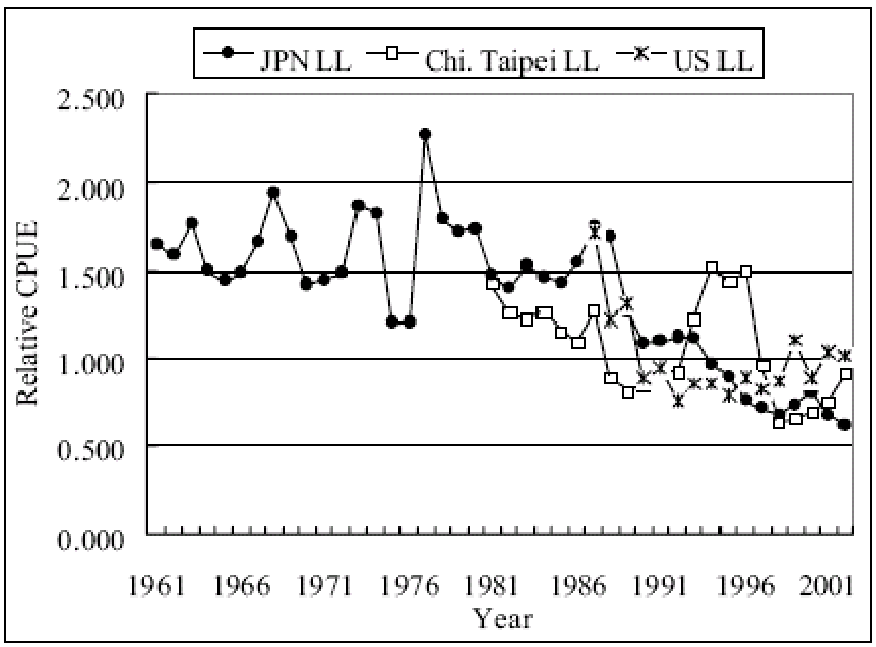

Figure 3.5 Abundance indices in numbers of BET. All ages are aggregated

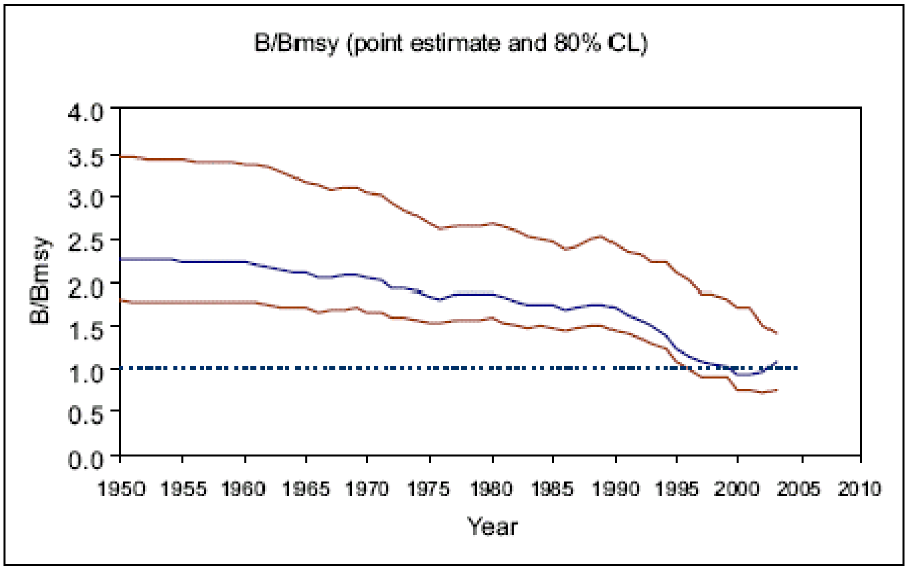

Figure 3.6 **Trajectory of the BET biomass modeled in production model analysis (middle line) bounded by upper and lower lines denoting 80 percent confidence intervals**

Table 3.8 **Summary Table for the Status of Atlantic Bigeye Tuna**

Age/size at Maturity	Age 3/~100 cm curved fork length
Spawning Sites	Tropical waters
Current Relative Biomass Level ***Minimum Stock Size Threshold***	B_{03}/B_{MSY} = 0.85 - 1.07 $0.6B_{MSY}$ (age 2+)
Current Relative Fishing Mortality Rate ***Maximum Fishing Mortality Threshold***	F_{02}/F_{MSY} = 0.73-1.01 F_{year}/F_{MSY} = 1.00
Maximum Sustainable Yield	93,000 - 114,000 mt
Current (2003) Yield	85,000 mt
Current (2003) Replacement Yield	89,000 - 103,000 mt
Outlook	Overfished; overfishing is occurring

SCRS Advice and Management Actions

Previous yield-per-recruit and spawner-per-recruit analyses highlighted the potential importance of reducing fishing mortality on small fish. However, the percentage of fish caught less than this minimum size (3.2 kg) is very high (46-62 percent of the total fish caught) since

1989. The SCRS, therefore, recommends the full implementation of the moratorium on Fish Aggregation Device (FAD) fishing by all surface fisheries in the Gulf of Guinea. This assessment indicated that the stock has declined due to the large catches made since the mid-1990s to around or below the level that produces the MSY, and that fishing mortality exceeded F_{MSY} for several years during that time period. Projections indicate that catches of more than 100,000 mt will result in continued stock decline. ICCAT should be aware that if major countries were to take the entire catch limit set under the ICCAT Recommendations and other countries were to maintain recent catch levels, then the total catch could exceed 100,000 mt. The SCRS highly recommended that catch levels of around 90,000 mt or lower be maintained at least for the near future for ICCAT to rebuild the stock.

The SCRS noted its appreciation for the effort made by ICCAT in establishing the Statistical Document Program for bigeye tuna and expressed hope that the data to be submitted to the Secretariat will be useful to improve estimates of unreported catches. The SCRS also stated its appreciation regarding the initiatives to reduce the IUU activities taken by several fishing authorities. These efforts are helpful in identifying and reducing the unreported catches in the Atlantic and will make the catch limit regulation more effective, and thus will contribute to reduce uncertainties in the bigeye stock assessment. As far as the IUU catches of BET are concerned, they are almost disappearing according to the available estimates. Nevertheless, the SCRS expressed concern that unreported catches may have been under-estimated.

SCRS evaluation of current regulations

ICCAT recommended a bigeye tuna minimum size regulation of 3.2 kg in 1980 to reinforce the same regulation for yellowfin tuna. It is clear that a large quantity of juvenile bigeye tuna smaller than 3.2 kg continues to be captured mostly from the equatorial surface fleets (baitboat and purse seine). The percentage and total number of fish smaller than the minimum size has increased since 1989 and was more than 45 percent of the total fish caught or more than six million fish thereafter, although the absolute number of undersized fish might have been reduced in some fisheries. According to previous yield-per-recruit analyses, a full implementation of this regulation could result in an increase in yield-per-recruit by almost 20 percent at F_{max}.

The moratorium on FAD fishing by surface gears in the Gulf of Guinea has been implemented by ICCAT since 1999. The full evaluation of this program is somewhat hindered by the multi-species nature of surface fisheries and the existence of other types of fisheries. The updated analysis indicated that this regulation appeared effective in reducing mortality for juvenile bigeye and increasing the spawning biomass per recruit. The full compliance with this regulation by all surface fisheries will greatly increase the effectiveness of this regulation. The SCRS was pleased to note that Ghana implemented this moratorium in the 2003/2004 season (SCRS/2004/027).

Limiting the annual catch to the average catch in two years of 1991 and 1992 entered into force for the major fishing countries whose 1999 catch reported to the 2000 SCRS was larger than 2,100 mt. The 2003 total reported catch for the major countries and fishing entities to which the catch limit applies (EC-Spain, EC-France, EC-Portugal, Japan, Ghana, China and Chinese Taipei) was 67,700 mt and 18,800 mt lower than the total catch limit (86,500 mt). As a whole, the total catch in 2003 for all countries is about 11,300 mt lower than the average total catch of 1991 and 1992.

SCRS Outlook

Stock projections were conducted based on the production model results, assuming a catch of 75,480 mt in 2003 and varying levels of constant catch thereafter. The projection results suggest that the biomass of the stock will likely decline further with constant catches of 100,000 mt or more. On average, increases in biomass are expected with catches of 90,000 mt or less. However, due to uncertainty, there is a non-negligible probability of further decline of the stock with a constant future catch of 100,000 mt or more.

3.2.3.2 Atlantic Yellowfin Tuna

Life History/Biology

Yellowfin tuna is a cosmopolitan species distributed mainly in the tropical and subtropical oceanic waters of the three oceans, where they form large schools. The sizes exploited range from 30 cm to 170 cm Fork Length (FL). Smaller fish (juveniles) form mixed schools with skipjack and juvenile bigeye, and are mainly limited to surface waters, while larger fish are found in surface and sub-surface waters. The majority of the long-term recoveries of tagged fish have been tagged in the West Atlantic and recovered in the East Atlantic, where several recaptures are recorded each year.

Sexual maturity occurs at about 100 cm FL. Reproductive output among females has been shown to be highly variable, although the extent of this is unknown. The main spawning ground is the equatorial zone of the Gulf of Guinea, with spawning occurring from January to April. Juveniles are generally found in coastal waters off Africa. In addition, spawning occurs in the Gulf of Mexico, in the southeastern Caribbean Sea, and off Cape Verde, although the relative importance of these spawning grounds is unknown.

Although such separate spawning areas might imply separate stocks or substantial heterogeneity in the distribution of yellowfin tuna, a single stock for the entire Atlantic is assumed as a working hypothesis (Atlantic Yellowfin Working Group, Tenerife, 1993), taking into account the transatlantic migration (from west to east) indicated by tagging, a 40-year time series of longline catch data that indicates yellowfin are distributed continuously throughout the entire tropical Atlantic Ocean, and other information (e.g., time-area size frequency distributions and locations of fishing grounds).

Growth patterns are variable with size, being relatively slow initially, and increasing at the time the fish leave the nursery grounds. Males are predominant in the catches of larger sized fish. Natural mortality is assumed to be higher for juveniles than for adults. This assumption is supported by tagging studies for Pacific yellowfin. New data on biology and catches obtained from the Brazilian longline fishery were presented in 2004.

Recent Updates on United States Yellowfin Tuna Research

During 2003, several collaborative studies were conducted by U.S. scientists in cooperation with scientists from other countries. Cooperative research by the U.S. NOAA Fisheries and Mexico continued and resulted in a joint analysis of United States and Mexican longline catch-per-unit-effort (CPUE) of yellowfin in the Gulf of Mexico (SCRS/2003/061). Cooperative research plans include further development of abundance indices for sharks and other tunas, as well as the refinement of the yellowfin tuna indices as additional data become available. Cooperative research on yellowfin tuna abundance indices, catch-at-age, and life-history studies is also continuing with Venezuelan scientists. One document on Venezuelan longline catch rate patterns resulted from this collaboration in 2003 (SCRS/2003/054) and additional working papers based on this collaboration are expected in future years.

U.S. scientists participated in the 2003 ICCAT Yellowfin Tuna Stock Assessment (Merida, Mexico, July 21-26, 2003), and submitted several other working papers. Two relative abundance patterns (one for the Gulf of Mexico and another for the Atlantic regions fished by U.S. longline vessels) based on U.S. pelagic longline data from 1981 to 2002 were presented in SCRS/2003/060. Additionally, a relative abundance index based on data collected through the Large Pelagic Survey from the Virginia-Massachusetts rod and reel fishery (1986-2002) was presented in SCRS/2003/062.

New information from a genetic study was presented in SCRS/2003/063. The phylogenetic analysis conducted on samples from the Gulf of Mexico and Gulf of Guinea by researchers at Texas A&M, Galveston, revealed the presence of siblings in several sampling tows for juvenile tuna. Given the high level of genetic diversity at both the mitochondrial and microsatellite loci, the probability of such sampling is extremely low and can best be explained by the unequal reproductive output of certain females. Increases in vulnerability of juvenile yellowfin tuna could be of concern in terms of genetic integrity of the population if levels of reproductive variance are confirmed to be large.

U.S. scientists also worked in cooperation with outside experts to study alternatives for improving the collection of catch statistics in the U.S. recreational yellowfin tuna fishery. A U.S. scientist attended the Tuna Statistics Meeting (Tema, Ghana, February 2-5, 2003) and collaborated with scientists from other nations (including Ghana) in the design of a pilot study to develop a sampling scheme for Ghana's tropical tuna fishery.

SCRS Recent Stock Assessment Results

A full assessment was conducted for yellowfin tuna in 2003 applying various age-structured and production models to the available catch data through 2001. Unfortunately, at the time of the assessment meeting, only 19 percent of the 2002 catch had been reported (calculated relative to the catch reports available at the time of the SCRS Plenary). The results from all models were considered in the formulation of the SCRS's advice.

The variability in overall catch-at-age is primarily due to variability in catches of ages zero and one (note that the catches in numbers of ages zero and especially one were particularly high during the period 1998-2001). Both equilibrium and non-equilibrium production models were examined in 2003 and the results are summarized in Table 3.9. The estimate of MSY based upon the equilibrium models ranged from 151,300 to 161,300 t; the estimates of F_{2001}/F_{MSY} ranged from 0.87 to 1.29. The point estimate of MSY based upon the non-equilibrium models ranged from 147,200-148,300 mt. The point estimates for F_{2001}/F_{MSY} ranged from 1.02 to 1.46. The main differences in the results were related to the assumptions of each model. The SCRS was unable to estimate the level of uncertainty associated with these point estimates. An age-structured virtual population analysis (VPA) was made using eight indices of abundance. The results from this model were more comparable to production model results than in previous assessments, owing in part to a greater consistency between several of the indices used. The VPA results compare well to the trends in fishing mortality and biomass estimated from production models. The VPA estimates that the spawning biomass (Figure 3.7) and the levels of fishing mortality (Figure 3.8) in recent years have been very close to MSY levels. The estimate of MSY derived from these analyses was 148,200 mt.

In summary, the age-structured and production model analyses implied that although the 2001 catches of 159,000 mt were slightly higher than MSY levels, effective effort may have been either slightly below or above (up to 46 percent) the MSY level, depending on the assumptions. Consistent with these model results, yield-per-recruit analyses also indicated that 2001 fishing mortality rates could have been either above or about the level which could produce MSY. Yield-per-recruit analyses further indicated that an increase in effort is likely to decrease the yield-per-recruit, while reductions in fishing mortality on fish less than 3.2 kg could result in substantial gains in yield-per-recruit and modest gains in spawning biomass-per-recruit.

Table 3.9 Summary Table for the Status of Atlantic Yellowfin Tuna

Age/size at Maturity	Age 3/~110 cm curved fork length
Spawning Sites	Tropical waters
Relative Biomass Level ***Minimum Stock Size Threshold***	B_{01}/B_{MSY} = 0.73 - 1.10 $0.5B_{MSY}$ (age 2+)
Relative Fishing Mortality Rate ***Maximum Fishing Mortality Threshold***	F_{01}/F_{MSY} = 0.87 - 1.46 F_{year}/F_{MSY} = 1.00
Maximum Sustainable Yield	147,200 - 161,300 mt
Current (2003) Yield	124,000 mt
Replacement Yield (2001)	May be somewhat below the 2001 yield (159,000 mt)
Outlook	Approaching an overfished condition

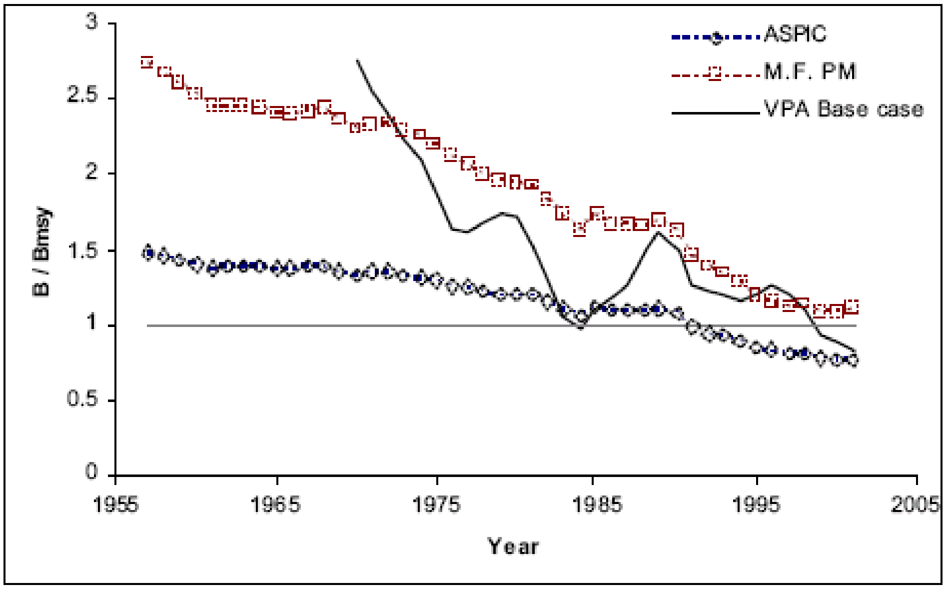

Figure 3.7 **Comparison of relative biomass trends calculated using VPA and non-equilibrium production models.**

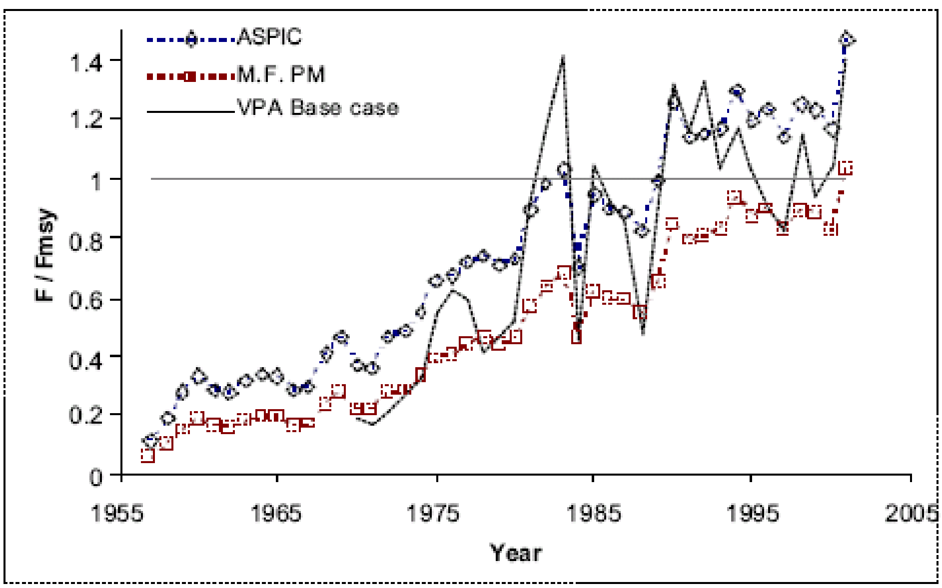

Figure 3.8 Comparison of relative fishing mortality trends calculated using VPA and non-equilibrium production models.

SCRS Advice and Management Recommendations

Estimated catches of yellowfin tuna have averaged 141,000 mt over the past three years. This average falls near the lower estimate of the range of MSY from the age-structured and production model analyses conducted during the 2003 assessment. The SCRS considers that the yield of 159,000 mt in 2001 is likely somewhat above the replacement yield, and that levels of fishing effort and fishing mortality may have been near MSY. Total catches since 2001 have been declining, but without a new assessment it is not clear whether or not this reflects decreases in fishing effort and fishing mortality. Therefore the SCRS reaffirms its support for ICCAT's 1993 recommendation "that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna, over the level observed in 1992." During the 2003 assessment, the SCRS's estimates of effective fishing effort for recent years fell near the estimate for 1992.

A number of management measures have been implemented in the United States, consistent with this advice, to prevent overfishing. In 1999, NOAA Fisheries implemented limited access in the pelagic longline fishery for Atlantic tunas, as well as a recreational retention limit for yellowfin tuna. The United States has also implemented a larger minimum size than that required by ICCAT. This species is listed as approaching an overfished condition by the United States.

The SCRS also continues to recommend that effective measures be found to reduce fishing mortality of small yellowfin, based on previous results of yield-per-recruit analysis. In 2003, the SCRS evaluated the effects of the moratorium on fishing on floating objects (and other measures to reduce catches of small fish) begun in late 1997, but there were insufficient data to fully evaluate the impact on yellowfin tuna. In general, the approach was intended to benefit bigeye tuna and is not expected to reduce the mortality of juvenile yellowfin tuna. In fact, the fishing mortality on juvenile yellowfin tuna appears to have increased substantially during the moratorium years, although it is unclear that this is related to the moratorium.

SCRS Evaluation of Management Measures

In 1973, ICCAT adopted a regulation that imposed a minimum size of 3.2 kg for yellowfin tuna, with a 15 percent tolerance in the number of undersized fish per landing. This regulation has not been adhered to internationally, as the proportion of landings of yellowfin tuna less than 3.2 kg has been far in excess of 15 percent per year for the purse seine and baitboat fisheries. Based on the catch species composition and catch-at-size data available during the 2003 assessment, yearly catches in number ranged between 54 percent and 72 percent undersized yellowfin tuna by purse seiners, from 63 percent to 82 percent undersized fish for baitboats over the period 1997-2001. Landings of undersized fish occur primarily in the equatorial fisheries. Unfortunately, it is difficult to realize substantial reductions in catches of undersized fish in these fisheries because small yellowfin tuna are mostly associated with skipjack tuna, especially when fishing occurs on floating objects; thus it is difficult to avoid catching small yellowfin when catching skipjack, the latter being an important component of eastern Atlantic (equatorial) purse seine fleet catches. The SCRS plans further investigations of the utility of minimum size regulations and alternative measures to reduce juvenile mortality in this multi-species fishery.

In 1993, ICCAT recommended "that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna, over the level observed in 1992." As measured by fishing mortality estimates from the 2003 assessment, effective effort in 2001 appeared to be approaching or exceeding the 1992 levels.

SCRS Outlook

Since reported yellowfin tuna landings in 2001 appeared to be somewhat above the MSY level estimated during the 2003 assessment and fishing effort and fishing mortality may have been in excess of the levels associated with MSY, it is important to ensure that effective effort does not increase beyond the 2001 level. Projections indicate that stock biomass is likely to decrease if fishing mortality increases to the level estimated for 1992, which is currently being approached or exceeded. Thus the possibility that the fishing power of the purse seiners and other fleets may further increase, even if the total capacity of the fleet were to remain constant, is also cause for concern. It should be noted that the current estimates of total yellowfin landings in 2002 and 2003, which were not available at the time of the assessment, are 139,000 mt and 124,000 t, respectively.

3.2.3.3 Atlantic Albacore Tuna

Life History / Species Biology

Albacore is a temperate tuna widely distributed throughout the Atlantic Ocean and Mediterranean Sea. For assessment purposes, the existence of three stocks is assumed based on available biological information: northern and southern Atlantic stocks (separated at 5ºN), and a Mediterranean stock. Albacore spawning areas in the Atlantic are found in subtropical western areas of both hemispheres and throughout the Mediterranean Sea. Spawning takes place during austral and boreal spring-summer. Sexual maturity is considered to occur at about 90 cm FL (age five) in the Atlantic, and at smaller size (62 cm, age two) in the Mediterranean. Until this age they are mainly found in surface waters, where they are targeted by surface gears. Some adult albacore are also caught using surface gears but, as a result of their deeper distribution, they are mainly caught using longlines. Young albacore tuna are also caught by longline in temperate waters.

Recent Updates on United States Albacore Tuna Research

In 2003, an analysis of U.S. longline CPUE (SCRS/03/086) was prepared in support of the ICCAT assessment of northern and southern Atlantic albacore tuna.

SCRS Stock Assessment Results

The last assessment of the North stock was conducted in 2000 (1975-1999) and that of the South stock in 2003; no assessment of the Mediterranean stock has ever been carried out. To coordinate the timing of the assessments of northern and southern albacore tuna, the stock assessment for northern albacore was postponed at the 2004 ICCAT meeting from 2006 to 2007 (note the management measures for northern albacore expire at the end of 2006). The SCRS noted the considerable uncertainty that continues to remain in the catch-at-size data for the North and South stocks, and the profound impact this has had on attempts to complete a satisfactory assessment of northern albacore tuna.

North Atlantic

The SCRS carried out an initial analysis of the state of the northern stock using a model essentially the same as that used in previous assessments. However, revisions to catch-at-size data, provided to the Secretariat during and shortly before the assessment, altered the historical data series. The impacts of these revisions are such that the SCRS concluded that it was not appropriate to proceed with an assessment based on the 2003 catch-at-age. Consequently, the SCRS's opinion of the current state of the northern albacore tuna stock is based primarily on the last assessment conducted in 2000 together with observations of CPUE and catch data provided to the SCRS since then. The results, obtained in 2000, showed consistency with those from previous assessments (Table 3.10).

The SCRS noted that CPUE trends have varied since the last assessment in 2000, and in particular differed between those representative of the surface fleets (Spain Troll age two and Spain Troll age three) and those of the longline fleets of Japan, Chinese Taipei and the United States. The Spanish age two troll series, while displaying an upward trend since the last assessment, none the less declines over the last ten years. For the Spanish age three troll series the trend in the years since the last assessment is down, however, the trend for the remainder of the last decade is generally unchanged. For the longline fleets, the trend in CPUE indices is either upwards (Chinese Taipei and United States) or unchanged (Japan) in the period since the last assessment. However, variability associated with all of these catch rate estimates prevented definitive conclusions about recent trends of albacore catch rates.

Equilibrium yield analyses, carried out in 2000 and made on the basis of an estimated relationship between stock size and recruitment, indicate that spawning stock biomass was about 30 percent below that associated with MSY. However, the SCRS noted considerable uncertainties in these estimates of current biomass relative to the biomass associated with MSY (B_{MSY}), owing to the difficulty of estimating how recruitment might decline below historical levels of stock biomass. Thus, the SCRS concluded that the northern stock is probably below B_{MSY}, but the possibility that it is above it should not be dismissed (Figure 3.9). However, equilibrium yield-per-recruit analyses made by the SCRS in 2000 indicate that the northern stock is not being growth overfished ($F < Fmax$).

South Atlantic

In 2003, an age-structured production model, using the same specifications as in 2000, was used to provide a Base Case assessment for South Atlantic albacore. Results were similar to those obtained in 2000, but the confidence intervals were substantially narrower in 2003 than in 2000 (Table 3.11). In part, this may be a consequence of additional data now available, but the underlying causes need to be investigated further. The estimated MSY and replacement yield from the 2003 Base Case (30,915 mt and 29,256 mt, respectively) were similar to those estimated in 2000 (30,274 mt and 29,165 mt). In both 2003 and 2000 the fishing mortality rate was estimated to be about 60 percent of F_{MSY}. Spawning stock biomass has declined substantially relative to the late 1980s, but the decline appears to have leveled off in recent years and the estimate for 2002 remains well above the spawning stock biomass corresponding to MSY.

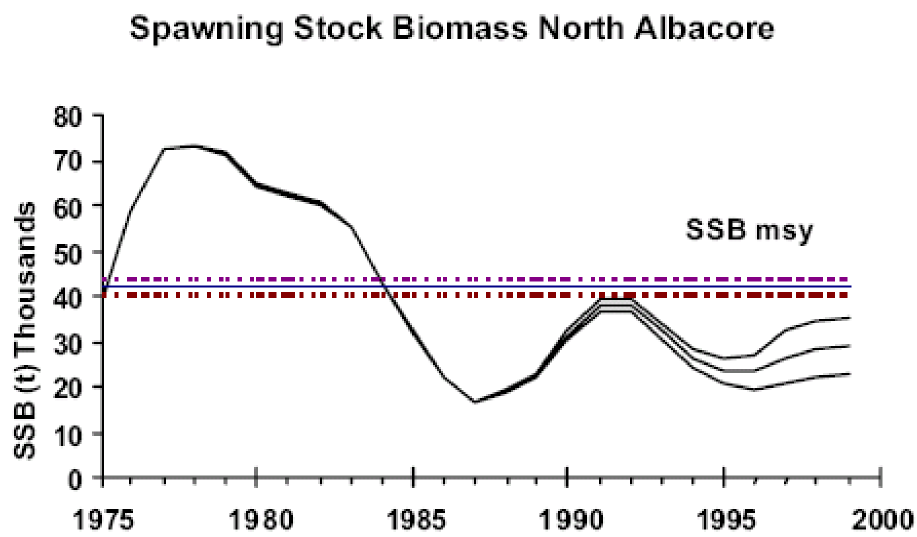

Figure 3.9 North Atlantic albacore spawning stock biomass and recruits with 80 percent confidence limits.

Table 3.10 Summary Table for the Status of North Atlantic Albacore Tuna

Age/size at Maturity	Age 5/~90 cm curved fork length
Spawning Sites	Subtropical western waters of the northern Hemisphere
Current Relative Biomass Level ***Minimum Stock Size Threshold***	B_{99}/B_{MSY} = 0.68 (0.52 - 0.86) *0.7B_{MSY}*
Current Relative Fishing Mortality Rate ***Maximum Fishing Mortality Threshold***	F_{99}/F_{MSY} = 1.10 (0.99 - 1.30) F_{year}/F_{MSY} = 1.00
Maximum Sustainable Yield	32,600 mt [32,400 - 33,100 mt]
Current (2003) Yield	25,516 mt
Current (2003) Replacement Yield	not estimated
Outlook	Overfished; overfishing is occurring

Table 3.11 Summary Table for the Status of South Atlantic Albacore Tuna

Age/size at Maturity	Age 5/~90 cm curved fork length
Spawning Sites	Subtropical western waters of the southern Hemisphere
Current Relative Biomass Level	B_{02}/B_{MSY} = 1.66 (0.74 - 1.81)
Current Relative Fishing Mortality Rate	F_{02}/F_{MSY} = 0.62 (0.46 - 1.48)

Maximum Sustainable Yield	30,915 mt (26,333 - 30,915)
Current (2003) Yield	27,811 mt
Current (2003) Replacement Yield	29,256 mt (24,530 - 32,277)
Outlook	Not overfished; overfishing is not occurring

SCRS Advice and Management Recommendations

North Atlantic

No assessment of the North Atlantic albacore stock was possible in 2003 because of uncertainties associated with the catch-at-age. In 2000, the SCRS recommended that in order to maintain a stable Spawning Stock Biomass in the near future the catch should not exceed 34,500 mt (the 1999 catch level) in the period 2001-2002. The SCRS further noted that should ICCAT wish the Spawning Stock Biomass to begin increasing towards the level estimated to support MSY, then catches in 2001 and 2002 should not exceed 31,000 mt. In 2003, the SCRS reiterated its previous advice and extended it until the next assessment.

South Atlantic

Recent catches of albacore tuna in the South Atlantic are in the vicinity of the current and recent estimates of MSY (30,915 mt). Both the 2000 and the 2003 albacore assessments estimated that the stock is above B_{MSY} (2003 estimates $B_{current}/B_{MSY} = 1.66$, $F_{current}/F_{MSY} = 0.62$). The SCRS recommends that in order to maintain SSB in the near future the catch should not exceed 31,000 mt for the next three to five years.

Mediterranean

There are no ICCAT management recommendations for the Mediterranean stock. However, the SCRS recommended to ICCAT that reliable data be provided on catch, effort and size for Mediterranean albacore tuna. The SCRS also recommended that an effort be made to recover historical data. Improvements to these basic inputs are essential before a stock assessment of Mediterranean albacore tuna can be attempted.

SCRS Evaluation of Management Recommendations

North Atlantic

Since 2001, ICCAT established a TAC of 34,500 mt for this stock. In 2003, ICCAT extended this TAC up to 2006. The SCRS noted that reported catches for 2001, 2002, and 2003 have been below the TAC. A 1998 recommendation that limits fishing capacity to the average of 1993-1995 also remains in force. The SCRS is unable to assess whether or not these recommendations have had a direct effect on the stock.

South Atlantic

Since 1999, ICCAT established the TAC for this stock (in 2001-2003 the TAC has been set to 29,200 mt). In 2003, ICCAT extended this TAC to 2004. The SCRS noted that reported catches have not exceeded the TAC in 2003. Also the total catch by Chinese Taipei, South Africa, Brazil and Namibia (26,620 mt) did not exceed the 27,500 mt catch limit of parties actively fishing for southern albacore, as stipulated by resolution 02-06. It should be noted that sufficient capacity exists within the fisheries to exceed the TAC as was done in 2000, 2001, and 2002. Japan adhered to its by-catch limit of four percent of the total catch of bigeye tuna in the Atlantic Ocean. However, the SCRS is unable to assess whether or not these catch limits have had a direct effect on the stock.

SCRS Outlook

North Atlantic

In terms of yield per recruit, the assessment carried out in 2000 indicates that the fishing intensity is at, or below, the fully exploited level. Concerning MSY-related quantities, the SCRS recalls that they are highly dependent on the specific choice of stock-recruitment relationship. The SCRS believed that using a particular form of stock-recruitment relationship that allows recruitment to increase with spawning stock size provided a reasonable view of reality. This hypothesis together with the results of the assessment conducted in 2000 indicate that the spawning stock biomass (B_{1999}) for the northern stock (29,000 mt) was about 30 percent below the biomass associated with MSY (42,300 mt) and that current F (2000) was about 10 percent above F_{MSY}. However, an alternative model allowing for more stable recruitment values in the range of observed SSB values would provide a lower estimate of SSB at MSY, below the current value.

South Atlantic

Catches of albacore in the South Atlantic in 2001 and 2002 were above replacement yield, and were below estimates of MSY in 2003. Nevertheless, both the 2000 and 2003 albacore assessments estimated that the stock is above B_{MSY}. There is now greater confidence in these estimates of MSY and therefore there is justification to base a TAC recommendation on MSY instead of replacement yield estimates from the model as in 2000. This results from the SCRS's view that current stock status is somewhat above B_{MSY} and catch of this level, on average, would be expected to reduce the stock further towards B_{MSY}. Recent estimates of high recruitment could allow for some temporary increase in adult stock abundance under a 31,000 mt catch, but this result is uncertain.

Mediterranean

Given the lack of an assessment, the implications of the rapid increase in landings in unknown.

3.2.3.4 Atlantic Skipjack Tuna

Life History / Species Biology

Skipjack tuna is a cosmopolitan species forming schools in the tropical and subtropical waters of the three oceans. Skipjack spawn opportunistically throughout the year in vast areas of the Atlantic Ocean. The size at first maturity is about 45 cm for males and about 42 cm for females in the East Atlantic, while in the West Atlantic sexual maturity is reached at around 51 cm for females and 52 cm for males. Skipjack growth is seasonal, with substantial differences according to the latitude. There remains considerable uncertainty about the variability of the growth parameters between areas. It is, therefore, a priority to gain more knowledge on the growth schemes of this species.

Skipjack is a species that is often associated with floating objects, both natural objects or fish aggregating devices (FADs) that have been used extensively since the early 1990s by purse seiners and baitboats (during the 1991 to 2003 period, about 55 percent of skipjack were caught with FADs). The concept of viscosity (low interchange between areas) could be appropriate for the skipjack stocks. A stock qualified as "viscous"can have the following characteristics:

- It may be possible to observe a decline in abundance for a local segment of the stock;
- Overfishing of that component may have little, if any, repercussion on the abundance of the stock in other areas; and,
- Only a minor proportion of fish may make large-scale migrations.

The increasing use of FADs could have changed the behavior of the schools and the migrations of this species. It is noted that, in effect, the free schools of mixed species were much more common prior to the introduction of FADs than now. These possible behavioral changes ("ecological trap" concept) may lead to changes in the biological parameters of this species as a result of the changes in the availability of food, predation and fishing mortality. Skipjack caught with FADs are usually found associated with other species. The typical catch with floating objects is comprised of about 63 percent skipjack, 20 percent small yellowfin, and 17 percent juvenile bigeye and other small tunas. A comparison of size distributions of skipjack between periods prior to and after the introduction of FADs show that, in the East Atlantic, there has been an increase in the proportion of small fish in the catches, as well as a decline in the total catch in recent years in some areas.

The SCRS reviewed the current stock structure hypothesis that consists of two separate management units, one in the East Atlantic and another in the West Atlantic, separated at 30^{o}W. The boundary of 30^{o}W was established when the fisheries were coastal, whereas in recent years the East Atlantic fisheries have extended towards the west, surpassing this longitude, and showing the presence of juvenile skipjack tuna along the Equator, west of 30^{o}W, following the drift of the FADs. This implies the potential existence of a certain degree of mixing. Nevertheless, taking into account the large distances between the east and west areas of the ocean, various environmental constraints, the existence of a spawning area in the East Atlantic as well as in the northern zone of the Brazilian fishery, and the lack of additional evidence (e.g. transatlantic migrations in the tagging data), the hypothesis of separate East and West Atlantic stock is maintained as the most plausible alternative. On the other hand, in taking into account the biological characteristics of the species and the different fishing areas, smaller management units could be considered.

SCRS Recent Stock Assessment Results

The last assessment on Atlantic skipjack tuna was carried out in 1999 (Table 3.12). The state of the Atlantic skipjack stock(s), as well as the stocks of this species in other oceans, show a series of characteristics that make it extremely difficult to conduct an assessment using current models. Among these characteristics, the most noteworthy are:

- The continuous recruitment throughout the year, but heterogeneous in time and area, making it impossible to identify and monitor the individual cohorts;
- Apparent variable growth between areas, which makes it difficult to interpret the size distributions and their conversion to ages; and,
- Exploitation by many and diverse fishing fleets (baitboat, purse seine), having distinct and changing catchabilities, which makes it difficult to estimate the effective effort exerted on the stock in the East Atlantic.

For these reasons, no standardized assessments have been able to be carried out on the Atlantic skipjack stocks. Notwithstanding, some estimates were made, by means of different indices of the fishery and some exploratory runs were conducted using a new development of the generalized production model.

<u>Eastern stock</u>

Standardized catch rates are not available. However, an analysis was made, for the 1969-2002 period, of the different indices of the purse seine fishery that could provide valuable information on the state of the stock. For the majority of the indices, the trends were divergent, depending on the area, which may indicate the viscosity of the skipjack stock, with limited mixing rates between areas. Because of the difficulties in assigning ages to the skipjack catches, the estimates of the values of natural mortality by age and obtaining indices of abundance (especially for the eastern stock), no catch-by-age matrices were developed and, consequently, no analytical assessment methods were applied.

<u>Western stock</u>

Standardized abundance indices up to 1998 were available from the Brazilian baitboat fishery and the Venezuelan purse seine fishery, and in both cases the indices seem to show a stable stock status. Uncertainties in the underlying assumptions for the analyses prevent the extracting of definitive conclusions regarding the state of the stock. However, the results suggest that there may be over-exploitation within the FAD fisheries, although it was not clear to what extent this applies to the entire stock. The SCRS could not determine if the effect of the FADs on the resource is only at the local level or if it had a broader impact, affecting the biology and behavior of the species. Under this supposition, maintaining high concentrations of FADs would reduce the productivity of the overall stock. However, since 1997, and due to the implementation of a voluntary Protection Plan for Atlantic tunas, agreed upon by the Spanish and French boat owners in the usual areas of fishing with objects, which later resulted in a

Commission regulation on the surface fleets that practice this type of fishing, there has been a reduction in the skipjack tuna catches associated with FADs. Maintaining this closure could have a positive effect on the resource.

Table 3.12 Summary Table for the Status of West Atlantic Skipjack Tuna

Age/size at Maturity	Age 1 to 2/~50 cm curved fork length
Spawning Sites	Opportunistically in tropical and subtropical waters
Current Relative Biomass Level ***Minimum Stock Size Threshold***	*Unknown* *Unknown*
Current Relative Fishing Mortality Rate F_{2003}/F_{MSY} ***Maximum Fishing Mortality Threshold***	*Unknown* $F_{year}/F_{MSY} = 1.00$
Maximum Sustainable Yield	*Not Estimated*
Current (2003) Yield	24,053 mt
Current Replacement Yield	*Not Estimated*
Outlook	*Unknown*

SCRS Advice and Management Recommendations

There is currently no specific regulation in effect for skipjack tuna. However, the French and Spanish boat owners voluntarily applied a moratorium for the period of November 1997 through January 1998, and November 1998 through January 1999. The moratorium, which was implemented in order to protect juvenile bigeye tuna, has had an influence on the skipjack catches made with FADs. Since 1999, a similar moratorium was applied, recommended by ICCAT, and is still in force. The average purse seine skipjack catches during the months from November to January by the fleets that applied the moratoria were reduced by 64 percent compared to the average catches between the 1993-1996 period (before the moratoria) and those corresponding to the 1998-2002 period. For the entire period in which the moratoria have been in effect (1998-2002), the average annual skipjack catches by the purse seine fleets that applied the moratoria decreased by 41 percent, which is equivalent to 42,000 mt per year. However, this decrease is likely a combined result of the decrease in effort and the moratorium impact; this is supported by the observation that the mean annual catch by boats has decreased only 18 percent between the two periods.

3.2.4 Atlantic Billfish

3.2.4.1 Blue Marlin

Life History/Species Biology

Blue marlin (*Makaira nigricans*) range from Canada to Argentina in the western Atlantic, and from the Azores to South Africa in the eastern Atlantic. Blue marlin are large apex predators with an average weight of 100-175 kg (220-385 lb). Female blue marlin grow faster and reach a larger maximum size than males. Young blue marlin are one of the fastest growing teleosts, reaching 30-45 kg (66-99 lb) after the first year. The maximum growth rate of these fish is 1.66 cm/day (0.65 inches/day) which occurs at 39 cm LJFL (15.3 inches) (NOAA Fsiheries, 1999). Life expectancy for blue marlin is between 20-30 years based on analysis of dorsal spines.

Estimates of natural mortality rates for billfish would be expected to be relatively low, generally in the range of 0.15 to 0.30, based on body size, behavior and physiology (N, 1999). Sagitta otolith weight is suggested to be proportional to age, indicating that both sexes are equally long-lived, based on the maximum otolith weight observed for each sex. Additionally, predicting age from length or weight is imprecise due to many age classes in the fishery.

Blue marlin have an extensive geographical range, migratory patterns that include trans-Atlantic as well as trans-equatorial movements, and are generally considered to be a rare and solitary species relative to the schooling Scombrids (tunas). Graves et al. (2002) captured eight blue marlin with recreational fishing gear and then implanted fish with satellite pop-up tags. These fish moved 74-248 km (40-134 nautical miles (nm)) over five days, with a mean displacement of 166 km (90 nm). Fish spent the vast majority of their time in waters with temperatures between 22 and 26 °C (71–78 °F) and at depths less than 10 m. The maximum time at liberty recorded of a tagged individual was 4,024 days (about 11 years) for a blue marlin that was estimated to weigh 29.5 kg (65 lb) at the time of release. Junior et al. (2004) found the depth of capture for blue marlin, with pelagic longline gear ranged from 50-190 m (164-623 feet), with most individuals captured at 90 m (295 feet).

The Cooperative Tagging Center (CTC) program has tagged and recaptured over 147 blue marlin and found that these fish moved an average of 903 km (488 nm) (NMFS, 1999). Some individuals have exhibited extended movement patterns, and strong seasonal patterns of movement of individuals between the United States and Venezuela are evident. A blue marlin released off Delaware and recovered off the island of Mauritius in the Indian Ocean represents the only documented inter-ocean movement of a highly migratory species in the history of the CTC. The minimum straight-line distance traveled for this fish was 16,853 km (9,100 nm) in 1,108 days-at-large (roughly three years).

Adults are found primarily in the tropics within the 24°C (75 °F) isotherm, and make seasonal movements related to changes in sea surface temperatures. In the northern Gulf of Mexico they are associated with the Loop Current, and are found in blue waters of low productivity rather than in more productive green waters. Off Puerto Rico, the largest numbers of blue marlin are caught during August, September, and October. Equal numbers of both sexes occur off northwest Puerto Rico in July and August, with larger males found there in May and smaller males in September. Very large individuals, probably females, are found off the southern coast of Jamaica in the summer and off the northern coast in winter, where males are caught in December and January.

There has not been an Atlantic wide survey of spawning activity for blue marlin, however, these fish generally reproduce between the ages of two and four, at 220-230 cm (86-90 inches) in length, and weigh approximately 120 kg (264 lb). Female blue marlin begin to mature at approximately 47-60 kg (104-134 lb), while males mature at smaller weights, generally from 35-44 kg (77-97 lb). There are likely two separate spawning events that occur at different times in the North and South Atlantic. South Atlantic spawning takes place between February and March (NMFS, 1999). Peak spawning activity in the North Atlantic Ocean occurs between July and October, with females capable of spawning up to four times per reproductive season (de Sylva and Breder, 1997).

During the spawning season, blue marlin release between one and eleven million small (1-2 mm), transparent pelagic planktonic eggs. The number of eggs has been correlated to interspecific sizes among billfish and the size of individuals within the same species. Ovaries from a 147 kg (324 lb) female blue marlin from the northwest Atlantic Ocean were estimated to contain 10.9 million eggs, while ovaries of a 125 kg (275 lb) female were estimated to contain seven million eggs. Males are capable of spawning at any time.

Blue marlin are generalist predators feeding primarily on epipelagic fish and cephalopods in coastal and oceanic waters, however, mesopelagic fish and crustaceans associated with rocky, sandy, and reef bottoms are also important components of the diet. Feeding in mesopelagic areas probably takes place at night (Rosas-Alayola et al., 2002). Diet studies of blue marlin off the northeastern coast of Brazil indicate that oceanic pomfret (*Brama brama*) and squid (*Ornithoteuthis antillarum*) were the main prey items and present in at least 50 percent of stomachs. Other important prey species vary by location and include dolphin fishes, bullet tuna (*Auxis. spp*) around the Bahamas, Puerto Rico, and Jamaica, and dolphin fishes and scombrids in the Gulf of Mexico. Stomach contents have also included deep-sea fishes such as chiasmodontids.

Constant ingestion of small quantities of food is necessary. Blue marlin have relatively small stomachs, reducing the proportion of the body allocated for visceral mass, and allocating more volume to musculature for swimming speed and endurance (Junior et al., 2004). In the Pacific Ocean, changes in the diet observed are related more with abundance and distribution of prey than preferences in food items, with *Auxis spp*. (bullet and frigate tunas) well represented in all locations. Predators of blue marlin are relatively unknown. Sharks will attack hooked blue marlin, but it is not known if they attach free-swimming, healthy individuals.

Effect of ICCAT Management Regulations

Since 1995, blue marlin have been managed under a single stock hypothesis because of tagging data and mitochondrial DNA evidence that are consistent with one Atlantic-wide stock. The participants in this fishery are varied. Most landings of blue marlin are incidental to offshore longline fisheries targeting tuna and/or swordfish near the surface. However, significant bycatch landings are also made using gear intended to fish deeper in the water column. The United States, Brazil, Venezuela, and Bahamas have significant, directed recreational fisheries for blue marlin (SCRS, 2004). Purse-seiners incidentally catch blue marlin. These harvests are more significant in the tropics where nets are set on floating Fish Aggregation Devices (FADs), than in the European Union (EU) where blue marlin comprise only 0.021percent of the total tuna catches, and less than 10 percent of the total billfish catches reported. The temporary ban on FADs adopted by the EU produced a 300-400 mt ww (661,386 – 881,849 lb) decrease in incidental catches of marlins (Gaertner et al., 2002).

ICCAT Recommendation 97-09 required Contracting Parties to reduce, starting in 1998, blue marlin and white marlin landings by at least 25 percent for each species from 1996 landings, by the end of 1999. Recommendations 00-13, 01-10, and 02-13 imposed or extended additional catch restrictions for blue marlin. These included limiting the annual amount of blue marlin that can be harvested by pelagic longline and purse seine vessels and retained for landing to no more than 50 percent of the 1996 or 1999 landing levels, whichever is greater, as well as requiring that all blue marlin and white marlin brought to pelagic longline and purse seine vessels alive be released in a manner that maximizes their survival. The live release provision does not apply to marlins that are dead when brought along the side of the vessel or that are not sold or entered into commerce (SCRS, 2004). In addition, these recommendations limited recreational landings in the United States to 250 blue and white marlin combined, on an annual basis. Also in 2000, ICCAT recommended that a blue marlin minimum size be established for recreational fisheries (251 cm (98.8 inches) LJFL). In November 2004, ICCAT extended phase one of the ICCAT mortality reduction plan, as established and modified by recommendations 00-13, 01-10, 02-13, through 2006 and postponed the next scheduled assessment of Atlantic blue marlin until 2006. The SCRS noted that it does not expect to have enough new information to provide an assessment of these recent regulations until 2006.

In the United States, blue marlin are managed exclusively for recreational fisheries. This fishery is subject to the ICCAT imposed 250-fish limit for both blue and white marlin combined, annually. There is also a domestic minimum size of 251 cm (99 inches) and 167 cm (66 inches) inches for blue and white marlin, respectively. In 2003, 131 blue and white marlin were reported landed in tournaments (108 blue marlin).

Status of the Stock and SCRS Outlook

The last stock assessment for blue marlin was in 2000 using similar methods to the previous assessment (1996), however, data was revised in response to concerns raised since the 1996 assessment. The assessment might reflect a retrospective pattern wherein improvement in estimated biomass ratios result in estimated lower productivity. The 2000 assessment was slightly more optimistic than the 1996 assessment. Atlantic blue marlin are at approximately 40 percent of B_{MSY} and over-fishing has taken place for the last 10-15 years. B_{MSY} is estimated at 2,000 mt (4,409,245 lb) and current fishing mortality is approximately four times higher than F_{MSY} (Table 3.13) (SCRS, 2004). There is uncertainty in the assessment because the historical data that is not well quantified. The 2000 assessment estimated that over-fishing was still occurring and that productivity (MSY and a stock's capacity to replenish) was lower than previously estimated, it is expected that landings in excess of estimated replacement yield would result in further stock decline (SCRS, 2004).

No additional assessment information became available in 2004 to modify recommendations currently in force. The current assessment indicates that the stock is unlikely to recover if the landings contemplated by the 1996 ICCAT recommendation continue into the future. While there is additional uncertainty in stock status and replacement yield estimates do not reflected in bootstrap results, these uncertainties can only be addressed through substantial investment in research into habitat requirements of blue marlin and further verification of historical data. The SCRS recommended that the ICCAT take steps to reduce the catch of blue marlin as much as possible, including: reductions in fleet-wide effort, a better estimation of dead discards, establishment of time area closures, and scientific observer sampling for verification of logbook data. The SCRS noted that future evaluation of management measures relative to the recovery of the blue marlin stock are unlikely to be productive unless new quantitative information on the biology and catch statistics of blue marlin, and additional years of data are available (SCRS, 2004).

A summary of Atlantic blue marlin stock assessment data can be found in Table 3.13. Estimated catches of Atlantic blue marlin by region for the period 1956 – 2001 can be found in Figure 3.10. A composite CPUE series for blue marlin for the period 1955 – 2000 can be found in Figure 3.11. The estimated median relative fishing mortality trajectory for Atlantic blue marlin can be found in Figure 3.12.

Table 3.13 Summary of Atlantic Blue Marlin Stock Assessment data. Weights are in metric tons, whole weight.

ATLANTIC BLUE MARLIN SUMMARY[1]	
	Total Atlantic
Maximum Sustainable Yield (MSY)	~ 2,000 t (~ 1,000 ~ 2,400 t)[2]
2002 Yield	2,494 t
2003 Yield[4]	1,951 t
1999 Replacement Yield	~ 1,200 t (~ 840 - 1,600 t)[2]
Relative Biomass (B_{2000}/B_{MSY})	~ 0.4 (~ 0.25 - 0.6)[2]
Relative Fishing Mortality (F_{1999}/F_{MSY})	4.0 (~ 2.5 - 6.0)[2]
Management Measures in Effect	- Reduced pelagic longline and purse seine landings to 50% of 1996 or 1999 levels, whichever is greater [Refs. 00-13[3], 01-10[3] and 02-13].

[1] Assessment results are uncertain. Uncertainty in these estimates is not fully quantified by bootstrapping.
[2] Approximate 80% CI from bootstrap for ASPIC model.
[3] These measures did not take effect until mid-2001.
[4] Reported Task I value, which is likely to be a substantial underestimate of the total catch.

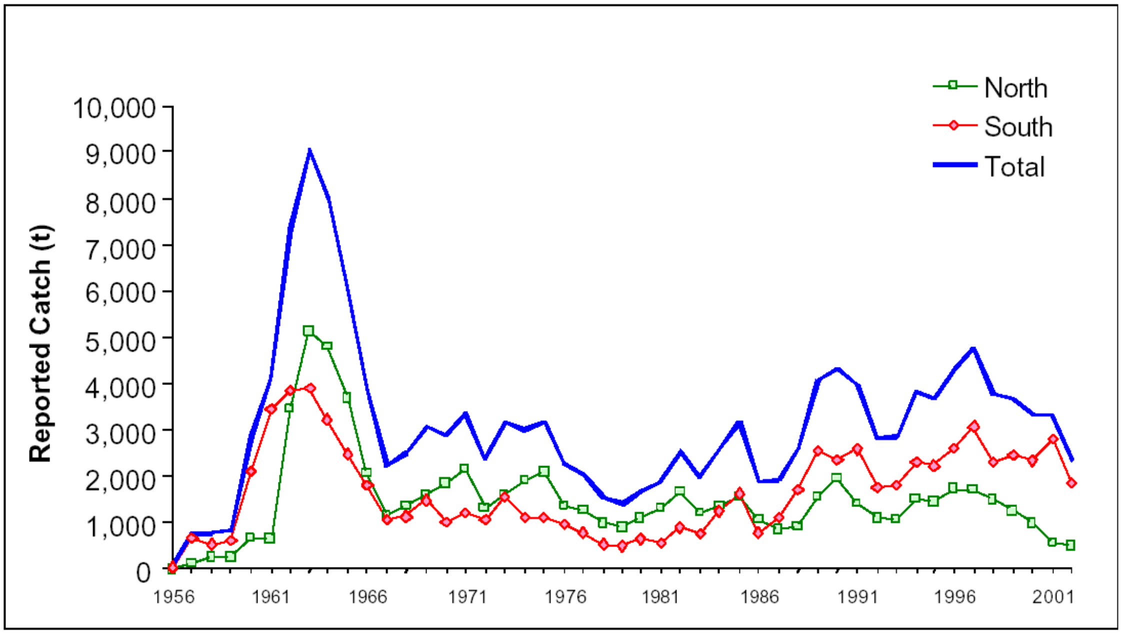

Figure 3.10 Estimated catches (including landings and dead discards in mt) of blue marlin in the Atlantic by region. The 2003 catch reported to ICCAT is preliminary and is not included in this figure. Weights are in metric tones, whole weight.

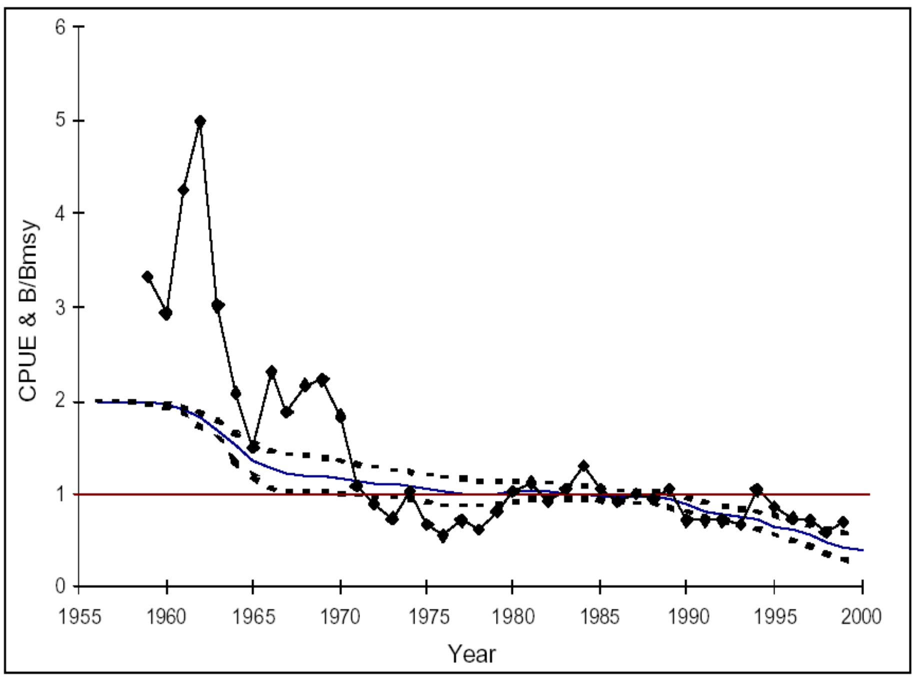

Figure 3.11 Composite CPUE series (symbols) used in the blue marlin assessment compared to model estimated median relative biomass (solid lines) from bootstrap results (80 percent confidence bounds shown by dotted lines)

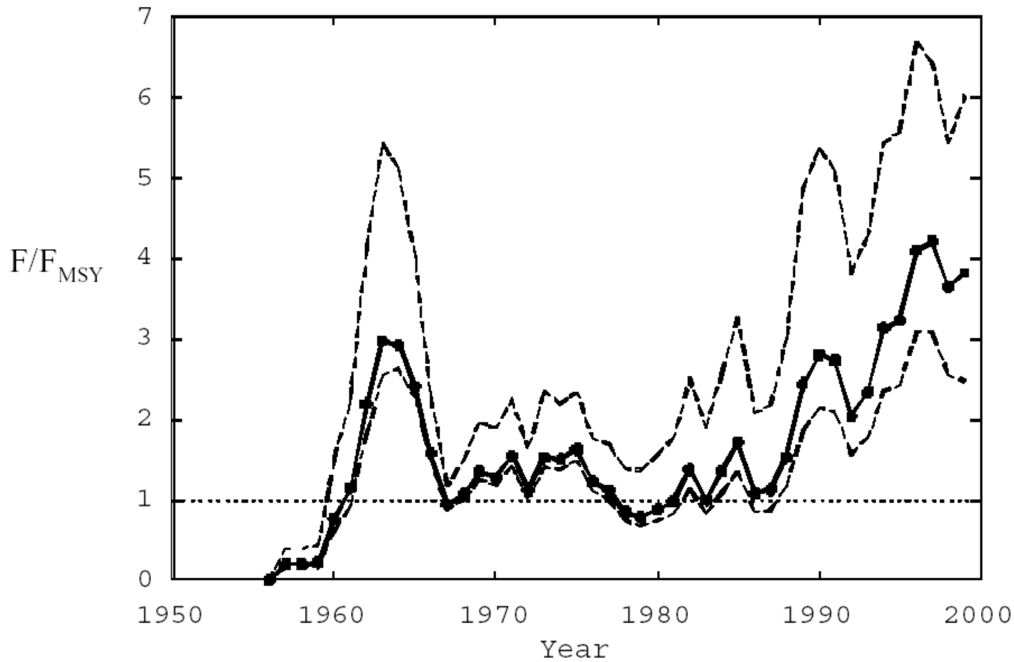

Figure 3.12 **Estimated median relative fishing mortality trajectory for Atlantic blue marlin (center, dark line) with approximate 80 percent confidence range (light lines) obtained from bootstrapping.**

3.2.4.2 White Marlin

Life History/Species Biology

White marlin (*Tetrapturus albidus*) are found exclusively in tropical and temperate waters of the Atlantic Ocean and adjacent seas, unlike sailfish and blue marlin, which are also found in the Pacific Ocean. White marlin are found at the higher latitudes of their range only in the warmer months. Junior et al. (2004) captured white marlin with pelagic longline gear off northeastern Brazil in depths ranging from 50-230 m (164-754 feet), with no obvious depth layer preference. White marlin generally prefer water temperatures above 22°C (71° F) with salinities between 35-37 ppt (NMFS, 1999). They may occur in small, same-age schools, however, are generally solitary compared to the Scombrids (tunas). Catches in some areas may include a rare species (*Tetrapturus georgei*) which is superficially similar to white marlin. The so-called "hatchet marlin" may also represent (*T. georgei)*, and has been caught occasionally in the Gulf of Mexico (NMFS, 1999).

White marlin are generally 20-30 kg (44-66 lb) at harvest. These fish grow quickly, with females attaining a larger maximum size than males, and have a life span of 18 years (SCRS 2004). Adult white marlin grow to over 280 cm (110 inches) TL and 82 kg (180 lb). White marlin exhibit sexually dimorphic growth patterns; females grow larger than males, but the dimorphic growth differences are not as extreme as noted for blue marlin. The longest time at liberty for a tagged white marlin, 4,305 days (11.8 years).

This species undergoes extensive movements, although not as extreme as those of the bluefin tuna and albacore. Trans-equatorial movements have not been documented for the species. There have been 29,751 white marlin tagged and released by the CTC program, with 540 reported recaptures (1.8 percent of all releases). The majority of releases took place in the months of July through September, in the western Atlantic off the east coast of the United States. Releases of tagged white marlin also occurred off Venezuela, in the Gulf of Mexico, and in the central west Atlantic. The mean straight line distance of recaptured white marlin is 842 km (455 nm). A substantial number of individuals moved between the mid-Atlantic coast of the United States and the northeast coast of South America. Overall, 1.1 percent of documented white marlin recaptures have made trans-Atlantic movements. The longest movement was for a white marlin tagged during July 1995 off the east coast near Cape May, NJ and recaptured off Sierra Leone, West Africa, in November, 1996. The fish traveled a distance of at least 6,517 km (3,519 nm) over 476 days (NMFS, 1999).

White marlin spawn in the spring (March through June) in the northwestern Atlantic Ocean and females are generally 20 kg (44 lb) in mass and 130 cm (51.2 inches) in length at sexual maturity. White marlin spawn in tropical and sub-tropical waters with relatively high surface temperatures and salinities (20 to 29°C (68-84°F) and over 35 ppt) and move to higher latitudes during the summer. There has not been an Atlantic-wide study of the spawning behavior of white marlin. Spawning seems to take place in more offshore areas than for sailfish, although larvae are not found as far offshore as blue marlin. Females may spawn up to four times per spawning season (de Sylva and Breder, 1997). It is believed there are at least three spawning areas in the western north Atlantic: northeast of Little Bahama Bank off the Abaco Islands, northwest of Grand Bahama Island, and southwest of Bermuda. Larvae have also been collected from November to April, but these may have been sailfish larvae (*Istiophorus platypterus*), as the two can not readily be distinguished (NMFS, 1999). Spawning concentrations occur off the Bahamas, Cuba, and the Greater Antilles, probably beyond the U.S. EEZ, although the locations are unconfirmed. Concentrations of white marlin in the northern Gulf of Mexico and from Cape Hatteras, NC to Cape Cod, MA are probably related to feeding rather than spawning (NMFS, 1999).

White marlin are primarily piscivorous. Oceanic pomfret and squid were the most important food items in a study that sampled sailfish stomachs collected off the coast of Brazil in the southwestern Atlantic Ocean (Junior et al., 2004). The number of food items per stomach ranged from 1-12 individuals. The largest prey observed in white marlin stomachs were snake mackerel (*Gempylus serpens*), that were 40-73 cm (15.7-28.7 inches) in length (Junior et al., 2004). Squid, dolphin, hardtail jack, flying fish, bonitos, mackerels, barracuda, and puffer fish are the most important prey items in the Gulf of Mexico.

The world's largest sport fishery for white marlin occurs in the summer from Cape Hatteras, NC to Cape Cod, MA especially between Oregon Inlet, NC and Atlantic City, NJ. Successful fishing occurs up to 148 km (80 nm) offshore at submarine canyons, extending from Norfolk Canyon in the mid-Atlantic to Block Canyon off eastern Long Island. Concentrations are associated with rip currents and weed lines (fronts), and with bottom features such as steep drop-offs, submarine canyons, and shoals. The spring peak season for white marlin sport fishing occurs in the Straits of Florida, southeast Florida, the Bahamas, and off the north coasts of Puerto

Rico and the Virgin Islands. In the Gulf of Mexico summer concentrations are found off the Mississippi River Delta, at DeSoto Canyon, at the edge of the continental shelf off Port Aransas, TX, with a peak off the Delta in July, and in the vicinity of DeSoto Canyon in August. In the Gulf of Mexico, adults appear to be associated with blue waters of low productivity, being found with less frequency in more productive green waters. While this is also true of the blue marlin, there appears to be a contrast between the factors controlling blue and white marlin abundance, as higher numbers of blue marlin are generally caught when catches of white marlin are low, and vice versa. It is believed that white marlin prefer slightly cooler temperatures than blue marlin.

Effect of ICCAT Management Regulations

Recommendation 97-09 required ICCAT Contracting Parties to reduce, starting in 1998, blue marlin and white marlin landings by at least 25 percent for each species from 1996 landings, such reduction to be accomplished by the end of 1999. ICCAT Recommendations 00-13, 01-10, and 02-13 imposed or extended additional catch restrictions for white marlin. These included reductions of 33 percent from the 1996 or 1999 landing levels, whichever is greater, in the annual amount of white marlin that can be harvested by pelagic longline and purse seine vessels and retained for landing. Further, all blue marlin and white marlin brought to pelagic longline and purse seine vessels alive are required to be released in a manner that maximizes their survival (SCRS, 2004). The live release provision does not apply to marlins that are dead when brought along the side of the vessel or that are not sold or entered into commerce. While the stock status evaluations are uncertain, projections indicated that the apparent intent of the ICCAT Billfish recommendations has, in the short term, some potential for stabilizing the stock biomass near current levels.

In the United States, white marlin are managed exclusively for recreational fisheries. The sport fishery for the species is concentrated between Cape Hatteras, NC and Cape Cod, MA during the summer months (NMFS, 1999). This fishery is subject to an ICCAT imposed, 250-fish limit, annually for both blue and white marlin combined. In 2001, time area closures were established in the United States to reduce interactions between longline fisheries and white marlin. In 2003, 131 blue and white marlin were reported landed in tournaments (23 white marlin). Purse seine fisheries have incidental catches of white marlin, especially those that set on FADs. A temporary ban on FADs implemented by the EU resulted in a 300-400 mt (661,386 – 881,849 lb) decrease in incidental purse seine catches of all marlins (Gaertner et al., 2002).

Status of the Stock and SCRS Outlook

White marlin have been managed under a single stock hypothesis by ICCAT since 2000. The most recent stock assessments for white marlin (1996, 2000, and 2002) all indicated that biomass of white marlin has been below B_{MSY} for more than two decades and the stock is overfished. In 2004, the SCRS indicated that in spite of significant improvements in the relative abundance estimates made available during the last three assessments, they are still not informative enough to provide an accurate estimate of stock status (SCRS, 2004). The 2002 assessment indicated that the relative fishing mortality is 8.28 times that permissible at F_{MSY} (Table 3.14). Given that the stock is severely depressed, the SCRS concluded that ICCAT should take steps to reduce the catch of white marlin by as much as possible, first by increasing observer coverage to improve estimates of catch and dead discards of white marlin.

Furthermore, SCRS recommended that Contracting Parties conduct research into habitat requirements and post-release survival of white marlin and take steps to verify historical fishery data.

The SCRS suggested that ICCAT take steps to make sure that the intended reductions in catch are complied with, and monitored, so that proper evaluation can be carried out in the future. The SCRS recommended improving observer programs so that better estimates of catch and dead discards of white marlin are obtained. The SCRS further recommended that, in the absence of observing a change in population status resulting from the most recent management measures, the potential for increasing stock size of white marlin may require future catches to be reduced beyond the level apparently intended by its most recent recommendations. However, the SCRS also stated that more definitive advice should be available after several years of data become available. The SCRS also noted that future evaluation of management measures relative to the recovery of the white marlin stock are unlikely to be productive unless new quantitative information on the biology and catch statistics of white marlin, and additional years of data, are available (SCRS, 2004). As such, ICCAT postponed the next white marlin assessment until 2006 or later. A summary of Atlantic white marlin stock assessment data can be found Table 3.14 and Figure 3.13.

Table 3.14 Summary of Atlantic White Marlin Stock Assessment data. Weights are in metric tons, whole weight. Source: SCRS, 2004.

ATLANTIC WHITE MARLIN SUMMARY[1]				
	Likely value	*Continuity case[2] estimate (80% conf. limit)*	*Retrospective adjusted estimate[3]*	*Range of sensitivity[4] estimates*
Maximum Sustainable Yield	Below 2000 Yield	964 t (849-1070)		323-1,320 t
2002 Yield	822 t	--		--
2003 Yield[5]	571 t	--		--
2001 Replacement Yield	Below 2000 Yield	222 t (101-416)	371 t	102-602 t
Relative Biomass (B_{2001}/B_{MSY})	<1 (Over-fished)	0.12 (0.06-0.25)	0.22	0.12-1.76
Relative Fishing Mortality (F_{2000}/F_{MSY})	>1 (Over-fishing)	8.28 (4.5-15.8)	5.05	0.80-10.30
Management Measures in Effect:	- In 2001 and 2002, PS and LL fisheries limit landings to 33% of max (1996, 1999) level. [Ref. 00-13], [Ref. 01-10] and [Ref. 02-13].			

[1] Assessment results are highly uncertain.
[2] The data used are not sufficiently informative to choose a "best case". For consistency, the continuity case presented here is based on data and assumptions that closely resemble the analyses made in 2000. Confidence limits from bootstrapping are conditional on this model-data set and thus may underestimate the real uncertainty.
[3] These results are for the continuity case except that they were adjusted for retrospective biases.
[4] The sensitivity analyses made were not chosen in a systematic way; the range is presented only for qualitative guidance.
[5] Reported Task I value for 2003, which is likely an underestimate of total catch.

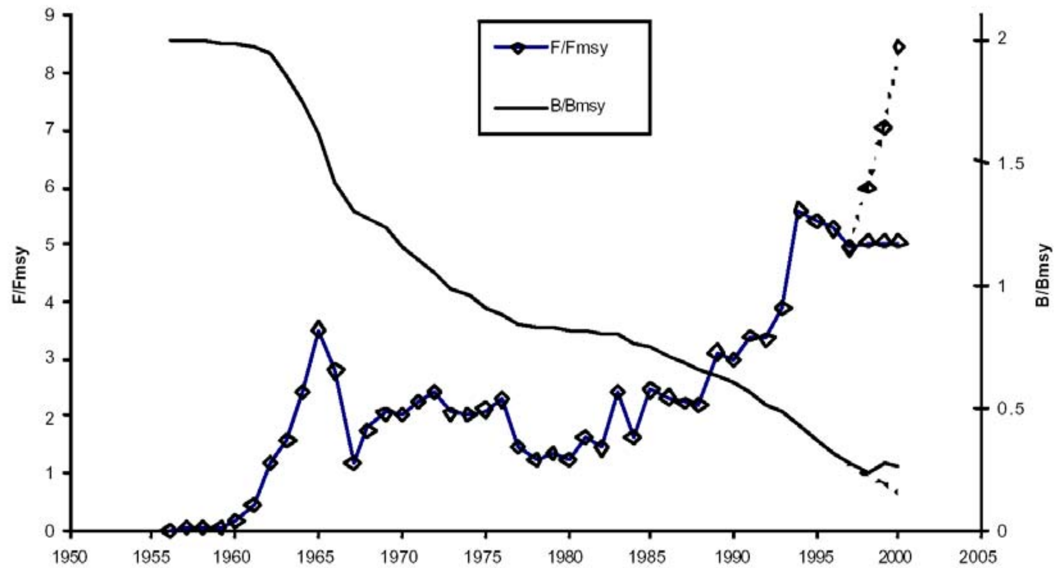

Figure 3.13 Estimated biomass ratio B2000/ BMSY (solid line, no symbols) and fishing mortality ratio F2000/FMSY (solid line with symbols) from the production model fitted to the continuity case for white marlin. Ratios of last three yearshave been adjusted for retrospective pattern. Broken lines show unadjusted ratios. Note that scales are different for each ratio. Source: SCRS, 2004.

3.2.4.3 Sailfish

Life History/Species Biology

Sailfish have a pan-tropical distribution and prefer water temperatures between 21 and 28°C (69-82°F). Although sailfish are the least oceanic of the Atlantic billfish and have higher concentrations in coastal waters (more than any other Istiophorid), they are also found in offshore waters. They range from 40°N to 40°S in the western Atlantic and 50°N to 32°S in the eastern Atlantic. No trans-Atlantic movements have been recorded, suggesting a lack of mixing between east and west. Although sailfish are generally considered to be rare and solitary species relative to the schooling Scombrids, sailfish are known to occur along tropical coastal waters in small groups consisting of at least a dozen individuals. Junior et al. (2004) captured sailfish in the southwestern Atlantic Ocean with pelagic longline gear at depths between 50-210 m (164-688 feet), with most individuals captured at 50 m. Sailfish are the most common representative of the Atlantic Istiophorid*s* in U.S. waters (SCRS, 2004). Female sailfish grow faster, and attain a larger maximum size, than males while both sexes have a life expectancy of 15 years (NMFS, 1999).

In the winter, sailfish are found in schools around the Florida Keys and eastern Florida, in the Caribbean, and in offshore waters throughout the Gulf of Mexico. In the summer they appear to diffuse northward along the U.S. coast as far north as the coast of Maine, although there is a population off the east coast of Florida all year long. During the summer, some of these fish move north along the inside edge of the Gulf Stream. After the arrival of northerlies in the winter, they regroup off the east coast of Florida. Sailfish appear to spend most of their time above the thermocline, which occurs at depths of 10 - 20 m (32.8 – 65.6 feet) and 200 - 250 m (656 – 820 feet), depending on location. The 28°C (82°F) isotherm appears to be the optimal temperature for this species. Sailfish are mainly oceanic but migrate into shallow coastal waters. Larvae are associated with the warm waters of the Gulf Stream (NMFS, 1999).

A total of 62,740 sailfish have been tagged and released through the efforts of the CTC program, with reported recapture of 1,090 sailfish (1.7 percent of all releases). Most releases occurred off southeast Florida, from north Florida to the Carolinas, the Gulf of Mexico, Venezuela, Mexico, the northern Bahamas and the U.S. Virgin Islands. One tagged and recaptured specimen traveled from Juno, FL to the mid-Atlantic, a distance of 2,972 km (1,745 miles). The longest movement tracked by tagging was 3,509 km (2,193 miles), with this specimen at-large for 1.4 years. During the winter sailfish are restricted to the warmer parts of their range and move farther from the tropics during the summer. The summer distribution of sailfish does not extend as far north as for marlins. Tag-and-recapture efforts have recovered specimens only as far north as Cape Hatteras, NC. Few trans-Atlantic or trans-equatorial movements have been documented using tag-recapture methods (NMFS, 1999).

Most sailfish examined that have been caught off Florida are under three years of age. Mortality is estimated to be high in this area, as most of the population consists of only two year classes. The longest period a recaptured-tagged animal was found to be at-large was 16.1 years. Unfortunately, the size at release is not available for this fish. Growth rate in older individuals is very slow (0.59 kg/yr (1.3 lb/year). Sailfish are probably the slowest growing of the Atlantic istiophorids. Sexual dimorphic growth is found in sailfish, but it is not as extreme as with blue marlin (NMFS, 1999).

Female sailfish spawn at age three and are generally 13-18 kg and 157 cm (28.6-39.6 lb and 61.8 inches), whereas males generally mature earlier at 10 kg and 140 cm (22 lb and 55.1 inches). Spawning takes place between April and October (de Sylva and Breder, 1997). Spawning has been reported to occur in shallow waters 9-12 m (30-40 ft) around Florida, from the Florida Keys to the region off Palm Beach on the east coast. Spawning is also assumed to occur, based on presence of larvae, offshore beyond the 100 m (328 feet) isobath from Cuba to the Carolinas, from April to September. However, these spawning activities have not been observed. Sailfish can spawn multiple times in one year, with spawning activity-moving northward in the western Atlantic as the summer progresses. Larvae are found in Gulf Stream waters in the western Atlantic, and in offshore waters throughout the Gulf of Mexico from March to October (NMFS, 1999). In the Pacific Ocean, sailfish spawn in waters between 27-30°C (Hernandez-H and Ramirez-H, 1998).

Sailfish are generally piscivorous, but also consume squid. Larvae eat copepods early in life then switch to fish at 6.0 mm (0.2 inches) in length (NMFS, 1999). The diet of adult sailfish caught around Florida consists mainly of pelagic fishes such as little tunny (*Euthynnus alletteratus*), halfbeaks (*Hemiramphus* spp.), cutlassfish (*Trichiurus lepturus*), rudderfish (*Strongylura notatus*), jacks (*Caranx spp.*), pinfish (*Lagodon rhomboides*), and squids (*Argonauta argo* and *Ommastrephes bartrami)*. Sailfish are opportunistic feeders and there is evidence that they may feed on demersal species such as sea robin (*Triglidae*), cephalopods and gastropods found in deep water.

Sailfish collected in the western Gulf of Mexico contained a large proportion of shrimp in their stomachs in addition to little tunny, bullet tuna (*Auxis* sp.), squid, and Atlantic moonfish (*Vomer setapinnis*). Adult sailfish are probably not preyed upon often, but predators include killer whales (*Orcinus orca*), bottlenose dolphin (*Tursiops turncatus*), and sharks. Junior et al. (2004) determined that squid were actually the second most important food item in the southwestern Atlantic off the coast of Brazil. Number of food items per stomach ranged from 1-14, and 6 percent of the stomachs were empty upon collection (Junior et al., 2004).

Participants from many nations characterize fisheries in both the western and eastern Atlantic Ocean. Sailfish are found predominantly in the upper reaches of the water column and are caught in directed sport fisheries (recreational) and as bycatch in the offshore longline fisheries for swordfish and tunas and as a directed catch in coastal fisheries. The reported catches of sailfish/spearfish (Task I) for 2003 were 1,310 and 416 mt (2,888,055 and 917,123 lb) for the west and east Atlantic, respectively. In coastal waters, artisanal fisheries use many types of shallow water gear to target sailfish (NMFS, 2003).

Effect of ICCAT Management Regulations

There are currently no specific ICCAT regulations for sailfish. Sailfish are managed as distinct eastern and western Atlantic stocks. This separation into two management units is based on life history information.

Status of the Stock and SCRS Outlook

Sailfish and Longbill spearfish landings have historically been reported together in annual ICCAT landing statistics. An assessment was conducted in 2001 for the western Atlantic sailfish stock based on sailfish/spearfish composite catches and sailfish "only" catches. The assessment tried to address shortcomings of previous assessments by improving abundance indices and separating the catch of sailfish from that of spearfish in the offshore longline fleets. The 2001 assessment looked at catches reported between 1956-2000 and all the quantitative assessment models used produced unsatisfactory fits, therefore the SCRS recommended applying population models that better accounted for these dynamics in order to provide improved assessment advice. For the western Atlantic stock, annual sailfish catches have averaged about 700 mt ww (1,543,235 lb) over the past two decades and the abundance indices have remained relatively stable. The 2000 yield was 506 mt ww (1,115,539 lb) (Table 3.15). Recent analyses did not provide any information on the MSY or other stock benchmarks for the 'sailfish only' stock. In the eastern Atlantic, abundance indices based on coastal/inshore fisheries for sailfish have decreased in recent years, while those attained from the Japanese longline fishery indicate constant estimates of abundance since the mid-1970s (SCRS, 2004).

Based on the 2001 assessment, it is unknown if the western or eastern sailfish stocks are undergoing overfishing or if the stocks are currently overfished. Therefore SCRS recommended that Contracting Parties consider methods to reduce fishing mortality rates, overall, and that western Atlantic catches should not be increased above current levels. Furthermore, the SCRS expressed concerned about the incomplete reporting of catches, particularly in recent years.

Management recommendations made by the SCRS in 2004 were the same as those made in 2003. These management recommendations indicated that ICCAT should consider methods for reducing fishing mortality rates. The current western Atlantic assessment led the SCRS to recommend that the West Atlantic sailfish “only” catches should not exceed current levels. For the East Atlantic, the SCRS recommended that sailfish “only” catches should not exceed current levels and that ICCAT should consider practical and alternative methods to reduce fishing mortality and assure data collection systems. SCRS expressed concern about the incomplete reporting of catches, particularly for the most recent years, the lack of sufficient reports by species, and evaluations of the new methods used to split the sailfish and spearfish catch and to index abundance. The SCRS recommended all countries landing sailfish/spearfish or having dead discards, report these data to the ICCAT Secretariat and that the SCRS should consider the possibility of a spearfish “only” assessment in the future (SCRS, 2004).

A summary of Atlantic sailfish stock assessment data is given in Table 3.15. The evolution of estimated sailfish/spearfish catches in the Atlantic during the period 1956–2002 for both east and west stocks in Figure 3.14. Available CPUE for western Atlantic sailfish/spearfish for the period 1967-2000 is shown in Figure 3.15. Estimated sailfish only catches from 1956-2000 is shown in Figure 3.16.

Table 3.15 Summary of Atlantic Sailfish Stock Assessment data. Weights are in metric tons, whole weight. Source: SCRS, 2004.

ATLANTIC SAILFISH “ONLY” SUMMARY		
	West Atlantic	**East Atlantic**
Maximum Sustainable Yield (MSY)	Not estimated	Not estimated
Recent Yield (2000)[1]	506 t[2]	969 t[2]
2000 Replacement Yield	~ 600 t	Not estimated
Management Measures in Effect	None	None

[1] Estimated yield includes that carried over from previous years.
[2] Recent yield (2000) was estimated during the 2001 sailfish assessment. To estimate the 2001, 2002 and 2003 yield, catches of sailfish and spearfish would have to be separated. A separation similar to the one conducted in the 2001 assessment has not yet been conducted.

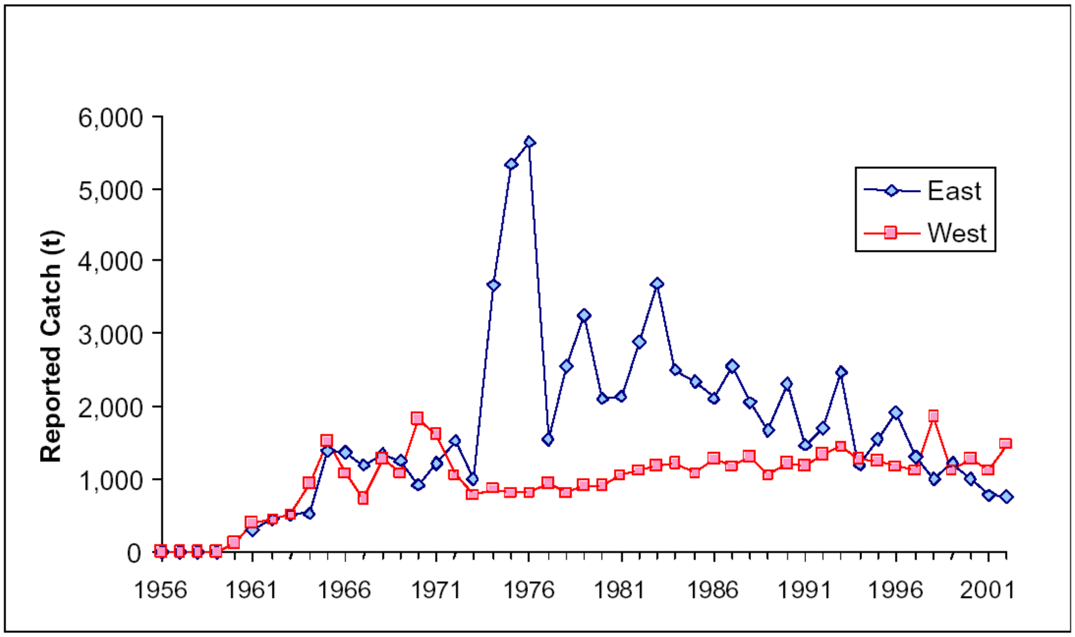

Figure 3.14 **Evolution of estimated sailfish/spearfish catches in the Atlantic (landings and dead discards, reported and carried over) in the ICCAT Task I database during 1956-2002 for the east and west stocks. The 2003 catch reported to ICCAT is preliminary and is not included in this figure. Weights are in metric tons, whole weight.**

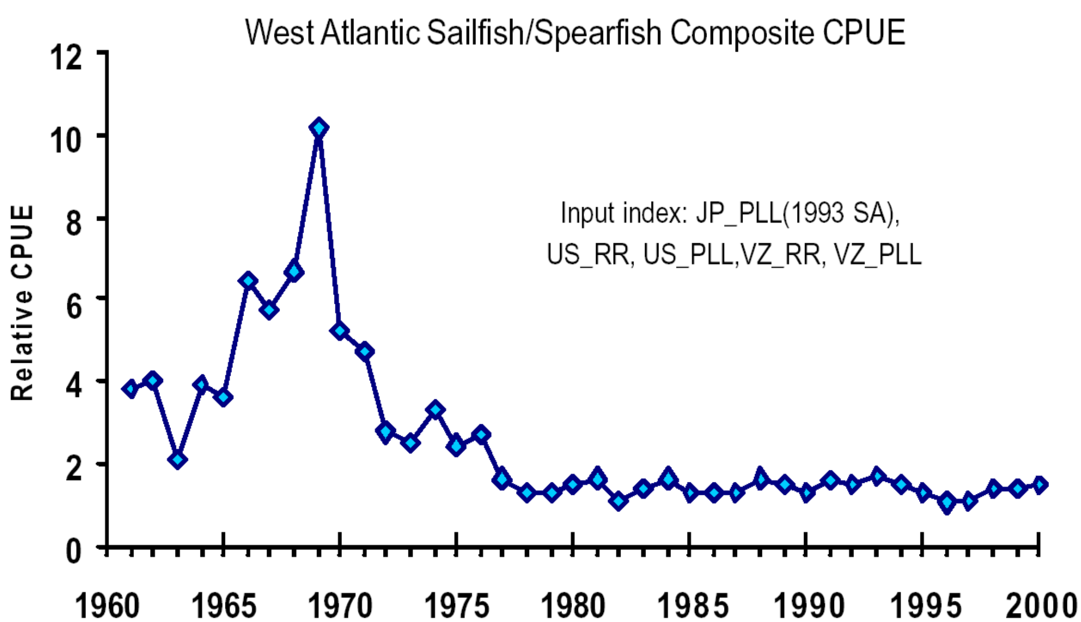

Figure 3.15 **Available standardized CPUE for western Atlantic sailfish/spearfish for the period 1967-2000, including Japanese, U.S., and Venezuelan time series data.**

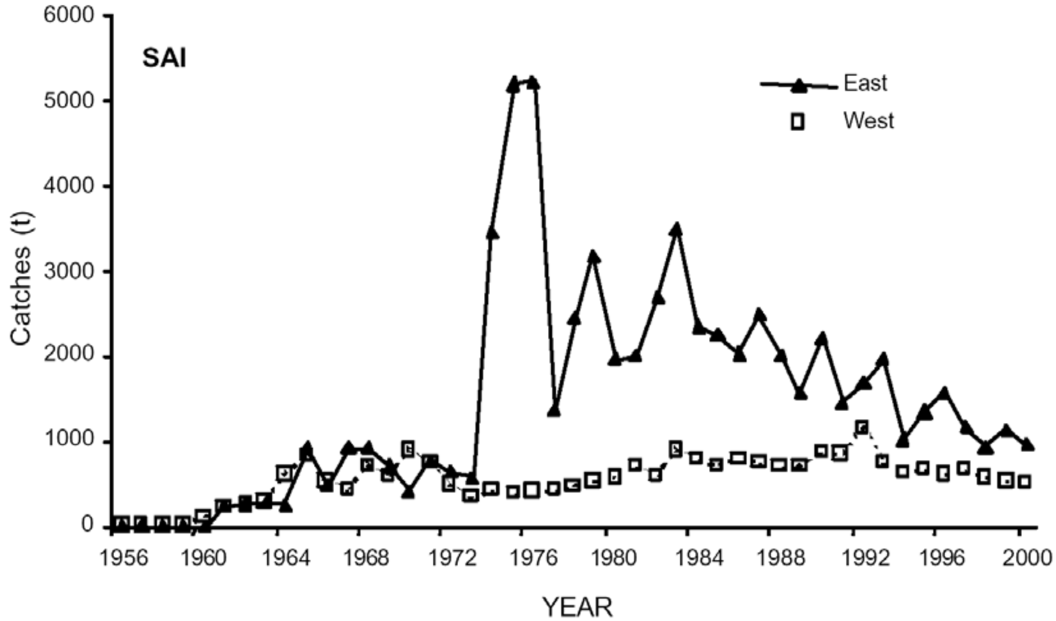

Figure 3.16 **Estimated sailfish "only" catches based on the new procedure for splitting combined sailfish and longbill spearfish catches from 1956-2000. Weights are in metric tons, whole weight.**

3.2.4.4 Longbill Spearfish

The longbill spearfish (*Tetrapturus pfluegeri*) are the most rare of the Atlantic istiophorids, and were identified as a distinct species in 1963. There is relatively little information available on spearfish life history. A related istiophorid, the Mediterranean spearfish (*Tetrapturus belone*), is the most common representative of this family in the Mediterranean Sea. Longbill spearfish are known to occur in epipelagic waters above the thermocline, off the east-coast of Florida, the Bahamas, the Gulf of Mexico, and from Georges Bank to Puerto Rico. Junior et al. (2004) captured spearfish off the coast of Brazil at depths ranging from 50-190 m (164 – 623 feet). The geographic range for this species is from 40°N to 35° S.

Spearfish spawn from November to May and females are generally 17-19 kg (37.4-41.8 lb) and 160-170 cm (63-66 inches) at first maturity. These fish are unique among istiophorids in that they are winter spawners. Larval spearfish have been identified from the vicinity of the mid-Atlantic ridge from December to February, indicating that this species spawns in offshore waters (de Sylva and Breder, 1997).

Common prey items include fish and squid. Specifically, Junior et al. (2004) observed 37 stomachs and found that oceanic pomfret and squid comprised 63 percent of the items identified in stomachs. Most prey items were between 1-10 cm (0.39-3.9 inches) in length, with a mean length of 6.7 cm (2.63 inches). The maximum number of prey items found in any individual stomach was 33.

Similar to sailfish, spearfish are caught incidentally or as bycatch, in offshore longline fisheries by many nations. There are also artisinal fisheries that take place in the Caribbean Sea and in the Gulf of Guinea. Directed recreational fisheries for spearfish are limited due to the fact that the fish are generally located further offshore than other istiophorids. The reported catches of sailfish/spearfish (Task I) for 2003 are 1,310 and 416 mt ww (2,888,055 and 917,123 lb) for the west and east Atlantic, respectively. The 2001-2003 reported catch of unclassified billfish was 12 percent of the reported catch for all billfish and for some fisheries this proportion is much greater. This is a problem for species like spearfish for which there is already a paucity of data (SCRS, 2004).

Effect of ICCAT Management Regulations

There are currently no specific ICCAT regulations for longbill spearfish in effect.

State of the Stock and SCRS Outlook

Initial stock assessments conducted on spearfish aggregated these landings with sailfish. As mentioned in the Sailfish section, the 2001 assessment included a 'sailfish only' in addition to an aggregate sailfish/spearfish assessment. West Atlantic catch levels for sailfish/spearfish combined seem sustainable because over the past two decades CPUE and catch levels have remained constant, however, MSY is unknown. As a result, it is unknown whether or not spearfish are experiencing overfishing or are overfished. Spearfish catch levels are shown in Figure 3.17.. The SCRS recommends implementing measures to reduce, or keep fishing mortality levels constant and evaluations of new methods to split sailfish and spearfish indices of abundance (SCRS, 2004).

Management recommendations are similar to those listed for sailfish, including: consider methods for Contracting Parties to reduce mortality rates, encourage Contracting Parties to provide complete reporting of spearfish catches, evaluate new methods to split the sailfish and spearfish catch/index abundance, and assess sailfish independently of spearfish.

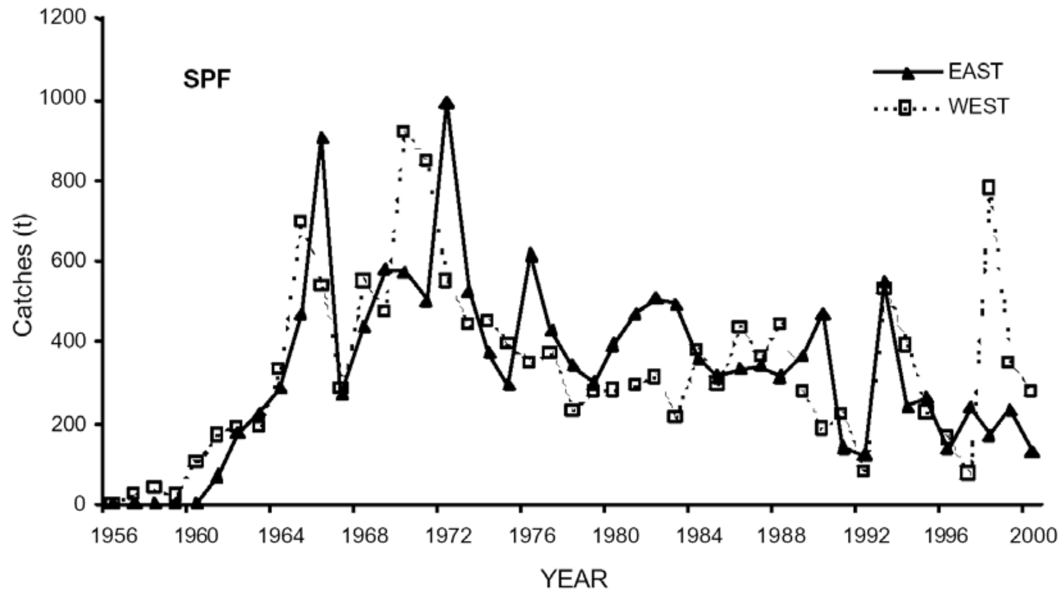

Figure 3.17 **Estimated spearfish "only" catches in the Atlantic based on the new procedure for splitting combined sailfish and spearfish catches from 1956-2000. Weights are in metric tons, whole weight.**

3.2.5 Atlantic Sharks

3.2.5.1 Life History/Species Biology

Sharks belong to the class Chondrichthyes (cartilaginous fishes) that also includes rays, skates, and deepwater chimaeras (ratfishes). From an evolutionary perspective, sharks are an old group of fishes characterized by skeletons lacking true bones. The earliest known sharks have been identified from fossils from the Devonian period, over 400 million years ago. These primitive sharks were small creatures, about 60 to 100 cm long, that were preyed upon by larger armored fishes that dominated the seas. Sharks have survived competition for eons, evolving into the large and aggressive predators that dominate the seas today. The life span of sharks in the wild is not known, but it is believed that many species may live 30 to 40 years or longer.

Relative to other marine fish, sharks have a very low reproductive potential. Several important commercial species, including large coastal carcharhinids such as sandbar (*Carcharhinus plumbeus)* (Casey and Hoey, 1985; Sminkey and Musick, 1995; Heist *et al*., 1995), lemon (*Negaprion brevirostris)* (Brown and Gruber, 1988), and bull sharks (Branstetter and Stiles, 1987), do not reach maturity until 12 to 18 years of age. Various factors determine this low reproductive rate: slow growth, late sexual maturity, one- to two-year reproductive cycles, a small number of young per brood, and specific requirements for nursery areas. These biological factors leave many species of sharks vulnerable to overfishing.

There is extreme diversity among the 350 species of sharks, ranging from tiny pygmy sharks of only 20 cm in length to the giant whale sharks, over 12 meters in length. There are fast-moving, streamlined species such as mako (*Isurus spp).* and thresher sharks (*Alopias spp*.), and sharks with flattened, ray-like bodies, such as angel sharks (*Squatina dumerili)*. The most commonly known sharks are large apex predators including the white (*Carchardodn carcharias*), mako, tiger (*Galeocerdo cuvier*), bull (*Carcharhinus leucas)*, and great hammerhead (*Sphyrna modarran*). Some shark species reproduce by laying eggs, others nourish their embryos through a placenta. Despite their diversity in size, feeding habits, behavior and reproduction, many of these adaptations have contributed greatly to the evolutionary success of sharks.

The most significant reproductive adaptations of sharks are internal fertilization and the production of fully developed young or "pups." These pups are large at birth, effectively reducing the number of potential predators and enhancing their chances of survival. During mating, the male shark inseminates the female with copulatory organs, known as claspers, that develop on the pelvic fins. In most species, the embryos spend their entire developmental period protected within their mother's body, although some species lay eggs. The number of young produced by most shark species in each litter is small, usually ranging from two to 25, although large females of some species can produce litters of 100 or more pups. The production of fully-developed pups requires great amounts of nutrients to nourish the developing embryo. Traditionally, these adaptations have been grouped into three modes of reproduction: oviparity, ovoviviparity, and viviparity.

Adults usually congregate in specific areas to mate and females travel to specific nursery areas to pup. These nurseries are discrete geographic areas, usually in waters shallower than those inhabited by the adults. Frequently the nursery areas are in highly productive coastal or estuarine waters where abundant small fishes and crustaceans provide food for the growing pups. These areas also may have fewer large predators, thus enhancing the chances of survival of the young sharks. In temperate zones, the young leave the nursery with the onset of winter; in tropical areas, young sharks may stay in the nursery area for a few years.

Shark habitat can be described in four broad categories: (1) coastal, (2) pelagic, (3) coastal- pelagic, and (4) deep-dwelling. Coastal species inhabit estuaries, the nearshore and waters of the continental shelves, e.g., blacktip (*Carcharhinus limbatus*), finetooth, bull, lemon, and sharpnose sharks (*Rhizoprinondon terraenaovae*). Pelagic species, on the other hand, range widely in the upper zones of the oceans, often traveling over entire ocean basins. Examples include shortfin mako (*Isurus oxyrinchus*), blue (*Prionace glauca*), and oceanic whitetip (*Carcharhinus longimanus*) sharks. Coastal-pelagic species are intermediate in that they occur both inshore and beyond the continental shelves, but have not demonstrated mid-ocean or transoceanic movements. Sandbar, scalloped hammerhead (*Sphyrna lewini*), and dusky sharks (*Carcharhinus obscurus*) are examples of coastal-pelagic species. Deep-dwelling species, e.g., most cat sharks (*Apristurus spp*.) and gulper sharks (*Centrophorus spp*.), inhabit the dark, cold waters of the continental slopes and deeper waters of the ocean basins.

Seventy-three species of sharks are known to inhabit the waters along the U.S. Atlantic coast, including the Gulf of Mexico and the waters around Puerto Rico and the U.S. Virgin Islands. Seventy-two species are managed by HMS; spiny dogfish also occur along the U.S. coast, however management for this species is under the authority of the Atlantic States Marine Fisheries Commission as well as the New England and Mid-Atlantic Fishery Management Councils. Based on a combination of ecology and fishery dynamics the sharks in the management unit have been divided into four species groups for management: (1) large coastal species, (2) small coastal species, (3) pelagic species, and (4) prohibited species (Table 3.16).

Table 3.16 Common names of shark species included within the four species management units under the purview of the HMS management division.

Management Unit	Shark Species Included
Large Coastal Sharks (11)	Sandbar, silky, tiger, blacktip, bull, spinner, lemon, nurse, smooth hammerhead, scalloped hammerhead, and great hammerhead sharks
Small Coastal Sharks (4)	Atlantic sharpnose, blacknose, finetooth, and bonnethead sharks
Pelagic Sharks (5)	Shortfin mako, thresher, oceanic whitetip, porbeagle, and blue sharks
Prohibited Species (19)	Whale, basking, sandtiger, bigeye sandtiger, white, dusky, night, bignose, Galapagos, Caribbean reef, narrowtooth, longfin mako, bigeye thresher, sevengill, sixgill, bigeye sixgill, Caribbean sharpnose, smalltail, and Atlantic angel sharks.

3.2.5.2 Status of the Stocks

NMFS is responsible for conducting stock assessments for the Large and Small Coastal Shark complexes (LCS and SCS) (Cortes, 2002; Cortes et al., 2002). ICCAT and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) have recently conducted assessments of three pelagic species. Stock assessments were conducted for the Large and Small Coastal Shark complexes (LCS and SCS) in 2002. Species-specific assessments for blacktip and sandbar sharks within the LCS complex and finetooth sharks, Atlantic sharpnose sharks, blacknose sharks (*Carcharhinus acronotus*), and bonnethead sharks (*Sphyrna tiburo*) within the SCS complex, were also conducted in 2002. The conclusions of these assessments are summarized in Table 3.17 and Table 3.18 and are fully described in Amendment 1 to the 1999 Atlantic Tunas, Swordfish, and Sharks FMP. Summaries of recent stock assessments and reports on several species of pelagic sharks (blue sharks, shortfin mako sharks, and porbeagle sharks (*Lamna nasus*) by COSEWIC and ICCAT are also included in this section.

3.2.5.3 Finetooth Sharks

Finetooth sharks inhabit shallow coastal waters to depths of 10 m (32.8 feet) near river mouths in the Gulf of Mexico and South Atlantic Ocean between Texas and North Carolina. These fish often form large schools and migrate to warmer waters when water temperatures drop below 20°C (68°F). Finetooth sharks are relatively productive compared to other sharks as fish are sexually mature at 3.9 (TL = 118 cm (46 inches)) and 4.3 (TL = 123 cm (48 inches)) years for males and females, respectively (Carlson et al. 2003). Reproduction in finetooth sharks is viviparous with yolksac placenta and embryos nourished through a placental connection. Females move into the nursery areas in late May and gestation is approximately 12 months. Each litter can have 1-6 pups with individuals measuring 51-64 cm (20-25 inches) in length. The finetooth shark feeds primarily on mullet, Spanish mackerel, spot, Atlantic menhaden, cephalopods, and crustacean (Bester and Burgess, 2004).

In a 2002 stock assessment, NMFS determined that finetooth sharks are not overfished ($B<B_{MSY}$), but that overfishing is occurring ($F>F_{MSY}$) (Table 3.17). Under National Standard 1 of the Magnuson-Stevens Act, NMFS is required to take measures to reduce fishing mortality. In general, more catch series data were available for the other species of SCS which were assessed simultaneously in 2002, than for finetooth sharks. It was determined that other species in the complex, and the complex as a whole, were not overfished and were not experiencing overfishing. Another limitation of the 2002 finetooth shark stock assessment was that bycatch data from the shrimp fishery was not included. Alternatives for reducing fishing mortality of finetooth sharks are explored in greater detail in Section 2.3.2 - Reducing Fishing Mortality of Finetooth Sharks.

Table 3.17 **Summary Table of Biomass and Fishing Mortality for Small Coastal Sharks SCS)** Source: Cortes, 2002.

Species/ Complex	**MSY (B_{MSY}) million lb dw**	**2001 Relative Biomass Level (B_{2001}/ B_{MSY})**	**Minimum Stock Size Threshold MSST = (0.5)B_{MSY} if M>=0.5 MSST = (1-M)Bmsy if M<0.5**	**Fishing Mortality Rate (F_{2000})**	**Maximum Fishing Mortality Threshold (F_{MSY})**	**Outlook**
Small Coastal Sharks (SCS)	7.0-2.2	1.38-2.39	16.2-50.2	0.03-0.24	0.04-0.78	Not overfished; No overfishing occuring
Finetooth Sharks	0.26-0.05	1.39-2.37	0.4-1.4	0.13-1.50	0.03-0.44	Not overfished; Overfishing is occuring
Bonnethead Sharks	1.8-0.5	1.46-2.78	2.3-7.3	0.03-0.18	0.05-0.53	Not overfished; No overfishing occuring
Atlantic Sharpnose Sharks	7.8-1.9	1.69-3.16	11.5-33.4	0.02-0.06	0.04-0.42	Not overfished; No overfishing occuring
Blacknose Sharks	0.8-0.2	1.92-3.15	1.6-4.5	0.02-0.19	0.03-0.44	Not overfished; No overfishing occuring

Table 3.18 **Summary Table of Biomass and Fishing Mortality for Large Coastal Sharks (LCS).** Source: Cortes et al., 2002

Species/ *Complex*	**2001 Biomass (N_{2001})**	**2001 Relative Biomass (N_{2001}/N_{MSY})**	**Fishing Mortality Rate (F_{2001})**	**Maximum Fishing Mortality Threshold (F_{MSY})**	**Outlook**
Large Coastal Complex	2,940-10,156	0.46-1.18	0.07-0.21	0.05-0.10	Overfished; Overfishing is occurring
Sandbar Sharks	1,027-4.86 E8	3.25E4-2.22	0.0001-0.70	0.05-0.46	Not overfished; Overfishing is occurring
Blacktip Sharks	5,587-3.16 E7	0.79-1.66	0.01-0.21	0.06-0.18	Not overfished; No overfishing occurring

ICCAT Stock Assessment on Blue and Shortfin Mako Sharks

At the 2004 ICCAT annual meeting in New Orleans the commission adopted a recommendation concerning the conservation of sharks caught in association with fisheries managed by ICCAT. This is the first binding measure passed by ICCAT dealing specifically with sharks. This recommendation includes, among other measures: reporting of shark catch data by Contracting Parties, a ban on shark finning, a request for Contracting Parties to live-release sharks that are caught incidentally, a review of management alternatives from the 2004 assessment on blue and shortfin mako sharks, and a commitment to conduct another stock assessment of selected pelagic shark species no later than 2007.

At the 2004 Inter-Sessional Meeting of the ICCAT Sub-Committee on bycatch, stock assessments for Atlantic blue shark (*Prionace glauca*) and shortfin mako (*Isurus oxyrinchus*) were conducted. This work included a review of their biology, a description of the fisheries, analyses of the state of the stocks and outlook, analyses of the effects of current regulations, and recommendations for statistics and research. The assessment indicated that the current biomass of North and South Atlantic blue shark seems to be above MSY ($B>B_{MSY}$), however, these results are conditional and based on assumptions that were made by the committee. These assumptions indicate that blue sharks are not currently overfished, again, this conclusion is conditional and based on limited landings data. The committee estimates that between 82,000 and 114,000 mt ww (180,779,054 - 251,326,978 lb) of blue shark are harvested from the Atlantic Ocean each year.

The North Atlantic shortfin mako population has experienced some level of stock depletion as suggested by the historical CPUE trend and model outputs. The current stock may be below MSY ($B<B_{MSY}$), suggesting that the species may be overfished. Overfishing may also be occurring as between 13,000 and 18,000 mt ww (28,660,094 – 39,683,207 lb) of shortfin mako are harvested in the Atlantic Ocean annually. South Atlantic stocks of shortfin mako shark are likely fully exploited as well, but depletion rates are less severe than in the North Atlantic.

The results of both of these assessments should be considered preliminary in nature due to limitations on quality and quantity of catch data available (SCRS, 2004). The sub-committee stated that catch data currently being reported to ICCAT does not represent the total catch actually landed, and are very limited with regard to size, age, and sex of shark harvested or caught incidentally. In order to attain a more accurate estimate of total landings, and improve future stock assessments, the committee made several recommendations, including: increase the infrastructure investment for monitoring the overall catch composition of sharks, standardize catch per unit effort (CPUE) from major fishing fleets, expand use of trade statitistics (fins) to extend historical time series, and include scientists from all Contracting Parties with significant blue and shortfin mako catches in future assessments (SCRS, 2004).

COSEWIC Stock Assessment on Porbeagle

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) conducted a species report and assessment for porbeagle in 2004. They suggest that significant declines in porbeagle abundance have occurred as a result of overexploitation in fisheries. In 2001, porbeagle biomass was estimated at 4,409 mt ww (9,720,181 lb), a decline of 89% from the prefishing biomass in 1961 (COSEWIC, 2004). The model employed predicts that populations declined precipitously after the fishery was developed in 1961, recovered slightly in the 1980s, and then declined again to the current level. Porbeagle quotas have been reduced significantly for Canadian fisheries. NMFS is interested in working with the Canadian government to address concerns raised by the COSEWIC report. Currently, NMFS has a species-specific quota of 46 mt dw (101,412 lb) for porbeagle. These fish are generally harvested incidentally in the pelagic longline fisheries. Between 2000 and 2003, landings of porbeagle were approximately 3.4 mt dw for the four fishing years combined.

3.2.5.4 Ongoing Research

Northeast Fisheries Science Center

<u>Fishery Independent Survey for Coastal Sharks</u>

The bi-annual fishery independent survey of Atlantic large and small coastal sharks in US waters from Florida to Delaware was conducted from April 19 to June 1, 2004. The goals of this survey are to: 1) monitor the species composition, distribution, and abundance of sharks in the coastal Atlantic; 2) tag sharks for migration and age validation studies; 3) collect biological samples for age and growth, feeding ecology, and reproductive studies; and 4) collect morphometric data for other studies. Results from this 2004 survey included 557 sharks representing eight species caught on 69 longline sets. The time series of abundance indices from this survey are critical to the evaluation of coastal Atlantic shark species.

<u>Age and Growth of Coastal and Pelagic Sharks</u>

A comprehensive aging and validation study for the shortfin mako (*Isurus oxyrinchus)*, continued in conjunction with scientists at Moss Landing Marine Laboratories, California using bomb carbon techniques. Additional validation studies have begun on the sandbar shark, (*Carcharhinus plumbeus)*, dusky shark, (*Carcharhinus obscurus)*, tiger shark, (*Galeocerdo cuvieri)*, and white shark, (*Carcharodon carcharias)*. Age and growth studies on the tiger shark (with scientists at the University of New Hampshire), thresher shark, (*Alopias vulpinus)* (with scientists at the University of Rhode Island), night shark, (*Carcharhinus signatus)* (with NMFS scientists at the SEFSC Panama City Laboratory), and the bull shark, (*Carcharhinus leucas)* (with scientists with the Florida Division of Natural Resources) are underway. Collection, processing, photographing, and reading of samples are in various stages for these species including intercalibration of techniques, criteria, and band readings. This intercalibration process involves sharing samples and comparing counts between researchers including a researcher from the Natal Sharks Board, South Africa for joint work on shortfin mako, blue, and basking shark band periodicity. Collections of vertebra took place at tournaments and on the biannual research cruise with 285 sharks injected with OTC for validation. Night and dusky sharks were prepared with gross sectioning to determine the best method for reading and all processing was initiated using histology. Readings were completed on the thresher and tiger sharks towards intercalibration to generate bias graphs. Vertebrae, length-frequency data, and tag/recapture data collected from 1962 to present are being analyzed on each of these species to obtain growth parameters.

Biology of the Thresher Shark

Life history studies of the thresher shark continued. Data collection was augmented to include reproductive and food habits, in addition to age and growth information.

Biology of the Porbeagle Shark

A cooperative U.S./Canada research program continued on the life history of the porbeagle shark, (*Lamna nasus)* with preliminary analysis of porbeagle tagging and recapture data using information from U.S., Canadian, and Norwegian sources.

Collection of Recreational Shark Fishing Data and Samples

Biological samples for age and growth, feeding ecology, and reproductive studies and catch data for pelagic sharks were collected at recreational fishing tournaments in the Northeast. Analysis of these tournament landings data was initiated by creating a database of historic information (1961-2004) and producing preliminary summaries of one long term tournament. The collection and analysis of these data are critical for input into species and age specific population and demographic models for shark management

Cooperative Shark Tagging Program (CSTP)

The Cooperative Shark Tagging Program involving over 6,500 volunteer recreational and commercial fishermen, scientists, and fisheries observers conducted since 1962, continued to tag large coastal and pelagic sharks and provide information to define essential fish habitat for shark species in U.S. Atlantic and Gulf of Mexico waters. Since its inception, the CSTP has tagged over 128,000 sharks representing 40 species.

Atlantic Blue Shark Life History and Assessment Studies

A collaborative program to examine the biology and population dynamics of the blue shark, *Prionace glauca,* in the North Atlantic is ongoing. Research on the food and feeding ecology of the blue shark is being conducted cooperatively with University of Rhode Island staff with additional samples collected and a manuscript under revision. A detailed reexamination of the reproductive parameters of the blue shark continued with collection of additional biological samples to determine if any changes have occurred since the 1970s. A manuscript on blue shark stock structure based on tagging data was completed detailing size composition and movements between Atlantic regions. Additionally, a research focus on the population dynamics in the North Atlantic with the objectives of constructing a time series of blue shark catch rates (CPUE) from research surveys, estimation of blue shark migration and survival rates, and the development of an integrated tagging and population dynamics model for the North Atlantic for use in stock assessment continued in collaboration between NEFSC scientists and scientists at the School of Aquatic and Fishery Sciences, University of Washington. Progress to date includes the preliminary recovery of historical research survey catch data, size composition, and biological sampling data on pelagic sharks and preliminary analysis of survival and movement rates for blue sharks based on tag and release data from the NMFS CSTP. Preparation of standardized catch rate and size composition data compatible with pelagic longline observer data continued with a resulting ICCAT submission. As part of this comprehensive program, cooperative research continued with the Irish Marine Institute and Central Fisheries Board on mark-recapture databases including coordination of formats and programs with the NMFS CSTP for joint data analyses.

Atlantic Shortfin Mako Life History and Assessment Studies

A collaborative program with students and scientists at the University of Rhode Island to examine the biology and population dynamics of the shortfin mako in the North Atlantic was continued. Ongoing research included an update on age and growth and reproductive parameters and an examination of the predator-prey relationships between the shortfin mako and its primary prey, bluefish (*Pomatomus saltatrix).* A manuscript was completed comparing contemporary and historic levels of bluefish predation. Future research includes the estimation of shortfin mako migration rates and patterns and survival rates using CSTP mark/recapture data and satellite tags with movements correlated with Advanced Very High Resolution Radiometer (AVHRR) sea surface temperature data. Toward these goals, two shortfin mako sharks were tagged with pop-up archival transmitting tags.

Blacktip Shark Migrations

Analysis of movements of the blacktip shark (*Carcharhinus limbatus)* in the western North Atlantic and Gulf of Mexico based on release and recapture data is ongoing with the examination of general migration patterns and exchange between and within regions of U.S. and Mexican waters. Release and recapture data were analyzed for evidence of Atlantic and Gulf primary and secondary blacktip nursery grounds.

Cooperative Atlantic States Shark Pupping and Nursery Survey (COASTSPAN)

NEFSC Apex Predators Program staff manage and coordinate this project that uses researchers in major coastal Atlantic states from Florida to Delaware to conduct a cooperative, comprehensive, and standardized investigation of valuable shark nursery areas. This research identifies which shark species utilize coastal zones as pupping and nursery grounds, gauges the relative importance of these areas, and determines migration and distribution patterns of neonate and juvenile sharks. This program is described in further detail in Section 3.3 of this document.

Juvenile Shark Survey for Monitoring and Assessing Delaware Bay Sandbar Sharks

NEFSC staff conduct this part of the COASTSPAN monitor and assessment project for the juvenile sandbar shark population in the Delaware Bay nursery grounds using monthly longline surveys from June to September each year. A random stratified sampling plan based on depth and geographic location is ongoing to assess and monitor the juvenile sandbar shark population during the nursery season. In addition, the tagging and recapture data from this project are being used to examine the temporal and spatial relative abundance and distribution of sandbar sharks in Delaware Bay.

Habitat Utilization, Food Habits, and Essential Fish Habitat of Delaware Bay Sandbar and Smooth Dogfish Sharks

The food habits portion of the study characterizes the diet, feeding periodicity, and foraging habits of the sandbar shark as well as examine the overlap in diet and distribution with the smooth dogfish shark (*Mustelus canis)*. Stomachs from over 800 sandbar sharks and over 200 smooth dogfish sharks have been sampled for contents through a non-lethal lavage method. Acquired data will be coupled with environmental data, providing information on preferred habitat. This information is an important contribution towards understanding essential fish habitat and provides information necessary for nursery ground management and rebuilding of depleted shark populations.

Ecosystems Modeling

Ecosystem modeling, focusing on the role of sharks as top predators, will be conducted using ECOPATH - ECOSIM models, using the sandbar shark as a model species and examining the ecological interactions between sandbar and smooth dogfish sharks in Delaware Bay.

Overview of Gulf and Atlantic Shark Nurseries

Due to the requirement for a better understanding of shark nursery habitat in U.S. coastal waters, NEFSC staff are editors for an American Fisheries Society symposium proceedings volume on U.S. Atlantic and Gulf of Mexico coastal shark nursery ground and habitat studies.

Post-Release Recovery and Survivorship Studies in Sharks -- Physiological Effects of Capture Stress

This ongoing research is directed towards the sandbar shark (*Carcharhinus plumbeus)*, and is being conducted cooperatively with Massachusetts Division of Marine Fisheries biologists. The study utilizes blood and muscle sampling methods in addition to acoustic tracking to obtain physiological profiles of individual sharks to characterize stamina and to determine ultimate post release survival. These analyses are requisite in view of the extensive current and proposed catch and release management strategies for coastal and pelagic shark species.

Southeast Fisheries Science Center

Stock Assessments of Pelagic, Large Coastal, and Prohibited Sharks

The ICCAT Sub-Committee on Bycatches conducted a stock assessment of blue sharks and shortfin makos in Tokyo, Japan, in June 2004. All information available on biology, fisheries, stock identity, catch, CPUE, and size of these species was reviewed and an evaluation of the status of stocks conducted using surplus production, age-structured, and catch-free stock assessment models. U.S. scientists contributed eight working documents for this meeting on various aspects of shark biology and methods to assess stock status; SEFSC scientists participated in the assessment process and authored or co-authored six of those documents. A stock assessment of dusky shark, a prohibited species under the shark FMP and candidate for listing under the ESA, is under way with expected completion in late 2004. Biological and fishery information available for this species is being synthesized and stock status will be evaluated using multiple stock assessment methodologies. The next assessment of large coastal sharks is planned for FY06, but data collection, synthesis, analysis, and preliminary stock evaluations will begin well in advance during FY05.

Update on Catches of Atlantic Sharks:

An update on catches of large and small coastal and pelagic sharks in U.S. Atlantic, Gulf of Mexico, and Caribbean waters was generated in FY04 for inclusion in the 2004 SAFE Annual Report and future shark stock assessments. Time series of commercial and recreational landings and discard estimates from several sources were compiled for the large coastal shark complex and sandbar and blacktip sharks. Additionally, recent species-specific commercial and recreational landings were provided for sharks in the large coastal, small coastal, and pelagic groups. Species-specific information on the geographical distribution of commercial landings by gear type and geographical distribution of the recreational catches was also provided. Trends in length-frequency distributions and average weights and lengths of selected species reported from three separate recreational surveys and in the directed shark bottom-longline observer program were also included. Another update on catches of Atlantic sharks will be generated in FY05.

Ecosystem Modeling

A dynamic mass-balance ecosystem model was used to investigate how relative changes in fishing mortality on sharks can affect the structure and function of Apalachicola Bay, Florida, a coastal marine ecosystem. Simulations were run for 25 years wherein fishing mortality rates from recreational and trawl fisheries were doubled for 10 years and then decreased to initial levels. Effect of time/area closures on ecosystem components were also tested by eliminating recreational fishing mortality on juvenile blacktip sharks. Simulations indicated biomass of sharks declined up to 57 percent when recreational fishing mortality was doubled. Simulating a time/area closure for juvenile blacktip sharks caused increases in their biomass but decreases in juvenile coastal shark biomass, a competing multi-species assemblage that is the apparent competitor. In general, reduction of targeted sharks did not cause strong top-down cascades. A manuscript from this study is currently in press.

Elasmobranch Feeding Ecology and Shark Diet Database

The current Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks gives little consideration to ecosystem function because there is little quantitative species-specific data on diet, competition, predator-prey interactions, and habitat requirements of sharks. Given this, several studies are currently underway describing the diet and foraging ecology, habitat use, and predator-prey interactions of elasmobranchs in various communities. In 2004, the diet of Atlantic sharpnose sharks (*Rhizoprionodon terraenovae*) was compared in two marine embayments of the northeast Gulf of Mexico. Results indicate that variations in diet composition between areas and ontogenetic diet shifts within each location are likely due to differences in overall habitat structure and availability of potential prey species. A manuscript is currently in review. A database containing information on quantitative food and feeding studies of sharks conducted around the world has been in development for several years and presently includes over 200 studies. This fully searchable database will continue to be updated and fine-tuned in FY05. The goal is to make this tool available to researchers in the relatively near future.

Cooperative Gulf of Mexico States Shark Pupping and Nursery Survey (GULFSPAN)

The SEFSC Panama City Shark Population Assessment Group manages and coordinates a survey of coastal bays and estuaries between the Panhandle of Florida and Texas. Surveys identify the presence/absence of neonate and juvenile sharks and attempt to quantify the relative importance of each area as it pertains to essential fish habitat requirements for sharks. The SEFSC Panama City Shark Population Assessment Group also initiated a juvenile shark abundance index survey in 1996. The index is based on random, depth-stratified gillnet sets conducted throughout coastal bays and estuaries in northwest Florida monthly from April to October. The species targeted for the index of abundance are juvenile sharks in the large and small coastal management groups. More information on this program can be found in Section 3.3 of this document.

Angel Shark Life History

The Atlantic Angel Shark is a benthic species inhabiting deep waters of the Gulf of Mexico and the Atlantic Ocean. This species is listed as prohibited by the Fisheries Management Plan for Atlantic Tunas, Swordfish, and Sharks due to the lack of biological data and a precautionary approach for species thought to be highly susceptible to exploitation. Life history studies began in 2003. Samples are obtained from commercial fishers and fishery-independent surveys. Preliminary reproductive parameters were determined in 2004 and results presented at the annual American Elasmobranch Society meeting held in Norman, Oklahoma, in May 2004.

Life History Studies of Elasmobranchs

Biological samples are obtained through research surveys and cruises, recreational fishers, and through collection by onboard observers on commercial fishing vessels. Age and growth rates and other life history aspects of selected species are processed and data analyzed following standard methodology. This information is vital as input to population models incorporating variation and uncertainty in estimates of life-history traits to predict the productivity of the stocks and ensure that they are harvested at sustainable levels. The age and growth parameters of bull shark (*Carcharhinus leucas*) and spinner shark (*C. brevipinna*) were completed and submitted for publication in 2004.

Cooperative Research-Definition of Winter Habitats for Blacktip Sharks in the Eastern Gulf of Mexico

A collaborative effort between SEFSC Panama City Shark Population Assessment Group and Mote Marine Laboratory is underway to define essential winter habitats for blacktip sharks (*Carcharhinus limbatus*). Deployment of archival Pop-up Archival Transmitting (PAT) tags on sharks during January-February of FY05 in the Florida Keys and north Florida will be executed with the cooperation of the charter boat industry. PAT tags will be programmed to detach from individuals during late spring and early summer when sharks have recruited to coastal areas.

Cooperative Research-Habitat Utilization among Coastal Sharks

Through a collaborative effort between SEFSC Panama City Shark Population Assessment Group and Mote Marine Laboratory, the utilization of coastal habitats by neonate and young-of-the-year blacktip and Atlantic sharpnose sharks will be monitored through an array of underwater acoustic receivers (VR2, Vemco Ltd.) placed throughout each study site. Movement patterns, home ranges, activity space, survival, and length of residence of individuals will be compared by species and area to provide information to better manage critical species and essential fish habitats.

Cooperative Research-Characterization of Bycatch in the Gulf Butterfish, (*Peprilus burti*), Trawl Fishery, with an Emphasis on Identification of Life History Parameters for several Potentially High-Risk Species

A proposal with the SEFSC Panama City Shark Population Assessment Group and the University of Florida was submitted to MARFIN to quantify and qualify the elasmobranch bycatch in the butterfish, (*Peprilus triacanthus)*, trawl fishery in the Gulf of Mexico. Determination of life history parameters for the roundel skate, (*R. texana)*, the clearnose skate, (*R. eglanteria)*, the spreadfin skate (*Dipturus olseni)*, and the Atlantic angel shark, (*Squatina dumerili)* will be developed ultimately for the estimation of vital rates. Vital rate information will be used to determine the productivity of the stocks and ensure that they are harvested at sustainable levels.

Coastal Shark Assessment Research Surveys

The SEFSC Mississippi Laboratories in Pascagoula have been operating annual research cruises aboard NOAA vessels since 1995. The objectives of this program are to conduct bottom longline surveys to assess the distribution and relative abundance of coastal sharks along U.S. and Mexican waters of the Gulf of Mexico and the U.S. eastern seaboard. This is the only long-term, nearly stock-wide, fishery-independent survey of Atlantic sharks conducted in U.S. and neighboring waters. Ancillary objectives are to collect biological and environmental data, and to tag-and-release sharks. Starting in 2001 and under the auspices of the Mex-US Gulf Program, the Pascagoula Laboratories have provided logistical and technical support to Mexico's Instituto Nacional de la Pesca to conduct a cooperative research cruise aboard the Mexican research vessel Onjuku in Mexican waters of the Gulf of Mexico. The cruise also took place in 2002, but was suspended in 2003 and 2004 because of mechanical problems with the research vessel and other issues.

Cooperative Research--The capture depth, time, and hooked survival rate for bottom longline-caught large coastal sharks

A collaborative effort between SEFSC Panama City Shark Population Assessment Group and the University of Florida to examine alternative measures in the shark bottom longline fishery to reduce mortality on prohibited sharks such as reduced soak time, restrictions on the length of gear, and fishing depth restrictions will be tested using hook timers. Funding is being sought through the NMFS Cooperative Research Program.

3.3 Habitat

3.3.1 Regulatory Requirements

Section 303(a)(7) of the Magnuson-Stevens Act, 16 U.S.C. §§ 1801 *et seq*., as amended by the Sustainable Fisheries Act in 1996, requires that FMPs describe and identify essential fish habitat (EFH), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat. The Magnuson-Stevens Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." (16 U.S.C. § 1802 (10)). The EFH regulations (at 50 C.F.R. 600 Subpart J) provide additional interpretation of the definition of essential fish habitat: "'Waters' include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include aquatic areas historically used by fish where appropriate; 'substrate' includes sediment, hard bottom, structures underlying the waters, and associated biological communities; 'necessary' means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and 'spawning, breeding, feeding, or growth to maturity' covers a species' full life cycle."

The EFH regulations require that EFH be described and identified within the U.S. Exclusive Economic Zone (EEZ) for all life stages of each species in a fishery management unit. FMPs must describe EFH in text, tables, and figures, as appropriate, that provide information on the biological requirements for each life history stage of the species. According to the EFH regulations, an initial inventory of available environmental and fisheries data sources should be undertaken to compile information necessary to describe and identify EFH and to identify major species-specific habitat data gaps. Available information should be evaluated through a hierarchical analysis based on: distribution data for some or all portions of the geographic range of a species (Level 1); habitat-related densities or relative abundances (Level 2); growth, reproduction, or survival rate comparisons between habitats (Level 3); and habitat-dependent production rates (Level 4). This information should be interpreted with a risk-averse approach to ensure that adequate areas are protected as EFH for the managed species. Habitats that satisfy the criteria in the Magnuson-Stevens Act have been identified and described as EFH in the 1999 FMPs and in Amendment 1 to the 1999 Tunas, Swordfish, and Shark FMP.

NMFS originally described and identified EFH and related EFH regulatory elements for all HMS in the management unit in the 1999 FMPs, and more recently updated EFH for five shark species (blacktip, dusky, finetooth, nurse, and sandbar) in Amendment 1 to the 1999 Tunas, Swordfish, and Shark FMP, which was implemented in 2003. The EFH regulations further require NMFS to conduct a comprehensive review of all EFH related information at least once every five years and revise or amend the EFH provisions if warranted. This includes modifying the boundaries of areas considered to be EFH. To that effect, NMFS is currently undertaking the comprehensive five-year review of information pertaining to EFH for all HMS in the management unit.

NMFS is currently conducting a review of the most recent life history and EFH related information available for HMS in the management unit, with an emphasis on the factors that influence distribution of the species. This includes information available in the form of fishery-independent sources (directed research investigations) fishery-dependent sources (capture and bycatch reporting), and fishery observer data. For more information on identifying EFH see Section 2.2.

3.3.1.1 Habitat Areas of Particular Concern

The EFH regulations encourage FMPs and FMP amendments to identify habitat areas of particular concern (HAPCs) within EFH, for habitats that satisfy one or more of the criteria of being sensitive or vulnerable to environmental stresses, are rare, or are particularly important ecologically to the species. HAPCs represent subsets of identified EFH areas based upon the importance of their ecological function, their sensitivity to human-induced environmental degradation, development activities that serve as stressors on the habitat, and the rarity of the habitat. These areas should be identified to provide additional focus for conservation efforts.

Because of the lack of specific, detailed information regarding HMS habitat associations, the 1999 FMPs and Amendment 1 to the 1999 Tunas, Swordfish, and Shark FMP identified HAPC for only one HMS. The HAPC areas identified were for sandbar shark nursery and pupping grounds in Great Bay, NJ, lower and middle Delaware Bay, lower Chesapeake Bay, MD, and near the Outer Banks, NC, in areas of Pamlico Sound and off Hatteras and Ocracoke Islands. It is possible that the comprehensive five year review of new EFH related information may result in the identification of HAPCs for additional HMS species. For more information on identifying HAPCs see Section 2.2.

3.3.1.2 Research and Information Needs

The EFH regulations suggest that FMPs and FMP amendments should contain recommendations, preferably in priority order, for research efforts that have been identified as necessary for carrying out the EFH management mandate. The 1999 FMPs containe numerous recommendations for data needs, and many of these are being addressed through ongoing research efforts and data collection. These efforts vary from the gathering of additional information from diverse sources in order to better map the distributions of EFH, to long range research projects that will provide additional life history information for use in better defining the environmental parameters that influence the distribution of the HMS. For example, the highest priority recommendation was to continue the delineation of shark nurseries and establish geographic boundaries of the summer nurseries of commercially important species. To address this, in 2002, NOAA scientists, including the NEFSC, completed a research synthesis project to delineate shark nursery areas along the Atlantic East coast and in the Gulf of Mexico (McCandless *et al*., 2003). The results of the comprehensive five year review should also result in an updated identification of research and information needs that should be addressed in order to improve the ability to conserve and manage habitat concerns under the EFH mandate. Updates on some of the research can be found in Section 3.3.3.

3.3.2 Habitat Types and Distributions

HMS traverse large expanses of the world’s oceans, straddling jurisdictional boundaries. Although many of the species frequent other oceans of the world, the Magnuson-Stevens Act only authorizes the description and identification of EFH in Federal, state or territorial waters, including areas of the U.S. Caribbean, the Gulf of Mexico and the Atlantic coast of the United

States to the seaward limit of the U.S. EEZ. These areas are connected by currents and water patterns that influence the occurrence of HMS at particular times of the year. On the largest scale, the North and South Equatorial currents bathe the U.S. Caribbean islands. The North Equatorial Current continues through the Caribbean Basin to enter the Gulf of Mexico through the Yucatan Straits. The current continues through the Florida Straits to join the other water masses (including the Antilles Current) to form the Gulf Stream along the eastern coast of the United States. Variations in flow capacities of the Florida Straits and the Yucatan Straits produce the Loop Current, the major hydrographic feature of the Gulf of Mexico. These water movements in large part influence the distributions of the pelagic life stages of HMS.

Tuna, swordfish, and billfish distributions are most frequently associated with hydrographic features such as density fronts between different water masses. The scales of these features vary. For example, the river plume of the Mississippi River extends for miles into the Gulf of Mexico and is a fairly predictable feature, depending on the season. Fronts that set up over the De Soto Canyon in the Gulf of Mexico, or over the Charleston Bump or the Baltimore Canyon in the Mid-Atlantic, may be of a much smaller scale. The locations of many fronts or frontal features are statistically consistent within broad geographic boundaries. These locations are influenced by riverine inputs, movement of water masses, and the presence of topographic structures underlying the water column, thereby influencing the habitat of HMS. Those areas that are known spawning grounds, or areas of aggregation for feeding or other reasons, are considered to be EFH for those species.

Sharks are found in a wide variety of coastal and ocean habitats including estuaries, nearshore areas, the continental shelf, continental slope, and open ocean. Many species are migratory and, like all other marine species, are affected by the condition of the habitat. Atlantic sharks are broadly distributed as adults but have been found to utilize specific estuaries as pupping and nursery areas during pupping season and throughout their neonate (newborn) life stages which may vary from a few to many months. Since coastal and coastal pelagic species frequently appear near shore and have pupping and nursery areas near shore, much more is known about their habitat requirements, particularly for early life history stages. Much less is known about the habitat requirements, pupping areas, and other details of pelagic and deep dwelling species.

The following sections are intended to provide a general overview of the various habitats with which HMS are most frequently associated. A more detailed description is contained in the 1999 Tunas, Swordfish, and Shark FMP.

3.3.2.1 Atlantic Ocean

Material in this section is largely a summary of information in MMS, 1992; 1996. Original sources of information are referenced in those documents.

The region of the Atlantic Ocean within which EFH for Federally managed HMS is identified spans the area between the Canadian border in the north and the Dry Tortugas in the south. It includes a diverse spectrum of aquatic species of commercial, recreational, and ecological importance. The distribution of marine species along the Atlantic seaboard is strongly affected by the cold Labrador Current in the northern part, the warm Gulf Stream in the middle and southern portions of the region, and generally by the combination of high summer and low winter temperatures. For many species Cape Hatteras forms a strong zoogeographic boundary between the Mid- and South Atlantic areas, while the Cape Cod/Nantucket Island area is a somewhat weaker zoogeographic boundary in the north.

Coastal and Estuarine Habitat

Although HMS move primarily through open ocean waters, they do periodically utilize inshore habitats. This is especially true for several species of sharks that move inshore, often into shallow coastal waters and estuaries, to give birth; these areas then become nursery areas as the young develop. Examples include Great Bay, New Jersey, Chesapeake Bay, Maryland and Delaware Bay, Delaware which provide important nursery habitat for sandbar sharks, and Bull's Bay, South Carolina, and Terrebone Bay, Louisiana which are important blacktip shark nursery areas. Typically, the pups (neonates) remain in these same areas throughout their early life stages, which may vary from a few to many months. Recent tagging studies have shown that some sharks return to summer nursery areas in subsequent years. Although billfish move primarily throughout open-ocean waters, two species, the white marlin and the sailfish can be found inshore. Sailfish are also known to move inshore to spawn off the east coast of Florida and in the Florida Keys.

Coastal habitats that may be encountered by HMS are described in this section. Those areas that are known nursery or spawning grounds, or areas of HMS aggregation for feeding or other reasons, are considered to be EFH for those species. It should be noted that characteristics of coastal and offshore habitats may be affected by activities and conditions occurring outside of those areas (farther up-current) due to water flow or current patterns that may transport materials that could cause negative impacts.

Estuaries are highly productive, yet fragile, environments that support a great diversity of fish and wildlife species, including sharks. Many commercially valuable fish and shellfish stocks are dependent on these areas during some stage of their development. In the vicinity of North Carolina, Virginia, and Maryland, approximately 90 percent of the commercially valuable fish species are dependent on estuaries for at least part of their life cycle.

Along the Atlantic seaboard coastal wetlands are located predominantly south of New York because these coastal areas have not been glaciated. Nearly 75 percent of the Atlantic coast salt marshes are found in the states of North Carolina, South Carolina, and Georgia. These three states contain approximately nine million acres of salt marsh. Wetland vegetation plays an important role in nutrient cycling, and provides stability to coastal habitats by preventing the erosion of sediments and by absorbing the energy of storms.

There are 13,900 square miles (sq mi) (36,000 square kilometers (sq km)) of estuarine habitat along the Atlantic coast, of which approximately 68 percent (9,400 sq mi) occurs north of the Virginia/ North Carolina border, with Chesapeake Bay contributing significantly to the total. South of the Gulf of Maine, where there is a wider coastal plain and greater agricultural activity, estuaries carry higher sediment and nutrient loads. The increased fertility and generally higher water temperatures resulting from these nutrient loads allow these estuaries to support greater numbers of fish and other aquatic organisms.

South of the Virginia/North Carolina border, there are approximately 4,500 sq mi (11,655 sq km) of estuarine habitat. The Currituck, Albemarle, and Pamlico Sounds, which together constitute the largest estuarine system along the entire Atlantic coast, make up a large portion of these southern estuaries. A unique feature of these sounds is that they are partially enclosed and protected by a chain of fringing islands, the Outer Banks, located 32 to 48 km (20 to 30 mi) from the mainland.

Because of their low tidal flushing rates, estuaries are generally more susceptible to pollution than other coastal water bodies. The severity of the problem varies depending on the extent of tidal flushing. In Maryland and Virginia, the primary problems reported are excessive nutrients (nitrates and phosphates), particularly in the Chesapeake Bay and adjoining estuarine areas. Other problems included elevated bacterial and suspended sediment levels. Non-point sources of pollution are considered one of the main causes of pollution. Elevated bacterial levels were also listed as a local coastal pollution problem in Maryland.

In North Carolina, the primary problems listed for estuarine areas were enrichment in organics and nutrients, fecal coliform bacteria, and low dissolved oxygen. Insufficient sewage treatment, wide-spread use of septic systems in coastal areas, as well as agricultural runoff are considered to be major causes of these pollution problems. Oil spills from vessel collisions and groundings, as well as illegal dumping of waste oil, are a common cause of local, short-term water quality problems, especially in estuaries along the North and Mid-Atlantic coasts. These sources of pollution and habitat degradation may have a negative impact on coastal shark populations, particularly during vulnerable early life stages.

Many of the coastal bays and estuaries along the AtlanticEast Coast and Gulf of Mexico are described in greater detail in the 1999 Tunas, Swordfish, and Shark FMP, including the distribution, size, depth, freshwater inflow, habitat types, tidal range and salinity for each of the major estuaries and bays on the East coast and Gulf coast, and are not repeated here.

Continental Shelf and Slope Areas

Moving seaward away from the coast, the next major geologic features encountered are the continental shelf and slope areas. The continental shelf is characterized by depths ranging from a few meters to approximately 60 meters (m) (198 ft), with a variety of bottom habitat types. Far less research has been done in this area than on the coasts and estuaries, and consequently much less is known about the specific habitat requirements of HMS within these regions.

The shelf area of the Mid-Atlantic Bight averages about 100 km (60 mi) in width, reaching a maximum of 150 km (90 mi) near Georges Bank, off New England, and a minimum of 50 km (30 mi) offshore Cape Hatteras, NC. Current speeds are strongest at the narrowest part of the shelf where wind-driven current variability is highest. The distribution of marine species, including HMS, along the Atlantic seaboard may be strongly influenced by currents, the warm Gulf Stream in the middle and south portions of the region, and generally by the combination of high summer and low winter temperatures.

The continental shelf in the South Atlantic Bight varies in width from 50 km (32 mi) off Cape Canaveral, FL to a maximum of 120 km (75 mi) off Savannah, GA, and a minimum of 30 km (19 mi) off Cape Hatteras. The shelf is divided into three cross-shelf zones. Waters on the inner shelf (0 to 20 m (0 to 66 ft)) interact extensively with rivers, coastal sounds, and estuaries. This interaction tends to form a band of low-salinity, stratified water near the coast that responds quickly to local wind-forcing and seasonal atmospheric changes. Mid-shelf (20 to 40 m (66 to 132 ft)) current flow is strongly influenced by local wind events with frequencies of two days to two weeks. In this region, vertically well mixed conditions in fall and winter contrast with vertically stratified conditions in the spring and summer. Gulf Stream frontal disturbances (e.g., meanders and cyclonic cold core rings) that occur on time scales of two days to two weeks dominate currents on the outer shelf (40 to 60 m (132 to 197 ft)).

The Mid-Atlantic area from Cape Cod, MA to Cape Hatteras, NC represents a transition zone between northern cold-temperate waters of the north and the warm-temperate waters to the south. Water temperatures in the Mid-Atlantic vary greatly by season. Consequently, many of the fish species of importance in the Mid-Atlantic area migrate seasonally, whereas the major species in the other three areas are typically resident throughout the year (MMS, 1992; 1996). The shelf-edge habitat may range in water depth between 40 and 100 m (131 and 328 ft). The bottom topography varies from smooth sand to mud to areas of high relief with associated corals and sponges. The fish species found in this area include parrotfish (*Scaridae*) and the deepwater species of the snapper-grouper assemblage.

The continental slope generally has smooth mud bottoms in water depths of 100 to 200 m (328 to 656 ft). Many of the species in this zone are representatives of cold water northern species exhibiting tropical submergence (i.e., being located in deeper, cooler water as latitude decreases).

A topographic irregularity southeast of Charleston, SC, known as the Charleston Bump, is an area of productive sea floor which rises abruptly from 700 to 300 m (2,300 to 980 ft) within a distance of about 20 km (12 mi), and at an angle which is approximately transverse to both the general isobath pattern and the Gulf Stream currents. The Charleston Gyre is a persistent oceanographic feature that forms in the lee of the Charleston Bump. It is a location in which larval swordfish have been commonly found and may serve as nursery habitat.

Pelagic Environment

Many HMS spend their entire lives in the pelagic, or open ocean environment. These species are highly mobile and physiologically adapted to traveling great distances with minimal effort. Much of what is known about the association between HMS and their migrations across vast open ocean habitat comes from tagging studies.

While the open ocean may appear featureless, there are major oceanographic features such as currents, temperature gradients, eddies, and fronts that occur on a large scale and may influence the distribution patterns of many oceanic species, including HMS. For instance, the Gulf Stream produces meanders, filaments, and warm and cold core rings that significantly affect the physical oceanography of the continental shelf and slope. These features tend to aggregate both predators and prey, and are frequently targeted by commercial fishing vessels. This western boundary current has its origins in the tropical Atlantic Ocean (i.e., the Caribbean Sea). The Gulf Stream system is made up of the Yucatan Current that enters the Gulf of Mexico through the Yucatan Straits; the Loop Current which is the Yucatan Current after it separates from Campeche Bank and penetrates the Gulf of Mexico in a clockwise flowing loop; the Florida Current, as it travels through the Straits of Florida and along the continental slope into the South Atlantic Bight; and the Antilles Current as it follows the continental slope (Bahamian Bank) northeast to Cape Hatteras. From Cape Hatteras it leaves the slope environment and flows into the deeper waters of the Atlantic Ocean.

The flow of the Gulf Stream as it leaves the Straits of Florida reaches maximum speeds of about 200 cm/s. During strong events, maximum current speeds greater than 250 cm/s have been recorded offshore of Cape Hatteras. The width of the Gulf Stream at the ocean surface ranges from 80 to 100 km (50 to 63 mi) and extends to depths of between 800 and 1,200 m (2,624 to 3,937 ft).

As a meander passes, the Gulf Stream boundary oscillates sequentially onshore (crest) and offshore (trough). A meander can cause the Gulf Stream to shift slightly shoreward or well offshore into deeper waters. The Gulf Stream behaves in two distinct meander modes (small and large), with the size of the meanders decreasing as they move northward along the coast. During the large meander mode the Gulf Stream front is seaward of the shelf break, with its meanders having large amplitudes. Additionally, frontal eddies and accompanying warm-water filaments are larger and closer to shore. During the small meander mode the Gulf Stream front is at the shelf break. Frontal eddies and warm-water filaments associated with small amplitude meanders are smaller and farther from shore. Since HMS tend to follow the edge of the Gulf Stream, their distance from shore can be greatly influenced by the patterns of meanders and eddies.

Meanders have definite circulation patterns and conditions superimposed on the statistical mean (average) condition. As a meander trough migrates in the direction of the Gulf Stream's flow, it upwells cool nutrient-rich water, which at times may move onto the shelf and may evolve into an eddy. These boundary features move south-southwest. As warm-water filaments, they transfer momentum, mass, heat, and nutrients to the waters of the shelf break.

Gulf Stream filaments are mesoscale events which occur regularly offshore the southeast United States. The filament is a tongue of water extending from the Gulf Stream pointing to the south. These form when meanders cause the extrusion of a warm surface filament of Gulf Stream water onto the outer shelf. The cul-de-sac formed by this extrusion contains a cold core that consists of a mix of outer-shelf water and nutrient-rich water. This water mix is a result of upwelling as the filament/meander passes along the slope. The period from genesis to decay typically is about two to three weeks.

The Charleston Gyre is a permanent oceanographic feature of the South Atlantic Bight, caused by the interaction of the Gulf Stream waters with the topographically irregular Charleston Bump. The gyre produces an upwelling of nutrients, which contributes significantly to primary and secondary productivity of the Bight. The degree of upwelling varies with the seasonal position and velocity of the Gulf Stream currents.

In the warm waters between the west edge of the Florida Current/Gulf Stream and 20° N and 40° N, pelagic brown algae, *Sargassum natans* and *S. fluitans*, form a dynamic structural habitat. The greatest concentrations are found within the North Atlantic Central Gyre in the Sargasso Sea. Large quantities of *Sargassum* frequently occur on the continental shelf off the southeastern United States. Depending on prevailing surface currents, this material may remain on the shelf for extended periods, be entrained into the Gulf Stream, or be cast ashore. During calm conditions *Sargassum* may form irregular mats or simply be scattered in small clumps. Oceanographic features such as internal waves and convergence zones along fronts aggregate the algae along with other flotsam into long linear or meandering rows collectively termed "windrows."

Pelagic *Sargassum* supports a diverse assemblage of marine organisms including fungi, micro- and macro-epiphytes, sea turtles, numerous marine birds, at least 145 species of invertebrates, and over 100 species of fishes. The fishes associated with pelagic *Sargassum* include juveniles as well as adults, including large pelagic adult fishes. Swordfish and billfish are among the fishes that can be found associated with *Sargassum*. The *Sargassum* community, consisting of the floating *Sargassum* (associated with other algae, sessile and free-moving invertebrates, and finfish) is important to some epipelagic predators such as wahoo and dolphin. The *Sargassum* community provides food and shelter from predation for juvenile and adult fish, including HMS, and may have other functions such as habitat for fish eggs and larvae.

Offshore water quality in the Atlantic is controlled by oceanic circulation, which, in the Mid-Atlantic is dominated by the Gulf Stream and by oceanic gyres. A shoreward, tidal and wind-driven circulation dominates as the primary means of pollutant transport between estuaries and the nearshore. Water quality in nearshore water masses adjacent to estuarine plumes and in water masses within estuaries is also influenced by density-driven circulation. Suspended sediment concentration can also be used as an indication of water quality. For the Atlantic coastal areas, suspended sediment concentration varies with respect to depth and distance from shore, the variability being greatest in the mid-Atlantic and South Atlantic. Re-suspended bottom sediment is the principal source of suspended sediments in offshore waters.

3.3.2.2 Gulf of Mexico

(Material in this section is largely a summary of information in MMS, 1996; Field *et al.*, 1991; and NOAA 1997. Original sources of information are referenced in those documents.)

The Gulf of Mexico supports a great diversity of fish resources that are related to a variety of ecological factors, such as salinity, primary productivity, and bottom type. These factors differ widely across the Gulf of Mexico and between inshore and offshore waters. Characteristic fish resources are not randomly distributed; high densities of fish resources are associated with particular habitat types (e.g., east Mississippi Delta area, Florida Big Bend sea grass beds, Florida Middle Grounds, mid-outer shelf, and the De Soto Canyon area). The highest values of surface primary production are found in the upwelling area north of the Yucatan Channel and in the De Soto Canyon region. In terms of general biological productivity, the western Gulf is considered to be more productive in the oceanic region than is the eastern Gulf. Productivity of areas where HMS are known to occur varies between the eastern and western Gulf, depending on the influence of the Loop Current.

Coastal and Estuarine Habitats

There are 5.62 million hectares (ha) (13.88 million acres) of estuarine habitat among the five states bordering the Gulf. This includes 3.2 million ha (8 million acres) of open water, 2.43 million ha (6 million acres) of emergent tidal vegetation (including about 162,000 ha (400,318 acres) of mangroves), and 324,000 ha (800, 636 acres) of submerged vegetation. Estuaries are found from east Texas through Louisiana, Mississippi, Alabama, and northwest Florida and encompass more than 62,000 sq km (23,938 sq mi) of water surface area. Estuaries of the Gulf of Mexico export considerable quantities of organic material, thereby enriching the adjacent continental shelf areas, and many of these estuaries provide important habitat as pupping and nursery grounds for juvenile stages of many important invertebrate and fish species including many species of Atlantic sharks.

Coastal wetland habitat types that occur along the Gulf Coast include mangroves, non-forested wetlands (fresh, brackish, and saline marshes), and forested wetlands. Marshes and mangroves form an interface between marine and terrestrial habitats, while forested wetlands occur inland from marsh areas. Wetland habitats may occupy narrow bands or vast expanses, and can consist of sharply delineated zones of different species, monospecific stands of a single species, or mixed plant species communities.

Continental Shelf and Slope Areas

The Gulf of Mexico is a semi-enclosed, subtropical sea with a surface area of approximately 1.6 million sq km (0.6 million sq mi). The main physiographic regions of the Gulf basin are the continental shelf, continental slope and associated canyons, the Yucatan and Florida Straits, and the abyssal plains. The U.S. continental shelf is narrowest, only 16 km (9.9 mi) wide, off the Mississippi River. The continental shelf width varies significantly from about 350 km (217 mi) offshore western Florida, 156 km (97 mi) off Galveston, TX, and decreasing to 88 km (55 mi) off Port Isabel near the Mexican border. The depth of the central abyss ranges to 4,000 m (13,000 ft). The Gulf is unique because it has two entrances: the Yucatan Strait and the Straits of Florida. The Gulf's general circulation is dominated by the Loop Current and its associated eddies. The Loop current is caused by differences between the sill depths of the two straits. Coastal and shelf circulation, on the other hand, is driven by several forcing mechanisms: wind stress, freshwater input, buoyancy and mass fluxes, and transfer of momentum and energy through the seaward boundary.

In the Gulf, the continental shelf extends seaward from the shoreline to about the 200-m water depth (660 ft), and is characterized by a gentle slope of less than one degree. The continental slope extends from the shelf edge to the continental rise, usually at about the 2,000-m (6,500 ft) water depth. The topography of the slope in the Gulf is uneven and is broken by canyons, troughs, and escarpments. The gradient on the slope is characteristically one to six degrees, but may exceed 20 degrees in some places, particularly along escarpments. The continental rise is the apron of sediment accumulated at the base of the slope. The incline is gentle with slopes of less than one degree. The abyssal plain is the basin floor at the base of the continental rise.

Physical Oceanography

The Gulf receives large amounts of freshwater runoff from the Mississippi River as well as from a host of other drainage systems. In recent years, large amount of nutrient laden runoff from the Mississippi River have resulted in large hypoxic or low oxygen areas in the Gulf. This "dead zone" may affect up to 16,500 sq km (6,371 sq mi) during the summer, resulting in unfavorable habitat conditions for a wide variety of species.

Sea-surface temperatures in the Gulf range from nearly constant throughout (isothermal) (29° to 30°C (84° to 86°F)) in August to a sharp horizontal gradient in January, (25°C (77°F) in the Loop Current core to 14° to 15° C (57° to 59°F) along the northern shelf). The vertical distribution of temperature reveals that in January, the thermocline depth is about 30 to 61 m (98 to 200 ft) in the northeast Gulf and 91 to 107 m (298 to 350 ft) in the northwest Gulf. In May, the thermocline depth is about 46 m (150 ft) throughout the entire Gulf.

Sea surface salinities along the north Gulf vary seasonally. During months of low freshwater input, salinities near the coastline range between 29 to 32 ppt. High freshwater input conditions during the spring and summer months result in strong horizontal gradients and inner shelf salinities less than 20 ppt. The mixed layer in the open Gulf, from the surface to a depth of approximately 100 to 150 m (330 to 495 ft), is characterized by salinities between 36.0 and 36.5 ppt.

Sharp discontinuities of temperature and/or salinity at the sea surface, such as the Loop Current front or fronts associated with eddies or river plumes, are dynamic features that may act to concentrate buoyant material such as detritus, plankton, or eggs and larvae. These materials are transported, not by the front's movements or motion across the front, but mainly by lateral movement along the front. In addition to open ocean fronts, a coastal front, which separates turbid, lower salinity water from the open-shelf regime, is probably a permanent feature of the north Gulf shelf. This front lies about 30 to 50 km (19 to 31 mi) offshore. In the Gulf, these fronts are the most commonly utilized habitat of the pelagic HMS species.

The Loop Current is a highly variable current entering the Gulf through the Yucatan Straits and exiting through the Straits of Florida (as a component of the Gulf Stream) after tracing an arc that may intrude as far north as the Mississippi-Alabama shelf. This current has been detected down to about 1,000 m (3,300 ft) below the surface. Below that level there is evidence of a countercurrent. When the Loop Current extends into or near shelf areas, instabilities, such as eddies, may develop that can push warm water onto the shelf or entrain cold water from the shelf. These eddies consist of warm water rotating in a clockwise fashion. Major Loop Current eddies have diameters on the order of 300 to 400 km (186 to 249 miles), and may extend to a depth of about 1,000 m. Once these eddies are free from the Loop Current, they travel into the western Gulf along various paths to a region between 25° N to 28° N and 93° W to 96° W. As eddies travel westward a decrease in size occurs due to mixing with resident waters and friction with the slope and shelf bottoms. The life of an individual eddy, until its eventual assimilation by regional circulation in the west ernGulf, is about one year. Along the Louisiana/Texas slope, eddies are frequently observed to affect local current patterns, hydrographic properties, and possibly the biota of fixed oil and gas platforms or hard bottoms.

Once an eddy is shed, the Loop Current undergoes major dimensional adjustments and reorganization.

3.3.2.3 U.S. Caribbean

(Material in this section is largely a summary of information in Appeldoorn and Meyers, 1993. Original sources of information are referenced in that document.)

The waters of the Caribbean region include the coastal waters surrounding the U.S. Virgin Islands and Puerto Rico. All of these Caribbean islands, with the exception of St. Croix, are part of a volcanic chain of islands formed by the subduction of one tectonic plate beneath another. Tremendously diverse habitats (rocky shores, sandy beaches, mangroves, seagrasses, algal plains, and coral reefs) and the consistent light and temperature regimes characteristic of the tropics are conducive to high species diversity.

The waters of the Florida Keys and southeast Florida are intrinsically linked with the waters of the Gulf of Mexico and the waters of the Caribbean to the west, south, and east, and to the waters of the South Atlantic Bight to the north. These waters represent a transition from insular to continental regimes and from tropical to temperate regimes. This zone, therefore, contains one of the richest floral and faunal complexes.

Coastal and Estuarine Habitats

Although the U.S. waters of the Caribbean are relatively nutrient poor, and therefore have low rates of primary and secondary productivity, they display some of the greatest diversity of any part of the South Atlantic region. High and diverse concentrations of biota are found where habitat is abundant. Coral reefs, sea grass beds, and mangrove ecosystems are the most productive of the habitat types found in the Caribbean, but other areas such as soft-bottom lagoons, algal hard grounds, mud flats, salt ponds, sandy beaches, and rocky shores are also important in overall productivity. These diverse habitats allow for a variety of floral and faunal populations.

Offshore, between the sea grass beds and the coral reefs and in deeper waters, sandy bottoms and algal plains dominate. These areas may be sparsely or densely vegetated with a canopy of up to one meter of red and brown algae. Algal plains are not areas of active sand transport. These are algae-dominated sandy bottoms, often covered with carbonate nodules. They occur primarily in deep water (> 15 m, or 50 ft), and account for roughly 70 percent of the area of the insular shelf of the U.S. Virgin Islands. Algal plains support a variety of organisms including algae, sponges, gorgonians, solitary corals, mollusks, fish, and worms, and may serve as critical juvenile habitat for commercially important (and diminishing) species such as queen triggerfish and spiny lobsters.

Coral reefs and other coral communities are some of the most important ecological (and economic) coastal resources in the Caribbean. They act as barriers to storm waves and provide habitat for a wide variety of marine organisms, including most of the economically important species of fish and shellfish. They are the primary source for carbonate sand, and serve as the basis for much of the tourism. Coral communities are made by the build up of calcium carbonate produced by living animals, coral polyps, in symbiosis with a dinoflagellate, known as zooxanthellae. During summer and early fall, most of the coral building organisms are at or near the upper temperature limit for survival and so are living under natural conditions of stress. Further increase in local or global temperature could prove devastating.

Sea grass beds are highly productive ecosystems that are quite extensive in the Caribbean; some of the largest sea grass beds in the world lie beyond the shore on both sides of the Keys. Sea grass beds often occur in close association with shallow-water coral reefs. Seagrasses are flowering plants that spread through the growth of roots and rhizomes. These act to trap and stabilize sediments, reduce shoreline erosion, and buffer coral reefs; they provide food for fish, sea turtles (heavy grazers), conch, and urchins; they provide shelter and habitat for many adult species and numerous juvenile species who rely on the sea grass beds as nursery areas; and they provide attachment surfaces for calcareous algae.

Mangrove habitats are very productive coastal systems that support a wide variety of organisms. The mangrove food web is based largely on the release of nutrients from the decomposition of mangrove leaves, and in part on the trapping of terrestrial material. Red mangroves (*Rhizophora mangle*), with their distinctive aerial prop roots, grow along the shoreline, often in mono-specific stands. The roots of the red mangroves help to trap sediments and pollutants associated with terrestrial runoff and help to buffer the shore from storm waves. Red mangrove forests support a diverse community of sponges, tunicates, algae, larvae, and corals, as well as juvenile and adult fish and shellfish. Black mangroves (*Aveicennia germinans*) and white mangroves (*Laguncularia racemosa*) grow landward of the red mangroves. They also act as important sediment traps. Exposed and sheltered mangrove shorelines are common throughout the U.S. Caribbean.

Throughout the U.S. Caribbean, both rocky shores and sandy beaches are common. While many of these beaches are high-energy and extremely dynamic, buffering by reefs and seagrasses allows some salt-tolerant plants to colonize the beach periphery. Birds, sea turtles, crabs, clams, worms, and urchins use the intertidal areas.

Salt ponds, common in the U.S. Virgin Islands, are formed when mangroves or fringing coral reefs grow or storm debris is deposited, effectively isolating a portion of a bay. The resulting “pond” undergoes significant fluctuations of salinity with changes in relative evaporation and runoff. The biota associated with salt ponds are, therefore, very specialized, and usually somewhat limited. Salt ponds are extremely important in trapping terrestrial sediments before they reach the coastal waters.

Insular Shelf and Slope Areas

Puerto Rico and the U.S. Virgin Islands contain a wide variety of coastal marine habitats, including coral and rock reefs, sea grass beds, mangrove lagoons, sand and algal plains, soft bottom areas, and sandy beaches. These habitats are, however, very patchily distributed. Nearshore waters range from zero to 20 m (66 ft) in depth, and outer shelf waters range from 20 to 30 m (66 to 99 ft) in depth, the depth of the shelf break. Along the north coast the insular shelf is very narrow (two to three km wide), seas are generally rough, and few good harbors are present. The coast is a mixture of coral and rock reefs, and sandy beaches. The east coast has an extensive shelf that extends to the British Virgin Islands. Depth ranges from 18 to 30 m (59 to 99 ft). Much of the bottom is sandy, commonly with algal and sponge communities. The southeast coast has a narrow shelf (eight km wide). About 25 km (15.5 mi) to the southeast is Grappler Bank, a small seamount with its summit at a depth of 70 m (231 ft). The central south coast broadens slightly to 15 km (99 mi) and an extensive sea grass bed extends nine kilometers offshore to Caja de Muertos Island. Further westward, the shelf narrows again to just 2 km (1.2 mi) before widening at the southwest corner to over 10 km (6 mi). The entirety of the southern shelf is characterized by hard or sand-algal bottoms with emergent coral reefs, grass beds, and shelf edge. Along the southern portion of the west coast the expanse of shelf continues to widen, reaching 25 km (15.5 mi) at its maximum. A broad expanse of the shelf is found between 14 and 27 m (46 and 99 ft), where habitats are similar to those of the south coast. To the north, along the west coast, the shelf rapidly narrows to two to three kilometers.

Physical Oceanography

U.S. Caribbean waters are primarily influenced by the westward flowing North Equatorial Current, the predominant hydrological driving force in the Caribbean region. It flows from east to west along the northern boundary of the Caribbean plateau and splits at the Lesser Antilles, flowing westward along the north coasts of the islands.

The north branch of the Caribbean Current flows west into the Caribbean Basin at roughly 0.5 m (1.7 ft) per second. It is located about 100 km (62 mi) south of the islands, but its position varies seasonally. During the winter it is found further to the south than in summer. Flow along the south coast of Puerto Rico is generally westerly, but this is offset by gyres formed between the Caribbean Current and the island. The Antilles Current flows to the west along the northern edge of the Bahamas Bank and links the waters of the Caribbean to those of southeast Florida.

Coastal surface water temperatures remain fairly constant throughout the year and average between 26° and 30°C (79° and 86°F). Salinity of coastal waters is purely oceanic and therefore is usually around 36 ppt. However, in the enclosed or semi-enclosed embayments salinity may vary widely depending on fluvial and evaporational influences.

It is believed that no up-welling occurs in the waters of the U.S. Caribbean (except perhaps during storm events) and, since the waters are relatively stratified, they are severely nutrient-limited. In tropical waters nitrogen is the principal limiting nutrient.

3.3.3 Stock Assessment and Fishery Evaluation (SAFE) Report – Research Updates

3.3.3.1 Atlantic Sharks

Cooperation between Federal and state governments in developing coordinated conservation measures is important to successful domestic management of coastal shark species because range, migrations and mating and pupping areas overlap some state and even federal jurisdictions. Many coastal species utilize highly productive bays and estuaries within state waters as nursery habitat (where parturition and young-of-the-year sharks occur) and/or secondary nursery habitat (utilized by juveniles, age 1+ only). Studies suggest that these inshore nursery grounds offer selective advantages of low predation rates and high forage abundance to juvenile sharks. Information on these areas is vital to understanding and managing sharks at this vulnerable stage when many sharks come closest to man's influence.

The HMS Management Division is currently funding two cooperative programs that are investigating shark pupping and nursery areas, the Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey, which began in 1998, and the Cooperative Gulf of Mexico States Shark Pupping and Nursery (GULFSPAN) Survey, which was initiated in 2003.

The Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey (McCandless et al. 2004)

The COASTSPAN Survey, an alliance of NMFS and Atlantic state cooperators, continued through 2004. Results for the 2003 sampling year were compiled and synthesized, and the final report is currently under review. Participants in the 2003 COASTSPAN survey included the North Carolina Division of Marine Fisheries, the South Carolina Department of Natural Resources, Coastal Carolina University, the University of Georgia's Marine Extension Service and the University of Florida's Program for Shark Research. Researchers from the National Marine Fisheries Service's Apex Predators Program and the University of Rhode Island conducted the survey in Delaware Bay. A total of 3,698 sharks were sampled in the 2003 COASTSPAN survey. Juvenile sharks sampled, tagged and released during the survey were the Atlantic sharpnose, blacknose, blacktip, bonnethead, bull, dusky, finetooth, nurse, sandbar, sand tiger, scalloped hammerhead, silky, spinner, and tiger sharks, and also the smooth and spiny dogfish. Environmental parameters for each sampling location were also measured to indicate habitat preferences. There were a number of tag recaptures returned by fishery biologists and commercial and recreational fisherman in 2003 from sharks which were tagged by COASTSPAN cooperators in previous years.

In 2003, a pilot study to characterize the diet and niche overlap of the sandbar shark and the smooth dogfish in Delaware Bay was initiated and a total of 277 sandbar shark and 83 smooth dogfish stomachs were sampled. During this pilot study, fishing methods as well as the stomach sampling techniques were refined. In addition, preliminary results from the random stratified sampling plan initiated in 2001 in Delaware Bay indicate that there was an increasing trend in the relative abundance of juvenile sandbar sharks during the summer nursery season from 2001-2003.

The Cooperative Gulf of Mexico States Shark Pupping and Nursery (GULFSPAN) Survey (Carlson et al. 2004)

In 2003, NMFS initiated the Cooperative Gulf of Mexico States Shark Pupping and Nursery (GULFSPAN) Survey to expand upon the Atlantic COASTSPAN Survey. States involved in the program during 2004, the second year of the program, include Florida, Mississippi, Alabama, and Louisiana. Sharks sampled, tagged, and released during the surveys included the Atlantic sharpnose, blacknose, blacktip, bonnethead, bull, finetooth, great hammerhead, sandbar, scalloped hammerhead, and spinner sharks. In addition, environmental parameters were measured and qualitative type recorded. The most abundant sharks included the Atlantic sharpnose, blacktip, and bull shark.

In Florida waters, most species captured were juveniles and young-of-the-year. Among sharks for all areas combined, the Atlantic sharpnose shark, a member of the small coastal management group, was the most abundant shark captured, and the blacktip shark was the most abundant species captured in the large coastal management group. The bonnethead shark was the second most abundant species captured in the small coastal group and overall was the third most encountered species. The remaining species commonly captured in decreasing abundance were the finetooth, spinner, scalloped hammerhead, blacknose, and sandbar shark. Other species infrequently caught were bull shark, and great hammerhead shark, and the Florida smoothhound.

In Missippi/Alabama waters 75 percent of the sharks captured were immature. The blacktip shark was the most abundant species caught, followed by the Atlantic sharpnose, finetooth, and bull sharks. In Louisiana, three species of sharks were caught in the 2004 sampling season; most species captured were juveniles. The blacktip shark was the most abundant species caught, followed by the bull shark. A single adult specimen of the finetooth shark and a single healed-scar, young-of-the-year Atlantic sharpnose shark were also collected in 2004.

New information on habitat preferences is also emerging from this study. Juvenile bonnethead sharks appear to prefer habitat dominated by seagrass (in northwest Florida) or mangroves (Louisiana). In areas where neither of these habitat types is available, juvenile bonnetheads are in very low numbers or absent (i.e. Mississippi Sound). Adult bonnethead sharks, however, are found in diverse habitats ranging from areas with a mud or sand bottom to areas dominated by seagrass. Evidence indicates bull sharks are found among the most diverse environmental conditions with salinities ranging from 15 ppt (in Louisiana and Mississippi) to 33 ppt (in northwest Florida), and over all habitat types. Juvenile sandbar sharks are still predominately caught in the northwest Gulf of Mexico while blacktip, finetooth, and Atlantic sharpnose sharks are found throughout all areas. Although bull sharks can be found over a variety of habitats, the areas of highest abundance are those adjacent to freshwater inflow.

Obtaining information regarding trophic relationships and feeding habits of sharks, also critical to understanding essential fish habitat, is another goal of the program. A quantitative examination of feeding ecology from different areas can assist in understanding how juvenile sharks use nursery habitats, and which habitats are more valuable as nursery areas than others.

Mote Marine Laboratory Center for Shark Research (CSR) (Hueter and Tyminski. In Review)

Mote Marine Laboratory's CSR long-term research program is focusing on identifying and understanding shark nursery areas of the U.S. Gulf of Mexico and southeast Atlantic coasts. This program has aimed to characterize these nursery areas, obtain estimates of juvenile shark relative abundance, distribution, and growth rates, and reveal the movement patterns of these sharks through tagging studies. As of fall 2004, the CSR has collected data on 20,732 sharks of 16 species that utilize these coastal waters as pupping and nursery areas. More than half of the captured sharks (12,241) comprise neonate, young-of-the-year (YOY) or older juvenile sharks. The studies have found that most pupping activity in the region occurs in the late spring and early summer, and the neonate and YOY animals inhabit the primary nurseries throughout the summer and into the fall. Typically, declining water temperatures in the fall are associated with the exit of sharks from these natal waters to warmer southerly, and in some cases offshore, winter nurseries. Tag returns of Year-1 sharks have demonstrated travel distances to winter nursery areas of at least 500 km (311 mi). Tag return data have further demonstrated annual cycles of philopatric behavior whereby juveniles of both large and small coastal species migrate back to their natal nurseries in spring and summer.

3.3.3.2 Atlantic Bluefin Tuna

The Tag-A-Giant (TAG) Program (Block. 2004)

The TAG program, a collaborative effort among scientists from Stanford University, the Monterey Bay Aquarium, and NOAA Fisheries, continued in 2004, placing electronic tags internally and externally on Atlantic bluefin tuna in the North Atlantic to continuously record data. TAG deployed 201 archival and 37 pop-up satellite archival tags (PSATs) over the past two years, during which time 21 archival tags were recovered, more than a third of which were recaptured east of the 45 degree management line.

The objectives of the TAG program are to detail the movements and behaviors of Atlantic bluefin tuna using a range of electronic tagging technologies to answer questions about habitat preferences on spawning and feeding grounds, spawning site fidelity, the level of mixing between eastern and western stocks and how movements are influenced by age class and season; to link the biological data with environmental data to determine how the bluefin's physical environment influences behaviors, movements, abundance and distribution, and to obtain a high enough sample size to develop predictive models that will enable researchers to estimate the abundance and distribution of bluefin based on oceanographic features, season, and year class. This information is being collected primarily to provide ICCAT with the information.

To date, for the entire program over 12,000 geolocation points have been obtained. It is now possible to examine data in relation to year class, season, and spawning grounds visited. Bluefin tuna tagged in the west have shown visitation to both the Mediterranean and Gulf of Mexico spawning grounds. Most visitations to spawning grounds in the Gulf of Mexico occurred in the spring months where spawning fish appear to prefer mesoscale cyclonic eddies in the western Gulf. Data collected to date consistently show that spawning occurs primarily after the bluefin reach 10 years of age. This is quite different from the estimated age of first reproduction at eight years used in current stock assessments by ICCAT for the western stock and five years for the eastern stock. Bluefin tuna that are 8.5 years and younger tend to remain near New England in the summer and fall where as older fish move offshore, many traveling to the east of the 45 degree management zone to the Mid-Atlantic Bight and Flemish Cap. Seasonal patterns are also apparent. Bluefin tuna remained in the coastal and offshore waters of North Carolina and the South Atlantic Bight throughout the winter months, predominately over the shallow continental shelf. In the spring, most fish move north depending on age class, where they remain for the summer before returning to the south in the fall. The movements among regions appear to be dependent on temperature.

In 2002 and 2003, the TAG program expanded tagging efforts to New England, off the coast of Nantucket to spread efforts over a broader area. In 2003, efforts were expanded to the eastern Atlantic off the coast of Ireland where the program has obtained the first data on a new body of fish about which little is currently known. Deploying tags off Ireland will also increase the likelihood of documenting the behaviors of fish spawning in the Mediterranean for comparison to those spawning in the Gulf of Mexico. The improved understanding of bluefin movements and behaviors has important applications for management, and can serve as the basis for necessary changes in current management strategies.

Atlantic BluefinTuna Movements off New England and in the Mid-Atlantic (Wilson et al. In Press)

Beginning in 1997, studies led by the New England Aquarium have implanted pop-up and pop-up archival satellite tags (PSATs) on northern Atlantic bluefin tuna. Recent studies involved the implantation of PSATs into 68 Atlantic bluefin tuna in the southern Gulf of Maine and off the coast of North Carolina between July 2002 and January 2003. Most of the fish tagged in the southern Gulf of Maine in late summer/early fall remained in that area until late October, consistent with previous studies. Of the 33 fish with PSATs remaining attached over the winter months, 14 remained in northern shelf waters (between Maryland and Nova Scotia), 14 moved south to waters off the coasts of Virginia and North Carolina, and five were in offshore waters of the northwestern Atlantic Ocean. In the spring, six of the 11 fish with tags remaining either stayed in northern waters or moved to that area from Virginia and North Carolina waters, and the other five fish moved offshore into the Mid-Atlantic Ocean. Similar seasonal movement patterns have been shown by individuals tagged in coastal waters off North Carolina. During the winter months, these fish remained either on the Carolina shelf or in offshore waters of the northwestern Atlantic Ocean and moved offshore along the path of the Gulf Stream in spring. By summer, many were in northern shelf waters.

Swimming depth was significantly correlated with location, season, size class, time of day, and moon phase. The greatest depth recorded was 672 m (2,218 ft), and the fish experienced temperatures ranging from 3.4° to 28.7°C (38° to 83.7° F). The data show that Atlantic bluefin tuna spend the majority of their time in the top 20 m (66 ft) of the water column, descending occasionally to depths in excess of 500 m (1,650 ft). The vertical behavior of bluefin tuna differed among locations, with shallower swimming depths occurring when the fish were in inshore waters.

3.3.3.3 Billfish

*Movements and Spawning of White Marlin (*Tetrapturus albidus*) and Blue Marlin (*Makaira nigricans*) off Punta Cana, Dominican Republic (Prince et al., In Review)*

Collaborative studies conducted by NMFS and University of Miami scientists using pop-up satellite archival tags (PSATs) and conducting adult and larval sampling off the Dominican Republic in the spring of 2003 have revealed important information concerning white and blue marlin spawning locations as well as horizontal and vertical movements. Co-occurrence of larval blue marlin and white marlin in samples suggest that the two species share a spawning location in the vicinity of Punta Cana. Adult white and blue marlin caught in the area appear to have similar vertical and horizontal movement patterns in terms of time at depth, time at temperature, average horizontal displacement per day, net horizontal displacement, and directional dispersion (compass heading).

Displacements of seven white marlin tagged with PSATs ranged from 31.7 to 267.7 nmi (58.7 to 495.8 km), while displacement of one blue marlin was 219.3 nmi (406.2 km). In general, all marlin spent a high proportion of the monitoring time in the upper 25 m (27 yd) and at temperatures at or above 28° C (82° F). Minimum and maximum depth and temperatures monitored show that on most days marlin visited depths of 100 m (330 ft) or more, but generally stayed at these depths less that 10 percent of the time. Minimum temperatures ranged from 16.8° to 20.6° C (62.2° to 69° F), while maximum temperatures ranged from 28.2° to 30.0° C (82.7° to 86° F).

The characterization of adult movements and larval distribution in a potentially important spawning area is seen as a necessary “first step” towards improved management and rebuilding of depressed Atlantic billfish stocks. However, more information on the distribution of reproduction and nursery areas and on adult movement patterns is needed to help managers make more informed decisions regarding conservation of the resource.

Virginia Institute of Marine Science (VIMS) Blue Marlin and White Marlin Tagging Studies (Kerstetter, Pers. Comm.)

Scientists at VIMS have been involved with electronic tagging of blue and white marlin since 1999, some of which has been conducted in conjunction with the NOAA SEFSC. More recently, VIMS has deployed over 60 pop-up satellite archival tags (PSATs) on white marlin during the past three years from both recreational sport boats and a commercial pelagic longline vessel to determine post-release survival (paper in press). In addition to this work, VIMS is also in the process of updating information regarding habitat preferences and vertical movements of white marlin using environmental data obtained from the PSAT work, as well as other environmental data. Most of the work at VIMS, however, remains focused on the interactions of billfish with the various fisheries.

3.4 Fishery Data Update

In this section, HMS fishery data, with the exception of some data on Atlantic sharks, are analyzed by gear type; Section 3.4.6 provides a summary of landings by species. While HMS fishermen generally target particular species, the non-selective nature of most fishing gears promote effective analysis and management on a gear-by-gear basis. In addition, issues such as bycatch, and safety are generally better addressed by gear type. A summary of catch statistics can be found in Section 3.4.6 of this report.

The revised list of authorized fisheries (LOF) and fishing gear used in those fisheries became effective December 1, 1999 (64 FR 67511). The rule applies to all U.S. marine fisheries, including Atlantic HMS. As stated in the rule, “no person or vessel may employ fishing gear or participate in a fishery in the exclusive economic zone (EEZ) not included in this LOF without giving 90 days’ advance notice to the appropriate Fishery Management Council (Council) or, with respect to Atlantic HMS, the Secretary of Commerce (Secretary).” Acceptable HMS fisheries and authorized gear types for Atlantic tunas, swordfish, and sharks include: swordfish handgear fishery - rod and reel, harpoon, handline, bandit gear; pelagic longline fishery - longline; shark drift gillnet fishery - gillnet; shark bottom longline fishery - longline; shark recreational fishery - rod and reel, handline; tuna purse seine fishery - purse seine; tuna recreational fishery- rod and reel, handline; and tuna handgear fishery - rod and reel, harpoon, handline, bandit gear. For Atlantic billfish, the only acceptable fishery and authorized gear type is recreational fishery - rod and reel. Species whose life history characteristics may lead to their eventual categorization as highly migratory, but which are not currently under the Secretary or Regional Council management authority, are covered in two broad categories: Recreational Fisheries (Non-FMP) and Commercial Fisheries (Non-FMP). Species that fit this description may be harvested with the gears listed for these catchall categories.

Due to the nature of SCRS data collection, Table 3.19 depicts a summary of U.S. and international HMS catches by species rather than gear type. International catch levels are taken from the 2004 Standing Report of the SCRS, while U.S. reported catches, other than sharks, are taken from the U.S. National Report. The U.S. percentage of regional and total catches for HMS species are presented (Table 3.19) to provide a basis for comparison of the U.S.' catches relative to other nations/entities. Catch of billfish includes both recreational landings and dead discards from commercial fisheries; catch for bluefin tuna includes commercial landings and discards and recreational landings; and swordfish include commercial landings and discards. Historical catch levels dating back to 1950 can be found in the SCRS Report and a discussion of typical species-specific U.S. catch levels can be found in the 1999 Tunas, Swordfish, and Shark FMP. International catch and landings tables are included for the longline and purse seine fisheries in Sections 3.4.1 and 3.4.2 of this report. At this point, data necessary to assess the U.S. regional and total percentage of international catch levels for Atlantic shark species are unavailable.

Table 3.19 Calendar Year 2003 U.S. vs International Catch of HMS (mt ww) other than sharks. Source: SCRS, 2004.

Species	Total International Reported Catch	Region of U.S. Involvement	Total Regional Catch	U.S. Catch	U.S. Percentage of Regional Catch	U.S. Percentage of Total Atlantic Catch
Atlantic Swordfish	21,946* (includes N. & S. Atlantic)	North Atlantic	11,028*	2,524	22.88%	11.59%
		South Atlantic	10,919*	20	0.18%	
Atlantic Bluefin Tuna	30,513**	West Atlantic	2,144	1,428 (52 mt discards)	66.60%	4.68%
Atlantic Bigeye Tuna	85,088	Total Atlantic	85,088	484	0.57%	0.57%
Atlantic Yellowfin Tuna	123,929	West Atlantic	24,978	7,702	30.84%	6.21%
Atlantic Albacore Tuna	60,742 (includes N. & S. Atlantic and Mediterranean)	North Atlantic	25,516	448	1.76%	0.74%
		South Atlantic	27,811	2	0.007%	

Species	Total International Reported Catch	Region of U.S. Involvement	Total Regional Catch	U.S. Catch	U.S. Percentage of Regional Catch	U.S. Percentage of Total Atlantic Catch
Atlantic Skipjack Tuna	147,478	West Atlantic	24,053	78	0.32%	0.05%
Atlantic Blue Marlin	1,951	North Atlantic	640	19	2.96%	0.97%
Atlantic White Marlin	571	North Atlantic	191	1	0.52%	0.18%
Atlantic Sailfish	1,835	West Atlantic	1,310	53	4.04%	2.88%

* Actual catches are likely higher given significant non-compliance with ICCAT reporting requirements.
** Significant non-compliance with ICCAT reporting requirements affects SCRS from estimating aggregate 2003 eastern Atlantic bluefin tuna catches accurately.

3.4.1 Pelagic Longline Fishery

3.4.1.1 Domestic Aspects of the Atlantic Pelagic Longline Fishery

The U.S. pelagic longline fishery for Atlantic HMS primarily targets swordfish, yellowfin tuna, and bigeye tuna in various areas and seasons. Secondary target species include dolphin, albacore tuna, pelagic sharks (including mako, thresher, and porbeagle sharks), as well as several species of large coastal sharks. Although this gear can be modified (i.e., depth of set, hook type, etc.) to target swordfish, tunas, or sharks, it is generally a multi-species fishery. These vessel operators are opportunistic, switching gear style and making subtle changes to target the best available economic opportunity of each individual trip. Pelagic longline gear sometimes attracts and hooks non-target finfish with no commercial value, as well as species that cannot be retained by commercial fishermen due to regulations, such as billfish. Pelagic longlines 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 (or undersized catch of permitted species) that cannot be landed due to fishery regulations is required to be released, whether dead or alive. Pelagic longline gear is composed of several parts (see Figure 3.18[5]).

[5] As of April 1, 2001, (66 FR 17370) a vessel is considered to have pelagic longline gear on board when a power-operated longline hauler, a mainline, floats capable of supporting the mainline, and leaders (gangions) with hooks are on board.

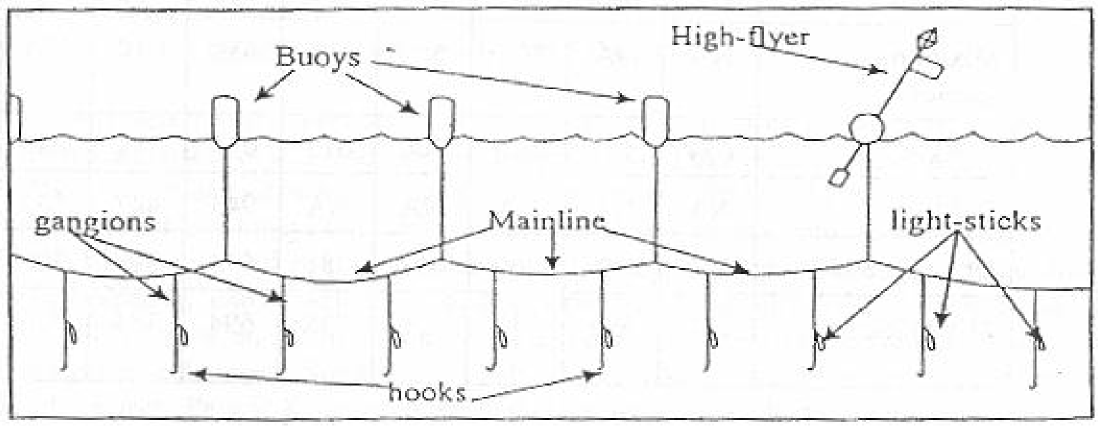

Figure 3.18 Typical U.S. Pelagic Longline Gear. Source: Arocha, 1996

The primary fishing line, or mainline of the longline system, can vary from five to 40 miles in length, with approximately 20 to 30 hooks per mile. The depth of the mainline is determined by ocean currents and the length of the floatline, which connects the mainline to several buoys and periodic markers which can have radar reflectors or radio beacons attached. Each individual hook is connected by a leader to the mainline. Lightsticks, which contain chemicals that emit a glowing light are often 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.

When targeting swordfish, the lines generally are deployed at sunset and hauled at sunrise to take advantage of swordfish nocturnal near-surface feeding habits (NMFS, 1999). In general, longlines targeting tunas are set in the morning, deeper in the water column, and hauled in the evening. Except for vessels of the distant water fleet, which undertake extended trips, fishing vessels preferentially target swordfish during periods when the moon is full to take advantage of increased densities of pelagic species near the surface. The number of hooks per set varies with line configuration and target species (Table 3.20).

Table 3.20 Average Number of Hooks per Pelagic Longline Set, 1999 - 2003. Source: Data reported in pelagic longline logbook.

Target Species	1999	2000	2001	2002	2003
Swordfish	521	550	625	695	712
Bigeye Tuna	768	454	671	755	967
Yellowfin Tuna	741	772	731	715	723
Mix of tuna species	NA	638	719	767	764
Shark	613	621	571	640	970
Dolphin	NA	943	447	542	692
Other species	781	504	318	300	865
Mix of species	738	694	754	756	750

Figure 3.19 illustrates the difference between swordfish (shallow) sets and tuna (deep) longline sets. Swordfish sets are buoyed to the surface, have few hooks between floats, and are relatively shallow. This same type of gear arrangement is used for mixed target sets. Tuna sets

use a different type of float placed much further apart. Compared with swordfish sets, tuna sets have more hooks between the floats and the hooks are set much deeper in the water column. It is believed that because of the difference in fishing depth, tuna sets hook fewer turtles than the swordfish sets. In addition, tuna sets use bait only, while swordfish fishing uses a combination of bait and lightsticks. Compared with vessels targeting swordfish or mixed species, vessels specifically targeting tuna are typically smaller and fish different grounds.

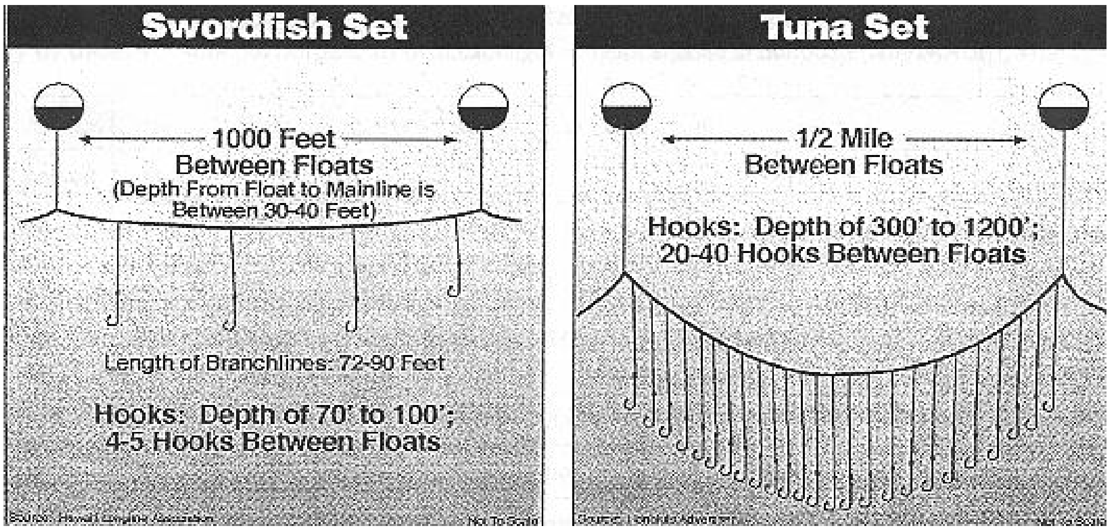

Figure 3.19 Different Pelagic Longline Gear Deployment Techniques. Source: Hawaii Longline Association and Honolulu Advertiser.

Regional U.S. Pelagic Longline Fisheries Description

The U.S. pelagic longline fishery sector is comprised of five relatively distinct segments with different fishing practices and strategies, including the Gulf of Mexico yellowfin tuna fishery, the South Atlantic-Florida east coast to Cape Hatteras swordfish fishery, the mid-Atlantic and New England swordfish and bigeye tuna fishery, the U.S. distant water swordfish fishery, and the Caribbean Islands tuna and swordfish fishery. Each vessel type has different range capabilities due to fuel capacity, hold capacity, size, and construction. In addition to geographical area, segments differ by percentage of various target and non-target species, gear characteristics, and deployment techniques. Some vessels fish in more than one fishery segment during the course of the year.

<u>The Gulf of Mexico Yellowfin Tuna Fishery</u>

Gulf of Mexico vessels primarily target yellowfin tuna year-round; however, each port has one to three vessels that directly target swordfish, either seasonally or year-round. Longline fishing vessels that target yellowfin tuna in the Gulf of Mexico also catch and sell dolphin, swordfish, other tunas, and sharks. During yellowfin tuna fishing, few swordfish are captured incidentally. Many of these vessels participate in other Gulf of Mexico fisheries (targeting shrimp, shark, and snapper/grouper) during allowed seasons. Home ports for this fishery include Madiera Beach, Florida; Panama City, Florida; Dulac, Louisiana; and Venice, Louisiana.

For catching tuna, the longline gear is configured similar to swordfish longline gear but is deployed differently. The gear is typically set out at dawn (between 2 a.m. and noon) and retrieved at sunset (4 p.m. to midnight). The water temperature varies based on the location of fishing. However, yellowfin tuna are targeted in the western Gulf of Mexico during the summer when water temperatures are high. In the past, fishermen have used live bait, however, NMFS prohibited the use of live bait in an effort to decrease bycatch and bycatch mortality of billfish (65 FR 47214, August 1, 2000). In this, and all other areas, except the NED, specific circle hooks (16/0 or larger non-offset and 18/0 or larger with an offset not to exceed 10 degrees) are currently required, as are whole finfish and squid baits.

<u>The South Atlantic ~ Florida East Coast to Cape Hatteras Swordfish Fishery</u>

South Atlantic pelagic longline vessels previously targeted swordfish year-round, although yellowfin tuna and dolphin fish were other important marketable components of the catch. In 2001 (65 FR 47214, August 1, 2000), the Florida East Coast closed area (year-round closure) and the Charleston Bump closed area (February through April closure) became effective. NMFS plans to analyze logbook data to determine the effectiveness of these closed areas (see Sections 2.1 and 3.8).

Prior to these closures, smaller vessels used to fish short trips from the Florida Straits north to the bend in the Gulf Stream off Charleston, South Carolina (Charleston Bump). Mid-sized and larger vessels migrate seasonally on longer trips from the Yucatan Peninsula throughout the West Indies and Caribbean Sea, and some trips range as far north as the mid-Atlantic coast of the United States to target bigeye tuna and swordfish during the late summer and fall. Fishing trips in this fishery average nine sets over 12 days. Home ports (including seasonal ports) for this fishery include Georgetown, South Carolina; Charleston, South Carolina; Fort Pierce, Florida; Pompano Beach, Florida; and Key West, Florida. This sector of the fishery consists of small to mid-size vessels, which typically sell fresh swordfish to local high-quality markets.

<u>The Mid-Atlantic and New England Swordfish and Bigeye Tuna Fishery</u>

Fishing in this area has evolved during recent years to focus almost year-round on directed tuna trips, with substantial numbers of swordfish trips as well. Some vessels participate in directed bigeye/yellowfin tuna fishing during the summer and fall months and then switch to bottom longline and/or shark fishing during the winter when the large coastal shark season is open. Fishing trips in this fishery sector average 12 sets over 18 days. During the season, vessels primarily offload in the ports of New Bedford, Massachusetts; Barnegat Light, New Jersey; Ocean City, Maryland; and Wanchese, North Carolina.

<u>The U.S. Atlantic Distant Water Swordfish Fishery</u>

This fishing ground covers virtually the entire span of the western north Atlantic to as far east as the Azores and the mid-Atlantic Ridge. Approximately 12 large fishing vessels operate out of mid-Atlantic and New England ports during the summer and fall months targeting swordfish and tunas, and then move to Caribbean ports during the winter and spring months. Many of the current distant water operations were among the early participants in the U.S. directed Atlantic commercial swordfish fishery. These larger vessels, with greater ranges and capacities than the coastal fishing vessels, enabled the United States to become a significant player in the north Atlantic fishery. They also fish for swordfish in the south Atlantic. The distant water vessels traditionally have been larger than their southeast counterparts because of the distances required to travel to the fishing grounds. Fishing trips in this fishery tend to be longer than in other fisheries, averaging 30 days and 16 sets. Ports for this fishery range from San Juan, Puerto Rico through Portland, Maine, and include New Bedford, Massachusetts, and Barnegat Light, New Jersey. This segment of the fleet was directly affected by the L-shaped closure in 2000 and the NED closure in 2001. A number of vessels have recently returned to this fishery with the issuance of the July 6, 2004, rule (69 FR 40734) to reduce sea turtle bycatch and bycatch mortality. Unlike in other areas, vessels fishing in the NED are required to use specific circle hooks (18/0 or larger with an offset not to exceed 10 degrees) and whole mackerel and squid baits.

The Caribbean Tuna and Swordfish Fishery

This fleet is similar to the southeast coastal fishing fleet in that both are comprised primarily of smaller vessels that make short trips relatively near-shore, producing high quality fresh product. Both fleets also encounter relatively high numbers of undersized swordfish at certain times of the year. Longline vessels targeting HMS in the Caribbean use fewer hooks per set, on average, fishing deeper in the water column than the distant water fleet off New England, the northeast coastal fleet, and the Gulf of Mexico yellowfin tuna fleet. This fishery is typical of most pelagic fisheries, being truly a multi-species fishery, with swordfish as a substantial portion of the total catch. Yellowfin tuna, dolphin and, to a lesser extent, bigeye tuna, are other important components of the landed catch. Ports for this fishery include St. Croix, U.S. Virgin Islands; and San Juan, Puerto Rico. Many of these high quality fresh fish are sold to local markets to support the tourist trade in the Caribbean.

U.S Pelagic Longline Catch, Landings, and Bycatch

U.S. pelagic longline catch (including bycatch, incidental catch, and target catch) is largely related to these vessel and gear characteristics, but is summarized for the whole fishery in Table 3.21. U.S. pelagic longline landings of Atlantic tunas and swordfish for 1999 – 2003 are summarized in Table 3.22. Additional information related to landings can be seen in Section 3.4.6.

Table 3.21 Reported Catch of Species Caught by U.S. Atlantic Pelagic Longlines, in Number of Fish, for 1999 - 2003. Source: Pelagic Longline Logbook Data.

Species	1999	2000	2001	2002	2003
Swordfish Kept	67,120	62,978	47,560	49,320	51,835
Swordfish Discarded	20,558	17,074	13,993	13,035	11,829
Blue Marlin Discarded	1,253	1,443	635	1,175	595

Species	1999	2000	2001	2002	2003
White Marlin Discarded	1,969	1,261	848	1,438	809
Sailfish Discarded	1,407	1,091	356	379	277
Spearfish Discarded	151	78	137	148	108
Bluefin Tuna Kept	263	235	177	178	273
Bluefin Tuna Discarded	604	737	348	585	881
Bigeye, Albacore, Yellowfin, Skipjack Tunas Kept	114,438	94,136	80,466	79,917	63,321
Pelagic Sharks Kept	2,894	3,065	3,460	2,987	3,037
Pelagic Sharks Discarded	28,967	28,046	23,813	22,828	21,705
Large Coastal Sharks Kept	6,382	7,896	6,478	4,077	5,326
Large Coastal Sharks Discarded	5,442	6,973	4,836	3,815	4,813
Dolphin Kept	31,536	29,125	27,586	30,384	29,372
Wahoo Kept	5,136	4,193	3,068	4,188	3,919
Turtles Discarded	631	271	424	465	399
Number of Hooks (X 1,000)	*7,902*	*7,976*	*7,564*	*7,150*	*7,008*

Table 3.22 Reported Landings in the U.S. Atlantic Pelagic Fishery (in mt ww) for 1999 - 2003. Source: U.S. National Report to ICCAT, 2004 (NOAA Fisheries, 2004a).

Species	1999	2000	2001	2002	2003
Yellowfin Tuna	3,374	2,901	2,201	2,573	2,154
Skipjack Tuna	2.0	1.8	4.3	2.5	4.2
Bigeye Tuna	929.1	531.9	682.4	535.8	284.9
Bluefin Tuna	73.5	66.1	37.5	49.9	81.4
Albacore Tuna	194.5	147.3	193.8	155	110.9
Swordfish N.*	3,362.4	3,315.8	2,483	2,598.8	2,772.1
Swordfish S.*	185.2	143.8	43.2	199.9	20.9

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

Marine Mammals

Of the marine mammals that are hooked by U.S. pelagic longline fishermen, many are released alive, although some animals suffer serious injuries and may die after being released.

Marine mammals are caught primarily during the third and fourth quarters in the Mid-Atlantic Bight and Northeast Coastal areas (Figure 3.20). In 2003, the incidental catch was highest in the third quarter in the Mid-Atlantic Bight.

In 2000, there were 14 observed takes of marine mammals by pelagic longlines. This number has been extrapolated based on reported fishing effort to an estimated 403 mammals fleet-wide (32 common dolphin, 93 Risso's dolphin, 231 pilot whales, 19 whales, 29 pygmy sperm whales) (Yeung, 2001). Incidental catch of pilot whales on pelagic longlines is thought to result from pilot whales preying on tuna that have been caught on the gear.

In 2001 and 2002, there were 16 and 24 observed takes of marine mammals, respectively. The majority of these interactions were observed in the Mid-Atlantic Bight, followed by the NED research experiment. In 2001, a total of 84 Risso's dolphin and 93 pilot whales are estimated to have been interacted with in the pelagic longline fishery. In 2002, the pelagic longline fishery is estimated to have interacted with 87 Risso's dolphin and 114 pilot whales. In the NED research experiment, an additional four Risso's dolphin and one northern bottlenose whale were recorded with serious injuries during 2001, as well as three Risso's dolphin, one unidentified dolphin, and one unidentified marine mammal in 2002. One striped dolphin was recorded as released alive during the NED experiment in 2001, as well as one Risso's dolphin, one common dolphin, one pilot whale, and one unidentified dolphin in 2002 (Garrison, 2003).

In 2003, there were 28 observed takes of marine mammals in the pelagic longline fishery. The majority of these interactions were observed in the Mid-Atlantic Bight, followed by the NED experimental fishery, and the Northeast Coastal area. This number has been extrapolated based on reported fishing effort to an estimated 300 mammals fleet wide (49 beaked whales, 16 dolphin, 30 Atlantic spotted dolphin, 46 common dolphin, 105 Risso's dolphin, 32 pilot whales, 22 minke whales). In addition, five Risso's dolphin, one striped dolphin, and one baleen whale were observed captured in the 2003 NED research experiment, with one Risso's dolphin recorded as dead (Garrison and Richards, 2004).

Sea Turtles

Currently, many sea turtles are taken in the Gulf of Mexico and Northeast Coastal areas (Figure 3.20) and most are released alive. In the past, the bycatch rate was highest in the third and fourth quarters. Loggerhead and leatherback turtles dominate the catch of sea turtles. In general, sea turtle captures are rare, but takes appear to be clustered (Hoey and Moore, 1999).

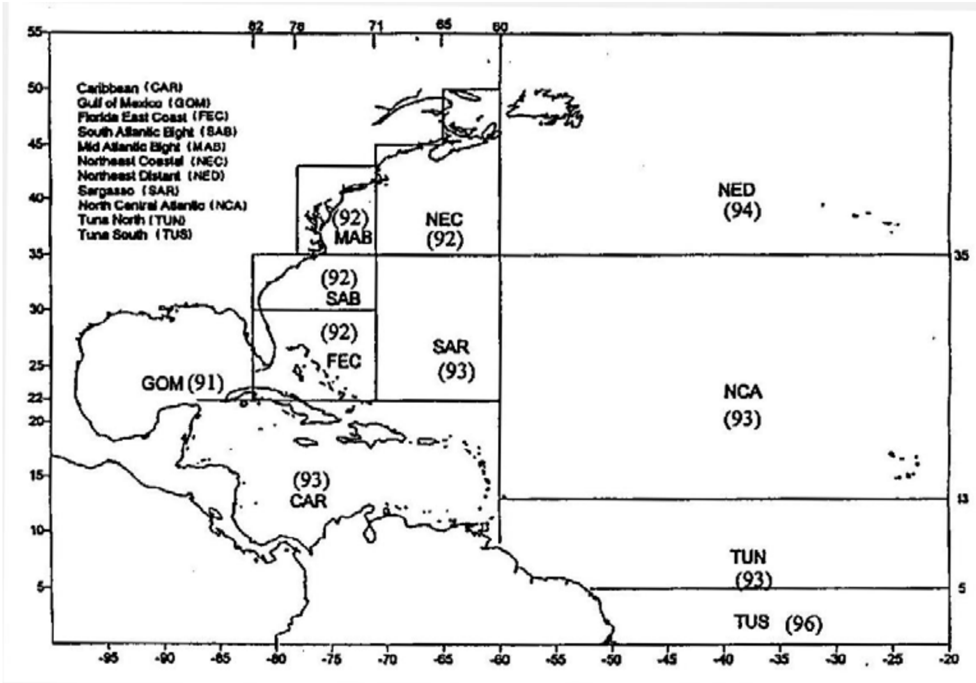

Figure 3.20 Geographic Areas Used in Summaries of Pelagic Logbook Data. Source: Cramer and Adams, 2000

The estimated take levels for 2000 were 1,256 loggerhead and 769 leatherback sea turtles (Yeung, 2001). For 2001, the estimated take levels outside of the NED closed area were 312 loggerhead and 1,208 leatherback sea turtles. For 2002, the estimated take levels outside of the NED closed area were 575 loggerhead and 962 leatherback sea turtles (Garrison, 2003). In 2003, the estimated take levels outside the NED closed area were 727 loggerhead and 1,112 leatherback sea turtles, with greatest number of takes occurring in the GOM.

As a result of the increased sea turtle interactions in 2001 and 2002, NMFS reinitiated consultation for the pelagic longline fishery and completed a new BiOp on June 1, 2004. The June 2004 BiOp concluded that long-term continued operation of the Atlantic pelagic longline fishery is not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp’s ridley, or olive ridley sea turtles, but is likely to jeopardize the continued existence of leatherback sea turtles. The BiOp included a reasonable and prudent alternative (RPA) and an incidental take statement (ITS) for the combined years 2004 – 2006, and for each subsequent three-year period (NOAA Fisheries, 2004b).

A final rule published in July 2004 (69 FR 40734) prohibited the possession of “J”-style hooks in the pelagic longline fishery and required the possession and use of specific sea turtle release and disentanglement gears, handling and release protocols, as well as requiring the use of specific circle hooks and baits.

NED Research Experiment

Consistent with the conservation recommendation of an earlier, 2001 BiOp, NMFS initiated a research experiment in the NED area in consultation and cooperation with the domestic pelagic longline fleet. The goal was to develop and evaluate the efficacy of new technologies and changes in fishing practices to reduce sea turtle interactions. In 2001, the experiment attempted to evaluate the effect of gangions placed two gangion lengths from floatlines, the effect of blue-dyed bait on target catch and sea turtle interactions, and the effectiveness of dipnets, line clippers, and dehooking devices. Eight vessels participated, making 186 sets, between August and November. During the course of the research experiment, 142 loggerhead and 77 leatherback sea turtles were incidentally captured and no turtles were released dead.

The data gathered during the 2001 experiment were analyzed to determine if the tested measures reduced the incidental capture of sea turtles by a statistically significant amount. The blue-dyed bait parameter decreased the catch of loggerheads by 9.5 percent and increased the catch of leatherbacks by 45 percent. Neither value is statistically significant. In examining the gangion placement provision, the treatment sections of the gear (with gangions placed 20 fathoms from floatlines) did not display a statistically significant reduction in the number of loggerhead and leatherback sea turtle interactions than the control sections of the gear (with a gangion located under a floatline). The treatment section of the gear recorded an insignificant increase in the number of leatherback interactions. Following an examination of the data, NMFS discovered that the measures had no significant effect upon the catch of sea turtles (Watson *et al.*, 2003).

Dipnets and line clippers were examined for general effectiveness. The dipnets were found to be adequate in boating loggerhead sea turtles. Several line clippers were tested, with the La Force line clipper having the best performance. Several types of dehooking devices were tested, with the work on these devices continuing in the 2002 and 2003 NED research experiment.

In the summer and fall of 2002, NMFS conducted the second year of the research experiment. The use of circle and "J"-hooks, whole mackerel bait, squid bait, and shortened daylight soak time were tested to examine their effectiveness in reducing the capture of sea turtles. The data indicate there were 501 sets made by 13 vessels with 100 percent observer coverage. During the course of the experiment, 100 loggerhead and 158 leatherback sea turtles were captured and 11 were tagged with satellite tags. In addition to the sea turtles, the vessels interacted with one unidentified marine mammal, one unidentified dolphin, one common dolphin, one longfin pilot whale, and four Risso's dolphins; all were released alive (Watson *et al.*, 2003).

In 2003, the research experiment tested a number of treatments to verify the results of the 2002 experiment in addition to testing additional treatments. Data indicate that there were 539 sets made by 11 vessels with 100 percent observer coverage. During the course of the experiment, one olive ridley, 92 loggerhead, and 79 leatherback sea turtles were captured; all were released alive (Foster *et al.*, 2004; Watson *et al.*, 2004). In addition to the sea turtles, the vessels interacted with one striped dolphin, one baleen whale, and five Risso's dolphin resulting in one mortality (Garrison and Richards, 2004).

From 2001 through 2003, NMFS worked with the commercial fishing industry to develop new pelagic longline fishing technology to reduce interaction rates and bycatch mortality of threatened and endangered sea turtles. The cooperative gear technology research investigated line configurations, setting and retrieving procedures, hook types, hook sizes, bait types, and release and disentanglement gears. Ultimately, specific hook designs and bait types were found to be the most effective measures for reducing sea turtle interactions. Large circle hooks and mackerel baits were found to substantially reduce sea turtle interactions over the use of the industry standard "J"-hooks and squid baits. The gears developed to remove hooks and line from hooked and entangled sea turtles are anticipated to reduce post-hooking mortality associated with those interactions not avoided.

NMFS believes that the transfer of this information to other fishing countries will result in significant reductions in interaction rates and post-release mortalities of threatened and endangered sea turtles throughout their ranges.

Seabirds

Gannets, gulls, greater shearwaters, and storm petrels are occasionally hooked by Atlantic pelagic longlines. These species and all other seabirds are protected under the Migratory Bird Treaty Act. Seabird populations are often slow to recover from excess mortality as a consequence of their low reproductive potential (one egg per year and late sexual maturation). According to NMFS observer data from 2003, three unidentified seabirds were observed hooked between January and September. 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 United States has developed a National Plan of Action in response to the Food and Agriculture Organization of the United Nations (FAO) International Plan of Action to reduce the incidental take of seabirds (http://www.nmfs.gov.gov/NPOA-S.html). Although Atlantic pelagic longline interactions will be considered in the plan, NMFS has not identified a need to implement gear modifications to reduce seabird takes by Atlantic pelagic longlines. Takes of seabirds have been minimal in the fishery, most likely due to the setting of longlines at night and/or fishing in areas where birds are largely absent. Observed seabird bycatch in the Atlantic pelagic longline fishery from 1999 - 2003 can be seen in Section 3.8.

Finfish

In the U.S. pelagic longline fishery, fish are discarded for a variety reasons. Swordfish, yellowfin tuna, and bigeye tuna may be discarded because they are undersized or unmarketable (e.g., shark bitten). Blue sharks, as well as other species, are discarded because of a limited markets (resulting in low prices) and perishability of the product. Large coastal sharks are discarded during times when the shark season is closed. Bluefin tuna may be discarded because target catch requirements for other species have not been met. Also, all billfish are required to be released. In the past, swordfish have been discarded when the swordfish season was closed. Reported catch from 1999 – 2003 for the U.S. pelagic longline fishery (including reported bycatch, incidental catch, and target catch) is summarized in Table 3.4.1.2. Additional U.S.

landings and discard data are available in the 2004 U.S. National Report to ICCAT (NOAA Fisheries, 2004a).

At this time, direct use of observer data with pooling for estimating dead discards in this fishery represents the best scientific information available for use in stock assessments. Direct use of observer data has been employed for a number of years to estimate dead discards in Atlantic and Pacific longline fisheries, including billfish, sharks, and undersized swordfish. Furthermore, the data have been used for scientific analyses by both ICCAT and the Inter-American Tropical Tuna Commission (IATTC) for a number of years.

Bycatch mortality of marlins, swordfish, and bluefin tuna from all fishing nations may significantly reduce the ability of these populations to rebuild, and it remains an important management issue. In order to minimize bycatch and bycatch mortality in the domestic pelagic longline fishery, NMFS implemented regulations to close areas to longline fishing (Figure 3.4.1.4) and has banned the use of live bait by longline vessels in the Gulf of Mexico.

As part of the BFT rebuilding program, ICCAT recommends an allowance for dead discards. The U.S. annual dead discard allowance is 68 mt ww. The estimate for the 2003 calendar year was used as a proxy to calculate the amount to be added to, or subtracted from, the U.S. BFT landings quota for 2004. The 2003 calendar year preliminary estimate of U.S. dead discards, as reported per the longline discards calculated from logbook tallies, adjusted as warranted when observer counts in quarterly/geographic stratum exceeded logbook reports, totaled 52.4 mt ww. Estimates of dead discards from other gear types and fishing sectors that do not use the pelagic longline vessel logbook are unavailable at this time, and thus, are not included in this calculation. As U.S. fishing activity is estimated to have resulted in fewer dead discards than its allowance, the ICCAT recommendation and U.S. regulations state that the United States may add one half of the difference between the amount of dead discards and the allowance (i.e., 68.0 mt – 52.4 mt = 15.6 mt, 15.6 mt/2 = 7.8 mt ww) to its total allowed landings for the following fishing year, to individual fishing categories, or to the Reserve category. NMFS proposes to allocate the 7.8 mt ww to the Reserve category quota to assist in covering potential overharvests from the previous fishing years.

The 2002 calendar year preliminary dead discard estimate, as reported in pelagic longline vessel logbooks and published in 2003 Final Initial Quota Specifications (68 FR 56783, October 2, 2003), totaled 38.0 mt ww. This preliminary estimate has been revised using the longline discards calculated from logbook tallies, adjusted as warranted when observer counts in stratum exceeded logbook reports. The revised 2002 calendar year dead discard estimate is 41.6 mt ww.

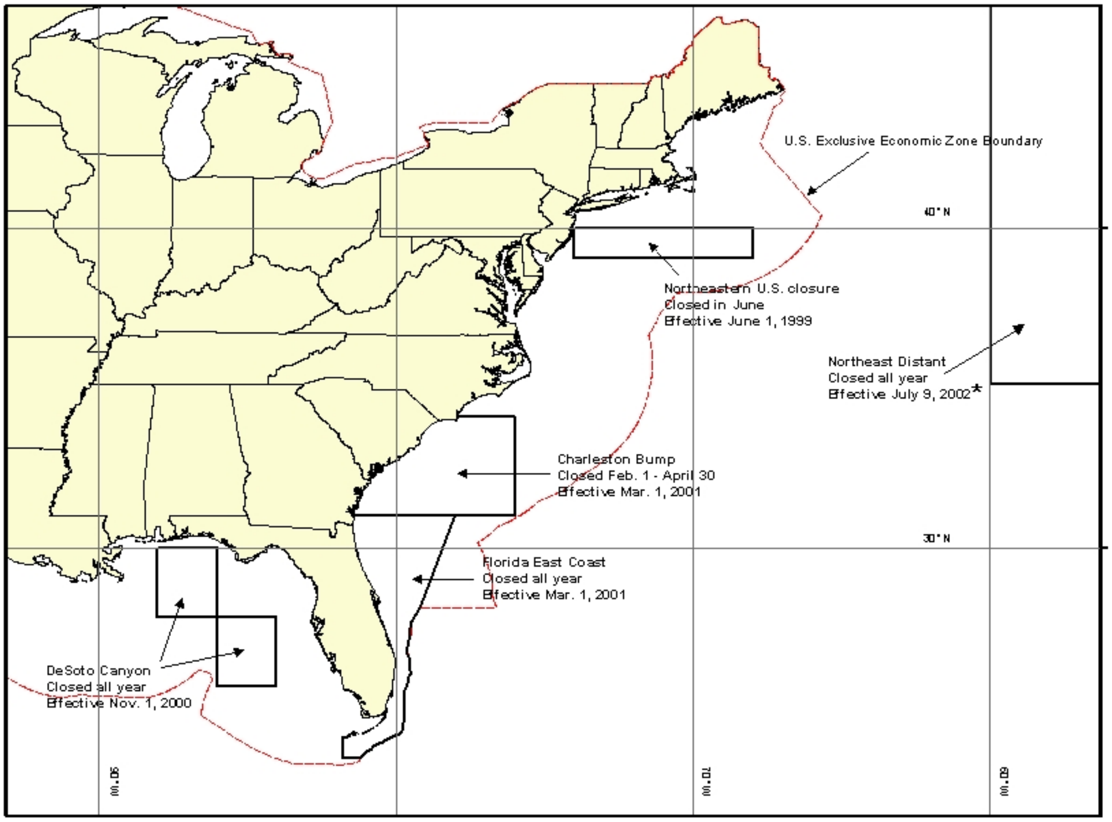

Figure 3.21 Areas Closed to Pelagic Longline Fishing by U.S. Flagged Vessels

*Closed except to vessels complying with specific conditions (see 50 CFR 635 for details).

3.4.1.2 International Aspects of the Atlantic Pelagic Longline Fishery

Pelagic longline fisheries for Atlantic HMS primarily target swordfish and tunas. Directed pelagic longline fisheries in the Atlantic have been operated by Spain, the United States, and Canada since the late 1950s or early 1960s. The Japanese pelagic longline tuna fishery started in 1956 and has operated throughout the Atlantic since then. Most of the 35 other ICCAT nations now also operate pelagic longline vessels.

ICCAT generally establishes management recommendations on a species (*e.g.* swordfish) or issue basis (*e.g.* data collection) rather than by gear type. For example, ICCAT typically establishes quotas or landing limits by species, not gear type. In terms of data collection, ICCAT may require use of specific collection protocols or specific observer coverage levels in certain fisheries or on vessels of a certain size, but these are usually applicable to all gears, and not specific to any one gear type. However, there are a handful of management recommendations that are specifically applicable to the international pelagic longline fishery. These include, a prohibition on longlining in the Mediterranean Sea in June and July by vessels over 24 meters in length, a prohibition on pelagic longline fishing for bluefin tuna in the Gulf of Mexico, and mandated reductions in Atlantic white and blue marlin landings for pelagic longline and purse seine vessels from specified levels, among others.

Because most ICCAT management recommendations pertain to individual species or issues, as discussed above, it is often difficult to obtain information specific to the international pelagic longline fishery. For example, a discussion of authorized total allowable catches (TAC) for specific species in this section of the document would be of limited utility because it is not possible to identify what percentage of quotas are allocated to pelagic longline. Division of quota, by gear type, is typically done by individual countries.

Nevertheless, ICCAT does report landings by gear type. Available data indicate that longline effort produces the second highest volume of catch and effort, and is the most broadly distributed (longitudinally and latitudinally) of the gears used to target ICCAT managed species (Figure 3.22) (SCRS, 2004). Purse seines produce the highest volume of catch of ICCAT managed species from the Atlantic (SCRS, 2004). From 1999 through 2002 (inclusive) there was a declining trend in estimated international landings of HMS for fisheries in which the U.S. participated. In 2003, international landings of HMS for fisheries in which the U.S. participated totaled 113,826 mt, which represented a modest increase over 2002 (SCRS, 2004). Detailed information on international Atlantic pelagic longline catches can be found in Table 3.24.

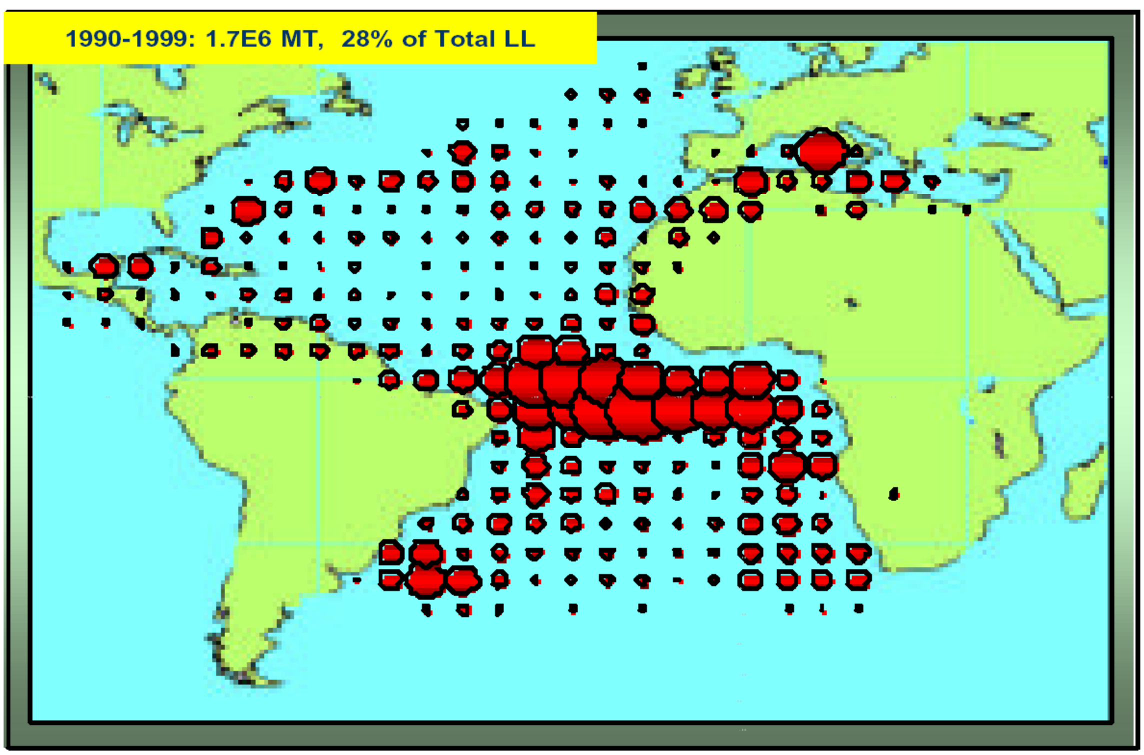

Figure 3.22 Distribution of Atlantic Longline Catches for all Countries 1990-1999. Source: SCRS, 2004

Scientific observer data are being collected on a range of pelagic longline fleets in the Atlantic and will be increasingly useful in better quantifying total catch, catch composition, and disposition of catch as these observer programs mature. Previous ICCAT observer coverage requirements of five percent for non-purse seine vessels that participated in the bigeye and yellowfin tuna fishery, including pelagic longline (per ICCAT Recommendation 96-01), are no longer in force. There is currently no ICCAT required minimum level of observer coverage specific to pelagic longline fishing. Japan is required to have eight percent observer coverage of its vessels fishing for swordfish in the North Atlantic, which are primarily pelagic longline vessels, however, the recommendation is not specific to vessel or gear type. ICCAT recommendation 04-01, a conservation and management recommendation for the bigeye tuna fishery, will enter into force in mid-2005 and requires at least five percent observer coverage of pelagic longline vessels over 24 meters fishing for bigeye.

ICCAT has also developed a running tabulation of the diversity of species caught by the various gears used to target tunas and tuna like species in the Atlantic and Mediterranean (Table 3.23). For all fish species, longline gear shows the highest documented diversity of catch, followed by gillnets and purse seine. For seabirds, longline gear again shows the highest diversity of catch, while for sea turtles and marine mammals, purse seine and gillnet have a higher documented diversity of species for Atlantic tuna fleets (SCRS, 2004).

Table 3.23 ICCAT Bycatch Table (LL, longline; GILL, gillnets; PS, purse-seine; BB, baitboat; HARP, harpoon; Trap, traps). Source: SCRS 2004.

ICCAT Bycatch Table (www.iccat.es)

Count	Group	LL	GILL	PS	BB	HARP	TRAP	OTHER
214	*All Groups*	149	110	78	12	33	20	43
		69.6%	51.4%	36.4%	5.6%	15.4%	9.3%	20.1%
12	*Skates and Rays*	10	6	6	0	2	0	1
		83.3%	50.0%	50.0%	0.0%	16.7%	0.0%	8.3%
46	*Coastal Sharks*	45	19	6	1	7	2	9
		97.8%	41.3%	13.0%	2.2%	15.2%	4.3%	19.6%
11	*Pelagic Sharks*	10	7	5	0	5	2	4
		90.9%	63.6%	45.5%	0.0%	45.5%	18.2%	36.4%
23	*Teleosts (ICCAT Species)*	23	18	16	9	6	7	11
		100.0%	78.3%	69.6%	39.1%	26.1%	30.4%	47.8%
82	*Teleosts (excluding Scombridae and billfishes)*	44	37	25	2	5	4	17
		53.7%	45.1%	30.5%	2.4%	6.1%	4.9%	20.7%
5	*Sea Turtles*	3	4	5	0	2	1	1
		60.0%	80.0%	100.0%	0.0%	40.0%	20.0%	20.0%
9	*Sea Birds*	8	2	0	0	0	0	0
		88.9%	22.2%	0.0%	0.0%	0.0%	0.0%	0.0%
26	*Marine Mammals*	6	17	15	0	6	4	0
		23.1%	65.4%	57.7%	0.0%	23.1%	15.4%	0.0%

3.4.1.3 U.S. Pelagic Longline Catch in Relation to International Catch

Highly Migratory Species

The U.S. fleet is a small part of the international fleet that competes on the high seas for catches of tunas and swordfish (Table 3.24). Although the U.S. fleet landed as much as 35 percent of the swordfish from the North Atlantic, north of 5^{o} N. latitude in 1990, this proportion decreased to 24.3 percent by 2001. For tunas, the U.S. proportion of landings was 23 percent in 1990, decreasing to 9.4 percent of total Atlantic tuna catches by 2001 (NOAA Fisheries, 2003a).

In 2002, the U.S fleet landed 27.6 percent of the swordfish from the North Atlantic, and 11.5 percent of total Atlantic tuna catches (NOAA Fisheries, 2004c). In recent years, the proportion of U.S. pelagic longline landings of HMS, for the fisheries in which the United States participates, has remained relatively stable in proportion to international landings (Table 3.24). The U.S. fleet accounts for less than 0.5 percent of the landings of swordfish and tuna from the Atlantic Ocean south of 5^{o} N. latitude, and does not operate at all in the Mediterranean Sea. Tuna and swordfish landings by foreign fleets operating in the tropical Atlantic and Mediterranean are greater than the catches from the north Atlantic area where the U.S. fleet operates. Even within the area where the U.S. fleet operates, the U.S. portion of fishing effort (in numbers of hooks fished) is less than 10 percent of the entire international fleet's effort, and likely less than that due to differences in reporting effort between ICCAT countries (NOAA Fisheries, 2001b).

Table 3.24 Estimated International Longline Landings of HMS, Other than Sharks, for All Countries in the Atlantic: 1999 - 2003 (mt ww)[1]. Source: SCRS, 2004.

	1999	2000	2001	2002	2003
Swordfish (N. Atl + S. Atl)	25,201	24,990	22,562	22,127	20,788
Yellowfin Tuna (W. Atl)[2]	11,596	11,465	12,684	11,578	10,178
Bigeye Tuna	76,513	70,976	55,162	46,509	51,606
Bluefin Tuna (W. Atl.)[2]	914	859	610	727	188
Albacore Tuna (N. Atl + S. Atl)	27,209	28,881	29,667	27,779	27,879
Skipjack Tuna (N. Atl + S. Atl)	51	60	70	109	106
Blue Marlin (N. Atl. + S. Atl.)[3]	2,359	2,187	1,638	1,337	1,671
White Marlin (N. Atl. + S. Atl.)[3]	981	893	593	730	557
Sailfish (W. Atl.)[3]	524	811	812	1,271	853
Total	**145,348**	**141,122**	**123,798**	**112,167**	**113,826**
U.S. Longline Landings (2003 and 2004 U.S. Natl. Report)[4]	**8,331.1**	**7,253.5**	**5,695.3**	**6,203.9**	**5,468.4**
U.S. Longline Landings as a Percent of Total Longline Landings	**5.7**	**5.1**	**4.6**	**5.5**	**4.8**

[1]Landings include those classified by the SCRS as longline landings for all areas
[2]Note that the United States has not reported participation in the E. Atl yellowfin tuna fishery since 1983 and has not participated in the E. Atl bluefin tuna fishery since 1982.
[3]Includes U.S. *dead discards.*
[4]Includes swordfish, blue marlin, white marlin, and sailfish longline discards.

Sea Turtles

From 1999 to 2003, the U.S. pelagic longline fleet targeting HMS captured an average of 772 loggerhead and 1,013 leatherback sea turtles per year, based on observed takes and total reported effort. In 2003, the U.S. Pelagic longline fleet was estimated to have captured 727 loggerhead and 1,112 leatherback sea turtles (Garrison and Richards, 2004). Since other ICCAT nations do not monitor incidental catches of sea turtles, an exact assessment of their impact is not possible. However, high absolute numbers of sea turtle catches in the foreign fleets have been reported from other sources (NOAA Fisheries, 2001b). Throughout the Atlantic basin, including the Mediterranean Sea, a total of 210,000 – 280,000 loggerhead and 30,250 – 70,000 leatherback sea turtles are estimated to be captured by pelagic longline fisheries each year (Lewiston *et al*., 2004).

Mortality in the domestic and foreign pelagic longline fisheries is just one of numerous factors affecting sea turtle populations in the Atlantic (National Research Council, 1990). Many sources of anthropogenic mortality are outside of U.S. jurisdiction and control. If the U.S. swordfish quota was to be relinquished to other fishing nations, the effort now expended by the U.S. fleet would likely be replaced by foreign effort. This could significantly alter the U.S. position at ICCAT and make the implementation of international conservation efforts more difficult. This would also eliminate the option of gear or other experimentation with the U.S. longline fleet, thus making it difficult to find take reduction solutions which could be transferred to other longlining nations to effect a greater global reduction in sea turtle takes in pelagic longline fisheries. The United States has, and will continue to make efforts at ICCAT, IATTC, and other international forums, to encourage adoption of sea turtle conservation measures by international fishing fleets. However, NMFS is not aware of the implementation of sea turtle conservation measures by foreign fleets, and in the absence of a domestic fishing fleet subject to sea turtle conservation measures, foreign vessels would likely increase their fishing effort and sea turtle mortality would likely increase. Further, NMFS continues to advance turtle conservation through participation in both domestic and international workshops.

In February 2003, the United States supported a workshop consisting of technical experts on sea turtle biology and longline fishery operations from interested nations in order to share information and discuss possible solutions to reduce incidental capture of marine turtles in these fisheries. The United States introduced the NED sea turtle bycatch mitigation research at the November 2003, ICCAT meeting in Dublin, Ireland, and co-sponsored ICCAT Resolution 03-11 which encouraged other nations to improve data collection and reporting on sea turtle bycatch and promote the safe handling and release of incidentally captured sea turtles. A poster and video describing the NED research experiment and preliminary results were displayed, as well as many of the experimentally tested release gears. In January 2004, the Northeast Distant Waters Longline Research ad hoc advisory group met in Miami, Florida. The purpose of this meeting was to present a summary of the 2001 and 2002 NED pelagic longline sea turtle bycatch mitigation research and the preliminary results for the 2003 research, and to discuss future research needs. Also in January 2004, the IATTC - CIAT Bycatch Working Group met in Kobe, Japan. The purpose of U.S. attendance at this meeting was to present results of sea turtle mitigation research by the U.S, to hear research results on bycatch mitigation from other countries, to encourage IATTC countries to evaluate or adopt sea turtle mitigation technology in their fisheries, and to address other bycatch issues in longline fisheries.

Additionally, the Inter-American Convention for the Protection and Conservation of Sea Turtles ("Inter-American Convention") was concluded on September 5, 1996, in Salvador, Brazil, and entered into force in May 2001. This is the first international agreement devoted solely to the protection of sea turtles. The Inter-American Convention calls for the Parties to establish national sea turtle conservation programs. Each party will agree to implement broad measures for the conservation of sea turtles, including the use of turtle excluder devices in commercial shrimp trawl vessels and the mitigation of impacts on sea turtles from other fisheries.

3.4.1.4 Management of the U.S. Pelagic Longline Fishery

The U.S. Atlantic pelagic longline fishery is restricted by a limited swordfish quota, divided between the North and South Atlantic (separated at 5° N. lat.). Other regulations include minimum sizes for swordfish, yellowfin, bigeye, and bluefin tuna, limited access permitting, bluefin tuna catch requirements, shark quotas, protected species incidental take limits, reporting requirements (including logbooks), and gear and bait requirements. Current billfish regulations prohibit the retention of billfish by commercial vessels, or the sale of billfish from the Atlantic Ocean. As a result, all billfish hooked on longlines must be discarded, and are considered bycatch. This is a heavily managed gear type and, as such, is strictly monitored. Because it is difficult for pelagic longline fishermen to avoid undersized fish in some areas, NMFS has closed areas in the Gulf of Mexico and along the east coast. The intent of these closures is to relocate some of the fishing effort into areas where bycatch is expected to be lower. There are also time/area closures for pelagic longline fishermen designed to reduce the incidental catch of bluefin tuna and sea turtles. In order to enforce time/area closures and to monitor the fishery, NMFS requires all pelagic longline vessels to report positions on an approved vessel monitoring system (VMS).

In June 2004, NMFS conditionally re-opened the NED to pelagic longline fishing. NMFS limited vessels with pelagic longline gear onboard in that area, at all times, to possessing onboard and/or using only 18/0 or larger circle hooks with an offset not to exceed 10 degrees. Only whole mackerel and squid baits may be possessed and or utilized with allowable hooks. In August of 2004, NMFS limited vessels with pelagic longline gear onboard, at all times, in all areas open to pelagic longline fishing, excluding the NED, to possessing onboard and/or using only 16/0 or larger non-offset circle hooks and/or 18/0 or larger circle hooks with an offset not to exceed 10 degrees. Only whole finfish and squid baits may be possessed and/or utilized with allowable hooks. All pelagic longline vessels must possess and use sea turtle handling and release gear in compliance with NMFS careful release protocols.

Permits

The 1999 Tunas, Swordfish, and Shark FMP established six different limited access permit types: 1) directed swordfish, 2) incidental swordfish, 3) swordfish handgear, 4) directed shark, 5) incidental shark, and 6) tuna longline. To reduce bycatch concerns in the pelagic longline fishery, these permits were designed so that the swordfish directed and incidental permits are valid only if the permit holder also holds both a tuna longline and a shark permit.

Similarly, the tuna longline permit is valid only if the permit holder also holds both a swordfish (directed or incidental, not handgear) and a shark permit.

As of October 2004, approximately 208 tuna longline limited access permits had been issued. In addition, approximately 195 directed swordfish limited access permits, 99 incidental swordfish limited access permits, 241 directed shark limited access permits, and 348 incidental shark limited access permits had been issued. Vessels with limited access swordfish and shark permits do not necessarily use pelagic longline gear, but these are the only permits that allow for the use of pelagic longline gear.

Monitoring and Reporting

Pelagic longline fishermen and the dealers who purchase HMS from them are subject to reporting requirements. NMFS has extended dealer reporting requirements to all swordfish importers as well as dealers who buy domestic swordfish from the Atlantic. These data are used to evaluate the impacts of harvesting on the stock and the impacts of regulations on affected entities.

Commercial HMS fisheries are monitored through a combination of vessel logbooks, dealer reports, port sampling, cooperative agreements with states, and scientific observer coverage. Logbooks contain information on fishing vessel activity, including dates of trips, number of sets, area fished, number of fish, and other marine species caught, released and retained. In some cases, social and economic data such as volume and cost of fishing inputs are also required.

Pelagic Longline Observer Program

One thousand eighty-eight pelagic longline sets were observed and recorded by NMFS observers in 2003 (11.5% overall coverage - 100% coverage in the NED; and 6.2% coverage in remaining areas). Table 3.25 details the amount of observer coverage in past years for this fleet. The June 1, 2004, BiOp mandates that eight percent of the pelagic longline trips be selected for observer coverage. Generally, due to logistical problems, it has not always been possible to place observers on all selected trips. NMFS is working towards improving compliance with observer requirements and facilitating communication between vessel operators and observer program coordinators. In addition, fishermen are reminded of the safety requirements for the placement of observers specified at 50 CFR 600.746, and the need to have all safety equipment on board required by the U.S. Coast Guard.

Table 3.25 Observer Coverage of the Pelagic Longline Fishery. Source: Yeung, 2001; Garrison, 2003; and Garrison and Richards, 2004.

Year	Number of Sets Observed			Percentage of Total Number of Sets		
1999	420			3.8		
2000	464			4.2		
	Total	Non-NED	NED	Total	Non-NED	NED
2001*	403	217	186	3.7	2.0	100.0
2002*	856	353	503	8.9	3.7	100.0

Year	Number of Sets Observed			Percentage of Total Number of Sets		
2003*	1088	552	536	11.5	6.2	100.0

*In 2001, 2002, and 2003, 100 percent observer coverage was required in the NED research experiment.

Safety Issues Associated with the Fishery

Like all offshore fisheries, pelagic longlining can be dangerous. Trips are often long, the work is arduous, and the nature of setting and hauling longline gear may result in injury or death. Like all other HMS fisheries, longline fishermen are exposed to unpredictable weather. NMFS does not wish to exacerbate unsafe conditions through the implementation of regulations. Therefore, NMFS considers safety factors when implementing management measures on pelagic longline fishermen. For example, all time/area closures are expected to be closed to fishing, not transiting, in order to allow fishermen to make a direct route to and from fishing grounds. NMFS seeks comments from fishermen on any safety concerns they may have. Fishermen have pointed out that, due to decreasing profit margins, they may fish with less crew or less experienced crew or may not have the time or money to complete necessary maintenance tasks. NMFS encourages fishermen to be responsible in fishing and maintenance activities.

3.4.1.5 Economic Aspects of the U.S. Pelagic Longline Fishery

Costs and Revenues

The amount of economic data available for this gear type is increasing, although additional up to date information is needed. Since 1996, NMFS has been collecting economic information on a per trip basis through submission of voluntary forms in the pelagic logbook maintained in the Southeast Fisheries Science Center (SEFSC). Compared to the number of logbook reports, few economic data were collected, because submission was voluntary. In 2003, NMFS initiated mandatory cost earnings reporting for selected vessels in order to improve the economic data available for all HMS fisheries. Mandatory submission of this economic data is needed for NMFS to accurately assess the economic impacts of proposed fishery management regulations on fishermen and their communities as required by Federal laws, such as the National Environmental Policy Act (NEPA), Executive Order 12866, the Regulatory Flexibility Act (RFA), and National Standards 7 and 8 of the Magnuson-Stevens Act. Specifically, this information will be used to conduct cost-benefit analyses and develop regulatory impact analyses of proposed regulations in an effort to help NMFS develop and improve fishery management strategies.

Larkin *et al.* (2000) examined 1996 logbooks and the 1996 voluntary forms and found that net returns to a vessel owner varied substantially depending on the vessel size and the fishing behavior (i.e. sets per trip, fishing location, season, target species). This study noted that of 3,255 pelagic longline trips which reported, 642 provided the voluntary economic information. From all trips, four species (swordfish, yellowfin tuna, dolphin fish, and sandbar sharks) comprised 77 percent of all species landed and accounted for 84 percent of the total gross revenues for the fleet. Generally, vessels that were between 46 and 64 feet in length, had between 10 and 21 sets per trip, fished in the second quarter, fished in the Caribbean, or had more than 75 percent of their gross revenues from swordfish had the highest net return to the owner (ranging from $3,187 to $13,097 per trip). Vessels that were less than 45 feet in length, had between one and three sets per trip, fished in the first quarter, fished between North Carolina and Miami, FL, or had between 25 and 50 percent of their gross revenues from swordfish had the lowest net return to the owner (ranging from $642 to $1,885 per trip).

Larkin *et al*. (in press) used the above data in a cost function model to determine if and how captains decide on levels of effort in order to minimize variable costs per trip. They found that, on average, increasing the price of bait increased the demand for light sticks (i.e. these inputs are complements); changing the price of fuel did not affect any purchase decisions; and for every additional 10 feet in vessel length, operators demanded an additional 149 light sticks, 319 pounds of bait, and 540 gallons of fuel per trip. They also found that on average increasing swordfish landings required additional light sticks, bait and fuel. Increasing tuna landings reduced the demand for light sticks while increasing the demand for bait and fuel. Additionally, some inputs (i.e. light sticks, bait demand, and fuel demand) varied significantly with region, quarter, number of sets, and target species. They also found that if the price of light sticks or bait increases, the quantity demanded falls, particularly for light sticks (i.e. own-price elasticities are negative). However, elasticities could also change depending on region, target species, or number of trips but did not change between seasons.

Porter *et al*. (2001) conducted a survey of 147 vessels along the Atlantic and Gulf of Mexico (110 surveys were completed) in 1998 regarding 1997 operations. The survey consisted of 55 questions divided into five categories (vessel characteristics, fishing and targeting strategies, demographics, comments about regulations, and economic information of variable and fixed costs). The vessels interviewed were diverse in vessel size and target species (swordfish, tuna, mixed). Information was also used from trip tickets and logbooks. They found that on average, the average vessel received approximately $250,000 annual gross revenues, annual variable costs were approximately $190,000, and annual fixed costs were approximately $50,000. Thus, vessels were left with approximately $8,000 to cover depreciation on the vessel and the vessel owner lost approximately $3,500 per year. On a per trip level, gross revenues averaged $22,000 and trip expenses, including labor, were $16,000. Labor cost the owner the most (43 percent) followed by gear. Generally trip returns were divided so the vessel owner received 43 percent and the captain and crew 57 percent. Based on 2002 data, NMFS estimates annual gross revenues of approximately $187,074.00 in 2002 (NOAA Fisheries, 2004d). Along with other studies, Porter *et al*. (2001) noted differences between region, vessel size, and target species. Porter *et al*. (2001) also noted that 1997 was probably a financially poor year due to a reduction in swordfish quota and a subsequent closure of the fishery. In all, these studies are consistent with Larkin *et al*. (1998) and Ward and Hanson (1999) in that characteristics of fishing trips can influence the success of the trip and that pelagic longline fishermen do not have large profits.

Many consumers consider swordfish to be a premier seafood product. Swordfish that bring $3.00 per pound to the vessel may sell in some restaurants at prices of over $20.00 for a six-ounce steak. Swordfish prices are affected by a number of demand and supply factors, including the method of harvest, either by distant-water or inshore vessels, and by gear type (harpoon vs. pelagic longline). Generally, prices for fresh swordfish can be expected to vary during the month due to the heavier fishing effort around the full moon. Swordfish prices also vary by size and quality, with prices first increasing with size, up to about 250 pounds dressed weight (lbs dw), then decreasing due to higher handling costs for larger fish. “Marker” swordfish weighing 100 to 275 lbs dw are preferred by restaurants because uniform-sized dinner portions can be cut with a minimum of waste. “Pups” weighing 50 to 99 lbs dw are less expensive than markers but the yield of uniformly sized portions is smaller. “Rats” (33 to 49 lbs dw) are the least expensive but are generally not used by food service or retail buyers who require large portions of uniform size. Similarly, larger tunas are also more desirable than smaller ones. Size of fish harvested can be a substantial factor in management because regulations might have the effect of reducing catch but might raise the average size per fish caught and therefore, raise the price. Current ex-vessel prices for Atlantic HMS are summarized in Section 3.5.

3.4.2 Purse Seine

3.4.2.1 Overview of History and Current Management

Purse seine gear consists of a floated and weighted encircling net that is closed by means of a drawstring threaded through rings attached to the bottom of the net. The efficiency of this gear is enhanced by the assistance of spotter planes used to locate schools of tuna. Once a school is spotted, the vessel intercepts and uses the large net to encircle it, with the aid of a smaller skiff. Once encircled, the drawstring is pulled, closing the bottom of the net and preventing escape. The net is then lifted next to the vessel where the tunas are removed and placed onboard the larger vessel. Domestic aspects of the Atlantic tunas purse seine fisheries are described in Section 2.2.3 of the 1999 Atlantic Tunas, Swordfish, and Shark FMP. Economic and social aspects of the fisheries are described in Sections 3.5 and 3.6 of this document, respectively.

Vessels using purse seine nets have participated in the U.S. fishery for bluefin tuna continuously since the 1950s, although a number of purse seine vessels did target and land bluefin tuna off the coast of Gloucester, MA as early as the 1930s. A limited entry system with non-transferable individual vessel quotas (IVQs) for purse seining was established in 1982, effectively excluding any new entrants to this category. Equal baseline quotas are assigned to individual vessels by regulation; the IVQ system is possible given the small pool of ownership in this sector of the fishery. Currently, only five vessels comprise the bluefin tuna purse seine fleet and the quotas were made transferable among the five vessels in 1996. Over the last few years, the Purse seine category has not fully harvested its allocated quota. This can be attributed to a number of different reasons outside of the industry's or NOAA Fisheries' control. NOAA Fisheries has issued several EFPs to address this issue and will continue to assess current regulations and their impact on providing reasonable opportunities to harvest available quota. In late December 2004, NOAA Fisheries transferred 100 mt from the Purse seine category to the Reserve category (70 FR 302, January 3, 2005).

3.4.2.2 Most Recent Catch and Landings Data

Table 3.26 shows purse seine landings of Atlantic tunas from 1999 through 2003. Purse seine landings make up approximately 20% of the total annual U.S. landings of bluefin tuna (about 25 percent of total commercial landings), but account for only a small percentage, if any, of the landings of other HMS. In the 1980s and early 1990s, purse seine landings of yellowfin tuna were often over several hundred metric tons. Over 4,000 mt ww of yellowfin were recorded landed in 1985. In recent years, via informal gentlemen's agreements with other sectors fo the tuna industry, the purse seine fleet has opted not to direct any effort on HMS other than bluefin tuna.

Table 3.26 **Domestic Atlantic Tuna Landings for the Purse Seine Fishery: 1999-2003 (mt ww). NW Atlantic Fishing Area**. Source: U.S. National Report to ICCAT: 2004.

Species	1999	2000	2001	2002	2003
Bluefin Tuna	247.9	275.2	195.9	207.7	265.4
Yellowfin Tuna	0	0	0	0	0
Skipjack Tuna	0	0	0	0	0

*3.4.2.3 **U.S. vs. International Purse Seine Catch***

The U.S. purse seine fleet has historically accounted for a small percentage of total Atlantic landings. Over the past five years, the U.S. purse seine fishery has contributed to less than 0.15% of the total purse seine landings reported to ICCAT.

Table 3.27 **Estimated International Purse Seine Atlantic Tuna Landings in the Atlantic and Mediterranean: 1999-2003 (mt ww).** Source: SCRS, 2004

Species	1999	2000	2001	2002	2003
Bluefin Tuna	15,884	17,616	17,520	18,548	15,525
Yellowfin Tuna	83,445	80,253	102,641	95,435	79,908
Skipjack Tuna	95,367	80,762	77,995	70,750	92,805
Bigeye Tuna	20,923	17,909	22,060	16,192	22,237
Total	**215,619**	**196,540**	**220,216**	**200,925**	**210,475**
U.S. Total	**248**	**275**	**196**	**208**	**265**
U.S. Percentage	**0.12%**	**0.14%**	**0.09%**	**0.10%**	**0.13%**

Since the 1999 ICCAT meeting, ICCAT has continued to implement a FADs closed area in the Gulf of Guinea. The closure (which became mandatory in mid-1999) was in response to concern over catches of juvenile and undersize tunas by non-U.S. internationally flagged purse seiners relying on FADs. The full evaluation of this program is somewhat hindered by the multi-species nature of surface fisheries and the existence of other types of fisheries. The updated analysis indicated that this regulation appeared effective at reducing mortality for juvenile bigeye. Full compliance with this regulation by all surface fisheries will greatly increase the effectiveness of this regulation.

3.4.2.4 Bycatch Issues and Data Associated with the Fishery

The Atlantic bluefin tuna Purse seine category fishery is currently listed as a Category III fishery under the Marine Mammal Protection Act. After a school of fish is located, a purse seine net is set by paying out the net in a circle around the school. This affords considerable control over what is encircled by the net and the net does not remain in the water for any considerable amount of time. Therefore, this gear-type is not likely to result in mortality or serious injury of marine mammals or sea turtles. As a result, the 2001 BiOp concluded that the continued operation of the purse seine fishery may adversely affect, but is not likely to jeopardize, the continued existence of any endangered or threatened species under NOAA Fisheries jurisdiction.

This fishery was observed in 1996, with near-100% coverage. Six pilot whales, one humpback whale, and one minke whale were observed as encircled by the nets during the fishery. All were released alive or dove under the nets and escaped before being pursed.

About mid-way through the 2000 bluefin tuna purse seine fishing season, large concentrations of bluefin tuna were located in one of the areas of Georges Bank that has been closed to all fishing gears in order to provide protection and rebuilding of northeast multispecies stocks, particularly for cod, haddock, and yellowtail flounder. As tuna purse seine gear was not permitted to be used in the closed areas, the purse seine fleet could not access these fish, which were behaving in a manner conducive to purse seine operations (spending time very close to the surface). Purse seine vessels have traditionally fished in or near the closed area, most often to the west, near the "BB" buoy. The 1996 observer data showed minimal interaction with demersal species. In an effort to gather information on the interaction of tuna purse seines with demersal species and avoid conflicts with other gear types, NOAA Fisheries issued EFPs to the purse seine fleet, and placed observers on the vessels. This allowed the purse seine vessels to fish in the closed area during 2000 and successfully prosecute the tuna fishery, while providing NOAA Fisheries with additional data on purse seine operations and gear interactions.

Only five observed purse seine sets were made in the closed areas during the 2000 fishing season, and there was no bycatch of groundfish reported on these sets. In order to gather additional information on the impacts of this fishery in the closed areas, and to allow the purse seine fleet to utilize their allocated quota of bluefin tuna for 2001 and avoid conflicts with other gear types, NOAA Fisheries issued EFPs to the purse seine fleet again in 2001, and placed observers on the vessels. The New England Fisheries Management Council revised the list of exempted gear in May 2004, to allow the tuna purse seiners access to the closed areas under Amendment 13 to Northeast Multispecies FMP.

3.4.2.5 Safety Issues Associated with the Fishery

There are no new safety issues associated with the U.S. Atlantic tunas purse seine fishery since the publication of the 1999 Atlantic Tunas, Swordfish, and Shark FMP.

3.4.3 Commercial Handgear

Handgear, including handline, harpoon, rod and reel, and bandit gear are used for Atlantic HMS by fishermen on private vessels, charter vessels, and headboat vessels.

Operations, frequency and duration of trips, and distance ventured offshore vary widely. An overview of the history of the HMS handgear fishery (commercial and recreational) can be found in Section 2.5.8 of the 1999 Atlantic Tunas, Swordfish, and Shark FMP.

The proportion of domestic HMS landings harvested with handgear varies by species, with Atlantic tunas comprising the majority of commercial landings. Commercial handgear landings of all Atlantic HMS (other than sharks) in the United States are shown in Table 3.28. The fishery is most active during the summer and fall, although in the South Atlantic and Gulf of Mexico fishing occurs during the winter months. For bluefin tuna, commercial handgear landings accounted for approximately 45 percent of total U.S. landings, and almost 65 percent of commercial bluefin landings. The commercial handgear fishery for bluefin tuna occurs mainly in New England, and more recently off the coast of North Carolina, with vessels targeting large medium and giant bluefin using rod and reel, handline, harpoon, and bandit gear. Beyond these general patterns, the availability of bluefin tuna at a specific location and time is highly dependent on environmental variables that fluctuate from year to year. Fishing usually takes place between eight and 200 km from shore using bait including mackerel, whiting, mullet, ballyhoo, herring, and squid.

The majority of U.S. commercial handgear fishing activities for bigeye, albacore, yellowfin, and skipjack tunas take place in the northwest Atlantic. Rod and reel gear is also used by recreational fishermen, which is addressed in Section 3.4.4. In 2003, three percent of the total yellowfin catch, or nine percent of the commercial yellowfin catch, was attributable to commercial handgear. The majority of these landings occurred in the northwest Atlantic Ocean. Commercial handgear landings of skipjack tuna accounted for approximately 12 percent of total skipjack landings, or about 55 percent of commercial skipjack landings. For albacore, commercial handgear landings accounted for less than one percent of total albacore landings, or about three percent of commercial albacore landings. Commercial handgear landings of bigeye tuna accounted for approximately one percent of total bigeye landings and two percent of total commercial bigeye landings.

3.4.3.1 Overview of History and Current Management

A thorough description of the commercial handgear fisheries for Atlantic tunas can be found in Section 2.2.3 of the 1999 Atlantic Tunas, Swordfish, and Shark FMP. The domestic swordfish fisheries are discussed in Section 2.3.3 of the 1999 Atlantic Tunas, Swordfish, and Shark FMP. The domestic shark fisheries are discussed is Section 2.4.3 of the 1999 Atlantic Tunas, Swordfish, and Shark FMP. Economic and social aspects of all the domestic handgear fisheries are described later in this document (Section 3.5 and 3.6 respectively).

3.4.3.2 Most Recent Catch and Landings Data

Updated tables of landings for the commercial handgear fisheries by gear and by area for 1999-2003 are presented in the following tables.

Table 3.28 Domestic Landings for the Commercial Handgear Fishery, by Species and Gear, for 1999-2003 (mt ww). Source: U.S. National Report to ICCAT: 2004

Species	Gear	1999	2000	2001	2002	2003
Bluefin Tuna	Rod and Reel	643.6	579.3	889.7	878.8	595.1
	Handline	15.5	3.2	9.0	4.5	2.5
	Harpoon	115.8	184.2	101.9	55.5	53.2
	TOTAL	**774.9**	**766.7**	**1,000.6**	**983.8**	**650.8**
Bigeye Tuna	Troll	0.0	0.0	0.0	0.0	0.0
	Handline	12.3	5.7	33.7	14.4	6.3
	TOTAL	**12.3**	**5.7**	**33.7**	**14.4**	**6.3**
Albacore Tuna	Troll	0.0	0.0	0.0	0.0	0.0
	Handline	4.4	7.9	3.9	6.6	3.4
	TOTAL	**4.4**	**7.9**	**3.9**	**6.6**	**3.4**
Yellowfin Tuna	Troll	0.0	0.0	0.0	0.0	0.0
	Handline	220.0	284.0	300.0	244.0	216.0
	TOTAL	**220.0**	**284.0**	**300.0**	**244.0**	**216.0**
Skipjack Tuna	Troll	0.0	0.0	0.0	0.0	0.0
	Handline	6.4	9.7	10.5	12.4	9.4
	TOTAL	**6.4**	**9.7**	**10.5**	**12.4**	**9.4**
Swordfish	Handline	5.0	8.9	8.9	11.7	11.7
	Harpoon	0.0	0.6	7.4	2.8	0.0
	TOTAL	**5.0**	**9.5**	**16.3**	**14.5**	**11.7**

Table 3.29 Domestic Landings for the Commercial Handgear Fishery by Species and Region for 1999-2003 (mt ww). Source: U.S. National Report to ICCAT: 2004

Species	Region	1999	2000	2001	2002	2003
Bluefin Tuna	NW Atl	774.4	766.7	1,000.6	938.3	650.8
Bigeye Tuna	NW Atl	11.9	4.1	33.2	13.8	6.0
	GOM	0.2	0.1	0.5	0.6	0.3
	Caribbean	0.2	1.5	0.0	0.0	0.0
Albacore Tuna	NW Atl	0.6	2.9	1.7	3.9	1.4
	GOM	$\leq$ .05	0.0	0.0	0.0	$\leq$ .05

Species	Region	1999	2000	2001	2002	2003
	Caribbean	3.8	5.0	2.2	2.7	2.0
Yellowfin Tuna	NW Atl	192.0	235.7	242.5	137.0	148.0
	GOM	12.7	28.6	43.4	100.0	59.0
	Caribbean	14.5	19.4	14.3	7.0	9.0
Skipjack Tuna	NW Atl	0.2	0.2	0.2	0.2	0.2
	GOM	0.4	0.7	0.0	0.0	0.0
	Caribbean	5.8	8.8	10.3	12.5	9.2
Swordfish	NW Atl	5.0	8.9	8.9	11.6	10.2
	GOM	$\leq$ .05	1.2	0.3	2.9	1.5

Handgear Trip Estimates

Table 3.30 displays the estimated number of rod and reel and handline trips targeting large pelagic species in 2001 through 2003. The trips include commercial and recreational trips, and are not specific to any particular species. It should be noted that these estimates are still preliminary and subject to change.

Table 3.30 **Estimated number of vessel trips targeting large pelagic species, 2001-2003.** Source: Large Pelagics Survey database

Year	AREA							Total
	NH/ME	MA	CT/RI	NY	NJ (north)	NJ (south) + MD/DE	VA	
Private Vessels								
2001	1,944	3,641	497	2,039	3,040	2,675	910	14,746
2002	5,090	15,180	2,558	7,692	2,762	22,757	6,524	62,563
2003	4,501	13,411	2,869	12,466	3,214	21,619	5,067	63,147
Charter Vessels								
2001	133	567	203	280	660	655	307	2,805
2002	1,132	3,357	937	1,686	1,331	6,300	1,510	16,253
2003	221	2,561	1,246	2,035	1,331	5,201	546	13,141

3.4.3.3 U.S. vs. International Handgear Catch

SCRS data do not lend themselves to organize international landings into a commercial handgear category. While some countries report rod and reel landings, these numbers may include both commercial and recreational landings. International catches of all Atlantic HMS for 2003 are summarized in Table 3.24.

3.4.3.4 Bycatch Issues and Data Associated with the Fishery

As compared with other commercial gear types, commercial handgear produces relatively lower levels of bycatch. However, bycatch in the yellowfin tuna commercial handgear fishery is unmonitored in those areas where commercial activities occur after the Large Pelagic Survey (LPS) sampling season. Rod and reel discards of HMS, as assessed from LPS data, are discussed in the Recreational Section (3.4.4) as are new efforts in documenting catch and release survival rates. At this time, however, there is little information regarding important interactions and new data relating to commercial handgear bycatch. Anecdotal reports suggest that there may be low levels of bluefin, yellowfin, and bigeye tuna discards, but there is no supporting documentation at this point. Some regulatory discards occur because fishermen must comply with minimum size restrictions.

3.4.3.5 Safety Issues Associated with the Fishery

Section 3.9 of the 1999 Atlantic Tunas, Swordfish, and Shark FMP describes safety of human life at sea as it pertains to the fisheries for Atlantic HMS. Additional safety information regarding the commercial handgear fisheries for Atlantic HMS is presented below.

The U.S. Coast Guard (USCG) conducts routine vessel safety inspections at sea on a variety of vessels throughout the year, and during the busy General category bluefin tuna season the USCG concentrates patrol activities on General category bluefin tuna boats. Boarding officers indicate that the majority of the commercial handgear vessels have the necessary safety equipment; however, many part-time fishermen operating smaller vessels do not meet the necessary safety standards. There have been several cases of vessels participating in this fishery that have capsized due to weight while attempting to boat commercial-sized bluefin tuna (measuring 73 inches or greater and weighing several hundred pounds).

Currently, NOAA Fisheries does not require proof of proper safety equipment as a condition to obtain a commercial handgear permit. Instead, NOAA Fisheries informs permit applicants that commercial vessels are subject to the Fishing Vessel Safety Act of 1988 and advises them to contact their local USCG office for further information. The USCG District Boston office reports receiving 50 to 75 calls a week during the peak fishing season; officers speak with all callers to answer vessel questions.

Since NOAA Fisheries regulations do not require USCG inspection or safety equipment in order to obtain a commercial handgear permit, NOAA Fisheries cannot be certain that all participants in the commercial bluefin handgear fishery are adequately prepared for the conditions they may encounter. NOAA Fisheries is concerned about the safety of all vessels participating in the bluefin tuna fishery and is working with the USCG to improve communication of vessel safety requirements to commercial handgear vessel operators.

It is unlawful for Atlantic tuna vessels to engage in fishing unless the vessel travels to and from the area where it will be fishing under its own power and the person operating that vessel brings any bluefin tuna under control (secured to the catching vessel or on board) with no assistance from another vessel, except when shown by the operator that the safety of the vessel or its crew was jeopardized or other circumstances existed that were beyond the control of the operator. NOAA Fisheries Enforcement and USCG boarding officers have recently encountered vessels participating in the bluefin tuna fishery that are unable to transit to and from the fishing grounds due to their limited fuel capacity. Occasionally these smaller vessels will work in cooperation with a larger documented vessel to catch a bluefin; others have been observed to leave lifesaving equipment at the dock to make room for extra fuel, bait, and staples. NOAA Fisheries is concerned that use of such inadequately-equipped vessels jeopardizes crew in that the vessel may not be able to safely return to shore without assistance of the larger vessel due to insufficient fuel or to adverse weather conditions.

Over the last couple of years, NOAA Fisheries has received a number of vessel permit applications from kayak owner/operators. In addition to the requirement mentioned above, NOAA Fisheries only issues permits to vessels that possess either a USCG Documentation number, a state registration number, or a foreign registration number (recreational permit only). As kayaks typically do not require such documentation NOAA Fisheries has denied all applications for a kayak to date.

Over the last few years, the USCG focused boardings on small vessels, especially those owned by “part-time” commercial bluefin fishermen, and terminated several dozen trips due to the lack of safety equipment on board. If a vessel is boarded at sea and found to be lacking major survival equipment, the USCG will terminate the trip and escort the vessels back to the dock.

NOAA Fisheries has concerns regarding individuals embarking on HMS trips by themselves. Recently there have been a few incidents of fishermen either severely injuring themselves or dying while pursing HMS by themselves. Certain hazardous situations could be mitigated by having an additional person onboard the vessel while conducting a trip targeting large pelagics. NOAA Fisheries encourages vessel owner/operators to practice safe fishing techniques.

NOAA Fisheries will consider all safety comments and information, including those from the USCG and NMFS Enforcement, when planning future General category effort control schedules and will discuss these issues in future meetings with the AP.

3.4.4 Recreational Handgear

The following section describes the recreational portion of the handgear fishery, and is primarily focused upon rod and reel fishing. The HMS Handgear (rod and reel, handline, and harpoon) fishery includes both commercial and recreational fisheries and is described fully in Section 2.5.8 of the 1999 FMP. The recreational billfish fishery is described fully in Section 2.1.3 of the 1999 Billfish Amendment. The commercial sale, barter or trade of Atlantic billfish by U.S. commercial interests is prohibited, only recreational landings are authorized.

3.4.4.1 Overview of History and Current Management

Atlantic tunas, swordfish, and sharks are managed under the 1999 FMP and Amendment 1 to the 1999 FMP, while Atlantic billfish are managed separately under the Billfish FMP, as amended. Summaries of the domestic aspects of the Atlantic tuna fishery, the Atlantic swordfish fishery, and the Atlantic shark fishery are found in Sections 2.2.3, 2.3.3, and 2.4.3, respectively, of the 1999 FMP. A history of Atlantic billfish management is provided in Section 1.1.1 of the Billfish Amendment.

Atlantic tunas, sharks, swordfish, and billfish are all targeted by domestic recreational fishermen using rod and reel gear. The recreational swordfish fishery had declined dramatically over the past twenty years, but recent information indicates that the recreational swordfish fishery is rebuilding in the Mid-Atlantic Bight, and off the east coast of Florida. Effective March 1, 2003, an HMS Angling category permit has been required to fish recreationally for any HMS-managed species (Atlantic tunas, sharks, swordfish, and billfish) (67 FR 77434, December 18, 2002). Prior to March 1, 2003, the regulations only required vessels fishing recreationally for Atlantic tunas to possess an Atlantic Tunas Angling category permit.

Recreational fishing for Atlantic HMS is managed primarily through the use of minimum size limits and bag limits. Recreational tuna fishing regulations are the most complex and include a combination of minimum sizes, bag limits, limited season-based quota allotment for bluefin tuna, and reporting requirements (depending upon the particular species and vessel type).

The recreational swordfish fishery has been managed through the use of a minimum size requirement and landings requirement (swordfish may be gutted and beheaded but may not be cut into smaller pieces). However, regulations published on January 7, 2003 (68 FR 711) established a recreational retention limit of one swordfish per person up to three per vessel per day, effective March 2003. Regardless of the length of a trip, no more than the daily limit of North Atlantic swordfish can be possessed onboard a vessel.

The recreational shark fishery is managed using bag limits, minimum size requirements, and landing requirements (sharks must be landed with heads and fins attached). Additionally, the possession of 19 species of sharks is prohibited.

Atlantic blue and white marlin have a combined landings cap (*i.e.*, a maximum amount of fish (250) that can be landed per year); however, the overall management strategy for the recreational billfish fishery is through the use of minimum size limits. There are no recreational retention limits for Atlantic sailfish, blue marlin, and white marlin. Recreational anglers may not land longbill spearfish.

ICCAT has made several recommendations to recover billfish resources throughout the Atlantic Ocean that are discussed in detail in Section 3.2.4.

3.4.4.2 Most Recent Catch and Landings Data

The recreational landings database for HMS consists of information obtained through surveys including the Marine Recreational Fishery Statistics Survey (MRFSS), Large Pelagic Survey (LPS), Southeast Headboat Survey (HBS), Texas Headboat Survey, and Recreational Billfish Survey Tournament Data (RBS). Descriptions of these surveys, the geographic areas they include, and their limitations, are discussed in Section 2.6.2 of the 1999 FMP and Section 2.3.2 of the 1999 Billfish Amendment.

Reported domestic landings of Atlantic bluefin tuna (1983 through 1998) and BAYS tuna (1995 through 1997) were presented in Section 2.2.3 of the 1999 FMP. As landings figures for 1997 and 1998 were preliminary in the 1999 FMP, updated landings for recreational rod and reel fisheries are presented in Table 3.31 through 2003. Recreational landings of swordfish are monitored by the LPS and the MRFSS. However, because swordfish landings are considered rare events, it is difficult to extrapolate the total recreational landings from dockside intercepts.

An ad hoc committee of NMFS scientists reviewed the methodology and data used to estimate recreational landings of Atlantic HMS during 2004. The Committee was charged with reviewing the 2002 estimates of U.S. recreational landings of bluefin tuna, white marlin and blue marlin reported by NMFS to ICCAT. The committee was also charged with recommending methods to be used for the estimation of 2003 recreational fishery landings of bluefin tuna and marlin. Although the Committee discovered a few problems with the raw data from the LPS and the estimation program used to produce the estimates, the Committee concluded that the estimation methods for producing the 2002 estimates were consistent with methods used in previous years. The report of the Committee is available at: http://www.nmfs.noaa.gov/sfa/hms/RecReports/2002-2003%20Bluefin-Marlin%Report-120304.pdf.

Table 3.31 **Updated Domestic Landings for the Atlantic Tunas, Swordfish and Billfish Recreational Rod and Reel Fishery: Calendar years 1996-2003 (mt ww)*.** Sources: NMFS, 2004; Large Pelagic Survey; SEFSC Recreational Billfish Survey. (Recreational shark landings are provided in **Table 3.34** through **Table 3.37**).

Species	Region	1996	1997	1998	1999	2000	2001	2002	2003
Bluefin tuna**	NW Atlantic	362	299	184	103.0	49.5	242.9	519.4	314.6
	GOM	0	0	0	0.4	0.9	1.7	1.5	0
	Total	**362**	**299**	**184**	**103.4**	**50.4**	**244.6**	**520.9**	**314.6**
Bigeye tuna	NW Atlantic	108.2	333.5	228.0	316.1	34.4	366.2	49.6	188.5
	GOM	0	0	0	1.8	0	0	0	0
	Caribbean						0	0	4.0
	Total	**108.2**	**333.5**	**228.0**	**317.9**	**34.4**	**366.2**	**49.6**	**192.5**
Albacore	NW Atlantic	277.8	269.5	601.1	90.1	250.75	122.3	323.0	333.8
	GOM	61.7	65.2	0	0	0	0	0	0
	Total	**339.5**	**334.7**	**601.1**	**90.1**	**250.75**	**122.3**	**323.0**	**333.8**
Yellowfin tuna	NW Atlantic	4,484.8	3,560.9	2,845.7	3,818.2	3,809.5	3,690.5	2,624	4,672
	GOM	13.2	7.7	80.9	149.4	52.3	494.2	200	640
	Caribbean				0	0	0.1	7.2	16
	Total	**4,498**	**3,569**	**2,927**	**3,967.6**	**3,861.8**	**4184.7**	**2,831.2**	**5,328**
Skipjack tuna	NW Atlantic	48.1	42.0	49.5	63.6	13.1	32.9	23.3	34.0
	GOM	36.4	21.7	37.0	34.8	16.7	16.1	13.2	11.0
	Caribbean				0	0	0	13.2	15.7
	Total	**84.5**	**63.7**	**86.5**	**98.4**	**29.8**	**49.0**	**49.7**	**60.7**
Blue marlin***	NW Atlantic	17.0	25.0	34.1	24.8	13.8	9.0		
	GOM	8.3	11.5	4.5	7.5	4.7	5.1		
	Caribbean	9.6	8.6	10.6	4.6	5.7	2.3		
	Total	**34.9**	**45.1**	**49.2**	**36.9**	**24.2**	**16.4**	**5.6**	**19**
White marlin ***	NW Atlantic	2.7	0.9	2.4	1.5	0.23	2.8		
	GOM	0.6	0.9	0.2	0.1	0	0.3		
	Caribbean	0.0	0.0	0.02	0	0	0		
	Total	**3.3**	**1.8**	**2.6**	**1.6**	**0.23**	**3.1**	**5.6**	**0.6**
Sailfish***	NW Atlantic	0.2	0	0.1	0.07	1.75	61.2		
	GOM	0.8	0.4	1.0	0.6	0.24	0.6		
	Caribbean	0.2	0.2	0.05	0	0.06	0		
	Total	**1.2**	**0.6**	**1.5**	**0.67**	**2.05**	**61.8**	**103**	
Swordfish	**Total**	**5.9**	**10.9**	**4.7**	**21.3**	**15.6**	**1.5**	**21.5**	**5.1**

* 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.
** Rod and reel catch estimates for bluefin tuna in the U.S. National Report to ICCAT include both recreational and commercial landings. Rod and reel catch of bluefin less than 73" curved fork length (CFL) are recreational, and rod and reel catch of bluefin 73 inches CFL or greater are commercial. Rod and reel catch of bluefin > 73" CFL also includes a few metric tons of "trophy" bluefin (recreational bluefin 73").
*** Blue marlin, white marlin, and sailfish landings are based on the U.S. National Report to ICCAT and consist primarily of reported tournament landings.

Atlantic Billfish Recreational Fishery

Due to the rare nature of billfish encounters and the difficulty of monitoring landings outside of tournament events, reports of recreational billfish landings are sparse. However, the RBS provides a preliminary source for analyzing recreational billfish landings. Table 3.32 documents the number of billfish landed in 2000-2003, as reported by the RBS.

Table 3.32 Preliminary RBS Recreational Billfish Landings (calendar year). Source: NMFS Recreational Billfish Survey (RBS).

Species	1999	2000	2001	2002	2003
Blue Marlin	172	117	75	84	96
White Marlin	36	8	22	33	20
Sailfish	30	18	11	14	24
Swordfish	-	-	0	16	48

In support of the sailfish assessment conducted at the 2001 SCRS billfish species group meeting, document SCRS/01/106 developed indices of abundance of sailfish from the U.S. recreational billfish tournament fishery for the period 1973-2000. The index of weight per 100 hours fishing was estimated from numbers of sailfish caught and reported in the logbooks submitted by tournament coordinators and NOAA Fisheries observers under the RBS, as well as available size information. Document SCRS/01/138 estimated U.S. sailfish catch estimates from various recreational fishery surveys.

All recreational, non-tournament landings of billfish, including swordfish, must be reported within 24 hours of landing to NMFS by the permitted owner of the vessel landing the fish. This requirement is applicable to all permit holders, both private and charter/headboat vessels, not fishing in a tournament. In Maryland and North Carolina, vessel owners should report their billfish landings at state-operated landings stations. A landed fish means a fish that is kept and brought to shore. Due to large-scale non-compliance with the call-in requirement, the landings in Table 3.33 are considered a minimum estimate of the non-tournament landings of billfish.

Table 3.33 Number of billfish reported to NMFS via call-in system by fishing year, 2002-2004. Source: G. Fairclough, pers. comm.

Species	2002*	2003	2004**
Blue Marlin	0	7	2
White Marlin	0	1	0
Sailfish	3	16	34
Swordfish	28	188	194

Based on a fishing year of June 1 – May 31.
* Reporting requirement did not go into effect until March 1, 2003
** 2004 landings as of January 28, 2005

Swordfish Recreational Fishery

The recreational swordfish fishery in the North Atlantic Ocean has been steadily expanding in recent years, probably due to increased availability of small swordfish and an increased interest in the sport. Fishermen typically fish off the east coast of Florida and off the coasts of New Jersey and New York. Fish have also been occasionally encountered on trips off Maryland and Virginia. In the past, the New York swordfish fishery occurred incidental to overnight yellowfin tuna trips. During the day, fishermen targeted tunas, while at night they fished deeper for swordfish. This appears to have evolved into a year-round directed fishery off Florida and a summer fishery off of New Jersey. The Florida fishery occurs at night with fishermen targeting swordfish using live or dead bait and additional attractants such as lightsticks, LED lights, and light bars suspended under the boat.

Historically, fishery survey strategies have not captured all landings of recreational handgear-caught swordfish. Although some handgear swordfish fishermen have commercial permits[1], many others land swordfish strictly for personal consumption. Therefore, NOAA Fisheries published regulations to improve recreational swordfish monitoring and conservation. A final rule was published on January 7, 2003 (68 FR 711), that included a trip limit of one swordfish per person, up to three per vessel, and mandatory reporting of all recreationally-landed swordfish and billfish via a toll-free call-in system. These regulations became effective on March 2, 2003. Accordingly, all reported recreational swordfish landings will be counted against the Incidental swordfish quota.

Recreational fishing tournaments allow for the collection of a large volume of fishery-dependent data in a relatively short time period. Tournaments also provide a "snapshot" of the recreational fishery at a particular time and location. Analysis of tournament data collected over a period of years could provide valuable information regarding trends in the recreational swordfish fishery. A recent study documented recreational handgear-caught swordfish in three south Florida tournaments (J. Levesque, pers. comm. 2003). The tournaments occurred from July though September 2002, two in Lighthouse Point and the other in Ft. Lauderdale. Data was obtained through direct at-sea observation, dockside interviews with anglers landing swordfish, and a telephone interview with a tournament organizer. A total of 156 vessels and between 468 - 624 individuals participated in the three tournaments.

[6] Access to the commercial swordfish fishery is limited; hand gear fishermen however may purchase permits from other permitted fishermen because the permits are transferable.

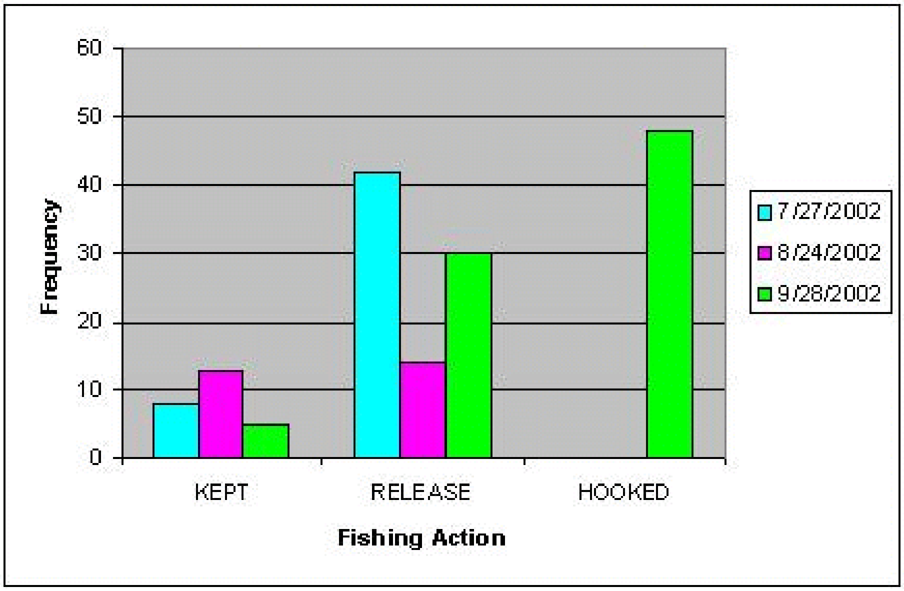

Figure 3.23 **Total Number of Swordfish Caught, Kept and Released in Three Sampled Recreational Swordfish Tournaments off Southeast Florida during 2002.** Source: J. Levesque, pers. comm. 2003.

Figure 3.23 indicates that 112 swordfish were caught during the three monitored tournaments. Of these, 26 swordfish were retained and 86 swordfish were released alive. Additional data from the September 28, 2002, tournament indicated that, in that tournament, 48 swordfish were hooked, 30 were released, and four were kept. The definition of hooked, for these purposes, was a swordfish that was on the line for any given amount of time. All hooked fish were assumed to be swordfish. The three fishing tournaments implemented a 55-inch, or 140 cm LJFL minimum size requirement for landed swordfish, although current federal regulations are 119 cm (46.9 in) LJFL.

Sizes for landed swordfish ranged from 130 - 230 cm (51.2 – 90.6 in) fork length. The mean size for landed swordfish was 160 cm (63 in) fork length. Weights for landed swordfish ranged from 36 - 144 kg (79.3 – 317.2 lb). The mean weight for the landed swordfish was 62.6 kg (137.9 lb). Estimated weights for the released swordfish ranged from 13 - 32 kg (28.6 – 70.5 lb). The mean estimated weight for released swordfish was 19.5 kg (43 lb).

The overall number of swordfish hooked per-unit-effort was .0615-swordfish/hr. or 6.15 swordfish per 100-hrs.-drifting. The catch per-unit-effort was .0143-swordfish landed/hr. or 1.43 fish per 100-hrs.-drifting.

Shark Recreational Fishery

Recreational landings of sharks are an important component of HMS fisheries. Recreational shark fishing with rod and reel is a popular sport at all social and economic levels, largely because the resource is accessible. Sharks can be caught virtually anywhere in salt water, depending upon the species. Recreational shark fisheries are oftentimes exploited in nearshore waters by private vessels and charter/headboats. However, there is also some shore-based fishing and some offshore fishing. The following tables provide a summary of landings for each of the three species groups. Amendment 1 to the 1999 Atlantic Tunas, Swordfish, and Shark FMP limited the recreational fishery to rod and reel and handline gear only.

Table 3.34 Estimates of Total Recreational Harvest of Atlantic Sharks: 1998-2003 (numbers of fish in thousands). Source: Cortés and Neer 2002, and E. Cortés, 2005.

Species Group	1998	1999	2000	2001	2002	2003
LCS	165.5	91.0	129.4	127.8	77.9	81.4
Pelagic	11.8	11.1	13.3	3.8	4.7	4.3
SCS	169.6	115.8	184.7	211.6	153.8	134.7
Unclassified	-	-	-	22.2	2.4	16.2

Table 3.35 Recreational Harvest of Atlantic Large Coastal Sharks (LCS) by Species, in number of fish: 1998-2003. Sources: 1998-2000 (Cortés and Neer, 2002), 2001-03 (Cortés, 2005).

LCS Species	1998	1999	2000	2001	2002	2003
Basking**	0	0	0	0	0	0
Bignose*	0	0	0	0	0	0
Bigeye sand tiger**	0	0	0	0	0	0
Blacktip	82,288	34,962	67,600	48,757	42,290	38,753
Bull	1,850	3,107	6,057	4,151	1,910	3,345
Caribbean Reef*	74	3	122	0	0	0
Dusky*	4,499	5,570	2,285	5,583	1,047	2,731
Galapagos*	0	0	0	0	0	0
Hammerhead, Great	467	352	921	3,382	4	68
Hammerhead, Scalloped	1,920	1,349	3,403	1,183	1,061	2,320
Hammerhead, Smooth	375	1	1,274	703	2	1
Hammerhead, Unclassified	390	75	3,668	0	5,293	0
Lemon	2,120	146	2,782	5,488	1,683	4,002
Night*	133	50	0	0	0	0
Nurse	2,455	1,503	2,233	3,672	2,173	647
Sandbar	35,766	20,553	10,867	36,094	8,341	5,185
Sand tiger**	0	0	0	604	0	0

LCS Species	1998	1999	2000	2001	2002	2003
Silky	5,376	3,863	5,168	3,808	1,785	444
Spinner	7,522	6,391	4,474	3,651	4,134	4,460
Tiger	1,380	153	1,480	758	170	110
Whale**	0	0	0	0	0	0
White**	0	0	0	0	0	0
Large Coastal Unclassified	18,925	12,953	17,096	16,211	9,098	22,086
Total:	165,540	91,031	129,430	134,045	78,991	84,152

*indicates species that were prohibited in the recreational fishery as of July 1, 1999.
** indicates species that were prohibited as of April 1997.

Table 3.36 **Recreational Harvest of Atlantic Pelagic Sharks by Species, in number of fish: 1998-2003.** Sources: 1998-2000 (Cortés and Neer, 2002), 2001-03 (Cortés, 2005).

Pelagic Shark Species	1998	1999	2000	2001	2002	2003
Bigeye thresher*	0	0	0	0	65	0
Bigeye sixgill*	0	0	0	0	0	0
Blue Shark	6,085	5,218	7,010	950	0	376
Mako, Longfin*	0	0	0	0	0	0
Mako, Shortfin	5,633	1,383	5,808	2,871	3,206	3,957
Mako, Unclassified	8	9	0	0	0	0
Oceanic whitetip	0	0	0	0	0	0
Porbeagle	0	0	0	0	0	0
Sevengill*	0	0	0	0	0	0
Sixgill*	0	0	0	0	0	0
Thresher	36	4,512	528	0	1,467	0
Total:	11,762	11,122	13,346	3,821	4,673	4,333

* indicates species that were prohibited in the recreational fishery as of July 1, 1999.

Table 3.37 Recreational Harvest of Atlantic SCS by Species, in number of fish: 1998-2003. Sources: 1998-2000 (Cortés and Neer 2002), 2001-03 (Cortés, 2005).

SCS Species	1998	1999	2000	2001	2002	2003
Atlantic Angel*	110	0	0	0	0	0
Blacknose	10,523	6,019	10,463	15,179	11,416	6,705
Bonnethead	29,606	41,128	57,405	58,511	50,894	39,863
Finetooth	1,124	78	1,786	6,701	2,952	1,774
Sharpnose, Atlantic	128,254	68,621	114,973	131,165	88,523	86,361
Sharpnose, Caribbean*	0	0	0	0	0	0
Smalltail*	0	4	29	26	0	0
Total:	169,617	115,850	184,656	211,556	153,785	134,703

* indicates species that were prohibited in the recreational fishery as of July 1, 1999.

3.4.4.3 U.S. vs. International Catch

Important directed recreational fisheries for HMS occur in the United States, Venezuela, the Bahamas, and Brazil. Many other countries and entities in the Caribbean and the west coast of Africa are also responsible for significant HMS recreational landings. Directed recreational fisheries for sailfish occur in the Western Atlantic and include the United States, Venezuela, the Bahamas, Brazil, Dominican Republic, Mexico, and other Caribbean nations. However, of these countries, the United States is the only country that currently reports recreational landings to ICCAT. Therefore, a comparison of the percentage of U.S. landings relative to recreational fisheries in other countries is not possible. Further, total landings data are incomplete because many countries that reported landings in 1996 failed to report their 1998 and 1999 landings, which hampered the 2000 Atlantic marlin stock assessments, as well.

As part of a 1997 SCRS survey, 12 ICCAT member countries as well as Chinese Taipei and Senegal provided information on the existence of, and level of data collection for, recreational and artisinal fisheries. The survey results indicated that Brazil, Canada, France, Italy, Morocco, UK, Bermuda, and the United States have recreational fisheries in the ICCAT area of concern. Levels of data collection varied widely from country to country, making any comparison of catch levels difficult and potentially inaccurate. The wide range of recreational catches across nations and species warrants further exploration of potential data sources and the feasibility of increased recreational monitoring.

At the 1999 ICCAT meeting in Rio de Janeiro, Brazil, the Commission adopted a resolution to improve the quantity and quality of recreational data collection. Recreational fisheries were to be discussed and assessed in each country's National Report beginning in the year 2000. In addition, the SCRS was called upon to examine the impact of recreational fishing on tuna and tuna-like species. At this time additional information is not available regarding international HMS recreational catches.

At the 2004 ICCAT meeting in New Orleans, U.S., the Commission adopted a recommendation concerning prohibited gear in the sport and recreational fisheries in the Mediterranean Sea. Prohibited gear includes towed and encircling nets, seine sliding, dredgers, gill nets, trammel net and longline to fish for tuna and tuna-like species. The recommendation also prohibits the sale of sport and recreational tuna and tuna-like species and stipulates that data on these fisheries be collected and transmitted to the SCRS.

3.4.4.4 Bycatch Issues and Data Associated with the Fishery

Bycatch in the recreational rod and reel fishery is difficult to quantify because many fishermen value the experience of fishing and may not be targeting a particular pelagic species. Recreational "marlin" or "tuna" trips may yield dolphin, tunas, wahoo, and other species, both undersized and legal sized. Bluefin tuna trips may yield undersized bluefin, or a seasonal closure may prevent landing of a bluefin tuna above the minimum size. In some cases, therefore, rod and reel catch may be discarded. The Magnuson-Stevens Act (16 USC 1802 (2)) stipulates that bycatch does not include fish under recreational catch and release.

The 1999 Billfish Amendment established a catch-and-release fishery management program for the recreational Atlantic billfish fishery. As a result of this program, all Atlantic billfish that are released alive, regardless of size, are not considered bycatch. NMFS believes that establishing a catch and release fishery in this situation will further solidify the existing catch-and-release ethic of recreational billfish fishermen, and thereby increase release rates of billfish caught in this fishery. The recreational white shark fishery is by regulation a catch-and-release fishery only and white sharks are not considered bycatch.

Bycatch can result in death or injury to discarded fish. Therefore, bycatch mortality should be incorporated into fish stock assessments, and into the evaluation of management measures. Rod and reel discard estimates from Virginia to Maine during June - October could be monitored through the expansion of survey data derived from the LPS (dockside and telephone surveys). However, the actual numbers of fish discarded for many species are so low that presenting the data by area could be misleading, particularly if the estimates are expanded for unreported effort in the future. The number of kept and released fish reported or observed through the LPS dockside intercepts for 1997-2003 are presented in Table 3.38.

Outreach programs to address bycatch were included in the 1999 FMP and the Billfish Amendment. These programs have not yet been implemented, but the preparation of program designs are currently in progress. One of the key elements in the outreach program will be to provide information that leads to an improvement in post-release survival from both commercial and recreational gear. Additionally, an outreach program to encourage the use of circle hooks to increase post-release survival within HMS fisheries was introduced in a proposed rule published in 2001 (66 FR 66386, December 26, 2001). The final rule to promote the voluntary use of circle hooks published in 2003 (68 FR 711, January 7, 2003). Initial implementation of the outreach program began in 2004 with workshops conducted on the proper handling and release of sea turtles.

A study by Graves *et al.* (2002), investigated short-term (5 days) post-release mortality of Atlantic blue marlin using pop-up satellite tag technology. A total of nine recreationally-caught blue marlin were tagged and released during July and August of 1999. All hooks employed in the study were “J” hooks. The attached tags were programmed to detach from the fish after five days and to record direct temperature and inclination of the buoyant tag to determine if the fish were actively swimming after being released. After detachment, the tags floated to the surface and began transmitting recorded position, temperature and inclination data to satellites of the Argos™ system. Three different lines of evidence provided by the tags (movement, water temperature, and tag inclination) suggested that at least eight of the nine blue marlin survived for five days after being tagged and released. One of the tags did not transmit any data which precluded the derivation of a conclusion regarding the tagged marlin’s survival.

Table 3.38 Observed or reported number of HMS kept* and released in the rod and reel fishery, Maine through Virginia. Source: Large Pelagic Survey (LPS) Preliminary Data.

	Number of Fish Kept							Number of Fish Released Alive						
Species	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
White Marlin**	7	11	6	2	5	8	12	203	465	156	59	118	215	160
Blue Marlin**	3	3	3	0	1	0	4	30	27	28	17	14	30	39
Sailfish**	0	1	0	6	0	0	0	2	2	3	0	2	6	6
Swordfish	5	1	3	14	1	5	9	6	5	1	5	10	6	21
Giant Bluefin Tuna	51	69	56	34	20	176	58	6	11	6	0	0	8	0
Large Medium Bluefin Tuna	6	26	13	3	7	11	11	3	8	5	3	6	2	0
Small Medium Bluefin Tuna	28	19	8	30	87	62	83	34	26	44	37	5	8	13
Large School Bluefin Tuna	60	134	106	95	457	391	287	158	67	42	22	128	47	40
School Bluefin	1,000	392	212	151	338	556	509	840	412	136	159	58	200	174
Young School Bluefin	5	13	1	4	0	7	4	139	581	94	23	40	182	10
Bigeye Tuna	26	17	27	16	9	32	21	6	9	0	0	8	1	3
Yellowfin Tuna	2,472	2,646	2,501	2,366	2,423	2,595	3,216	222	645	682	97	74	328	200
Skipjack Tuna	296	261	146	32	100	117	681	468	267	88	69	130	250	526
Albacore	146	558	133	513	302	534	546	43	92	52	17	52	95	31
Thresher Shark	7	7	3	2	5	20	24	2	2	2	1	0	5	8
Mako Shark	74	78	49	49	27	72	141	94	92	49	114	65	120	208
Sandbar Shark	5	2	2	1	2	0	9	30	56	6	4	10	17	26
Dusky Shark	6	6	1	0	0	1	0	50	54	7	32	8	9	0
Tiger Shark	0	2	0	0	1	1	0	5	5	0	3	2	3	12
Porbeagle	0	1	0	0	0	1	0	5	6	0	0	0	14	3
Blacktip Shark	2	1	0	0	1	0	1	0	2	5	0	0	6	0

	Number of Fish Kept							Number of Fish Released Alive						
Species	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Atl. Sharpnose Shark	0	1	0	0	0	0	0	0	3	0	0	0	0	0
Blue Shark	27	26	11	12	2	36	65	1,897	780	572	374	141	505	2,061
Hammerhead Shark	2	1	1	1	2	0	0	4	4	5	0	1	6	38
Wahoo	10	71	45	41	34	49	68	1	2	0	0	13	6	3
Dolphin (Mahi)	1,022	7,263	2,139	955	1,294	2,509	4,209	61	194	73	48	108	111	677
King Mackerel	171	198	141	289	19	36	66	1	10	8	24	10	5	5
Atlantic Bonito	384	328	254	194	77	704	315	203	300	166	27	49	176	282
Little Tunny	428	1,231	97	139	48	240	121	1,015	1,507	133	118	118	585	443
Amberjack	3	6	9	6	19	7	44	18	40	24	20	14	57	111
Spanish Mackerel	0	2	1	13	3	5	35	1	1	0	0	0	0	1

*NOAA Fisheries typically expands these "raw" data to report discards of bluefin tuna by the rod and reel fishery to ICCAT. If sample sizes are large enough to make reasonable estimates for other species, NOAA Fisheries may produce estimates for other species in future SAFE reports.
**Amendment One to the Atlantic Billfish FMP established billfish released in the recreational fishery as a "catch and release" program, thereby exempting these fish from bycatch considerations.

3.4.4.5 Safety Issues Associated with the Fishery

The USCG does not maintain statistics on boating accidents, rescue, or casualty data specifically pertaining to recreational fishing as it does for the commercial industry. As a result, the 1999 FMP and the Billfish Amendment contain only minimal safety information regarding recreational HMS fisheries. Safety issues associated with handline fisheries for tunas is discussed in Section 3.4.3. The USCG compiles statistics on the total number of recreational boating accidents and casualties, independent of the activity or fishery in which they are engaged Table 3.39). Two common situations often place recreational boaters in potential danger. Individuals in small vessels often venture out farther than their vessels are designed to travel without proper navigational equipment, and may encounter rougher water than their boats are designed to withstand. Since fishermen targeting HMS species, particularly marlin, often travel at least 75 to 100 miles offshore, having a properly equipped vessel of adequate size is very important for the safety of recreational HMS constituents. Additionally, as the recreational swordfish fishery off the southeastern coast of Florida occurs at night and usually in small boats ranging from 23 to 40 feet in length, it presents other unique risks. Shipping traffic regularly runs through the recreational swordfish fleet, which could lead to incidents if someone is not on watch at all times. Another frequent safety concern of the Coast Guard is when someone is up in the flying bridge. Both of these situations can lead to people falling overboard. In 2003, approximately 70 percent of all boating casualties were due to drowning and in approximately 86 percent of all the drowning deaths, the victim was not wearing a personal floatation device (PFD) (Table 3.40).

Table 3.39 **Overall 2003 Reported Boating Accident Types.** Source: USCG Boating Statistics, 2003.

Accident Type	# Accidents	# of Injuries	# of Fatalities	Total Property Damage
Capsizing	514	330	206	$3,167,989
Carbon Monoxide	20	30	7	$0
Collision with Fixed Object	558	491	50	$4,751,034
Collision with Floating Object	152	104	3	$1,123,884
Vessel Collision	1,469	1,063	70	$7,474,678
Departed Vessel	45	6	39	$0
Ejected from Vessel	7	4	5	$0
Falls within Boat	233	253	6	$183,400
Falls on PWC	15	14	1	$0
Fall Overboard	509	354	201	$141,018
Fire/Explosion (fuel)	142	68	7	$2,921,295
Fire/Explosion (other than fuel)	68	10	2	$9,189,282
Flooding or Swamping	274	61	41	$2,383,566
Grounding	291	193	8	$4,282,148
Not Reported	158	126	20	$1,028,992
Other Casualty	80	58	4	$177,900

Accident Type	# Accidents	# of Injuries	# of Fatalities	Total Property Damage
Sinking	128	23	8	$2,021,308
Skier Mishap	451	466	6	$13,001
Struck by Boat	89	82	9	$116,350
Struck by Motor	107	103	6	$350
Struck Submerged Object	128	49	4	$1,446,179
Total	**5,438**	**3,888**	703	**$40,422,374**

Table 3.40 **Overall 2003 Reported Boating Accident Cause-of-Death Statistics.** Source: USCG Boating Statistics, 2003.

Cause of Death	# Fatalities	PFD Worn	
		Yes	No
Carbon Monoxide Poisoning	7	0	7
Burns	3	0	3
Drowning	481	65	416
Electrocution	3	0	3
Hypothermia	32	8	24
Other	12	5	7
Trauma	135	46	89
Not Reported	30	3	27
Total	703	127	576

3.4.5 Commercial Atlantic Shark Fishery

3.4.5.1 Overview of History and Current Management

In 1993, NOAA Fisheries implemented the Fishery Management Plan (FMP) for Sharks of the Atlantic Ocean, which established three management units: large coastal sharks (LCS), small coastal sharks (SCS), and pelagic sharks. At that time NOAA Fisheries identified LCS as overfished, and therefore implemented commercial quotas for LCS and established recreational harvest limits for all sharks. In 2003, NOAA Fisheries amended the measures enacted in the 1999 FMP based on the 2002 LCS and SCS stock assessments, litigation, and public comments. Implementing regulations for Amendment 1 to the 1999 FMP were published on December 24, 2003 (68 FR 74746). Management measures enacted in the amendment included: re-aggregating the large coastal shark complex, using maximum sustainable yield (MSY) as a basis for setting commercial quotas, eliminating the commercial minimum size restrictions, establishing three regional commercial quotas (Gulf of Mexico, South Atlantic, and North Atlantic) for LCS and SCS management units, implementing trimester commercial fishing seasons effective January 1, 2005, imposing gear restrictions to reduce bycatch, and a time/area closure off the coast of North Carolina effective January 1, 2005. As a result of using MSY to establish quotas, and implementing a new rebuilding plan, the overall annual landings quota for LCS in 2004 was established at 1,017 metric tons (mt) dressed weight (dw). The overall annual landings quota for SCS was established at 454 mt dw and the pelagic, blue, and porbeagle shark quotas were established at 488 mt dw, 273 mt dw, and 92 mt dw respectively.

The regional quotas which were established in Amendment 1 to the HMS FMP for LCS and SCS were intended to improve overall management of the stocks by tailoring quotas to specific regions based on landings information. These quotas were based upon average historical landings (1999-2001) from the canvass and quota monitoring databases. The canvass database provides a near-census of the landings at major dealers in the southeast United States (including state landings) and the quota monitoring database collects information from dealers in the South Atlantic and Gulf of Mexico.

On November 30, 2004, NOAA Fisheries issued a final rule (69 FR 69537), which established, among other things, new regional quotas based on updated landings information from 1999-2003. This final rule did not change the overall quotas for LCS, SCS, and pelagic sharks established in Amendment 1, only the percentages allocated to each of the regions. The updated information was based on several different databases, including the canvass and quota monitoring databases, the Northeast Commercial Fisheries Database (CFDBS), and the snapper grouper logbook. The new regional quotas and trimester seasons for the commercial Atlantic shark fishery became effective January 1, 2005.

3.4.5.2 Most Recent Catch and Landings Data

Commercial shark fishing effort is generally concentrated in the southeastern United States and Gulf of Mexico (Cortes and Neer, 2002). Approximately 84-91 percent of LCS, 56-64 percent of pelagic sharks, and nearly all of SCS landings came from the southeast region (Cortes and Neer, 2002). McHugh and Murray (1997) found in a survey of shark fishery participants that the largest concentration of bottom longline fishing vessels is found along the central Gulf coast of Florida, with the John’s Pass - Madeira Beach area considered the center of directed shark fishing activities. Consistent with other HMS fisheries, some shark fishery participants move from their home ports to other fishing areas as the seasons change and fish stocks move.

Landings data from 1999-2002 indicate that overall LCS landings in the Atlantic commercial shark fishery decreased from 1,778 mt dw in 1999 to 1,559 mt dw in 2002, but increased to 1,866 mt dw in 2002. Preliminary data from 2003 indicate landings of 1,659 mt dw (Table 3.41). These data are subject to change as additional non-Federal (state landings) are included in the landings estimates. For SCS, landings ranged from a low of 263 mt dw in 2002 to a high of 329 mt dw in 2001 (Table 3.42). For pelagic sharks, landings ranged from a low of 139 mt dw in 2002 to a high of 182 mt dw in 1999 (Table 3.43). There are a number of other sources of mortality on LCS including discards, recreational catches, catches by other countries, and bycatch of sharks in other fisheries are listed in

Table 3.44. All of these sources of mortality are taken into account when developing stock assessments for the Atlantic commercial shark fishery.

Species-specific landings estimates from 1999-2003 for LCS indicate that sandbar and blacktip sharks were the two predominant species landed in recent years. In 2001 and 2002, sandbar sharks were the most abundant species landed in the LCS complex and accounted for 40 and 45 percent of total LCS landings respectively, whereas blacktip sharks were the most abundant species landed in 2000 with 44 percent of total LCS landings (Table 3.41).

Hammerhead sharks (all species combined) were the third most abundant species landed, ranging from 2-3 percent of total LCS landings in 2001 and 2002, respectively. Finetooth, and sharpnose sharks were the most abundant species landed in the SCS complex. In 2001, finetooth sharks represented 42 percent of total SCS landings, and in 2002 sharpnose sharks represented 32 percent of total SCS landings (Table 3.42). Shortfin mako were the most abundant among pelagic shark landings, accounting for 51 percent of that category (Table 3.43).

Regional quotas for LCS and SCS were implemented for the first time in 2004. At that time, data indicated that the Gulf of Mexico, South Atlantic, and North Atlantic regions accounted for 42, 54, and 4 percent of the total LCS landings and 4, 83, and 13 percent of the total SCS landings, respectively. Based on a review of updated landings, new regional quotas were established in 2005 (69 FR 69537) for the Gulf of Mexico, South Atlantic and North Atlantic regions at 52, 41, and 7 percent of the total LCS landings (Table 3.45) and 4, 83, and 13 percent of the total SCS landings, respectively (Table 3.46). The quota for pelagic sharks was not divided among regions.

Recreational catches account for a significant portion of LCS and SCS landings. For the two most recent years for which data are available (2000-2001), 140,400 and 142,000 LCS respectively, were estimated to have been caught by recreational fishermen. For SCS 184,700 sharks were caught recreationally in 2000 and 189,500 in 2001. For pelagic sharks 13,300 were caught recreationally in 2000 and 3,800 were caught in 2001.

Table 3.41 Commercial landings of large coastal sharks in lb dw: 1999-2003. Source: Cortés and Neer, 2002; Cortés, 2003.

Large Coastal Sharks	1999	2000	2001	2002	2003
Basking**	0	0	0	0	0
Bignose*	9,035	672	1,442	0	318
Bigeye sand tiger**	0	0	0	0	0
Blacktip	1,286,979	1,633,919	1,135,199	1,096,455	1,487,604
Bull	25,426	24,980	27,037	40,463	93,816
Caribbean Reef*	0	0	1	34	
Dusky*	110,950	205,746	1,884	16,367	23,288
Dusky, fins*	0	0	89	0	0
Galapagos*	0	0	0	0	0
Hammerhead, Great	0	0	0	0	0
Hammerhead, Scalloped	0	0	0	0	0
Hammerhead, Smooth	0	0	0	0	0
Hammerhead, Unclassified	53,394	35,060	69,356	107,905	153,548
Large Coastal			172,494	147,431	51,433
Lemon	23,604	45,269	24,453	56,945	80,688
Narrowtooth*	0	0	0	0	0
Night*	4,287	0	0	0	20
Nurse	1,168	429	387	69	70
Sandbar	1,299,987	1,491,908	1,404,186	1,851,447	1,436,838
Sandbar, fins		996	2,364	24,289	-
Sand tiger**	6,401	6,554	1,248	415	975
Silky	8,649	31,959	14,197	30,731	51,588

Large Coastal Sharks	1999	2000	2001	2002	2003
Spinner	629	14,473	6,970	8,447	12,133
Tiger	30,274	24,443	26,973	16,115	18,536
Whale**	0	0	0	0	0
White**	82	1,201	26	0	1,454
Large Coastal Unclassified	978,312	108,692	525,661	708,049	853,564
Unclassified fins	80,393	86,824	23,988	9,017	181,431
Total	3,919,570 (1,778 mt dw)	3,713,125 (1,684 mt dw)	3,437,955 (1,559 mt dw)	4,114,179 (1,866 mt dw)	4,421,249 (2,005 mt dw)

* indicates species that were prohibited in the commercial fishery as of June 21, 2000.
** indicates species that were prohibited as of April 1997. *** Preliminary data, species not yet available.

Table 3.42 **Commercial landings of small coastal sharks in lb dw: 1999-2003.** Source: Cortés and Neer, 2002; Cortés, 2003. *2003 data pending.

Small coastal sharks	1999	2000	2001	2002	2003
Atlantic Angel*	0	86	0	439	1,375
Blacknose	130,317	178,083	160,990	144,616	131,511
Bonnethead	53,702	69,411	63,461	36,553	38,614
Finetooth	246,404	202,572	303,184	185,120	163,407
Sharpnose, Atlantic	239,647	142,511	196,441	213,140	190,960
Sharpnose, Atlantic, fins	0	0	209	10	0
Sharpnose, Caribbean*	2,039	353	205	0	0
Unclassified Small Coastal	136	11	51	2	25,307
Total:	672,245 (305 mt dw)	593,027 (269 mt dw)	724,541 (329 mt dw)	579,880 (263 mt dw)	549,799 (249 mt dw)

* indicates species that were prohibited in the commercial fishery as of June 21, 2000.

Table 3.43 **Commercial landings of pelagic sharks in lb dw: 1999-2003.** Source: Cortés and Neer, 2002; Cortés, 2003. *2003 data pending.

Pelagic Sharks	1999	2000	2001	2002	2003
Bigeye thresher*	17,759	4,376	330	0	0
Bigeye sixgill*	0	0	0	0	0
Blue	1,111	3,508	65	8	6,324
Mako, Longfin*	4,619	6,560	9,453	1,971	1,831
Mako, Shortfin	170,860	129,088	171,888	156,540	150,076
Mako, Unclassified	58,344	74,690	73,556	58,545	33,203
Oceanic whitetip	698	657	922	1,590	2,559
Porbeagle	5,362	5,272	1,152	2,659	1,738
Porbeagle, fins	0	0	12	7	0
Sevengill*	0	0	0	0	0
Sixgill*	0	0	0	0	0
Thresher	96,012	81,624	56,893	53,260	46,502
Thresher, fins	0	0	201	340	
Unclassified pelagic	46,056	41,184	31,639	18,392	297,126
Unclassified pelagic, fins	0	3,746	12,026	12,325	0
Total:	400,821 (182 mt dw)	350,705 (159 mt dw)	358,137 (162 mt dw)	305,637 (139 mt dw)	616,967 (280 mt dw)

* indicates species that were prohibited in the commercial fishery as of June 21, 2000.

Table 3.44 Estimates of total landings and dead discards for large coastal sharks: 1981-2003 (numbers of fish in thousands). Source: Cortes, 2002. *2002 and 2003 data pending.

Year	Commercial Landings	Pelagic Longline Discards	Recreational Catches	Unreported	Bottom Longline Discards	Mexican Catches	Menhaden Fishery bycatch	Total
1981	16.2	0.9	265.0	N/A	0.9	120.0	25.1	428.1
1982	16.2	0.9	413.9	N/A	0.9	81.9	25.1	538.9
1983	17.5	0.9	746.6	N/A	1.0	85.4	25.1	876.5
1984	23.9	1.3	254.6	N/A	1.4	120.7	25.1	426.9
1985	22.2	1.2	365.6	N/A	1.3	87.7	25.1	503.1
1986	54.0	2.9	426.1	24.9	3.1	81.8	25.1	617.9
1987	104.7	9.7	314.4	70.3	5.9	80.2	25.1	610.3
1988	274.6	11.4	300.6	113.3	15.5	89.3	25.1	829.8
1989	351.0	10.5	221.1	96.3	19.9	105.6	25.1	829.4
1990	267.5	8.0	213.2	52.1	15.1	122.2	25.1	703.3
1991	200.2	7.5	293.4	11.3	11.3	95.7	25.1	644.5
1992	215.2	20.9	304.9	N/A	12.2	103.4	25.1	681.6
1993	169.4	7.3	249.0	N/A	11.3	119.8	25.1	581.9
1994	228.0	8.8	160.9	N/A	16.3	110.7	26.2	550.9
1995	222.4	5.2	180.8	N/A	13.9	96.0	24.0	537.8
1996	160.6	5.7	191.5	N/A	7.6	106.1	25.1	493.6
1997	130.6	5.6	168.1	N/A	8.3	83.1	25.1	417.8
1998	174.9	4.3	169.6	N/A	9.9	74.1	25.1	458.1
1999	111.5	9.0	92.3	N/A	3.8	57.1	25.1	297.5
2000	111.2	9.4	131.5	N/A	4.8	52.1	25.1	343.0
2001	95.7	5.6	127.9	N/A	6.1	52.1	25.1	334.1
2002	123.4	2.4	77.9	N/A	4.9		25.1	233.7
2003	126.5	3.5	81.4	N/A	7.0		25.1	243.5

Table 3.45 Commercial landings of LCS (including unclassified sharks) in the Atlantic and Gulf of Mexico by region and year (mt dw) from 1999-2003.

Year	South Atlantic			Gulf of Mexico			North Atlantic		Total		
	Canvass	QMS	Logbook	Canvass	QMS	Logbook	CFDBS*	Logbook	Canvass	QMS	Logbook
1999	1246.9	474.5	789.2	1342.7	739.8	803.9	135.5	75.6	258.9	1415	1668.7
2000	1107	503.8	662.1	1255.3	912.1	760	168.7	167.6	2362.3	1591.3	1589.7
2001	1078.4	488.1	632.6	1270.4	639.4	898.8	254.4	98.9	2348.8	1390.1	1630.3
2002	1542	678.8	680.4	1406.5	614.7	1034.6	191.2	104	2948.5	1492.3	1819
2003	1226.7	674.9	635.7	1829.7	934.3	1168.4	178.3	64.6	3056.4	1804.9	1868.7
Total	6201	2820.1	3400	7104.6	3840.3	4665.7	928.1	510.7	13305.6	7693.6	8576.4
Average	1240.2	564.0	680	1420.9	768.1	933.1	185.6	102.1	2661.1	1538.7	1715.3
Total Combined	12526.2			15610.6			1438.8		29575.6		
Average Combined	835.1			1040.7			143.9		2019.7		
Percent	41% (416.9 mt dw)			52% (528.8 mt dw)			7% (71.2 mt dw)		100%		

*Northeast Commercial Fisheries Database System (CFDBS). There is no canvass data available for the North Atlantic.

Table 3.46 Commercial landings of SCS in the Atlantic and Gulf of Mexico by region and year (mt dw) from 1999-2003.

Year	South Atlantic			Gulf of Mexico			North Atlantic		Total		
	Canvass	QMS	Logbook	Canvass	QMS	Logbook	CFDBS*	Logbook	Canvass	QMS	Logbook
1999	391.3	317.3	198.4	11.8	14.5	26.5	3.7	2.07	403.1	335.7	226.97
2000	357.5	229.9	74.5	11.6	24.1	13	12.6	9.3	369.1	266.6	96.8
2001	446.3	309	143.9	8.8	18.9	34.5	0.1	7.8	455.1	328	186.2
2002	311.1	248.9	156.7	36.9	11.4	42.4	15.4	5.4	348	275.7	204.5
2003	168.3	197.4	147.1	47.9	46.1	73.6	0	7.4	216.2	243.5	228.1
Total	1674.5	1302.5	720.6	117.0	115.0	190.0	31.8	31.97	1791.5	1449.5	942.57
Average	334.9	260.5	144.12	23.4	23.0	38.0	6.4	6.394	358.3	289.9	188.514
Total Combined	3697.6			422			63.8		4183.4		
Average Combined	246.5			28.1			6.4		281.0		
Percent	88% (398.2 mt dw)			10% (45.4 mt dw)			2% (10.3 mt dw)		100%		

*Northeast Commercial Fisheries Database System (CFDBS). There is no canvass data available for the North Atlantic.

3.4.5.3 Bottom Longline Fishery

The Atlantic bottom longline fishery targets both LCS and SCS. Bottom longline is the primary commercial gear employed in the LCS and SCS fisheries in all regions. Gear characteristics vary by region, but in general, an approximately ten-mile long bottom longline, containing about 600 hooks, is fished overnight. Skates, sharks, or various finfishes are used as bait. The gear typically consists of a heavy monofilament mainline with lighter weight monofilament gangions. Some fishermen may occasionally use a flexible 1/16 inch wire rope as gangion material or as a short leader above the hook.

In January 2002, the observer coverage requirements in the shark bottom longline fishery changed from voluntary to mandatory participation if selected. NOAA Fisheries selects approximately 40-50 vessels for observer coverage during each season. Vessels are randomly selected if they have a directed shark limited access permit, have reported landings from sharks during the previous year, and have not been selected for observer coverage during each of the three previous seasons.

NOAA Fisheries currently manages the commercial shark observer program through a contract with the University of Florida and Florida Museum of Natural History, Commercial Shark Fishery Observer Program (CSFOP). The CSFOP trains and places observers aboard vessels in the directed shark bottom longline fishery in the Atlantic and Gulf of Mexico to collect data on the commercial shark fishery and thus improve overall management strategies for the fishery. Observers provide baseline characterization information, by region, on catch rates, species composition, catch disposition, relative abundance, and size composition within species for the large coastal and small coastal shark bottom longline fisheries.

During 2003, six observers logged 263 sea days on shark fishing trips aboard 20 vessels in the Atlantic from North Carolina to Florida and in the eastern Gulf of Mexico off Florida. The number of trips taken on each vessel ranged from one to five and the number of sea days each observer logged ranged from 9 to 35. Observers documented the catches and fishing effort on approximately 150 longline sets that fished 103,351 hooks. During 2004, five observers logged 196 sea days on 56 shark fishing trips aboard 11 vessels. Observers documented the catches and fishing effort during 120 longline sets that fished 90,980 hooks.

Data from the CSFOP between 2000 and 2002 show that LCS comprised 66.2 percent of the total catch (Burgess and Morgan, 2002). During 2003, LCS comprised 68.4 percent of the total catch. Sandbar sharks dominated the observed catches with 30.6 percent of total LCS catch (Table 3.47). The overall catch and disposition of species is listed in Table 3.48. Regional differences in sandbar shark abundance were evident. For example, in the Carolina region, sandbar sharks comprised 67.4 percent of the total catch and 77.2 percent of the large coastal shark catch. In the Florida Gulf region, sandbar sharks comprised 62.0 percent of the total catch and 66.5 percent of the large coastal catch, whereas in the Florida East Coast region, sandbar sharks comprised only 17.2 percent of the total observed catch, and 37.1 percent of the large coastal shark catch (Burgess and Morgan, 2003). Blacktip sharks comprised 13.9 percent of total observed catch and 20.3 percent of the large coastal catch (Burgess and Morgan, 2002). Tiger sharks comprised 7.5 percent of the total observed catch and 11.0 percent of the large coastal shark catch. A majority of tiger sharks (71.7 percent) and nurse sharks (98.8 percent) were tagged and released.

During 2003, CSFOP data indicate that SCS comprised 28.0 percent of the total observed catch (Burgess and Morgan, 2003; Burgess and Morgan 2004). The SCS catch was dominated by Atlantic sharpnose shark (80.3 percent). The remainder of the small coastal catch consisted of blacknose sharks (5.5 percent), bonnethead (0.03 percent), and finetooth (0.02 percent)(Table 3.47). In previous seasons, the Atlantic sharpnose shark was the most frequently caught shark in the Florida East Coast region and accounted for 51.6 percent of the total observed catch, and 96.0 percent of the small coastal catch in that region (Burgess and Morgan, 2002).

Bottom longlining for sharks has relatively low observed bycatch rates. Historically, finfish bycatch has averaged approximately five percent in the bottom longline fishery. Finfish bycatch for the bottom longline fishery includes, but is not limited to, skates, rays, cobia, redfish, bluefish, and great barracuda. During the second semi-annual season of 2003, observer data indicate that approximately 4,320 sharks were caught compared to 432 other fish, 4 invertebrates, and 3 sea turtles (Burgess and Johns, 1999). In terms of bycatch rates, observed shark catches constitute 91 percent of the 4,759 total animals caught, with other fish comprising 10 percent, invertebrates less than .01 percent, and sea turtles less than .01 percent. For more information on bycatch see Section 3.8.

Table 3.47 **Species composition of observed bottom longline catch during 2003.** Source: G. Burgess and A. Morgan 2004.

Species	Total Number Caught	% Total Catch	% Management Category
LCS			
Sandbar shark	2719	30.63	44.78
Blacktip shark	1232	13.88	20.29
Tiger shark	665	7.49	10.95
Spinner shark	309	3.48	5.09
Scalloped hammerhead	259	2.92	4.27
Bull shark	257	2.90	4.23
Nurse shark	175	1.97	2.88
Sand tiger	108	1.22	1.78
Dusky shark	108	1.22	1.78
Silky shark	105	1.18	1.73
Lemon shark	60	0.68	0.99
Great hammerhead	55	0.62	0.91
Bignose shark	8	0.09	0.13
Night shark	8	0.09	0.13
White shark	3	0.03	0.05
Caribbean shark	1	0.01	0.02

Species	Total Number Caught	% Total Catch	% Management Category
Total	**6072**	**68.41**	**100**
SCS			
Sharpnose shark	1996	22.49	80.32
Blacknose shark	484	5.45	19.48
Bonnethead	3	0.03	0.12
Finetooth	2	0.02	0.08
Total	**2485**	**28.00**	**100.00**
Pelagics			
Sevengill	5	0.06	45.45
Shortfin mako	2	0.02	18.18
Bigeye sixgill	2	0.02	18.18
Bigeye thresher shark	1	0.01	9.09
Sixgill shark	1	0.01	9.09
Total	11	0.12	100.00
Other			
Smooth dogfish	298	3.36	
Unidentified sharks	10	0.113	

Table 3.48 **Directed bottom longline shark observed catch and disposition, 2003**. Source: G. Burgess and A. Morgan 2004. * carcassed means sharks that are retained; ** other mortality refers to sharks brought to the vessel dead but not retained.

	Number caught	Percent total mortality	Number Carcassed*	Percent Carcassed	Other mortality**	Percent other mortality	Number Tagged released	Percent Released
Small Coastal	2,485	94.85	295	11.87	2,062	82.98	127	5.11
Large Coastal	6,072	86.68	4,677	77.03	586	9.65	809	13.32
Pelagic	11	90.91	2	18.18	8	72.73	1	9.09
Large coastal sharks:								
Sandbar	2,719	97.35	2,597	95.51	50	1.84	72	2.65
Blacktip	1,232	99.51	1,207	97.97	19	1.54	6	0.49
Tiger	665	40.60	41	6.17	229	34.44	395	59.40
Spinner	309	100.00	302	97.73	7	2.27		0.00
Scalloped hammerhead	259	98.84	86	33.20	170	65.64	3	1.16
Bull	257	96.89	248	96.50	1	0.39	8	3.11
Nurse	175	0.57	0	0.00	1	0.57	174	99.43
Dusky	108	76.85	38	35.19	45	41.67	25	23.15
Sand tiger	108	0.00	0	0.00	0	0.00	108	100.00
Silky	105	97.14	78	74.29	24	22.86	3	2.86
Lemon	60	86.67	52	86.67	0	0.00	8	13.33
Great hammerhead	55	96.36	25	45.45	28	50.91	2	3.64
Bignose	8	75.00	3	37.50	3	37.50	2	25.00
Night	8	100.00	0	0.00	8	100.00		0.00
White	3	33.33	0	0.00	1	33.33	2	66.67
Caribbean	1	0.00	0	0.00	0	0.00	1	100.00
Small coastal sharks:								
Sharpnose	1,996	96.24	14	0.70	1,907	95.54	74	3.71
Blacknose	484	89.05	276	57.02	155	32.02	53	10.95
Bonnethead	3	100.00	3	100.00	0	0.00	0	0.00
Finetooth	2	100.00	2	100.00	0	0.00	0	0.00
Pelagic sharks:								
Bigeye thresher	5	100.00	0	0.00	5	100.00	0	0.00
Sevengill	2	0.00	0	0.00	2	100.00	0	0.00
Shortfin mako	2	0.00	2	100.00	0	0.00	0	0.00
Sixgill	1	0.00	0	0.00	0	0.00	1	100.00
Bigeye sixgill	1	0.00	0	0.00	1	100.00	0	0.00

3.4.5.4 Gillnet Fishery

In the southeast shark gillnet fishery, NOAA Fisheries modified the requirement to have 100 percent observer coverage at all times on March 30, 2001 (66 FR 17370), by reducing the level required to a statistically significant level outside of right whale calving season (100 percent observer coverage is still required during the right whale calving season from November 15 through April 1). This modification of observer coverage reduced administrative costs while maintaining statistically significant and adequate levels of coverage to provide reasonable estimates of sea turtle and marine mammal takes outside the right whale calving season. The level of observer coverage necessary to maintain statistical significance will be reevaluated annually and adjusted accordingly. Additionally, in 2001, NOAA Fisheries established a requirement to conduct net checks every two hours to look for and remove any protected species.

The southeast shark gillnet fishery is comprised of several vessels based primarily out of ports in northern Florida (South Atlantic Region) that use nets typically 456 to 2,280 meters long and 6.1 to 15.2 meters deep, with stretched mesh from 12.7 to 22.9 cm. This fishery is currently prohibited in the state waters off South Carolina, Georgia, and Florida, thereby forcing some of these vessels to operate in deeper waters under Federal jurisdiction, where gillnets are less effective. The entire process (set to haulback) takes approximately 9 hours (Carlson and Baremore, 2002a). A total of 41 strikenet sets, in which a smaller second vessel actively sets the net around a school of sharks, were observed on 3 vessels from January through September 2003. However, 51 additional trips were made when the observer departed with the vessel but no strike was made. Reasons for not striking for sharks included the inability to locate the school, sharks located in state waters, and poor weather conditions (Carlson and Baremore, 2003).

On September 23, 2002, NOAA Fisheries implemented a restricted area to reduce bycatch of right whales from November 15 through March 31 (67 FR 59471). In this area, only gillnets used in a strikenet fashion can operate during times when right whales are present. Operation in this area at that time requires 100 percent observer coverage. Vessels fishing in a strikenet fashion used nets 364.8 meters long, 30.4 meters deep, and with mesh size 22.9 cm. Observed catch in the strikenet fishery consisted of 6 species of sharks (96.7 percent of total number caught) and 7 species of teleosts and rays (3.3 percent of total number caught). No marine mammals or sea turtles were observed caught. The blacktip shark made up 97.5 percent of the number of sharks caught, and 86 percent of the overall catch. Bycatch included crevalle jack, red drum, and great barracuda (Table 3.49).

A total of 24 driftnet sets were observed on 5 vessels from February through September, 2004. Driftnet vessels carried nets ranging in length from 547.2-2736 m; depths from 7.6-13.7 m and stretched mesh sizes from 12.7-22.9 cm. The most frequently used mesh size was 12.7 cm. For all observed driftnet sets, set duration averaged 0.4 hrs. Sets were made in sea water averaging 15.4 m deep. Haulback and processing of the catch averaged 3.4 hrs. Average soak time for the driftnet (time net was first set minus time haulback began) was 10.8 hrs.

The observed driftnet catch consisted of 9 species of sharks. Three species of sharks made up 92.9 percent (by number) of the observed shark catch (Table 3.50). These species were the Atlantic sharpnose shark, blacknose shark, and finetooth shark. By weight, the shark catch was made up of Atlantic sharpnose shark, (55.3 percent), blacknose shark (17.1 percent), blacktip shark (10.7 percent), and finetooth shark (10.3 percent). Total observed catch composition (percent of numbers caught) was 79.0 percent sharks, 20.7 percent teleosts, 0.3 percent rays, and 0.03 percent protected species (i.e marine mammals, sea turtles, sawfish).

There were 23 species of teleosts, 2 species of rays, and 1 species of marine mammal observed caught during the driftnet season (Table 3.50). Four species of teleosts and rays made up 90.8 percent by number of the overall non-shark species in observed strikenet catches. These species were little tunny (45.6 percent); king mackerel (23.3 percent); great barracuda (11.8 percent); and red drum (10.2 percent). For incidental driftnet catch species, the highest proportion discarded dead (with observed catch greater than 10 specimens) was Atlantic sailfish, (100.0 percent), king mackerel (78.3 percent), and cobia, (28.7 percent). Red drum had the highest discard proportion alive (98.1 percent)(Carlson and Baremore, 2003). Observed driftnet sets caught 23 species of teleosts and rays and no sea turtles or marine mammals. Only the great barracuda were retained, with all remaining bycatch discarded alive (Carlson, 2002).

Outside of right whale calving season, observed drift gillnet catch consisted of 26 species of teleosts and rays and one species of marine mammal, which was discarded dead. Five species of teleosts and one species of ray made up 90.6 percent by number of the overall non-shark catch. Little tunny (44.1 percent), king mackerel (20.8 percent), great barracuda (12.5 percent), Atlantic moonfish (9.4 percent), and cobia (3.8 percent) dominated the bycatch (Carlson and Baremore, 2002). During drift gillnet fishing, the highest proportion of species discarded dead (for species with greater than 10 individuals) was for tarpon, crevalle jack, king mackerel, and red drum. Cownose rays and red drum had the highest proportion of discarded alive with 78.1 percent and 50.0 percent, respectively (Carlson and Baremore, 2002).

Table 3.49 Total Strikenet Shark Catch and Bycatch by Species in order of Decreasing Abundance for all Observed Trips, 2003. Source: Carlson and Baremore, 2003.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Blacktip shark	6,401	97.5	.6	1.9
Blacknose shark	343	100.0	0	0
Crevalle jack	215	96.2	3.3	.5
Red Drum	18	0	100	0
Great barracuda	13	92.3	0	7.7
Manta ray	10	0	100	0
Bull shark	8	75	12.5	12.5
Permit	8	50	37.5	12.5
Nurse shark	1	0	100	0
Spinner shark	1	100	0	0
Finetooth shark	1	100	0	0
Cobia	1	100	0	0
Atlantic bonito	1	0	0	100
Total	**7,021**			

Table 3.50 Total Shark Catch by Species and Species Disposition in Order of Decreasing Abundance for all Observed Driftnet Sets, 2003. Source: Carlson and Baremore, 2003.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose	6,917	99.8	0	.2
Blacknose	799	100	0	0
Finetooth	620	100	0	0
Blacktip	375	45	24	31
Bonnethead	168	100	0	0
Scalloped Hammerhead	62	3.2	0	96.8
Spinner	20	5	0	95
Great Hammerhead	6	100	0	0
Lemon	1	0	100	0
Total	**8,968**			

Table 3.51 Total bycatch in NOAA Fisheries observed drift gillnet sets in order of decreasing abundance and species disposition for all observed trips, 2003. Source: Carlson, 2003.

Species	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)
Little tunny	1169	92.6	0	7.4
King mackerel	596	21.5	.2	78.3
Barracuda	300	100	0	0
Red drum	262	0	98.1	1.9
Cobia	80	70	1.3	28.7
Blackfin tuna	36	100	0	0
Atlantic sailfish	30	0	0	100
Cownose ray	22	0	59.1	40.9
Spanish mackerel	11	100	0	0
Remora	9	0	33.4	66.6
Crevalle jack	8	0	0	100
Blue runner	8	87.5	0	12.5
Tarpon	5	0	0	100
Manta ray	5	0	100	0
Dolphin	5	100	0	0
Tripletail	4	100	0	0
Spotted eagle ray	2	0	100	0
Blue marlin	2	0	0	100
Balloonfish	2	0	0	100
Wahoo	1	100	0	0
Pompano	1	100	0	0
Rainbow runner	1	100	0	0
Black drum	1	0	100	0
Bluefish	1	0	0	100

3.4.5.5 Pelagic Longline Fishery

The U.S. pelagic longline (PLL) fishery for Atlantic HMS primarily targets swordfish, yellowfin tuna, or bigeye tuna in various areas and seasons and catches sharks incidentally. Although this gear can be modified (i.e., depth of set, hook type, etc.) to target swordfish, tuna, or sharks, like other hook and line fisheries, it is a multi-species fishery. For more information on the PLL fishery see Section 3.4.1. Longline gear sometimes attracts and hooks non-target finfish with no commercial value, as well as species that cannot be retained by commercial fishermen, such as billfish or some species of sharks. Pelagic longlines may also interact with protected species such as marine mammals, sea turtles and sea birds.

From May 1992 through December 2000, the Pelagic Observer Program (POP) recorded a total of 4,612 elasmobranchs (15 percent of the total catch) caught off the southeastern U.S. coast in fisheries targeting tunas and swordfish (Beerkircher *et al.*, 2004). Of the 22 elasmobranch species observed, silky sharks were numerically dominant (31.4 percent of the elasmobranch catch), with silky, dusky, night, blue, unidentified, tiger, and scalloped hammerhead sharks making up the majority (84.6 percent) (Beerkircher *et al.*, 2004).

3.4.5.6 Protected Resources

Under the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1361 et seq.) the Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities), and the shark bottom longline as Category III (remote likelihood or no known serious injuries or mortalities) (July 20, 2004, 69 FR 43338). On October 29, 2003, NOAA Fisheries issued a biological opinion (BiOp) pursuant to the Endangered Species Act (ESA) regarding Atlantic shark fisheries. This BiOp concluded that the level of anticipated take in the Atlantic shark fishery resulting from measures implemented in Amendment 1 to the 1999 FMP (68 FR 74746), were not likely to jeopardize the continued existence of endangered green, leatherback, and Kemp's ridley sea turtles, the endangered smalltooth sawfish, or the threatened loggerhead sea turtle. Furthermore, it concluded that the actions in the rule were not likely to adversely affect marine mammals. As a result of this conclusion, NOAA Fisheries (NOAA Fisheries, 2003) anticipates that the continued operation of the shark bottom longline program will result in a 5-year total incidental take of the following numbers of sea turtles: Leatherback - 172; loggerhead - 1370; a total of 30 in any combination of hawksbill, green, and Kemp's ridley sea turtles. NOAA Fisheries also anticipates a 5-year take of 261 smalltooth sawfish, of which no lethal takes are expected. If the actual calculated incidental captures or mortalities exceed the incidental take statement, a formal consultation for that gear type must be re-initiated immediately. More information is available in Amendment 1 to the 1999 FMP and the October 2003 BiOp and is not repeated here.

Loggerhead Sea Turtles

In the bottom longline fishery a total of 55 sea turtles were observed caught from 1994 through 2004 (Table 3.52 and Figure 3.24). Seasonal variation indicates that most of the sea turtles were caught early in the year. Of the 55 observed sea turtles, 43 were loggerhead sea turtles, of which 26 were released alive. Another nine loggerheads were released in an unknown condition and eight were released dead. Based on extrapolation of observer data in Amendment 1 to the 1999 FMP, it was estimated that a total of 2,003 loggerhead sea turtles were taken in the shark bottom longline fishery from 1994 through 2002 (NOAA Fisheries, 2003a). An additional 503 unidentified sea turtles were estimated to have been taken. On average, 222 loggerhead sea turtles and 56 unidentified sea turtles were estimated to have been taken annually during this time period in the shark bottom longline fishery.

In the shark gillnet fishery, loggerhead sea turtles are rarely caught. During the 1999 right whale calving season no loggerhead sea turtles were caught in this fishery (Carlson and Lee, 1999). No loggerhead sea turtles were observed caught with strikenets during the 2000-2002 right whale calving seasons (Carlson 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a). However, three loggerhead sea turtles have been observed caught with drift gillnets during right whale calving season, one each year from 2000 to 2002 (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a; Garrison, 2003). In 2004 there were no observed sea turtle interactions in either the strikenet or drift gillnet fisheries.

No loggerhead sea turtles were caught outside of the right whale calving season in 2002 (Carlson and Baremore, 2002b), and no loggerhead turtles were observed caught during or after the right whale calving season in 2003 or 2004 in the directed shark gillnet fishery (Carlson and Baremore 2003; Carlson pers. comm). One loggerhead sea turtle mortality was reported in abandoned fishing gear in January 2004, and was not considered part of normal fishing operations.

Leatherback Sea Turtles

Of the 55 observed sea turtle interactions in the bottom longline fishery from 1994-2004, four were leatherback sea turtles of which one was dead and three were released with their condition unknown (Figure 3.24). Based on extrapolation of observer data, it was estimated that 269 leatherback sea turtles were taken in the shark bottom longline fishery from 1994 through 2002 (NOAA Fisheries, 2003a). On average, 30 leatherback sea turtles each year were taken in the shark bottom longline fishery during 1994 through 2002. This analysis only estimates takes without discriminating between live and dead releases. Of the observed leatherback takes, 25 percent were lethal. Applying the observed mortality rate of 25 percent to the total leatherback takes and an additional 42 percent post-release mortality estimate due to hook ingestion to the remaining, results in an estimated total number of leatherbacks killed as a result of the selected action at 17 per year. The leatherback mortality is very conservative because it is known that leatherbacks rarely ingest or bite hooks, but are usually foul hooked on their flippers or carapaces, reducing the likelihood of post-hooking release mortality. However, leatherback-specific data for this fishery is not available and therefore the most conservative estimate is used.

In the shark gillnet fishery, leatherback sea turtles are sporadically caught. During the 1999 right whale calving season, two leatherback sea turtles were caught in this fishery, and both were released alive (Carlson and Lee, 1999). No leatherback sea turtles were observed caught with strikenets during the 2000-2002 right whale calving seasons (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a). Leatherback sea turtles have been observed caught in shark drift gillnets including 14 in 2001 and two in 2002 (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a; Garrison, 2003). NOAA Fisheries temporarily closed the shark gillnet fishery (strikenetting was allowed) from March 9 to April 9, 2001, due to the increased number of leatherback interactions that year (66 FR 15045, March 15, 2001).

From 2003-2004, no leatherback sea turtles were observed caught in gillnets fished in strikenet or driftnet methods (Carlson and Baremore 2003; Carlson pers. comm.).

Smalltooth Sawfish

As of April 1, 2003, NOAA Fisheries listed smalltooth sawfish as an endangered species (68 FR 15674) under the ESA. After reviewing the best scientific and commercial information, the status review team determined that the continued existence of the U.S. Distinct Population Segment of smalltooth sawfish was in danger of extinction throughout all or a significant portion of its range from a combination of the following four listing factors: the present or threatened destruction, modification, or curtailment of habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence.

To date there has been only one observed catch of a smalltooth sawfish in shark gillnet fisheries (Table 3.53). The sawfish was taken on June 25, 2003, in a gillnet off southeast Florida and was released alive (Carlson and Baremore, 2003). The set was characteristic of a typical drift gillnet set, with gear extending 30 to 40 feet deep in 50 to 60 feet of water. Prior to this event it was speculated that the depth at which drift gillnets are set above the sea floor may preclude smalltooth sawfish from being caught. Although sometimes described as a lethargic demersal species, smalltooth sawfish feed mostly on schooling fishing, thus they would occur higher in the water column during feeding activity. In fact, smalltooth sawfish and Atlantic sharks may be attracted to the same schools of fish, potentially making smalltooth sawfish quite vulnerable if present in the area fished. The previous absence of smalltooth sawfish incidental capture records is more likely attributed to the relatively low effort in this fishery and the rarity of smalltooth sawfish, especially in Federal waters. These factors may result in little overlap of the species with the gear. The sawfish was cut from the net and released alive with no visible injuries. This indicates that smalltooth sawfish can be removed safely if entangled gear is sacrificed.

Given the high rate of observer coverage in the shark gillnet fishery, NOAA Fisheries believes that smalltooth sawfish takes in this fishery are very rare. The fact that there were no smalltooth sawfish caught during 2001 when 100 percent of the fishing effort was observed, indicates that smalltooth sawfish takes (observed or total) most likely do not occur on an annual basis. Based on this information, the 2003 BiOp estimated that one incidental capture of a sawfish (released alive) over the next five years, will occur as a result of the use of gillnets in this fishery (NOAA Fisheries, 2003a).

However, sawfish have been observed caught (eight known interactions, seven released alive, one released in unknown condition) in shark bottom longline fisheries from 1994 through 2004 (Morgan pers. comm., 2003, Burgess and Morgan 2004) (Figure 3.25). Based on these observations, expanded sawfish take estimates for 1994-2002 were developed for the shark bottom longline fishery (NOAA Fisheries, 2003a). A total of 466 sawfish were estimated to have been taken in this fishery from 1994-2002, resulting in an average of 52 per year. All but one of the observed sawfish was released alive.

Four delphinids have been observed caught and released alive between 1994 and 2004 (G. Burgess, pers. comm. 2004). One pelican was observed caught and killed off the Florida Gulf Coast in January 1995 (G. Burgess, pers. comm. 2001). Bycatch estimates for the shark bottom longline fishery have not been extrapolated for marine mammals. Observed takes of marine mammals in the Southeast Atlantic shark gillnet fishery during 1999-2004, totaled 12 bottlenose dolphins and four spotted dolphins. Extrapolated observations from these data suggest serious injury and mortality of 25 bottlenose dolphin and one Atlantic spotted dolphin in the shark gillnet fishery from 1999 through 2002 (Garrison, 2003).

Table 3.52 **Observed Sea Turtle Interactions by Month for Years 1994-2004 in the Shark Bottom Longline Fishery.** Source: A. Morgan pers. comm.

Month	Number of Sea Turtle Interactions
January	13
February	17
March	5
April	4
May	1
June	0
July	9
August	3
September	3
October	0
November	0
December	0
TOTAL	55

Table 3.53 **Protected Species Interactions in Drift Gillnet Sets During the Directed Shark Gillnet Fishery for All Observed Trips, 2003.** Source: Carlson, 2003.

Species	Total Number Caught	Released Alive	Discarded Dead	Released Condition Unknown or Comatose
Bottlenose dolphin	2	0	1	1
Smalltooth sawfish	1	1	0	0

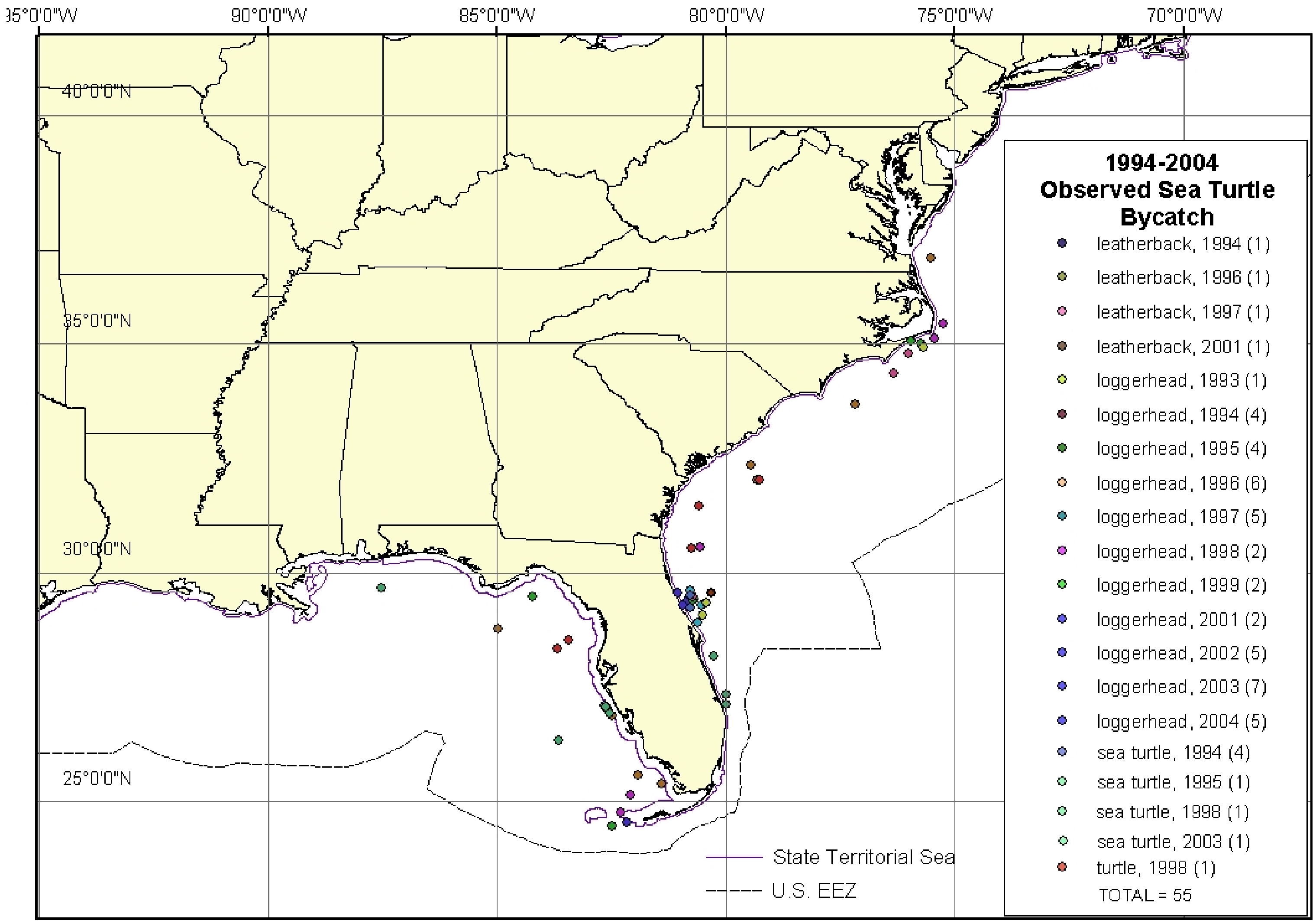

Figure 3.24 **Observed sea turtle interactions in the shark bottom longline fishery from 1994-2004.**

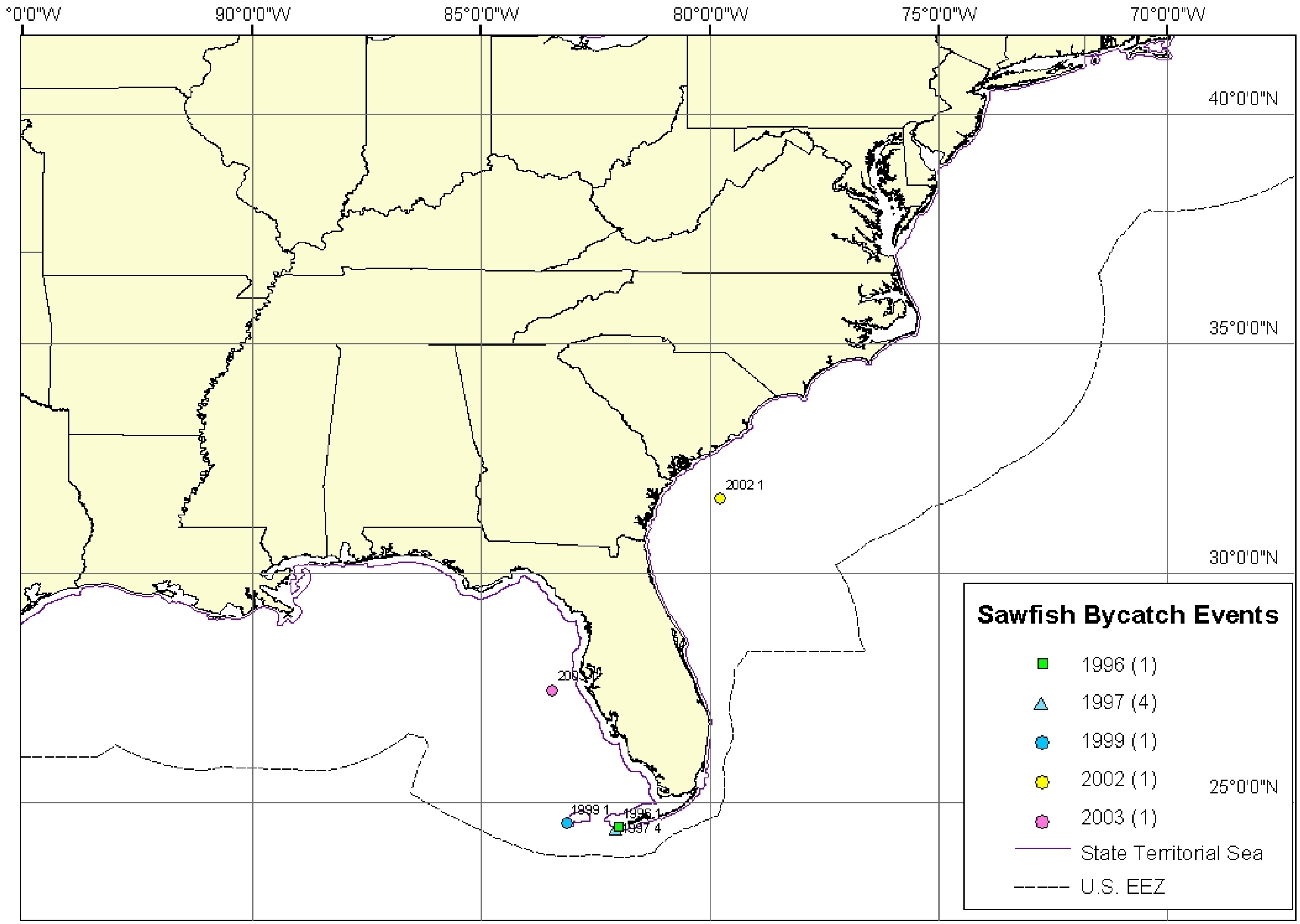

Figure 3.25 **Observed sawfish interactions in the shark bottom longline fishery from 1994-2004.**

National Plan of Action for the Conservation and Management Of Sharks

On February 15, 2001, NOAA Fisheries released the final National Plan of Action (NPOA) for the Conservation and Management of Sharks (66 FR 10484). The NPOA was developed pursuant to the endorsement of the International Plan of Action (IPOA) by the United Nations' Food and Agriculture Organization Committee on Fisheries Ministerial Meeting in February 1999. The overall objective of the IPOA is to ensure conservation and management of sharks and their long-term sustainable use. The final NPOA, consistent with the Magnuson-Stevens Act, requires NOAA Fisheries and the Regional Fishery Management Councils to undertake extensive data collection, analysis, and management measures in order to ensure the long-term sustainability of U.S. shark fisheries. The NPOA also encourages Interstate Marine Fisheries Commissions and State agencies to initiate or expand current data collection, analysis, and management measures and to implement regulations consistent with federal regulations, as needed. For additional information on the U.S. NPOA and its implementation, see http://www.nmfs.noaa.gov/.

Shark Finning Prohibition Act

On December 21, 2000, President Clinton signed the Shark Finning Prohibition Act into law (Public Law 106-557). This amended the Magnuson-Stevens Fishery Conservation and Management Act to prohibit any person under U.S. jurisdiction from (i) engaging in the finning of sharks; (ii) possessing shark fins aboard a fishing vessel without the corresponding carcass; and (iii) landing shark fins without the corresponding carcass. NOAA Fisheries published final regulations on February 11, 2002 (67 FR 6194). No changes were made to regulations affecting Atlantic federal commercial shark permit holders.

3.4.5.7 U.S. vs. International Breakdown of Landings

There is currently no comprehensive international reporting system for Atlantic shark catches and landings. While there are some international data, not all countries report shark catches and landings and those that do use varying reporting methods. The most recent landings reports for blue and shortfin mako sharks are presented in Table 3.54 and Table 3.55, respectively. In 2001, ICCAT passed a resolution on Atlantic sharks to determine needed improvements in data collection for Atlantic shortfin mako and blue sharks, and to conduct an interim meeting in 2003 to discuss the issue. In addition, the resolution called upon contracting parties and non-contracting parties to: (1) submit catch and effort data on Atlantic shortfin mako, porbeagle, and blue sharks; (2) encourage the release of live sharks that are caught incidentally; (3) minimize waste and discards from shark catches; and (4) voluntarily agree not to increase fishing effort targeting Atlantic porbeagle, shortfin mako and blue sharks until sustainable levels of harvest can be determined through stock assessments.

At its annual meeting in New Orleans in 2004, ICCAT adopted a recommendation to, among other things, ban shark finning, require vessels to fully utilize their entire catches of sharks, encourage the release of live sharks that are caught incidentally and are not used for food, and to review the assessment of shortfin mako sharks in 2005, and reassess blue sharks and shortfin mako no later than 2007. The ICCAT recommendation also encouraged countries to engage in research to identify shark nursery areas, and collect data on shark catches.

Table 3.54 **Nominal catches of blue shark reported to ICCAT (landings and discards in t) by major gear and flag between 1990 and 2002.** Source: ICCAT Report 2004-2005(I).

		1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**19**
Atlantic Total		2348	3533	2343	7879	8310	8422	9036	36
LANDINGS	longline	1387	2265	1667	5749	7366	7501	7767	36
	others	220	496	491	994	372	300	558	43
DISCARDS	longline	741	772	184	1136	572	618	609	18
	others	0	0	0	0	0	3	102	0
LANDINGS	BENIN	0	0	0	0	0	0	0	6
	BRASIL	0	0	0	0	0	0	743	11
	CANADA	0	0	0	0	0	276	12	11
	CAP-VERT	0	0	0	0	0	0	0	0
	CHINA.PR	0	0	0	0	0	0	0	0
	EC-CYPRUS	0	0	0	0	0	0	0	0
	EC-DENMARK	2	1	1	0	1	2	3	1
	EC-ESPANA	0	0	0	0	0	0	0	29
	EC-FRANCE	130	187	276	322	350	266	278	21
	EC-IRELAND	0	0	0	0	0	0	0	0
	EC-PORTUGAL	1387	2257	1583	5726	4669	5569	5710	39
	EC-U.K	1	0	0	0	0	12	0	0
	JAPAN	0	0	0	0	2596	1589	1044	99
	MEXICO	0	0	0	0	0	0	0	0
	NAMIBIA	0	0	0	0	0	0	0	0
	PANAMA	0	0	0	0	0	0	0	0
	SENEGAL	0	0	0	0	0	0	0	0
	SOUTHAFRICA	0	0	0	0	0	0	0	0
	TRINIDAD&TOBAG	0	0	0	0	0	0	0	0
	U.S.A	87	308	215	680	29	23	283	21
	UK-BERMUDA	0	0	0	0	0	0	0	1
	URUGUAY	0	8	84	15	93	64	252	28
DISCARDS	CANADA	0	0	0	0	0	0	0	0
	U.S.A	741	772	184	1136	572	618	710	18
	UK-BERMUDA	0	0	0	0	0	3	1	0

Table 3.55 **Nominal catches of shortfin mako shark reported to ICCAT (landings and discards in t) by major gear and flag between 1990 and 2002.** Source: ICCAT Report 2004-2005(I)

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Atlantic Total		486	538	511	1824	1352	2646	1680	5300	4105	3731	4366	4522	4792
LANDINGS	longline	218	328	235	1137	1017	1177	1421	5125	3941	3630	4044	4278	4527
	others	268	210	250	667	317	1440	259	175	165	100	322	244	266
DISCARDS	longline	0	0	26	20	18	29	0	0	0	2	0	0	0
LANDINGS	BRASIL	0	0	0	0	0	0	83	190	0	27	219	409	226
	CANADA	0	0	0	0	0	111	67	110	69	70	78	69	78
	CHINA.PR	0	0	0	34	45	23	27	19	74	126	306	22	208
	COTE D'IVOIRE	0	0	0	0	0	0	15	0	0	10	9	15	0
	NA	0	0	0	0	0	0	0	3777	3347	2895	2679	2921	2859
	TUGAL	193	314	220	796	649	749	785	519	425	446	706	523	471
		0	0	0	0	0	0	0	0	0	2	3	2	1
		0	0	0	0	0	0	213	248	0	0	0	0	0
		0	0	0	0	0	10	0	0	0	0	10	16	0
	A	0	0	0	0	0	0	0	0	0	1	0	0	459
	A	0	0	0	0	0	0	0	0	0	25	1	0	0
	AFRICA	0	0	0	0	0	0	0	0	19	13	0	79	19
	ENT	0	0	0	0	0	0	0	0	0	3	0	0	0
	D&TOBAGO	0	0	0	0	0	0	0	0	0	0	0	0	1
		268	210	250	945	628	1703	465	408	148	69	292	395	413
	MUDA	0	0	0	0	0	0	1	1	2	0	0	0	0
	AY	25	14	15	29	12	21	24	28	21	43	63	70	58
DISCARDS	MEXICO	0	0	0	0	0	1	0	0	0	0	0	0	0
		0	0	26	20	18	28	0	0	0	0	0	0	0
	MUDA	0	0	0	0	0	0	0	0	0	2	0	0	0

3.4.6 Fishery Data: LANDINGS BY SPECIES

The following tables are taken from the 2004 National Report of the United States to ICCAT (NAT-035) (NMFS, 2004). The purpose of this section is to provide a summary of recent landings of HMS on a species by species basis for comparison to Sections 4.1 through 4.5 of the 2004 HMS SAFE report. Landings for sharks can be found in Sections 3.4.4 and 3.4.5.

Table 3.56 U.S. Landings (mt) of Bluefin Tuna by Gear and Area, 1997-2003. Source: NMFS, 2004

Area	Gear	1997	1998	1999	2000	2001	2002	2003
NW Atlantic	Longline	26.0	30.5	25.1	22.8	17.7	7.8	16.3
	Handline	17.4	29.2	15.5	3.2	9.0	4.5	2.5
	Purse Seine	249.7	248.6	247.9	275.2	195.9	207.7	265.4
	Harpoon	97.5	133.1	115.8	184.2	101.9	55.5	87.9
	*Rod and reel (>145 cm LJFL)	752.6	610.4	657.5	632.8	993.4	1,001.7	676.4
	*Rod and reel (<145 cm LJFL)	178.9	166.3	103.0	49.5	242.9	519.4	314.6
	Unclassified	2.2	0.6	0.1	0.2	0.5	0.0	0.0
Gulf of Mexico	Longline	23.8	18.3	48.4	43.3	19.8	32.8	53.8
	*Rod and reel	0.0	0.0	0.4	0.9	1.7	1.5	0.0
NC Area 94a	Longline			0.0	0.0	0.0	9.3	11.3
All Areas	All Gears	1,348.1	1,237	1,214.1	1,212.1	1,582.8	1,840.2	1,428.2

* 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.

Table 3.57 U.S. Landings (mt) of Yellowfin Tuna by Gear and Area, 1997-2003. Source: NMFS, 2004**.**

Area	Gear	1997	1998	1999	2000	2001	2002	2003
NW Atlantic	Longline	838.9	464.9	581.3	734.5	631.8	400	272
	Rod and reel*	3,560.9	2,845.7	3,818.2	3,809.5	3,690.5	2,624	4,672
	Troll	218	177.5	0.0	0.0	0.0	0.0	0.0
	Purse seine	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Gillnet	1.3	1.7	0.2	0.2	7.6	5	1
	Trawl	1.9	0.7	4.1	1.8	2.7	0	2
	Harpoon	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	34.3	0.0	192	235.7	242.5	137	148
	Trap	**	0.1	0.8	0.5	0.1	0.0	0.0
	Unclassified	0.0	0.0	2.1	1.3	6.8	**	0.0
Gulf of Mexico	Longline	2,571.3	1,864.5	2,736.6	2,133	1,505.5	2,109	1,828
	Rod and reel*	7.7	80.9	149.4	52.3	494.2	200	640
	Handline	55.6	60.8	12.7	28.6	43.4	100	59
	Gillnet	0.0	0.0	**	0.0	0.0	0.0	0.0
	Unclassified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Caribbean	Longline	135.4	58.6	24.4	11.8	23.1	12	7
	Troll	19.6	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	0.7	3.9	14.5	19.4	14.3	7	9
	Gillnet	**	0.0	0.0	0.1	0.3	0.0	**
	Trap	0.1	0.0	0.1	0.3	0.3	0.0	0.0

Area	Gear	1997	1998	1999	2000	2001	2002	2003
NC Area 94a	Longline	6.1	4.6	0.2	2.1	3.5	0.0	5
SW Atlantic	Longline	221.9	55.3	32.4	19.8	36.2	52	42
All Areas	All Gears	7,673.7	5,619.2	7,569	7,050.9	6,702.8	5,646	7,685

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.
** ≤= 0.05 mt

Table 3.58 U.S. Landings (mt) of Skipjack Tuna by Gear and Area, 1997-2003. Source: NMFS, 2004.

Area	Gear	1997	1998	1999	2000	2001	2002	2003
NW Atlantic	Longline	1.0	0.7	0.3	0.0	0.1	**	0.9
	Rod and reel*	42.0	49.5	63.6	13.1	32.9	23.3	34.0
	Troll	0.6	0.4	0.0	0.0	0.0	0.0	0.0
	Purse seine	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Gillnet	8.9	16.9	26.5	1.9	3.6	**	0.9
	Trawl	0.0	0.2	1.0	0.0	0.2	**	0.5
	Handline	0.1	0.0	0.2	0.2	0.2	0.2	0.2
	Trap	0.0	0.0	17.5	0.0	0.0	**	1.5
	Pound	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unclassified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gulf of Mexico	Longline	1.3	0.6	0.4	0.2	0.2	**	**
	Rod and reel*	21.7	37.0	34.8	16.7	16.1	13.2	11.0
	Handline	0.0	0.0	0.4	0.7	0.0	0.0	**
	Trap	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unclassified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Caribbean	Longline	1.2	0.0	1.3	1.6	4.0	2.5	3.3
	Gillnet	0.2	0.0	0.4	0.6	1.6	0.6	0.4
	Harpoon	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	0.0	0.0	5.8	8.8	10.3	12.5	9.2
	Trap	**	0.0	0.1	0.3	0.4	0.7	0.2
	Troll	7.3	0.0	0.0	0.0	0.0	0.0	0.0
	Unclassified	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW Atlantic	Longline	**	0.0	0.0	0.0	0.0	0.0	0.0
All Areas	All Gears	84.3	105.3	152.3	44.1	69.6	53.0	62.1

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.
** ≤= 0.05 mt

Table 3.59 U.S. Landings (mt) of Bigeye Tuna by Area and Gear, 1997-2003. Source: NMFS, 2004.

Area	Gear	1997	1998	1999	2000	2001	2002	2003
NW Atlantic	Longline	476.3	544.3	737.8	333.2	506.1	328.6	168.7
	Rod and reel*	333.5	228.0	316.1	34.4	366.2	49.6	188.5
	Troll	3.9	4.0	0.0	0.0	0.0	0.0	0.0
	Gillnet	**	0.4	0.2	0.0	0.2	0.0	0.0
	Handline	2.7	0.0	11.9	4.1	33.2	13.8	6.0
	Pairtrawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Trawl	1.0	0.5	1.2	1.7	0.4	0.5	**

	Harpoon	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Haul Seine	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unclassified	0.5	0.0	0.9	0.0	1.8	0.0	0.0
Gulf of Mexico	Longline	33.9	25.6	54.6	44.5	15.3	41.0	27.5
	Rod and reel*	0.0	0.0	1.8	0.0	0.0	0.0	0.0
	Handline	**	0.1	0.2	0.1	0.5	0.6	0.3
Caribbean	Longline	50.0	48.5	23.2	13.7	31.9	29.7	7.2
	Handline	0.0	0.0	0.2	1.5	0.0	0.0	0.0
NC Area 94a	Longline	91.8	48.4	35.3	63.1	61.0	45.2	36.9
SW Atlantic	Longline	142.8	28.5	78.2	77.4	68.2	91.3	44.6
All Areas	All Gears	1,136.4	928.3	1,261.4	573.7	1,084.8	600.3	479.7

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.
** ≤= 0.05

Table 3.60 **U.S. Landings (mt) of Albacore Tuna by Gear and Area, 1997-2003.** Source: NMFS, 2004.

Area	Gear	1997	1998	1999	2000	2001	2002	2003
NW Atlantic	Longline	140.0	155.4	179.5	130.5	171.7	124.0	95.6
	Gillnet	42.8	40.1	27.0	0.8	3.3	2.6	0.1
	Handline	4.8	0.0	0.6	2.9	1.7	3.9	1.4
	Trawl	2.6	2.4	0.4	**	0.0	0.3	**
	Troll	1.6	5.8	0.0	0.0	0.0	0.0	0.0
	Rod and reel*	220.2	601.1	90.1	250.8	122.3	323.0	333.8
	Pair Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pound	1.3	0.9	0.4	0.0	0.0	0.0	0.0
	Unclassified	0.2	0.0	0.0	0.1	0.1	0.0	0.0
Gulf of Mexico	Longline	16.9	3.9	3.8	4.1	4.9	9.5	7.7
	Rod and reel*	49.3	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	0.0	0.0	**	0.0	0.0	0.0	**
Caribbean	Longline	16.1	17.8	8.3	9.2	8.7	8.4	4.0
	Troll	3.6	0.0	0.0	0.0	0.0	0.0	0.0
	Gillnet	**	0.0	0.2	0.1	0.5	**	**
	Trap	**	0.0	**	0.2	0.3	0.6	0.2
	Handline	0.0	0.0	3.8	5.0	2.2	2.7	2.0
NC Area 94a	Longline	11.4	1.6	1.5	2.6	6.1	4.8	1.6
SW Atlantic	Longline	4.7	1.4	1.4	0.9	2.4	8.3	2.0
All Areas	All Gears	515.5	830.4	317	407.2	324.2	488.1	448.4

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.
** ≤= 0.05 mt

Table 3.61 **U.S. Catches and Landings (mt) of Swordfish by Gear and Area, 1997-2003.** Source: NMFS, 2004.

Area	Gear	1997	1998	1999	2000	2001	2002	2003
NW Atlantic	*Longline	1,262.2	1,624.1	1,872.3	1,547.6	1,220.8	1,132.8	1,347.0
	Gillnet	0.4	36.3	0.0	0.0	0.0	0.1	0.0
	Pair Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	1.3	0.0	5.0	7.7	8.6	8.8	10.2

	Trawl	8.0	5.9	7.5	10.9	2.5	3.9	6.0
	Troll	0.4	0.7	0.0	0.0	0.0	0.0	0.0
	*Unclassified	11.9	9.1	3.8	1.4	1.8	0.1	0.0
	Harpoon	0.7	1.5	0.0	0.6	7.4	2.8	0.0
	***Rod and Reel	10.9	4.7	21.3	15.6	1.5	21.5	5.1
	Trap	0.0	0.1	**	0.0	0.0	**	0.1
Gulf of Mexico	*Longline	759.9	633.1	579.6	631.7	494.6	549.1	515.8
	Handline	0.0	0.0	**	1.2	0.3	2.9	1.5
Caribbean	*Longline	688.9	516.0	260.5	331.9	347.0	329.0	276.4
	Trap			0.0	0.3	0.0	0.1	**
NC Atlantic	*Longline	688.2	658.6	650.0	804.6	420.6	587.9	632.9
SW Atlantic	*Longline	417.9	170.1	185.2	143.8	43.2	199.9	20.9
All Areas	All Gears	3,850.7	3,660.2	3,585.2	3,497.3	2,548.3	2,838.9	2,815.9

* Includes landings and estimated dead discards from scientific observer and logbook sampling programs.
** $\leq$ = 0.5 mt
*** Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.

Table 3.62 U.S. Landings (mt) and dead discards of Blue Marlin, White Marlin and Sailfish by Gear and Area, 1998-2002. Source: NMFS, 2003.

		Blue Marlin					White Marlin					Sailfish				
Area	**Gear**	**1998**	**1999**	**2000**	**2001**	**2002**	**1998**	**1999**	**2000**	**2001**	**2002**	**1998**	**1999**	**2000**	**2001**	**2002**
NW Atlantic	Longline*	23.3	22.0	28.8	10.9	17.3	15.3	18.6	10.3	5.1	11.5	6.4	13.7	11.2	2.2	0.4
	Unclassified*	0.6	0.0	0.1	0.0	0.2	0.7	0.1	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0
	Rod and reel**	34.1	24.8	13.8	9.0	9.8	2.4	-	-	-	-	0.1	-	-	-	-
Gulf of Mexico	Longline*	18.5	55.2	29.6	9.4	17.8	11.8	31.5	29.9	10.1	15.6	17.0	57.4	33.9	8.2	6.3
	Rod and reel**	4.5	7.5	4.7	5.1	4.4	0.2	-	-	-	-	1.0	-	-	-	-
Caribbean	Longline*	2.3	1.6	0.5	1.2	0.8	1.3	5.0	0.5	0.7	1.5	0.2	0.5	0.1	0.0	0.2
	Rod and reel**	10.6	4.6	5.7	2.3	2.9	<.05	-	-	-	-	0.05	-	-	-	-
	Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown & NC Area 94a	Longline*	6.1	1.6	0.7	0.9	0.5	2.8	1.1	0.1	0.6	0.7	0.8	<.05	0.1	0.3	<.05
SW Atlantic	Longline*	1.6	1.7	0.0	0.0	0.0	0.9	0.5	0.0	0.0	0.0	2.7	<.05	0.1	0.0	0.0
NW Atlantic& Caribbean & Gulf of Mexico	Rod and reel***	-	-	-	-	-	-	5.2	1.3	3.4	5.6	-	163.0	75.7	57.8	103.0
All Areas	All Gears	101.6	119.0	83.9	38.8	54.7	35.4	62.0	42.1	19.9	35.3	28.3	234.6	121.1	68.5	109.9

* Includes landings and estimated discards from scientific observer and logbook sampling programs.
** Recreational billfish landings estimates are based on tournament reports and the Large Pelagic Survey (see Section 2.3 of the Billfish Amendment).
*** Estimation method no longer provides area-specific information.

3.5 Economic Status of HMS Fisheries

Under the National Standard 2 guidelines, NMFS must prepare an annual SAFE report in order to account for the best scientific information available. Each SAFE report should, among other things, provide information on the economic condition of the commercial and recreational fishing interests.

The review of each rule, and of HMS fisheries as a whole, is facilitated when there is a baseline against which the rule or fishery may be evaluated. In this report, as in past reports, NMFS decided to use 1996 as a baseline. NMFS believes that this baseline is appropriate because the Regulatory Flexibility Act (RFA) was amended in 1996, the Magnuson-Stevens Act was amended in 1996, NMFS began to collect economic information voluntarily for vessels using the pelagic logbook, and regarding HMS specifically, no rules were implemented in 1996 that were classified as significant under RFA. Additionally, while the Tunas, Swordfish, and Shark FMP and the Billfish Amendment 1 were finalized in 1999, scoping for these two major documents and its final rule began in 1997. It is possible that anticipation of these documents and any potential changes in their implementing regulations could have begun to impact the decisions made by HMS fishermen and any associated businesses.

In addition to using the 1996 baseline, this SAFE report also provides five years of data, when possible, in order to facilitate the analysis of trends. It also should be noted that all dollar figures are reported in nominal dollars (*i.e.* current dollars), unlike past SAFE reports. If analysis of real dollar (*i.e.* constant dollar) trends controlled for inflation is desired, price indexes for 1996 to 2003 are provided in Table 3.63. To determine the real price in base year dollars, divide the base year price index by the current year price index, and then multiply this result by the price that is being adjusted for inflation. From 1996 to 2003, the Consumer Price Index (CPI-U) indicates that prices have risen by 17.3 percent, the Gross Domestic Product (GDP) Implicit Price Deflator indicates that prices have risen 12.9 percent, and the Producer Price Index (PPI) for unprocessed finfish indicates a 5.6 percent rise. From 2002 to 2003 the CPI, GDP Deflator and the PPI for unprocessed finfish indicate prices rose by 2.3 percent, 1.8 percent, and -2.8 percent respectively.

Table 3.63 **Inflation Price Indexes.** The CPI-U is the standard Consumer Price Index for all urban consumers (1982-84=100) produced by U.S. Department Of Labor Bureau of Labor Statistics. The source of the Producer Price Index (PPI) for unprocessed finfish (1982=100) is also the Bureau of Labor Statistics. The Gross Domestic Product Implicit Price Deflator (2000=100) is produced by the U.S. Department of Commerce Bureau of Economic Analysis and obtained from the Federal Reserve Bank of St. Louis (http://www.stlouisfed.org/).

Year	CPI-U	GDP Deflator	PPI Unprocessed Finfish
1996	156.9	93.8	185.5
1997	160.5	95.4	165.7
1998	163	96.5	170.7
1999	166.6	97.9	191.7
2000	172.2	100.0	182.4
2001	177.1	102.4	176.1
2002	179.9	104.1	201.5

2003	184	106.0	195.8

3.5.1 Commercial Fisheries[7]

In 2003, the total commercial landings at ports in the 50 states by U.S. fishermen were 9.5 billion pounds and were valued at $3.3 billion. The overall value of landings was up eight percent from 2002 estimates. The total value of commercial HMS landings in 2003 was $73.7 million (Table 3.66). The 2003 ex-vessel price index indicated that seven of the 17 finfish species tracked had increasing ex-vessel prices, nine species had decreasing ex-vessel prices, and one species maintained ex-vessel prices. The total edible finfish ex-vessel price index for 2003 was up eight percent from 2002.

The estimated value of the 2003 domestic production of all fishery products was $7.0 billion. This is $670 million less than the estimated value in 2002. The total import value of fishery products was $21.3 billion in 2003. This is an increase of $1.6 billion from 2002. The total import value in 1996 was $13.1 billion. The total export value of fishery products was $12.0 billion in 2003. This is an increase of $294 million from 2002. The total export value in 1996 was $8.7 billion.

Consumers spent an estimated $61.2 billion for fishery products in 2003 including $42.0 billion at food service establishments, $18.9 billion in retail sales for home consumption, and $290.4 million for industrial fish products. The commercial marine fishing industry contributed $31.5 billion to the U.S. Gross National Product in 2003. In 1996, consumers spent an estimated $41.2 billion including $27.8 billion at food service establishments, $13.2 billion for home consumption, and $283.9 billion for industrial fish products. The commercial marine fishing industry contributed $21.0 billion to the U.S. Gross National Product in 1996.

The average ex-vessel prices per pound dressed weight (dw) for 1996 and 1999 to 2003 by area, Atlantic HMS, and major gear types are summarized in Table 3.64. The average ex-vessel prices per lb. dw for 1996 and 1999 to 2003 by species and area are summarized in Table 3.65. For both of these tables, prices are reported in nominal dollars. The ex-vessel price depends on a number of factors including the quality of the fish (*e.g.* freshness, fat content, method of storage), the weight of the fish, the supply of fish, and consumer demand.

[7] All the information and data presented in this section were obtained from NMFS 1997a and NMFS 2004.

Table 3.64 **Average ex-vessel prices per lb. dw for Atlantic HMS by gear and area.** Source: Dealer weigh out slips from the Southeast Fisheries Science Center and Northeast Fisheries Science Center, and bluefin tuna dealer reports from the Northeast Regional Office. HND=Handline, harpoon, spears, trot lines, and trolls, PLL=Pelagic longline, BLL=Bottom longline, Net=Gillnets and pound nets, TWL=Trawls, SEN=Seines, TRP=Pots and traps, DRG=Dredge, and UNK=Unknown. Gulf of Mexico includes: TX, LA, MS, AL, and the west coast of FL. S. Atlantic includes: east coast of FL. GA, SC, and NC dealers reporting to Southeast Fisheries Science Center. Mid-Atlantic includes: NC dealers reporting to Northeast Fisheries Science Center, VA, MD, DE, NJ, NY, and CT. N. Atlantic includes: RI, MA, NH, and ME. For bluefin tuna, all NC landings are included in the Mid-Atlantic.

Gulf of Mexico							
Species	**Gear**	**1996**	**1999**	**2000**	**2001**	**2002**	**2003**
Bigeye tuna	HND	$0.68	$2.13	$1.83	$1.82	$1.44	$1.25
	PLL	-	$4.04	$2.82	$2.64	$5.09	$3.41
	BLL	-	$4.41	$2.31	$0.50	$4.24	$3.53
Bluefin tuna	HND	-	-	$1.86	$1.25	$2.69	-
	PLL	$5.83	$6.32	-	-	$6.40	$6.32
	BLL	-	-	-	-	$4.50	-
Yellowfin tuna	HND	-	$2.38	$2.48	$2.55	$2.83	$2.34
	PLL	-	$3.18	$3.40	$3.25	$3.68	$3.64
	BLL	-	$3.06	$3.68	$3.31	$3.23	$3.73
Other tunas	HND	$0.28	$0.90	$0.76	$0.79	$0.91	$0.87
	PLL	-	$0.78	$0.72	$0.70	$0.79	$0.66
	BLL	-	$0.67	$0.85	$0.74	$0.75	$0.55
	NET	$0.38	$0.33	$0.58	$0.33	$0.83	$0.29
	TWL	-	$0.70	$0.61	$0.78	$0.40	$0.30
	SEN	-	$0.52	-	$0.61	$0.19	-
	TRP	-	-	-	-	$0.30	$0.30
Swordfish	HND	-	$3.21	$3.91	$2.84	$3.19	$3.68
	PLL	-	$3.39	$3.33	$3.41	$2.94	$2.91
	BLL	-	$3.29	$3.10	$3.25	$2.88	$2.67
Large coastal sharks	HND	$0.23	$0.64	$0.59	$0.51	$0.44	$0.45
	PLL	-	$0.79	$0.48	$0.45	$0.36	$0.38
	BLL	$0.60	$0.55	$0.43	$0.44	$0.36	$0.38
	NET	$0.38	$0.41	$0.48	$0.50	$0.39	$0.43
	TWL	$0.15	$0.49	$0.15	$0.25	$0.25	$0.25
Pelagic sharks	HND	-	$1.35	$1.38	$1.48	$0.93	$1.04
	PLL	-	$1.27	$1.27	$1.32	$1.06	$1.11
	BLL	-	$1.43	$1.31	$1.42	$1.19	$1.15
Small coastal sharks	HND	-	$0.59	$0.93	$0.37	$0.38	$0.32
	PLL	-	$0.50	$0.47	$0.74	$0.32	$0.33
	BLL	-	$0.52	$0.41	$0.61	$0.53	$0.50
	NET	-	$0.67	-	$0.45	$0.46	$0.36
	TRP	-	-	-	$0.74	-	-
Shark fins	HND	-	$8.51	$21.57	$15.90	$21.28	$13.97
	PLL	-	$14.02	$15.65	$21.08	-	$15.21
	BLL	-	$14.34	$15.89	$21.50	$22.72	$20.17
	NET	-	$7.78	$15.50	$11.02	-	$6.05
	TWL	-	-	$9.17	-	-	-

South Atlantic							
Species	**Gear**	**1996**	**1999**	**2000**	**2001**	**2002**	**2003**
Bigeye tuna	HND	$1.30	$2.02	$1.02	$2.14	$2.29	$1.89

	PLL	$1.33	$2.87	$2.27	$2.78	$2.33	$2.26
	BLL	$1.30	$3.00	$1.87	$2.63	$2.74	$2.66
	NET	$1.30	-	-	-	-	-
Bluefin tuna	HND	-	-	$7.99	$3.52	$3.35	-
	PLL	$4.62	$4.71	$5.36	$4.82	$4.95	$4.11
	BLL	-	-	-	$3.61	$5.15	-
Yellowfin tuna	HND	$1.55	$1.41	$1.56	$1.41	$1.54	$1.54
	PLL	$1.63	$2.17	$2.23	$2.14	$1.89	$2.09
	BLL	$1.41	$2.45	$2.29	$2.45	$2.29	$2.60
	NET	$1.07	$0.87	-	$1.21	$1.12	-
	TWL	-	-	-	-	$0.44	-
Other tunas	HND	$0.75	$0.67	$0.59	$0.61	$0.47	$0.58
	PLL	$0.79	$1.47	$1.31	$1.33	$1.09	$1.26
	BLL	$0.87	$1.41	$1.49	$1.86	$1.67	$1.13
	NET	$0.35	$0.19	$0.20	$0.23	$0.21	$0.21
	TWL	$0.31	$0.56	$0.25	$0.47	$0.26	-
	SEN	-	$0.11	-	-	-	-
	TRP	-	-	-	$0.18	-	-
Swordfish	HND	$2.48	$3.04	$3.92	$4.24	$3.93	$3.91
	PLL	$2.88	$3.27	$3.12	$3.27	$2.84	$2.98
	BLL	$2.46	$3.39	$3.42	$3.14	$2.76	$3.19
	NET	-	-	-	-	$2.50	-
Large coastal sharks	HND	$0.72	$0.66	$0.59	$0.96	$1.01	$0.49
	PLL	$1.54	$1.32	$1.21	$1.69	$2.63	$0.35
	BLL	$0.73	$1.13	$0.78	$0.89	$1.10	$0.39
	NET	$1.30	$1.70	$0.91	$1.49	$1.59	$0.30
	TWL	$0.86	$0.67	$0.49	$0.51	$0.81	$0.41
	TRP	-	-	-	-	$0.23	-
Pelagic sharks	HND	$0.82	$0.95	$0.78	$0.71	$0.68	$0.84
	PLL	$0.68	$1.04	$0.95	$0.95	$0.93	$0.93
	BLL	$0.59	$0.89	$0.90	$0.78	$0.75	$0.87
	NET	$0.33	$0.28	$0.35	$0.36	$0.34	$0.34
	TWL	-	$0.21	$0.20	$0.26	$0.26	-
Small coastal sharks	HND	$0.25	$0.39	$0.40	$0.46	$0.53	$0.49
	PLL	-	$0.57	$0.57	$0.63	$0.41	$0.24
	BLL	-	$0.57	$0.56	$0.53	$0.54	$3.19
	NET	$0.25	$0.52	$0.48	$0.54	$0.54	$0.53
	TWL	-	$0.52	$0.23	$0.23	-	-
Shark fins	HND	$14.00	$5.65	$11.92	$19.75	$15.53	$17.17
	PLL	-	$11.18	$10.34	$11.44	$6.81	$12.72
	BLL	$14.00	$15.76	$17.57	$22.21	$22.26	$17.83
	NET	-	$5.19	$6.95	$10.60	$10.41	$12.85
	TWL	$9.11	$6.61	-	$12.17	$14.00	$10.77

Mid-Atlantic							
Species	**Gear**	**1996**	**1999**	**2000**	**2001**	**2002**	**2003**
Bigeye tuna	HND	$5.74	$3.62	$4.45	$4.32	$3.97	$3.79
	PLL	$3.51	$3.19	$4.30	$3.81	$4.12	$3.92
	BLL	$2.61	$4.33	$3.45	$4.37	$2.84	$3.91
	NET	$3.87	$4.63	$5.55	$4.50	-	-
	TWL	$4.68	$3.16	$5.68	-	-	-
	DRG	-	-	-	-	$1.50	-
	UNK	-	-	-	-	$5.00	-

Mid-Atlantic							
Species	**Gear**	**1996**	**1999**	**2000**	**2001**	**2002**	**2003**
Bluefin tuna	HND	$14.70	$3.51	$6.60	$4.93	$4.06	$7.54
	PLL	$6.12	$7.34	$5.73	$6.83	$5.72	$6.25
	NET	$15.71	-	-	$2.23	-	-
	BLL	-	-	-	$7.00	$7.00	-
Yellowfin tuna	HND	$2.49	$1.60	$2.14	$2.11	$2.00	$1.93
	PLL	$2.51	$2.15	$2.32	$2.30	$2.14	$2.00
	BLL	$3.28	$1.51	$1.86	$2.11	$1.81	$1.89
	NET	$1.07	$1.07	$1.77	$1.49	$1.81	$1.50
	TWL	$2.40	$1.59	$1.56	$1.53	-	$1.48
	TRP	-	-	-	-	$1.97	$1.57
	DRG	-	-	-	-	$1.94	-
	UNK	-	-	-	-	$2.75	-
Other tunas	HND	$1.34	$0.89	$0.94	$0.89	$0.69	$0.66
	PLL	$1.84	$1.59	$1.03	$0.88	$0.86	$0.93
	BLL	-	$0.83	$1.17	$0.78	$0.83	$1.08
	NET	$0.45	$0.54	$0.44	$0.49	$0.75	$0.48
	TWL	$0.45	$0.66	$0.70	$0.47	$0.42	$0.62
	TRP	-	-	-	-	$0.57	$0.47
	DRG	-	-	-	-	$1.00	-
	UNK	-	-	-	-	$1.03	$1.69
Swordfish	HND	$3.61	$3.13	$3.25	$3.70	-	-
	PLL	$4.31	$3.53	$3.59	$3.47	$3.18	$2.97
	BLL	$4.88	$3.77	$2.91	$3.45	$4.00	-
	NET	$4.63	$3.81	-	$4.19	$3.51	-
	TWL	$4.56	$3.29	$3.94	$2.86	$3.34	$3.21
Large coastal sharks	HND	$0.74	$0.96	$0.50	$0.88	$2.09	$2.19
	PLL	$0.58	$0.79	$0.45	$2.62	$2.78	$2.32
	BLL	$0.54	$0.56	$0.41	$0.55	$1.11	$2.08
	NET	$0.45	$0.46	$0.53	$0.89	$1.02	$1.02
	TWL	$0.47	$0.49	$0.72	$0.55	$0.52	$0.50
	TRP	-	-	-	-	$2.50	-
	SEN	-	-	-	-	$1.26	-
	UNK	-	-	-	-	$0.50	-
Pelagic sharks	HND	$1.47	$1.71	$1.41	$1.26	$1.41	$1.57
	PLL	$1.25	$1.39	$1.45	$1.56	$1.31	$1.32
	BLL	$1.47	$1.04	$1.24	$0.97	$1.12	$1.17
	NET	$0.99	$0.99	$1.02	$1.02	$0.97	$1.08
	TWL	$1.00	$1.10	$0.90	$0.69	$1.03	$0.88
	TRP	-	-	-	$0.40	-	$1.43
	DRG	-	-	-	$0.49	$2.00	-
	UNK	-	-	-	-	-	$0.57
Small coastal sharks	HND	-	$0.46	$0.38	$0.51	$0.45	$0.36
	PLL	$0.25	-	$0.20	$0.44	$0.50	$0.39
	BLL	-	-	-	$0.95	-	-
	NET	-	$0.45	$0.40	-	$0.42	$0.39
	TWL	-	$0.53	-	-	$1.26	-
Shark fins	HND	$2.74	$3.60	$6.17	-	-	-
	PLL	$7.79	$3.35	$8.57	-	-	-
	BLL	$8.00	-	-	-	-	-
	NET	$4.77	$3.96	$3.38	-	-	-

North Atlantic							
Species	**Gear**	**1996**	**1999**	**2000**	**2001**	**2002**	**2003**
Bigeye tuna	HND	$3.69	$3.41	$4.22	$6.00	-	-
	PLL	$3.36	$3.26	$4.39	$3.42	$4.08	$3.50
	BLL	$2.15	-	-	-	-	-
	NET	$3.31	-	$0.42	-	-	-
	TWL	$8.00	$3.29	$3.87	$3.54	$3.76	-
Bluefin tuna	HND	$10.73	$8.44	$10.02	$8.21	$7.94	$6.33
	PLL	$5.56	$7.06	$5.65	$5.24	$5.96	$4.21
	NET	-	-	-	$4.26	-	-
	SEN	$11.05	$7.83	$7.80	$7.43	$6.61	$4.92
	TWL	-	-	-	$3.80	-	-
Yellowfin tuna	HND	$2.50	$1.16	$2.66	$2.87	$3.25	$1.90
	PLL	$2.14	$2.44	$2.77	$3.01	$2.76	$2.57
	BLL	$2.03	$0.51	$2.32	$3.77	-	-
	NET	$2.43	$0.50	-	-	$4.75	-
	TWL	$2.67	$2.21	$2.31	$2.10	$2.19	$1.65
	TRP	-	-	-	-	$4.50	$3.10
Other tunas	HND	$1.90	$1.41	$1.59	$2.39	$2.03	$1.56
	PLL	$0.98	$0.60	$1.13	$0.70	$1.15	$1.00
	BLL	$1.50	-	$0.50	$3.00	-	-
	NET	$0.73	$0.20	$0.50	$0.36	$0.70	$1.14
	TWL	$1.08	$0.37	$0.22	$0.80	$0.69	$0.37
	TRP	-	-	-	-	$0.34	$0.44
	DRG	-	-	-	-	$3.00	-
Swordfish	HND	$5.20	-	$8.00	$5.69	$5.32	-
	PLL	$4.01	$3.30	$3.67	$3.58	$3.30	$3.36
	BLL	$3.07	-	$2.00	-	-	-
	NET	$5.62	-	-	-	$4.25	-
	TWL	$3.08	$3.77	$4.05	$4.75	$3.05	$3.18
	TRP	-	-	-	-	$3.74	-
Large coastal sharks	HND	-	$0.74	-	$0.50	$0.45	$0.74
	PLL	$1.03	-	$1.00	$1.21	$0.29	$0.28
	BLL	$0.99	$1.03	$0.65	$1.43	$1.00	-
	NET	$0.83	$0.64	$1.06	$0.99	$0.89	$0.89
	TWL	$0.80	$1.00	$1.08	$0.93	$0.86	$0.66
	TRP	-	-	-	-	$0.28	$0.22
Pelagic sharks	HND	$1.60	-	-	$1.38	$1.71	-
	PLL	$1.26	$3.30	$1.38	$1.37	$1.31	$1.30
	BLL	$1.85	$0.89	$1.50	-	$0.65	-
	NET	$1.12	$0.70	$0.82	$0.98	$0.60	$1.30
	TWL	$0.96	$0.77	$0.97	$1.19	$0.81	$0.63
	TRP	-	-	-	-	$0.69	$0.68
Small coastal sharks	HND	-	-	-	-	-	-
	NET	-	-	-	$1.51	-	-
	TWL	-	-	-	-	$0.58	-
Shark fins	PLL	$4.25	-	$5.54	-	-	-
	BLL	$3.00	$0.33	$25.19	-	-	-
	NET	$1.96	$2.79	$2.41	-	-	-
	TWL	$2.32	$0.49	$3.00	-	-	-

Table 3.65 Average ex-vessel prices per lb. for Atlantic HMS by area.

Species	Area	1996	1999	2000	2001	2002	2003
Bigeye tuna	Gulf of Mexico	$0.68	$3.38	$2.26	$1.94	$4.33	$3.29
	S. Atlantic	$1.32	$2.77	$1.98	$2.57	$2.45	$2.24
	Mid-Atlantic	$3.99	$3.52	$4.39	$4.26	$3.82	$3.77
	N. Atlantic	$3.59	$3.30	$4.12	$4.32	$4.03	$3.45
Bluefin tuna	Gulf of Mexico	$5.83	$6.32	$1.86	$1.25	$5.56	$6.32
	S. Atlantic	$4.62	$4.70	$6.83	$4.00	$3.77	$4.11
	Mid-Atlantic	$9.48	$5.90	$5.98	$5.25	$4.70	$7.38
	N. Atlantic	$10.78	$8.26	$8.94	$5.79	$7.31	$5.71
Yellowfin tuna	Gulf of Mexico	-	$2.94	$3.22	$2.98	$3.23	$3.31
	S. Atlantic	$1.56	$1.77	$1.88	$1.70	$1.73	$1.76
	Mid-Atlantic	$2.43	$1.61	$2.12	$1.91	$2.02	$1.91
	N. Atlantic	$2.35	$1.52	$2.65	$2.93	$2.90	$2.38
Other tunas	Gulf of Mexico	$0.29	$0.86	$0.74	$0.76	$0.84	$0.75
	S. Atlantic	$0.62	$0.61	$0.58	$0.58	$0.49	$0.59
	Mid-Atlantic	$1.10	$0.80	$0.76	$0.70	$0.73	$0.70
	N. Atlantic	$1.31	$0.51	$0.93	$1.46	$1.17	$0.95
Swordfish	Gulf of Mexico	-	$3.35	$3.25	$3.31	$2.91	$2.95
	S. Atlantic	$2.79	$3.27	$3.24	$3.43	$3.14	$3.26
	Mid-Atlantic	$4.43	$3.47	$3.67	$3.53	$3.25	$2.97
	N. Atlantic	$4.09	$3.45	$3.87	$4.67	$3.47	$3.33
Large coastal sharks	Gulf of Mexico	$0.21	$0.56	$0.43	$0.44	$0.36	$0.38
	S. Atlantic	$1.02	$1.10	$0.78	$1.12	$1.27	$0.39
	Mid-Atlantic	$0.55	$0.59	$0.53	$1.09	$1.56	$1.62
	N. Atlantic	$0.88	$0.77	$1.01	$1.02	$0.77	$0.72
Pelagic sharks	Gulf of Mexico	-	$1.36	$1.31	$1.42	$1.11	$1.13
	S. Atlantic	$0.62	$0.83	$0.76	$0.68	$0.67	$0.71
	Mid-Atlantic	$1.21	$1.23	$1.20	$1.09	$1.17	$1.21
	N. Atlantic	$1.31	$0.81	$1.10	$1.23	$1.00	$1.12
Small coastal sharks	Gulf of Mexico	-	$0.55	$0.52	$0.58	$0.48	$0.40
	S. Atlantic	$0.25	$0.50	$0.48	$0.52	$0.53	$0.51
	Mid-Atlantic	$0.25	$0.47	$0.38	$0.55	$0.48	$0.38
	N. Atlantic	-	-	-	$1.51	$0.58	-
Shark fins	Gulf of Mexico	-	$14.01	$15.99	$20.90	$22.64	$18.12
	S. Atlantic	$10.74	$11.10	$14.16	$18.43	$17.10	$15.85
	Mid -Atlantic	$ 4.60	$3. 41	$4. 90	-	-	-
	N. Atlantic	$ 2.69	$1. 19	$6. 83	-	-	-

Table 3.64and Table 3.65indicate that the average ex-vessel prices for bigeye tuna have generally increased since 1996. However, prices from 2002 to 2003 have decreased in all four

regions. The gears used also influenced the average price of bigeye tuna. Longline-caught fish brought the highest average value in 2003.

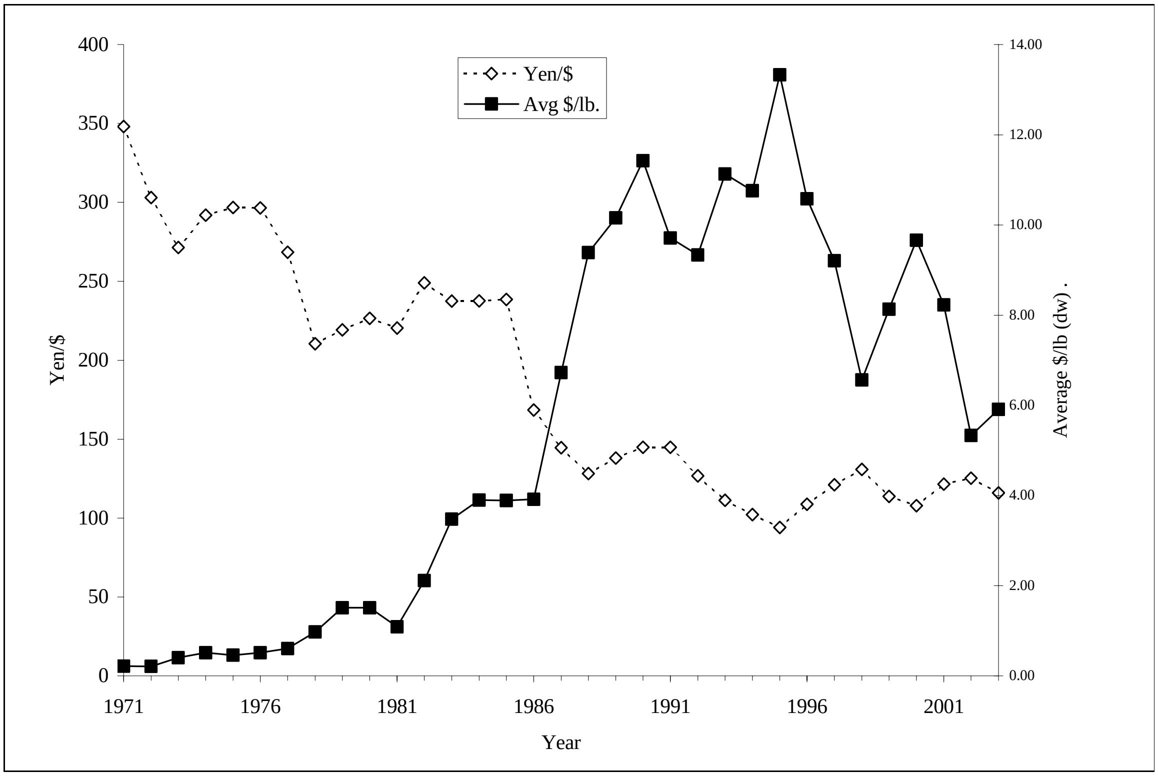

Figure 3.26 **Average Annual Yen/$ Exchange Rate and Average U.S. BFT Ex-vessel $/lb (dw) for all gears: 1971-2003.** Source: Federal Reserve Bank (www.stls.frb.org) and Northeast Regional Office.

Average ex-vessel prices for bluefin tuna have generally declined since 1996. Since 2002, however, prices increased in all regions except the North Atlantic (Table 3.65). As with bigeye tuna, the gear used also made a difference in the ex-vessel price (Table 3.64). In the North Atlantic and Mid-Atlantic, bluefin tuna caught with handgear had higher average prices than those caught with longline. This trend has been fairly consistent over the years between 1996 and 2003. The ex-vessel prices for bluefin tuna can be influenced by many factors, including market supply and the Japanese Yen/U.S. Dollar (¥/$) exchange rate. Figure 3.26 shows the average ¥/$ exchange rate, plotted with average ex-vessel bluefin tuna prices, from 1971 to 2003.

The average ex-vessel prices for yellowfin tuna have decreased slightly in 2003 in the Mid-Atlantic and North Atlantic while increasing slightly in the Gulf of Mexico and South Atlantic (Table 3.65). Yellowfin tuna caught with longline gear had higher average ex-vessel prices than fish caught with other gear types in 2003 (Table 3.64).

The average ex-vessel price for other tunas decreased in all regions except the South Atlantic in 2003 (Table 3.65). The average price of other tunas is lowest in the South Atlantic compared to other regions. The type of gear used did not appear to consistently influence the average ex-vessel prices of other tuna.

In the South Atlantic and Gulf of Mexico, average ex-vessel prices for swordfish increased in 2003, while it decreased in the Mid-Atlantic and North Atlantic (Table 3.65). Swordfish caught using handline gear had higher average ex-vessel prices than other gear types (Table 3.64).

The average ex-vessel price for LCS increased in the Gulf of Mexico and Mid-Atlantic in 2003. However, prices for LCS declined in the North Atlantic and South Atlantic (Table 3.65). Large coastal sharks caught on handline gear versus longline gear tended to have higher average ex-vessel prices in 2003, except in the Mid-Atlantic (Table 3.64).

The average ex-vessel prices for pelagic sharks increased in all regions in 2003 (Table 3.65). The 2003 prices for pelagic sharks are not significantly different than 1996 prices and are actually lower than 1996 when adjusting for inflation.

The average ex-vessel prices for small coastal sharks (SCS) declined in all regions in 2003 (Table 3.65). Small coastal sharks caught using bottom longline gear in 2003 had higher ex-vessel prices in 2003 than SCS caught in other gear types (Table 3.64).

Table 3.66 **Estimates of the total ex-vessel annual revenues of Atlantic HMS fisheries.** Note: Average ex-vessel prices may have some weighting errors, except for bluefin tuna which is based on a fleet-wide average. (NMFS, 1997; NMFS 2004a; Cortes, 2003; and bluefin tuna dealer reports from the Northeast Regional Office).

Species		1996	1999	2000	2001	2002	2003
Bigeye tuna	Ex-vessel $/lb dw	$2.40	$3.24	$3.18	$3.27	$3.66	$3.19
	Weight lb dw	1,212,706	1,664,385	1,012,352	2,391,350	1,267,645	846,191
	Fishery Revenue	$2,910,494	$5,395,971	$3,222,636	$7,827,218	$4,637,372	$2,697,233
Bluefin tuna	Ex-vessel $/lb dw	$10.58	$8.14	$9.66	$8.23	$5.33	$5.91
	Weight lb dw	1,652,989	1,926,442	2,137,580	2,176,016	4,133,625	2,519,345
	Fishery Revenue	$17,488,624	$15,677,959	$20,648,413	$17,904,240	$22,042,839	$14,889,328
Yellowfin tuna	Ex-vessel $/lb dw	$2.11	$1.96	$2.46	$2.38	$2.48	$2.34
	Weight lb dw	6,679,938	6,351,717	12,435,708	14,777,800	12,885,887	13,556,340
	Fishery Revenue	$14,094,669	$12,433,149	$30,577,372	$35,193,181	$31,919,170	$31,721,836
Other tunas*	Ex-vessel $/lb dw	$0.83	$0.69	$0.75	$0.87	$0.81	$0.75
	Weight lb dw	368,433	495,241	795,243	867,960	1,298,509	900,522
	Fishery Revenue	$305,799	$343,771	$593,595	$754,322	$1,057,273	$673,140
Total tuna	**Fishery Revenue**	**$34,799,586**	**$33,850,849**	**$55,042,015**	**$61,678,960**	**$59,656,653**	**$49,981,537**

Species		1996	1999	2000	2001	2002	2003
Swordfish**	Ex-vessel $/lb dw	$3.77	$3.38	$3.51	$3.74	$3.20	$3.13
	Weight lb dw	7,170,619	5,942,839	4,832,384	5,662,350	5,985,489	4,668,466
	Fishery Revenue	$27,033,234	$20,104,498	$16,974,346	$21,153,927	$19,150,819	$14,600,627
Large coastal sharks	Ex-vessel $/lb dw	$0.67	$0.76	$0.68	$0.91	$0.99	$0.78
	Weight lb dw	5,262,314	3,919,570	3,762,000	3,562,546	4,097,363	4,421,249
	Fishery Revenue	$3,525,750	$2,950,102	$2,560,307	$3,256,955	$4,040,977	$3,437,521
Pelagic sharks	Ex-vessel $/lb dw	$1.05	$1.06	$1.09	$1.11	$0.99	$1.04
	Weight lb dw	695,531	400,821	215,005	362,925	303,666	616,967
	Fishery Revenue	$730,308	$424,273	$233,650	$401,430	$299,487	$643,188
Small coastal sharks	Ex-vessel $/lb dw	$0.25	$0.51	$0.46	$0.79	$0.52	$0.43
	Weight lb dw	460,667	672,245	672245*	719,484	579,441	549,799
	Fishery Revenue	$115,167	$340,890	$309,926	$568,441	$299,023	$236,414
Shark fins (weight = 5% of all sharks landed)	Ex-vessel $/lb dw	$6.01	$7.43	$10.47	$19.67	$19.87	$17.09
	Weight lb dw	320,926	249,632	232,462	232,248	249,024	279,401
	Fishery Revenue	$218,561	$1,854,313	$2,434,344	$4,568,937	$4,949,056	$4,774,959
Total sharks	**Fishery Revenue**	**$4,589,786**	**$5,569,578**	**$5,538,227**	**$8,795,763**	**$9,588,545**	**$9,092,082**
Total HMS	Fishery Revenue	$66,422,606	$59,524,926	$77,554,588	$91,628,650	$88,396,016	$73,674,245

Table 3.66 summarizes the average annual revenues of the Atlantic HMS fishery based on average ex-vessel prices and the weight reported landed as per the United States National Report (NMFS 2003), the Shark Evaluation Reports (NMFS, 1997), information given to ICCAT (Cortes, 2001), as well as price and weight reported to the NMFS Northeast Regional Office by Atlantic bluefin tuna dealers. These values indicate that the estimated total annual revenue of Atlantic HMS fisheries has increased 11 percent from approximately $66.4 million in 1996 to approximately $73.7 million in 2003. From 2002 to 2003, the tuna fishery total revenue decreased by 16 percent. A majority of that decrease can be attributed to reduced commercial landings of bluefin tuna. From 2002 to 2003, the annual revenues from swordfish also decreased by 24 percent. From 2002 to 2003, the annual revenues from shark decreased by five percent.

Table 3.67 The overall average wholesale price per lb of fresh HMS sold in Atlantic and Gulf of Mexico states as reported by the Fulton Fish Market. Note: #'s indicate quality (1 is highest, 3 is lowest); BTF is by the fish. Source: NMFS, 2004.

Species	Description	1996 Price/lb	1999 Price/lb	2000 Price/lb	2001 Price/lb	2002 Price/lb	2003 Price/lb	Percent Change 1996 to 2003
Blacktip	-	$1.05	$1.04	$1.04	$1.05	$1.00	$1.33	27%
Mako	-	$2.77	$2.74	$3.18	$3.00	$2.00	$2.37	-14%
Thresher	-	$1.00	$0.91	$0.82	$1.25	$1.25	$0.78	-22%

Species	Description	1996 Price/lb	1999 Price/lb	2000 Price/lb	2001 Price/lb	2002 Price/lb	2003 Price/lb	Percent Change 1996 to 2003
Swordfish	100# and up	$6.28	$5.26	$5.26	$5.42	$5.19	$5.08	-19%
	50-99#	$6.02	$4.54	$4.72	$4.81	$4.59	$4.50	-25%
	26-49#	$5.50	$3.36	$3.58	$4.05	$3.50	-	-
	Cuts	$7.74	$6.55	$6.54	$6.73	$6.84	$6.55	-15%
Yellowfin tuna	#1: BTF	$7.00	$5.97	$5.69	$5.50	$7.42	-	-
	#1: Cuts	$9.38	$8.23	$8.00	$8.23	$10.67	-	-
	#2: BTF	$5.00	$4.24	$4.36	$3.97	$4.92	$4.60	-8%
	#2: Cuts	$6.52	$6.22	$6.20	$6.00	$7.29	$6.98	7%
	#3: BTF	-	$3.00	-	-	-	$2.50	-
	#3: Cuts	-	$4.50	-	-	-	-	-
Bigeye tuna	#1: BTF	-	$4.00	-	-	-	$6.50	-
	#1: Cuts	-	$5.50	-	-	-	$8.50	-
	#2: BTF	-	$4.26	-	-	-	-	-
	#2: Cuts	-	$6.00	-	-	-	-	-

Currently, NMFS does not collect wholesale price information from dealers. However, the wholesale price of some fish species is available off the web (http://www.st.nmfs.gov/st1/market_news/index.html). The wholesale prices presented in Table 3.67 are from the annual reports of the Fulton Fish Market. As with ex-vessel prices, wholesale prices depend on a number of factors including the quality of the fish, the weight of the fish, the supply of fish, and consumer demand.

As reported by the Fulton Fish Market, Table 3.67 indicates that the average wholesale price of HMS sold in Atlantic and Gulf of Mexico states decreased from 1996 to 2003. During that same period, the wholesale price of swordfish weighing over 100 pounds decreased 19 percent, swordfish weighing between 50 and 99 pounds decreased 19 percent, and swordfish cuts decreased 15 percent. The wholesale price of blacktip shark increased 27 percent from 1996 to 2003, with most of the increase occurring in 2003. The wholesale price both mako shark decreased 14 percent from 1996 to 2003, however 2003 wholesale prices were up from 2002. The wholesale price of thresher shark has decreased 22 percent from 1996 to 2003. Wholesale yellowfin tuna prices have remained relatively stable from 1996 to 2003. The yellowfin tuna wholesale price of #2 quality fish had decreased eight percent while the price of #2 cuts has increased seven percent from 1996 to 2003. Bigeye tuna wholesale prices from 1999 to 2003 have increased significantly for both high grade cuts and fish.

3.5.2 Recreational Fisheries

Although NMFS believes that recreational fisheries have a large influence on the economies of coastal communities, NMFS has only recently been able to gather additional information on the costs and expenditures of anglers or the businesses that rely on them.

An economic survey done by the U.S. Fish and Wildlife Service[2] in 2001 found that 9.1 million saltwater anglers went on approximately 72 million fishing trips and spent approximately $8.4 billion (USFWS, 2001). Expenditures included lodging, transportation to and from the coastal community, vessel fees, equipment rental, bait, auxiliary purchases (e.g. binoculars, cameras, film, foul weather clothing, etc.), and fishing licenses (USFWS, 2001). Saltwater anglers spent $4.5 billion on trip related costs and $3.9 billion on equipment (USFWS, 2001). Approximately 76 percent of the saltwater anglers surveyed fished in their home state (USFWS, 2001). The next USFWS survey is expected in 2006.

The American Sportfishing Association (ASA) also has a report listing the 2001 economic impact of sportfishing on specific states. This report states that all sportfishing has an overall economic importance of $116 billion dollars (ASA, 2001). Florida, Texas, North Carolina, New York, and Alabama are among the top ten states in terms of overall economic impact for both saltwater and freshwater fishing (ASA, 2001). Florida is also one of the top states in terms of economic impact of saltwater fishing with $2.9 billion in angler expenditures, $5.4 billion in overall economic impact, $1.5 billion in salaries and wages related to fishing, and 59,418 fishing related jobs (ASA, 2001). California followed Florida with $0.8 billion in angler expenditures, $1.7 billion in overall economic impact, $0.4 billion in salaries and wages, and 15,652 jobs (ASA, 2001). Texas and New Jersey were the next highest states in terms of economic impact (ASA, 2001).

At the end of 2004, NMFS began collecting market information regarding advertised charter boat rates. This preliminary analysis of the data collected includes 99 observations of advertised rates on the internet for full day charters. Full day charters vary from six to 14 hours long with a typical trip being 10 hours. Most vessels can accommodate six passengers, but this also varies from two to 12 passengers. Table 3.68 summarizes the average charter boat rate for full day trips on vessels with HMS Charter/Headboat permits. The average price for a full day boat charter was $1,053 in 2004. 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, it is apparent that there has been a significant gain in charter boat rates.

---

[2] This survey interviewed over 77,000 households during phase 1 and approximately 25,070 sports persons during phase 2. The response rate during phase two of the survey was 75 percent.

.

Table 3.68 Average Atlantic HMS charter boat rates for day trips.

Source: NMFS searches for advertised daily charter rates of HMS Charter/Headboat permit holders. (Observations = 99)

State	2004 Average Daily Charter Rate
AL	$1,783
CT	$1,500
DE	$1,060
FL	$894
LA	$1,050
MA	$777
MD	$1,167
ME	$900
NC	$1,130
NJ	$1,298
NY	$1,113
RI	$917
SC	$1,300
TX	$767
VA	$825
Overall Average	**$1,053**

In 2003, Ditton and Stoll published a paper that surveyed the literature regarding what is currently known about the social and economic aspects of recreational billfish fisheries. It has been projected that 230,000 anglers in the U.S. spent 2,136,899 days fishing for billfish in 1991. This is approximately 3.6 percent of all saltwater anglers over age 16. The states with the highest number of billfish anglers are Florida, California, North Carolina, Hawaii, and Texas in descending order. Billfish anglers studied in the U.S. Atlantic, Puerto Rico, and Costa Rica fished between 39 and 43 days per year.

Billfish recreational anglers tend to spend a great deal of money on trips. Ditton and Stoll (2003) report that a 1990 study of U.S. total trip costs for a typical billfish angler estimated a mean expenditure of $2,105 for Atlantic trips and $1,052 for Puerto Rico trips. The aggregate economic impact of billfish fishing trips in the U.S. Atlantic is conservatively estimated to be $22.7 million annually and $48.6 million for Puerto Rico.

In addition to the economic impact of recreational billfish angling, Ditton and Stoll (2003) report that using a contingent valuation method that consumer's surplus or net economic benefit to maintain current billfish populations in the U.S. Atlantic to be $497 per billfish angler per year in the U.S. Atlantic and $480 in Puerto Rico. They also estimate that the number of annual billfish anglers in the U.S. Atlantic to be 7,915 and 1,627 in Puerto Rico. The aggregate willingness-to-pay for maintaining current billfish populations is $3.93 million in the U.S. Atlantic and 0.78 million in Puerto Rico. The aggregate direct impact of billfish expenditures is estimated to be $15.13 million for the U.S. Atlantic and $32.40 million for Puerto Rico. Thus, the total aggregate economic value of billfish angler fishing is $19.06 million per year for the U.S. Atlantic and $33.18 million per year for Puerto Rico.

Generally, HMS tournaments last from three to seven days, but lengths can range from one day to an entire fishing season. Similarly, entry fees can range from approximately $0 to $5,000 per boat (average approximately $1,000/boat - $500/boat), depending largely upon the magnitude of the prize money that is being awarded. The entry fee would pay for a maximum of two to six anglers per team during the course of the tournament. Additional anglers can, in some tournaments, join the team at a reduced rate of between $50-$450. The team entry fee did not appear to be directly proportional to the number of anglers per team, but rather with the amount of money available for prizes and, possibly, the species being targeted. Prizes may include citations, T-shirts, trophies, fishing tackle, automobiles, boats, or other similar items, but most often consists of cash awards. In general, it appears that billfish and tuna tournaments charge higher entry fees and award more prize money than shark and swordfish tournaments, although all species have a wide range.

Cash awards distributed in HMS tournaments can be quite substantial. Several of the largest tournaments, some of which are described below, are part of the World Billfish Series Tournament Trail whereby regional winners are invited to compete in the World Billfish Series Grand Championship for a new automobile and a bronze sculpture. Other tournament series include the International Game Fish Association (IGFA) Rolex Tournament of Champions, and the South Carolina Governor's Cup. White marlin is a top billfish species from Cape Hatteras, North Carolina to the eastern tip of Georges Bank from June through October each year. The White Marlin Open in Ocean City, Maryland, which is billed as the "world's richest fishing tournament," established a new world record payout for catching a fish when it awarded $1.32 million in 2004 to the vessel catching the largest white marlin. The 21st Annual Pirates Cove Billfish Tournament in North Carolina awarded over $1 million in prizes in 2004, with the top boat garnering over $400,000 for winning in six categories. Total prize money awarded in the Big Rock Tournament in North Carolina has exceeded $1 million since 1998.

Blue marlin, sailfish and tunas are also often targeted in fishing tournaments, including those discussed above. In 2003, blue marlin was the HMS most frequently identified as a prize category in registered HMS tournaments. Forty-five teams participated in the 2004 Emerald Coast Blue Marlin Classic at Sandestin, Florida, with over $482,000 in cash prizes and the top boat receiving over $58,000. The 34th Annual Pensacola (Florida) International Billfish Tournament indicated that it would award over $325,000 in cash and prizes in 2004. The World Sailfish Championship in Key West, FL has a $100,000 guaranteed first prize for 2005. In South Carolina, the Megadock Billfishing Tournament offers a $1,000,000 prize for any boat exceeding the current blue marlin state record. The 2004 Florida Billfish Masters Tournament in Miami, Florida awarded over $123,000 in prize money, with the top boat receiving over $74,000. Sixty-two boats competed in the 2003 Babylon Tuna Club Invitational in Babylon, New York for over $75,000 in cash prizes, and the Mid-Atlantic Tuna Tournament sponsored by the South Jersey Marina in Cape May, New Jersey anticipates awarding over $25,000 in prizes in 2005.

Several tournaments target sharks. Many shark tournaments occur in New England, New York and New Jersey, although other regions hold shark tournaments as well. In 2004, the 24th Annual South Jersey Shark Tournament hosted over 200 boats and awarded over $220,000 in prize money, with an entry fee of $450 per boat. The "Mako Fever" tournament, sponsored by the Jersey Coast Shark Anglers, in 2004 awarded over $55,000 in prizes, with the first place vessel receiving $25,000. In 2004, the 18th Annual Monster Shark Tournament in Martha's Vineyard, Massachusetts was broadcast on ESPN, and featured a new fishing boat valued at over $130,000 awarded to the winner.

Swordfish tournaments have gained increased popularity in recent years, especially on the east coast of Florida, as the swordfish population has recovered. Events include the Islamorada Swordfish Tournament that began in 2004, and the Miami Swordfish Tournament that began in 2003. Both of these tournaments anticipated awarding over $30,000 in total cash and prizes, assuming that 50 boats would participate.

In addition to official prize money, many fishing tournaments may also conduct a "calcutta" whereby anglers pay from $200 to $5,000 to win more money than the advertised tournament prizes for a particular fish. Tournament participants do not have to enter calcuttas. Tournaments with calcuttas generally offer different levels depending upon the amount of money an angler is willing to put down. Calcutta prize money is distributed based on the percentage of the total amount entered into that calcutta. Therefore, first place winner of a low level calcutta (entry fee ~$200) could win less than a last place winner in a high level calcutta (entry fee~$1000). On the tournament websites, it was not always clear if the total amount of prizes distributed by the tournament included prize money from the calcuttas or the estimated price of any equipment. As such, the range of prizes discussed above could be a combination of fish prize money, calcutta prize money, and equipment/trophies.

Fishing tournaments can sometimes generate a substantial amount of money for surrounding communities and local businesses. Besides the entry fee to the tournament and possibly the calcutta, anglers may also pay for marina space and gas (if they have their own vessel), vessel rental (if they do not have their own vessel), meals and awards dinners (if not covered by the entry fee), hotel, fishing equipment, travel costs to and from the tournament, camera equipment, and other miscellaneous expenses. Fisher and Ditton (1992) found that the average angler who attended a billfish tournament spent $2,147 per trip (2.59 days), and that billfish tournament anglers spent an estimated $180 million (tournament and non-tournament trips) in 1989. Ditton and Clark (1994) estimated annual expenditures for Puerto Rican billfish fishing trips (tournaments and non-tournaments) at $21.5 million. More recently, Ditton, *et. al*. (2000) estimated that the total expenditure (direct economic impact) associated with the 1999 Pirates Cove Billfish Tournament, not including registration fees, was approximately $2,072,518. The total expenditure (direct economic impact) associated with the 2000 Virginia Beach Red, White, and Blue Tournament was estimated at approximately $450,359 (Thailing, *et. al*., 2001). These estimated direct expenditures do not include economic effects that may ripple through the local economy leading to a total impact exceeding that of the original purchases by anglers (*i.e*., the multiplier effect). Less direct, but equally important, fishing tournaments may serve to generally promote the local tourist industry in coastal communities. In a survey of participants in the 1999 Pirates Cove Billfish Tournament, Ditton, *et. al*. (2000) found that almost 80 percent of tournament anglers were from outside of the tournament's county. For this reason, tourism bureaus, chambers of commerce, resorts, and state and local governments often sponsor fishing tournaments.

3.6 Community and Social Update

According to National Standard 8 (NS 8), conservation and management measures should, consistent with conservation requirements, attempt to both provide for the continued participation of a community and, to the extent practicable, minimize the economic effects on the community. The information presented here addresses new data concerning the social and economic well-being of participants in the fishery and considers the impact of significant regulatory measures enacted in the past year.

3.6.1 Overview of Current Information and Rationale

The Magnuson-Stevens Act requires, among other things, that all FMPs include a fishery impact statement intended to assess, specify, and describe the likely effects of the measures on fishermen and fishing communities (§303(a)).

The National Environmental Policy Act (NEPA) also requires federal agencies to consider the interactions of natural and human environments by using a "systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences...in planning and decision-making" (§102(2)(A)). Moreover, agencies need to address the aesthetic, historic, cultural, economic, social, or health effects which may be direct, indirect, or cumulative. Consideration of social impacts is a growing concern as fisheries experience increased participation and/or declines in stocks. The consequences of management actions need to be examined to better ascertain and, if necessary, mitigate impacts of regulations on affected constituents.

Social impacts are generally the consequences to human populations that follow from some type of public or private action. Those consequences may include alterations to the ways in which people live, work or play, relate to one another, and organize to meet their needs. In addition, cultural impacts which may involve changes in values and beliefs that affect people's way of identifying themselves within their occupation, communities, and society in general are included under this interpretation. Social impact analyses help determine the consequences of policy action in advance by comparing the status quo with the projected impacts. Although public hearings and scoping meetings provide input from those concerned with a particular action, they do not constitute a full overview of the fishery.

While geographic location is an important component of a fishing community, the transient nature of HMS may necessitate permitted fishermen to shift location in an attempt to follow the fish. Because of this characteristic, management measures for HMS often have the most identifiable impacts on fishing fleets that use specific gear types. The geographic concentrations of HMS fisheries may also vary from year to year as the behavior of these migratory fish is unpredictable. The relationship between these fleets, gear types, and geographic fishing communities is not always a direct one; however, they are important variables for understanding social and cultural impacts. As a result, the inclusion of typical community profiles in HMS management decisions is somewhat difficult as geographic factors and the use of a specific gear type have to be considered.

NMFS (2001) guidelines for social impact assessments specify that the following elements are utilized in the development of FMPs and FMP amendments:

1. The size and demographic characteristics of the fishery-related work force residing in the area; these determine demographic, income, and employment effects in relation to the work force as a whole, by community and region.

2. The cultural issues of attitudes, beliefs, and values of fishermen, fishery-related workers, other stakeholders, and their communities.

3. The effects of proposed actions on social structure and organization; that is, on the ability to provide necessary social support and services to families and communities.

4. The non-economic social aspects of the proposed action or policy; these include life-style issues, health and safety issues, and the non-consumptive and recreational use of living marine resources and their habitats.

5. The historical dependence on and participation in the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution and rights.

To help develop this information for the 1999 FMP and the 1999 Billfish Amendment, NMFS contracted with Dr. Doug Wilson, from the Ecopolicy Center for Agriculture, Environmental and Resource Issues at Rutgers, the State University of New Jersey. Dr. Wilson and his colleagues completed their field work in July 1998. Their study considered HMS that have important commercial and recreational fisheries extending along the Atlantic and Gulf Coast from Maine to Texas and in the Caribbean. The study investigated the social and cultural characteristics of fishing communities in five states and one U.S. territory: Massachusetts, New Jersey, North Carolina, Florida, Louisiana, and Puerto Rico. These areas were selected because they each have important fishing communities that could be affected by measures included in the 1999 FMP and the 1999 Billfish Amendment, and because they are fairly evenly spread along the Atlantic and Gulf Coast and the Caribbean. For each state or territory, a profile of basic sociologic information was compiled, with at least two coastal communities visited for further analysis. Towns were selected based on HMS landings data, the relationship between the geographic communities and the fishing fleets, the existence of other community studies, and inputs from the Advisory Panels for HMS and Billfish. Complete descriptions of the study results can be found in Chapter 9 of the 1999 FMP and Chapter 7 of the Billfish Amendment. In 2002, NMFS contracted the Virginia Institute of Marine Science (VIMS) at the College of William and Mary to re-evaluate several of the baseline communities. NMFS recently received a report from James Kirkley at VIMS providing updated community profiles that are included in Section 3.6.3.

3.6.2 Social Impacts of Selected 2004 Regulatory Actions

Final Rule Implementing ICCAT Trade Restriction Measures (69 FR 70396, December 6, 2004).

This action adjusted the regulations governing the trade of species regulated by the International Commission for the Conservation of Atlantic Tunas (ICCAT) in the North and South Atlantic Ocean to implement recommendations adopted at the 2002 and 2003 meetings of ICCAT. This final rule lifted or implemented import prohibitions for bigeye tuna, bluefin tuna, and swordfish on Honduras, St. Vincent and the Grenadines, Belize, Sierra Leone, Bolivia, and Georgia. This rule also prohibited imports from vessels on the ICCAT illegal, unreported, and unregulated fishing list and from vessels that are not listed on ICCAT's record of vessels that are authorized to fish in the Convention Area. Additionally, this rule required issuance of a chartering permit before a vessel begins fishing under a chartering arrangement.

NMFS conducted an economic analysis, a Regulatory Impact Review (RIR), and Final Regulatory Flexibility Analysis (FRFA). The results of these analyses indicate that the economic impacts of these actions would be minimal. The final rule prohibited the importation of several HMS species from two countries and lifted prohibitions against three others in addition to imposing monitoring of chartering arrangements and prohibiting the import of HMS species from IUU fishing vessels. None of these nations are responsible for a significant portion of the imports of tuna-like species to the United States. As NMFS does not believe the IUU vessels and prohibited countries contribute a significant amount of HMS to U.S. markets, the measures are not anticipated to have any noticeable economic impact. Thus, the overall cumulative effects of this action are not significant.

The measures implemented by this rule primarily impact foreign fishing vessels, U.S. fish dealers, and U.S. vessels that enter chartering arrangements. This action is not expected to have substantial adverse impacts on U.S. public health and safety. For further background information, please see the Environmental Assessment and associated Final Regulatory Flexibility Analysis for this rule, available from the HMS Management Division of NMFS or at http://www.nmfs.noaa.gov/sfa/hms/Trade_Rule/Trade_Restrictions_Rule_FinalEA.pdf.

Final Rule Atlantic Commercial Shark Quotas and Fishing Season (69 FR 69537, November 30, 2004).

This final rule adjusted the regional quotas and establishes new trimester season quotas for large coastal sharks (LCS) and small coastal sharks (SCS) based on updated landings information. This final rule included a framework mechanism for the annual adjustment of quotas, a method of accounting for over- or underharvests in the transition from semi-annual to trimester seasons, and a new process for notifying participants of season opening and closing dates and quotas. This final rule also announced the opening and closing dates for the LCS fishery based on adjustments to the regional and trimester quotas. This action was necessary to ensure that the landings quotas in the Atlantic commercial shark fishery represent the latest landings data and accurately reflect historic and current fishing effort.

The actions are not expected to have any significant social or economic impacts. NMFS is revising the regional quotas based on updated historical landings data from both fishermen and dealers, for LCS and SCS. In the short term, re-adjusting the current regional quotas to account for increased fishing effort in the Gulf of Mexico and North Atlantic could have a positive economic effect by ensuring quotas reflect current fishing effort. There may be negative economic consequences resulting from the reduction in the South Atlantic quotas for LCS. However, these updated regional quotas, which are based on current fishery data, should provide a more accurate reflection of fishing effort by region and species group in the Atlantic Ocean. A framework mechanism for annual adjustment of regional quotas could prevent future closures due to overharvest and allow quotas to more accurately reflect current effort and landings in all regions. Only unused quota (up to 10 percent) could be transferred between regions during an annual quota adjustment. Removing the requirement for NMFS to file notification of fishing seasons' length at least 30 days prior the beginning of the season is not anticipated to have any significant economic or social impacts on participants. The action is not expected to have adverse impacts on public health and safety. For further background information, please see the Environmental Assessment and associated Final Regulatory Flexibility Analysis for this rule, available from the HMS Management Division of NMFS or at http://www.nmfs.noaa.gov/sfa/hms/hmsdocuments.html - shark.

Final Rule Implementing ICCAT Trade Monitoring Measures (69 FR 67268, November 17, 2004).

This action implemented the international trade tracking recommendations of the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Inter-American Tropical Tuna Commission (IATTC) for bluefin tuna, swordfish, and frozen bigeye tuna, regardless of ocean area of origin. Trade monitoring requirements for species covered under the recommendations for southern bluefin tuna were established by this rule, including: a highly migratory species (HMS) international trade permit; statistical documents and re-export certificates; and recordkeeping, reporting, and inspection requirements.

NMFS prepared a RIR/FRFA that examines the impacts of the alternatives for implementing the ICCAT and IATTC recommendations for international trade monitoring programs. The final rule would affect approximately 1,890 (930 foreign and 960 domestic) seafood businesses that participate in international trade of swordfish, bluefin tuna, southern bluefin tuna and bigeye tuna, all of which are considered small entities. Impacts to businesses would occur in two areas - permitting and reporting (reporting includes documentation and recordkeeping). NMFS expects only minor negative economic impacts from the final rule because the regulatory measures only involve adjusting permitting and reporting requirements. For further background information, please see the Final Regulatory Flexibility Analysis for this rule, available from the HMS Management Division of NMFS or at http://www.nmfs.noaa.gov/sfa/hms/Trade_Rule/HMS_ITP_FinalFRFA_Nov2004.pdf

Final Rule Reduction of Sea Turtle Bycatch and Bycatch Mortality in the Atlantic Pelagic Longline Fishery (69 FR 40734, July 6, 2004).

This final rule implemented new sea turtle bycatch and bycatch mortality mitigation measures for all Atlantic vessels that have PLL gear onboard and that have been issued, or are required to have, Federal HMS limited access permits, consistent with the requirements of the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management

Act (Magnuson-Stevens Act or M-S Act), and other domestic laws. These measures included mandatory circle hook and bait requirements, and mandatory possession and use of sea turtle release equipment to reduce bycatch mortality. This final rule also allowed vessels with pelagic longline gear onboard that have been issued, or are required to have, Federal HMS limited access permits to fish in the Northeast Distant (NED) Closed Area, if they possess and/or use certain circle hooks and baits, sea turtle release equipment, and comply with specified sea turtle handling and release protocols.

The final measures likely resulted in an initial increase in costs, but may have resulted in longer-term cost savings because circle hooks have lower replacement costs than ‘‘J’’-hooks, and because the newly-required release gears may result in increased hook retention. An informal internet and telephone survey of hook suppliers provided a range in price of approximately $0.28 to $0.50 ($0.3539 avg) per hook for 16/0 circle hooks, and $0.26 to $0.66 ($0.4176 avg) per hook for 18/0 commercial grade circle hooks. Large commercial grade ‘‘J’’-hooks range from approximately $0.26 to $1.00 (avg. $0.5733) per hook. Assuming that an average of 2,500 hooks per vessel are needed to initially comply with the hook requirements (equip vessels with enough hooks for one trip), the compliance cost for 16/0 circle hooks, on a per vessel basis, may range from $697.50 to $1241.75 with an anticipated average cost of approximately $884.75. Similarly, assuming that an average of 2,500 18/0 circle hooks per vessel are needed to initially comply with the hook requirements, the compliance cost, on a per vessel basis, may range from $657.25 to $1,650.00, with an anticipated average cost of approximately $1,044.00. The circle hook requirements should not have increased the needed skill level required for HMS fisheries, as the physical act of switching hook types is a normal aspect of commercial fishing operations. However, there probably was a period of time during which fishing crews adjust, as with any new gear. Circle hooks are not expected to be prohibitively difficult to work with, as some vessels are already utilizing them.

The requirement to purchase and use sea turtle release gear would require additional skills and would impose a compliance cost for purchase of the gear of between $485.00 and $1,056.50. These costs may be reduced if fishermen are able to construct various pieces of equipment themselves, rather than purchasing pre-assembled gear from a commercial supplier. In addition, specific protocols regarding the proper use of sea turtle release equipment and onboard turtle handling procedures are being implemented. These protocols may increase the needed skill level required for HMS fisheries. A document containing the sea turtle careful release protocols will be issued, and will be required to be onboard. Also, NMFS will conduct training on the proper use of the release equipment. Traditionally, bait accounts for 16 to 26 percent of the total costs per trip. Any fluctuations in the price and availability of mackerel, whole finfish, or squid baits could have a substantial positive or negative impact on profitability. These baits are generally abundant, but availability will likely depend upon harvesting and distributional capacities. There could also be unquantifiable compliance costs as fishing crews who have not traditionally fished with a particular hook and bait combination familiarize themselves with the most efficient techniques. For further background information, please see the Environmental Impact Statement for this rule, available from the HMS Management Division of NMFS or at http://www.nmfs.noaa.gov/sfa/hms/hmsdocuments.html - feis.

3.6.3 Summary of New Social and Economic Data Available

NMFS recently received updated community profiles from James Kirkley at VIMS. Profiles were developed for the United States; each of the states having ports with reported landings of HMS; each of the counties having ports with reported landings of HMS; and each of the corresponding ports. The profiles were developed using data from the 1990 and 2000 U.S. Census.

In 1990, the U.S. had a total population of 248.7 million (Table 3.69). The population increased to 281.4 million in 2000. As might be expected, the population was roughly half female and half male. Individuals between 18 and 44 years of age comprised the largest proportion of the population in 2000. The dominant race was white. There were 105.5 million total households. Between 1990 and 2000, the total number of business establishments in the U.S. increased from 6.2 to 7.1 million (Table 3.70). Retail trade and service-based businesses accounted for more than half the total number of establishments in the U.S. The number of establishments engaged in forestry, fishing, hunting, and agriculture was considerably below the number in 1990—84,811 in 1990 and 26,076 in 2000.

Table 3.69 Demographics, United States

Demographics	2000	1990
Total Population	281,421,906	248,709,873
Sex		
Male	138,053,563	121,239,418
Female	143,368,343	127,470,455
Age		
< 17	72,293,812	63,604,432
18-44	112,183,705	107,492,601
45- 64	61,952,636	46,371,009
> 65	34,991,753	31,241,831
Race		
White	211,460,626	199,686,070
Black or African American	34,658,190	29,986,060
American Indian and Alaska Native	2,475,956	1,959,234
Asian	10,242,998	6,908,638
Native Hawaiian and Other Pacific Islander	398,835	365,024
Other	22,185,301	9,804,847
Household		
Total	105,480,101	91,947,410
Family households	71,787,347	64,517,947
Nonfamily households	33,692,754	27,429,463
Households with individuals under 18 years	38,022,115	
Households with individuals 65 years and over	24,672,708	
Average household size	3	3
Average family size	3	

Housing Occupancy		
Total housing units	115,904,641	102,263,678
Vacant housing units	10,242,540	10,316,268
Housing Tenure		
Owner-occupied housing units	69,815,753	59,024,811
Renter-occupied housing units	35,664,348	32,922,599

Table 3.70 Number of Establishments by Industry, United States, 1990-2000

Industry	2000	1990
Total number of establishments	7,070,048	6,175,563
Forestry, fishing, hunting, and agriculture	26,076	84,811
Mining	23,738	30,359
Construction	709,590	578,375
Manufacturing	354,498	378,087
Wholesale trade	446,237	476,355
Retail trade	1,113,573	1,529,707
Transportation & Utilities	340,935	235,196
Finance, Insurance, Real Estate, Rental, & Leasing	723,904	544,736
Services	3,331,497	2,317,937

Gloucester, Massachusetts

Based on available data, there does not appear to be a large level of HMS landings in Gloucester, Massachusetts. In 1990, the population of Gloucester equaled 28,716; there was a minimal increase of approximately 1,500 individuals between 1990 and 2000 (Table 3.71). The dominant age group in both periods was the 18-44 year old group. The distribution of the population by sex was roughly equal at 50 percent. The major race is white (29,361 individuals in 2000). The number of business establishments increased from 728 to 959 establishments between 1990 and 2000 (Table 3.72). The major industries were retail trade and services. The number of establishments engaged in forestry, fishing, hunting, and agriculture was relatively unchanged—45 in 1990 and 44 in 2000.

Table 3.71 Demographic Profile, Gloucester, MA.

Demographics	2000	1990
Total Population	30273	28716
Sex		
Male	14502	13827
Female	15771	14889
Age		
< 17	6659	6143
18-44	11012	12359
45- 64	7889	5787
> 65	4713	4427

Demographics	2000	1990
Race		
White	29361	28546
Black or African American	186	45
American Indian and Alaska Native	37	28
Asian	218	53
Native Hawaiian and Other Pacific Islander	7	0
Other	464	44
Household		
Total	12592	11550
Family households	7896	7634
Nonfamily households	4696	3916
Households with individuals Under 18 years	3723	
Households with individuals 65 years and over	3379	
Average household size	2.38	
Average family size	3	
Housing Occupancy		
Total housing units	13958	13125
Vacant housing units	1366	1546
Housing Tenure		
Owner-occupied housing units	7523	6687
Renter-occupied housing units	5069	4892

Table 3.72 Number of Establishments, Gloucester, MA.

Industry Code Description	2000	1990
Total number of establishments	959	728
Forestry, fishing, hunting, and agriculture	44	45
Mining	0	1
Construction	86	76
Manufacturing	54	62
Wholesale trade	58	56
Retail trade	127	183
Transportation & Utilities	48	35
Finance, Insurance, Real Estate, Rental, & Leasing	61	52
Services	481	218

New Bedford, Massachusetts

New Bedford, Massachusetts has apparently become a bedroom or commuter community for Providence, Rhode Island and Boston, Massachusetts. It has an extremely long history of commercial fishing, but has experienced considerable declines in the social and economic importance of the commercial seafood industry since the implementation of the Fisheries

Conservation and Management Act, which has substantially affected the groundfish and sea scallop fisheries based in New Bedford. Between 1990 and 2000, New Bedford experienced a decrease in its population of approximately 6,000 individuals—99,922 in 1990 to 93, 768 in 2002 (Table 3.73). The major age group is the 18-44 group. It has a disproportionately high percent of females relative to males—53 percent females and 47 percent males. The major race is white—79 percent. Black or African American constitutes the second largest percentage of the population—4.4 percent. For unknown reasons, the Census lists zero for number of establishments engaged in forestry, fishing, hunting, and agriculture (Table 3.74). In 2000, there were 1,015 business establishments in New Bedford. The major industries, in terms of number of establishments, were retail trade and services, which were followed by manufacturing and construction.

Table 3.73 Demographic Profile, New Bedford, MA.

Demographics	**2000**	**1990**
Total Population	93768	99922
Sex		
Male	44173	46648
Female	49595	53274
Age		
< 17	23327	24980
18-44	35892	39549
45- 64	18901	18031
> 65	15648	17362
Race		
White	73950	87758
Black or African American	4112	3833
American Indian and Alaska Native	579	405
Asian	614	345
Native Hawaiian and other Pacific Islander	44	0
Other	14469	7581
Household		
Total	38178	38646
Family households	24083	26677
Nonfamily households	14095	11969
Households with individuals under 18 years	13036	
Households with individuals 65 years and over	11060	
Average household size	2.40	
Average family size	3.01	
Housing Occupancy		
Total housing units	41511	41760
Vacant housing units	3333	2972
Housing Tenure		
Owner-occupied housing units	16711	17003
Renter-occupied housing units	21467	21785

Table 3.74 Number of Establishments, New Bedford, MA.

Industry Code Description	2000	1990
Total number of establishments	1015	
Forestry, fishing, hunting, and agriculture	0	
Mining	2	
Construction	94	
Manufacturing	98	
Wholesale trade	47	
Retail trade	196	
Transportation & Utilities	36	
Finance, Insurance, Real Estate, Rental, & Leasing	69	
Services	473	

Barnegat Light, New Jersey

Barnegat Light is one of several municipalities on Long Beach Island, which is a large "barrier beach" island (NOAA, 2000). According to the 1990 and 2000 Census, the population increased from 1,160 in 1990 to 1,690 in 2000 (Table 3.75). The age distribution is quite different than many of the other HMS communities; in 2000, approximately 29 percent of the population was less than or equal to 17 years of age; 37 percent were between 18 and 44; 24 percent were between 45 and 64; and 9 percent were 65 or older. The major race is white (96 percent); less than five percent of the population is listed as a race other than white. The year 2000 Census indicates that there were 249 establishments in Barnegat Light (Table 3.76). Services and construction were the major industry in terms of number of establishments. Retail trade ranked third. Seven establishments were listed as engaged in forestry, fishing, hunting, and agriculture.

Table 3.75 Demographic Profile, Barnegat Light, NJ.

Demographics	2000	1990
Total Population	1690	1160
Sex		
Male	869	560
Female	821	634
Age		
< 17	493	317
18-44	630	487
45-64	410	215
> 65	157	141
Race		
White	1617	1134
Black or African American	9	17
American Indian and Alaska Native	2	2
Asian	22	3
Native Hawaiian and other Pacific Islander	0	4

Demographics	2000	1990
Other	40	0
Household		
Total Households	595	383
Family households	443	331
Nonfamily households	152	
Households with individuals under 18 years	250	
Households with individuals 65 years and over	121	
Average household size	2.84	
Average family size	3.31	
Housing Occupancy		
Total housing units	640	496
Vacant housing units	45	72
Housing Tenure		
Owner-occupied housing units	504	348
Renter-occupied housing units	91	76

Table 3.76 Number of Business Establishments, Barnegat Light, NJ

Industry Code Description	2000
Total number of establishments	249
Forestry, fishing, hunting, and agriculture	7
Mining	3
Construction	52
Manufacturing	4
Wholesale trade	11
Retail trade	46
Transportation & Utilities	12
Finance, Insurance, Real Estate, Rental, & Leasing	17
Services	97

Brielle Community, New Jersey

Brielle is a borough in the southernmost region of Monmouth County. In 1990, the population was 4,406 (Table 3.77). Brielle experienced a modest increase in the population in 2000 (from 4,406 to 4,893 individuals). The percent of males and females remained virtually unchanged between 1990 and 2000—48 percent males and 52 percent females. The age distribution is relatively the same for 18-44 (30 percent) and 45-64 (29 percent) year olds; between 1990 and 2000, the percent of the total population 65 or older declined from 20 to 18 percent. Whites accounted for approximately 93 percent of the population in both 1990 and 2000. The percent of other races, however, declined between 1990 and 2000. Census lists 183 business establishments for Brielle (Table 3.78). Retail trade, services, and construction accounted for 147 of the total establishments. One establishment was associated with forestry, fishing, hunting, and agriculture.

Table 3.77 Demographic Profile, Brielle, NJ.

Demographics	2000	1990
Total Population	4893	4406
Sex		
Male	2336	2123
Female	2557	2283
Age		
< 17	1130	870
18-44	1476	1472
45- 64	1419	1195
> 65	868	869
Race		
White	4553	4121
Black or African American	172	240
American Indian and Alaska Native	3	10
Asian	33	26
Native Hawaiian and other Pacific Islander	0	0
Other	132	9
Household		
Total	1938	1735
Family households	1414	1280
Nonfamily households	524	455
Households with individuals under 18 years	640	
Households with individuals 65 years and over	633	
Average household size	2.52	2.54
Average family size	3	
Housing Occupancy		
Total housing units	2123	1986
Vacant housing units	185	251
Housing Tenure		
Owner-occupied housing units	1617	1428
Renter-occupied housing units	321	307

Table 3.78 Number of Business Establishments, Brielle, NJ.

Industry Code Description	2000
Total number of establishments	183
Forestry, fishing, hunting, and agriculture	1
Construction	30
Manufacturing	3
Wholesale trade	7
Retail trade	35
Transportation & Utilities	12
Finance, Insurance, Real Estate, Rental, & Leasing	13
Services	82

Hatteras, North Carolina

Hatteras Township is located in the “Outer Banks” of North Carolina. It consists of the communities of Avon, Buxton, Frisco, and Hatteras. According to the 1990 and 2000 Census’, the population increased very modestly—from 2,584 in 1990 to 2,642 in 2000 (Table 3.79). The number of males and females were approximately equal in 2000 (1,323 males and 1,319 females); they were also nearly equal in 1990 (1,305 males and 1,279 females). The age distribution for individuals 17 or younger and 65 or older did not substantially change between 1990 and 2000; the distribution for the 18-44 and 45-64 year old groups, however, substantially changed (18-44: decreased from 43 to 35 percent between 1990 and 2000; 45-64: increased from 21-30 percent. U.S. Census lists 74 establishments in 2000. Services and transportation accounted for 65 percent of the total number of establishments in 2000 (Table 3.80). Two establishments were listed for forestry, fishing, hunting, and agriculture.

Table 3.79 Demographic Profile, Hatteras, NC.

Demographics	**2000**	**1990**
Total Population	2642	2584
Sex		
Male	1323	1305
Female	1319	1279
Age		
< 17	531	577
18-44	934	1111
45- 64	794	557
> 65	383	339
Race		
White	2605	2567
Black or African American	4	5
American Indian and Alaska Native	2	8
Asian	1	2
Native Hawaiian and other Pacific Islander	2	0
Other	28	2
Household		
Total	1171	1077
Family households	758	738
Nonfamily households	413	339
Households with individuals under 18 years	318	
Households with individuals 65 years and over	279	
Average household size	2.24	2.38
Average family size	2.73	
Housing Occupancy		
Total housing units	2178	1861
Vacant housing units	1007	784
Housing Tenure		
Owner-occupied housing units	902	798
Renter-occupied housing units	269	279

Table 3.80 Number of Business Establishments, Hatteras, NC.

Industry Code Description	2000
Total number of establishments	74
Forestry, fishing, hunting, and agriculture	2
Mining	0
Construction	5
Manufacturing	2
Wholesale trade	2
Retail trade	8
Transportation & Utilities	15
Finance, Insurance, Real Estate, Rental, & Leasing	7
Services	33

Wanchese Community, North Carolina

Wanchese, North Carolina is part of Roanoke Island, which is part of the Outer Banks. Although commercial fishing has historically been a major industry, there has been an increasing emphasis on recreational angling and tourism. Between 1990 and 2000, the population increased from 1,380 to 1,527 individuals (Table 3.81). The population is roughly evenly divided into males and females. The major age group is the 18-44 year old individuals. The most dramatic shafts in the population distribution have been the decline in the percent of individuals 17 or younger and increase in the 45-64 year old group. Whites accounted for the majority of the population in both 1990 and 2000—99 percent in 1990 and 98 percent in 2000. Between 1990 and 2000, the total number of establishments increased from 38 to 56. Manufacturing, which includes fish processing, had the largest number of establishments (9) in 1990 (Table 3.82). In 2000, however, the service sector had the largest number of establishments; manufacturing increased to 10 in 2000. The number of establishments engaged in forestry, fishing, hunting, and agriculture increased from two in 1990 to four in 2000.

Table 3.81 Demographic Profile, Wanchese, NC.

Demographics	2000	1990
Total Population	1527	1380
Sex		
Male	774	696
Female	753	684
Age		
< 17	358	414
18-44	617	582
45- 64	368	229
> 65	184	155
Race		
White	1498	1366
Black or African American	5	1

American Indian and Alaska Native	9	4
Asian	2	5
Native Hawaiian and other Pacific Islander	0	0
Other	13	4
Household		
Total	614	513
Family households	433	371
Nonfamily households	181	142
Households with individuals under 18 years	215	
Households with individuals 65 years and over	137	
Average household size	2.49	2.69
Average family size	2.96	
Housing Occupancy		
Total housing units	690	583
Vacant housing units	76	70
Housing Tenure		
Owner-occupied housing units	465	384
Renter-occupied housing units	149	129

Table 3.82 Number of Business Establishments, Wanchese, NC.

Industry Code Description	2000	1990
Total number of establishments	56	38
Forestry, fishing, hunting, and agriculture	4	2
Mining	0	0
Construction	5	7
Manufacturing	10	9
Wholesale trade	9	6
Retail trade	6	5
Transportation & Utilities	4	2
Finance, Insurance, Real Estate, Rental, & Leasing	0	1
Services	18	6

Dulac, Louisiana

Dulac, Louisiana has historically been a fishing community. It does not, however, have many local residents engaged in the HMS fishery (Wilson et al. 1998). Dulac, however, has typically been the major U.S. port for landings of highly migratory species. It also is an area undergoing major land changes because of global climate warming. Dulac is located in Terrebonne Parish, which is about 15 miles south of Houma. In 1990, the population was 3,273 individuals; it declined to 2,458 in 2000 (Table 3.83). The number of males and females in both 1990 and 2000 were nearly equal; actually, Dulac reported the same number of males as it did females in 2000. Individuals between 18 and 44 comprise the largest proportion of the population; the second age group with the highest population is the 45-64 year olds. Whites comprise the largest proportion of race—49 and 54 percent in, respectively, 1990 and 2000. Blacks or African Americans account for less than 3 percent. American Indian and Native

Alaskans accounted for 48 and 39 percent of the total population, respectively, in 1990 and 2000. As noted in Wilson et al. (1998), however, this latter category is made up mostly of the Houma Indians, which is a tribe not recognized by the U.S. government. Census 2000 lists 42 establishments for 2000 (Table 3.84). The largest numbers of establishments are in services (7), wholesale trade (8), retail trade (7), manufacturing (7), and forestry, fishing, hunting, and agriculture (5).

Table 3.83 Demographic Profile, Dulac, LA

Demographics	**2000**	**1990**
Total Population	2458	3273
Sex		
Male	1229	1615
Female	1229	1658
Age		
≤17	772	1194
18 – 44	884	1326
45 – 64	561	558
≥65	241	195
Race		
White	1327	1617
Black or African American	61	74
American Indian and Alaska Native	969	1573
Asian	12	0
Native Hawaiian and other Pacific Islander	0	0
Other	89	9
Household		
Total Households	768	922
Family households	609	791
Nonfamily households	159	131
Households with individuals under 18 years	359	
Households with individuals 65 years and over	190	195
Average household size	3.20	
Average family size	3.55	
Housing Occupancy		
Total housing units	1063	1182
Vacant housing units	295	272
Housing Tenure		
Owner-occupied housing units	609	729
Renter-occupied housing units	159	181

Table 3.84 Number of Business Establishments, Dulac, LA

Industry Code Description	**2000**
Total number of establishments	42
Forestry, fishing, hunting, and agriculture	5
Mining	3

Construction	2
Manufacturing	7
Wholesale trade	8
Retail trade	7
Transportation & Utilities	1
Finance, Insurance, Real Estate, Rental, & Leasing	2
Services	7

Venice, Louisiana

Venice is another Louisiana community with historical ties to the commercial fishing industry. In the past 20 years, however, oil and recreational fishing have become increasingly important for the economy of Venice. Wilson et al. (1998) note, however, few, if any, Venice residents commercially harvest highly migratory species. Demographic information on Venice is combined with Boothville. Like Dulac, the population of Venice has declined—from 2,743 in 1990 to 2,220 in 2000 (Table 3.85). Males outnumber females by a factor of 1.04 males per female. The number of individuals 17 or younger and 18-44 declined between 1990 and 2000. Individuals aged 45-64 increased from 426 to 491 individuals between 1990 and 2000. Whites account for a majority of the resident population, but blacks or African Americans accounted for 29 percent of the total population in both 1990 and 2000. Census indicates that the number of establishments equaled 105 and 99, respectively, in 1990 and 2000 (Table 3.86). The major industries in terms of number of establishments are services, transportation and utilities, and retail trade. Combined, they account for between 75 and 79 percent of the total number of establishments.

Table 3.85 Demographic Profile, Boothville and Venice, LA

Demographics	**2000**	**1990**
Total Population	2220	2743
Sex		
Male	1133	1403
Female	1087	1340
Age		
< 17	703	989
18-44	860	1155
45- 64	491	426
> 65	166	173
Race		
White	1375	1810
Black or African American	638	783
American Indian and Alaska Native	75	80
Asian	89	62
Native Hawaiian and other Pacific Islander	0	0
Other	43	8
Household		
Total	746	844

Family households	584	694
Nonfamily households	162	150
Households with individuals under 18 years	361	
Households with individuals 65 years and over	137	
Average household size	2.96	3.25
Average family size	3.38	
Housing Occupancy		
Total housing units	933	974
Vacant housing units	187	130
Housing Tenure		
Owner-occupied housing units	650	699
Renter-occupied housing units	96	145

Table 3.86 Number of Business Establishments, Boothville and Venice, LA

Industry Code Description	**2000**	**1990**
Total number of establishments	99	105
Forestry, fishing, hunting, and agriculture	1	2
Mining	4	7
Construction	4	6
Manufacturing	1	0
Wholesale trade	4	8
Retail trade	18	27
Transportation & Utilities	21	21
Finance, Insurance, Real Estate, Rental, & Leasing	7	3
Services	39	31
Miscellaneous		6

Islamorada, Florida

Islamorada has been subject to considerable expansion. In 1990, the population was 1,220 individuals; in 2000, the population was 6,846—429.5 percent over a ten-year period (Table 3.87). The population was roughly half male and half female in both census years. The pattern of age distribution, however, changed between 1990 and 2000. In 1990, the dominant age group was 18 to 44 years; in 2000, the dominant age group was 45-64 years of age. The population is 97 percent white. Between 1990 and 2000, the number of business establishments increased from 220 to 268 (Table 3.88). Services and retail trade accounted for 74 percent of the total number of establishments. The number of business establishments engaged in forestry, fishing, hunting, and agriculture decreased from three in 1990 to zero in 2000.

Table 3.87 Demographic Profile, Islamorada

Demographics	**2000**	**1990**
Total Population	6846	1220
Sex		

Demographics	2000	1990
Male	3626	659
Female	3220	561
Age		
< 17	1062	131
18-44	2192	499
45- 64	2437	365
> 65	1155	225
Race		
White	6630	1179
Black or African American	31	17
American Indian and Alaska Native	15	3
Asian	42	1
Native Hawaiian and other Pacific Islander	6	1
Other	122	19
Household		
Total	3174	646
Family households	1854	319
Nonfamily households	1320	327
Households with individuals under 18 years	619	
Households with individuals 65 years and over	789	
Average household size	2.10	1.86
Average family size	2.63	
Housing Occupancy		
Total housing units	5461	966
Vacant housing units	2287	320
Housing Tenure		
Owner-occupied housing units	2275	394
Renter-occupied housing units	917	252

Table 3.88 Number of Business Establishments, Islamorada

Industry Code Description	2000	1990
Total number of establishments	268	220
Forestry, fishing, hunting, and agriculture	0	3
Mining	0	0
Construction	16	13
Manufacturing	10	6
Wholesale trade	5	4
Retail trade	55	73
Transportation & Utilities	17	10
Finance, Insurance, Real Estate, Rental, & Leasing	23	29
Services	142	82
Miscellaneous		17

Pompano, Florida

Pompano is located near Ft. Lauderdale, Florida. It does have a small commercial, longline fleet. Between 1996 and 2002, landings, mostly tuna and swordfish, generally increased. Landings peaked in 2000 at 313.4 thousand pounds. In 2002, landings were 272.4 thousand pounds. It is a community noted for yacht sales and recreational angling. Between 1990 and 2000, the population increased from 72,411 to 78,191 individuals (Table 3.89). In terms of sex, Pompano has experienced a shift or change in the percentage of the population—it went from a 48/52 percent (male to female) ratio in 1990 to a 49/51 percent ratio in 2000. The percent of the total population by each age group remained relatively constant between 1990 and 2000; the 18-44 group declined by one percent; the 45-64 group increased by two percent; and the 65 and older group decreased by two percent. Census lists 4,964 establishments for Pompano Beach in 2000 (Table 3.90). The industry having the highest number of establishments is services. Construction, wholesale trades, retail trades, and finance and related industries accounted for 47 percent of the total number of establishments.

Table 3.89 Demographic Profile, Pompano

Demographics	**2000**	**1990**
Total Population	78191	72411
Sex		
Male	38565	34829
Female	39626	37852
Age		
< 17	13870	12388
18-44	28487	27001
45- 64	17570	14746
> 65	18264	18276
Race		
White	52989	50666
Black or African American	19897	20625
American Indian and Alaska Native	186	104
Asian	636	393
Native Hawaiian and other Pacific Islander	22	22
Other	4461	601
Household		
Total	35197	32157
Family households	18444	18446
Nonfamily households	16753	13711
Households with individuals under 18 years	7267	
Households with individuals 65 years and over	12942	
Average household size	2.13	2.17
Average family size	2.85	
Housing Occupancy		
Total housing units	44496	42719
Vacant housing units	9299	10562
Housing Tenure		

Demographics	2000	1990
Owner-occupied housing units	22110	20343
Renter-occupied housing units	13087	11814

Table 3.90 Number of Business Establishments, Pompano Beach

Industry Code Description	2000
Total number of establishments	4964
Forestry, fishing, hunting, and agriculture	9
Mining	0
Construction	523
Manufacturing	333
Wholesale trade	578
Retail trade	710
Transportation & Utilities	200
Finance, Insurance, Real Estate, Rental, & Leasing	504
Services	2107

Panama City, Florida

Panama City is located on the Gulf of Mexico in the Florida Panhandle. It is a relatively small city, but does have significant landings of highly migratory species. In 2002, 220.9 thousand pounds of highly migratory species were reported as being landed in Panama City. It is recognized as a major recreational angling center in the Florida Panhandle. Between 1990 and 2000, Panama City experienced a modest increase in its population—from 34,378 in 1990 to 36,417 in 2000 (Table 3.91). Since 1990, there has been an increase in the male population, as a percent of the total population, with a corresponding decrease in the percent of the total population by females—males: from 47 to 49 percent and females: from 53 to 51 percent. The 18-44 year old group is the dominant age group, in terms of percent of total population—39 percent in both 1990 and 2000. The percent of the total population by individuals 17 or younger declined between 1990 and 2000—from 25 to 23 percent. The number of establishments in Panama City equaled 3,324 in 2000 (Table 3.92). Services and retail trade accounted for nearly 67 percent of the total number of establishments. Forestry, fishing, hunting, and agriculture accounted for only 0.5 percent of the total number of establishments.

Table 3.91 Demographic Profile, Panama City (City)

Demographics	2000	1990
Total Population	36417	34378
Sex		
Male	17683	16094
Female	18734	18284
Age		
< 17	8361	8430
18-44	14380	13614
45- 64	7877	6499

Demographics	2000	1990
> 65	5799	5835
Race		
White	26819	25954
Black or African American	7813	7500
American Indian and Alaska Native	231	215
Asian	564	577
Native Hawaiian and Other Pacific Islander	28	6
Other	962	126
Household		
Total	14819	14053
Family households	9039	9127
Nonfamily households	5780	4926
Households with individuals Under 18 years	4570	
Households with individuals 65 years and over	4035	
Average household size	2.3	2.38
Average family size	2.92	
Housing Occupancy		
Total housing units	16548	15928
Vacant housing units	1729	1875
Housing Tenure		
Owner-occupied housing units	8565	8193
Renter-occupied housing units	6254	5860

Table 3.92 Number of Business Establishments, Panama City, FL

Industry Code Description	2000
Total number of establishments	3324
Forestry, fishing, hunting, and agriculture	17
Construction	319
Manufacturing	110
Wholesale Trade	155
Retail Trade	648
Transportation & Utilities	144
Finance, Insurance, Real Estate, Rental, & Leasing	366
Services	1563

3.7 International Trade and Fish Processing

Several regional fishery management organizations (RFMOs) including ICCAT have taken steps to improve collection of international trade data to further international conservation policy for management of HMS. While RFMOs cannot re-create information about stock production based on trade data, this information can be used provisionally to estimate landings related to these fisheries, and to identify potential compliance problems with certain ICCAT management measures. United States participation in HMS related international trade programs, as well as a review of trade activity, is discussed in this section. This section also includes a review of the available information on the processing industry for Atlantic HMS species.

3.7.1 Overview of International Trade for Atlantic HMS

3.7.1.1 Trade Monitoring

The United States collects general trade monitoring data through the U.S. Bureau of Customs and Border Protection (CBP; imports) and the U.S. Bureau of the Census (Census Bureau; exports and imports). These programs collect data on the amount and value of imports and exports categorized under the Harmonized Tariff Schedule (HTS). Many HMS have distinct HTS codes, and some species are further subdivided by product (*e.g.* fresh or frozen, fillets, steaks, etc.). NMFS provides Census Bureau trade data for marine fish products online for the public at http://www.st.nmfs.gov/st1/trade/index.html. Some species, such as sharks, are grouped together, which can limit the value of these data for fisheries management when species specific information is needed. These data are further limited since the ocean area of origin for each product is not distinguished. For example, the HTS code for Atlantic, Pacific, and even Indian Ocean bigeye tuna is the same.

Trade data for Atlantic HMS are of more use as a conservation tool when they indicate the flag of the harvesting vessel, the ocean of origin, and the species for each transaction. Under the authority of ATCA and the Magnuson-Stevens Act, NMFS collects this information while monitoring international trade of bluefin tuna and import of swordfish. NMFS trade monitoring programs will expand in 2005 to include import and export of southern bluefin tuna and frozen bigeye tuna, and swordfish exports. These programs implement ICCAT recommendations and support rebuilding efforts by collecting data necessary to identify nations and individuals that may be fishing in a manner that diminishes the effectiveness of ICCAT fishery conservation and management measures. Copies of all trade monitoring documents associated with these programs may be found on the NMFS HMS Management Division webpage at www.nmfs.noaa.gov/sfa/hms/. These and several other trade monitoring programs established by NMFS for HMS are described in further detail below.

3.7.1.2 Bluefin Tuna Statistical Document

The trade of bluefin tuna is tracked internationally as a result of the ICCAT recommendation to implement the Bluefin Statistical Document (BSD) program (Recommendation 92-01). Japan's support for the program, as a major importer of bluefin tuna, is partially responsible for the success of this program. In the United States, each bluefin tuna is tagged when documented, and for all nations, the BSD travels with each shipment until the final point of destination. This document is used to track both imports and exports of bluefin tuna by ICCAT and other participating nations. If bluefin tuna are exported from, or imported to, the United States, the document is submitted to NMFS as part of the monitoring program. Since 1997, NMFS has also received CBP data (derived from Entry Form 7501) on imports of fresh and frozen bluefin tuna and swordfish on a monthly basis. Comparison of these data with BSD data allow NMFS to identify shipments without BSDs in order to obtain missing data and enforce dealer reporting requirements. In 2003, ICCAT updated the BSD program to include the collection of farming related information on the BSD. In 2005, NMFS will add a re-export certificate to the program and expand it to include southern bluefin tuna as well. Data collected under the BSD program are discussed in Sections 3.7.2 and 3.7.3 addressing U.S. exports and imports of HMS.

3.7.1.3 Swordfish Certificate of Eligibility and Statistical Document

The U.S. Swordfish Certificate of Eligibility (COE) has tracked U.S. imports of swordfish since it was implemented in 1999. In 2005, this program will be replaced by a swordfish statistical document (SD) program similar to the BSD program described above. The swordfish SD program is based on a 2001 ICCAT recommendation (01-22), and will incorporate all of the prior functions of the COE, including the following: ensuring that all imported swordfish are greater than the minimum size of 14.9 kg (33 lb) dw, identifying the flag of the harvesting vessel, and indicating ocean area of origin. Similar to the BSD program, CBP data on swordfish imports is also used to obtain missing data and identify dealers that are not following the required reporting procedures. Once the swordfish SD program is implemented, the swordfish COE will no longer be in effect.

3.7.1.4 Bigeye Tuna Statistical Document

Like the two previous trade monitoring programs, the bigeye tuna SD program will be used to track movement of internationally traded bigeye tuna to its final destination. ICCAT recommended the implementation of a bigeye tuna SD program in 2001 (01-21). The initial program will be implemented in 2005 along with the swordfish SD, and will apply only to frozen bigeye tuna. It may be expanded to cover fresh product in the future. Other RFMOs including the Inter-American Tropical Tuna Commission and the Indian Ocean Tuna Commission have also adopted bigeye SD programs.

3.7.1.5 Yellowfin Tuna Form 370

Since the late 1970's, NOAA Form 370 has been used to document imports of yellowfin tuna and other species of tuna for the purpose of protecting dolphins in the Eastern Tropical Pacific Ocean. Form 370 is filed with other documents necessary for entry of yellowfin tuna into the United States. The form is *not* required for fresh tuna, animal food, or canned petfood made from tuna.

3.7.1.6 Billfish Certificate of Eligibility

The Billfish Certificate of Eligibility is used to ensure that any billfish being imported or sold in the United States (outside of the Pacific states) is not of Atlantic origin. In the Pacific states, billfish involved in trade are presumed to be of Pacific origin. Any statement that contains the specified information is sufficient to meet the certificate of eligibility documentation requirements; it is not necessary to use the form available from NMFS or to submit the form to NMFS upon final disposition of the billfish.

3.7.2 U.S. Exports of HMS

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

3.7.2.1 Atlantic and Pacific Bluefin Tuna Exports

As discussed in the previous section, NMFS collects detailed export data on Atlantic and Pacific bluefin tuna through the BSD program. Table 3.93 gives bluefin tuna export data for exports from the United States. Recent decreases in Atlantic BFT exports since 1999 could in part be a result of the growing U.S. market for high-quality fresh bluefin tuna meat. In 2003, exports also could have been impacted by a reduction in U.S. landings.

Table 3.93 United States exports of Atlantic and Pacific bluefin tuna, 1999 – 2003. Source: NMFS BSD Program, NERO, and Census Bureau.

Year	Commercial Landings (NERO, MT)	Atlantic BFT Exports (BSD, MT)	Pacific BFT Exports (BSD, MT)	Total U.S. Exports (BSD, MT)	Total U.S. Exports (Census Bureau, MT)	Value of U.S. Exports (Census Bureau, $ million)
1999	876.0	735.6	95.7	831.3	1,183.3	9.37
2000	903.9	758.0	76.0	834.0	1,044.9	11.20
2001	987.0	812.3	67.0	879.0	1,020.0	10.70
2002	964.0	730.4	0.1	730.5	922.5	10.74
2003	756.9	572.2	2.1	574.3	998.2	11.36

Note: most exports of Pacific BFT were in round (whole) form, although some exports were of dressed and gilled/gutted fish; Atlantic exports included whole, dressed, and product forms (dw); data are preliminary and subject to change.

3.7.2.2 Other Tuna Exports

Export data for other tunas is gathered by the Census Bureau, and includes trade data for albacore, yellowfin, bigeye, and skipjack tuna from all ocean areas of origin combined. Behind bluefin tuna, albacore tuna accounts for the next most valuable tuna export from the United States (Table 3.94). Comparing the last five years, the amount and value of exported albacore was greatest for the year 2003. In general, the amount and value of albacore exports appears to be on the rise. During the time period covered by this table, the annual amount and value of frozen exports exceeded fresh exports for every year.

Table 3.94 **Amount and value of United States exports of albacore tuna, 1999 – 2003 (Census Bureau data) and U.S. landings of North Atlantic albacore tuna (*2004 U.S. National Report to ICCAT*).**

Year	Atlantic Landings (mt ww)	U.S. Exports					
		Fresh		Frozen		Total for all Exports	
		MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
1999	317	517	1.01	2,743	5.52	3,260	6.54
2000	407	263	0.78	2,747	6.04	3,010	6.83
2001	324	1,542	3.62	4,609	9.83	6,151	13.45
2002	488	680	1.50	4,483	8.28	5,163	9.78
2003	448	893	1.86	9,731	18.85	10,624	20.71

Note: Landings may be calculated on a calendar or fishing year basis; exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change .

Table 3.95 and Table 3.96 show U.S. Atlantic landings and U.S. exports from all ocean areas combined for yellowfin and skipjack tuna, respectively. Yellowfin exports were greater and more valuable than exports for skipjack or bigeye tuna (Table 3.97). Export of fresh yellowfin product exceeded the value of frozen yellowfin product for all years except 2001. Fresh product exports were highest in 2002 and 2003. The amount and value of exported fresh and frozen skipjack tuna has varied over the five year period covered in Table 3.96, without any discernable trends. Exports and landings of skipjack in 1999 far exceeded values for the following four years.

Table 3.95 **Amount and value of United States exports of yellowfin tuna, 1999 - 2003 (Census Bureau data) and U.S. landings of Atlantic yellowfin tuna (*2004 U.S. National Report to ICCAT).***

Year	Atlantic Landings (mt ww)	U.S. Exports					
		Fresh		Frozen		Total for all Exports	
		MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
1999	7569	947	2.09	390	.84	1,337	2.93
2000	7051	412	1.12	406	.76	819	1.89
2001	6703	290	.71	834	1.45	1,124	2.17
2002	5653	1,612	2.37	420	.81	2,033	3.19
2003	7701	1,792	2.93	176	.68	1,968	3.62

Note: Landings may be calculated on a calendar or fishing year basis; exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change.

Table 3.96 **Amount and value of United States exports of skipjack tuna, 1999 - 2003 (Census Bureau data) and U.S. landings of West Atlantic skipjack tuna (*2004 U.S. National Report to ICCAT*).**

Year	Atlantic Landings (mt ww)	U.S. Exports					
		Fresh		Frozen		Total for all Exports	
		MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
1999	152	88	.20	1,092	.89	1,181	1.10
2000	44	7	.01	83	.05	91	.06
2001	69	82	.15	34	.04	117	.20
2002	66	66	.17	11	.01	77	.18
2003	77	81	.22	0	0	81	.22

NOTE: Landings data may have been ported on either a fishing year or calendar year basis; exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change.

Bigeye tuna exports and Atlantic landings are given in Table 3.97. No data were available for bigeye tuna exports in 2001, and prior to 2001 bigeye exports were included in the category of unspecified tuna. Annually, bigeye tuna exports include more fresh than frozen product, and increased from 2002 to 2003.

Table 3.97 **Amount and value of United States exports of bigeye tuna, 1999 - 2003 (Census Bureau data) and U.S. landings of Atlantic bigeye tuna (*2004 U.S. National Report to ICCAT*).**

Year	Atlantic Landings (mt ww)	U.S. Exports					
		Fresh		Frozen		Total for all Exports	
		MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
2002	600	95	.22	8	.01	104	.24
2003	483	255	.47	40	.08	295	.56

NOTE: Landings data may have been reported on either a fishing year or calendar year basis; exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change.

3.7.2.3 Shark Exports

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

Table 3.98 indicates the magnitude and value of shark exports by the United States from 1999-2003. The reduction in shark fin exports from 2001 to 2002 and 2003 is of particular note, as is the increase in the unit value of shark fins during this time period. Decreases in shark fin trade are expected to be the result of the Shark Finning Prohibition Act, which was enacted in December of 2000 and implemented by final rule in February 2002.

Table 3.98 Amount and value of U.S. shark product exports from 1999-2003. Source: Census Bureau.

Yr	Shark Fins Dried			Non-specified Fresh Shark			Non-specified Frozen Shark			Total for all Exports	
	MT	US$ (million)	$/KG	MT	US$ (million)	$/KG	MT	US$ (million)	$/KG	MT	US$ (million)
1999	106	.91	8.54	270	.48	1.80	155	.46	2.97	532	1.86
2000	365	3.51	9.62	430	.78	1.82	345	.81	2.35	1140	5.10
2001	335	3.16	9.44	332	.54	1.64	634	2.34	3.69	1301	6.04
2002	123	3.46	28.00	968	1.47	1.52	982	2.34	2.38	2,075	7.28
2003	45	4.03	87.79	837	1.31	1.57	592	1.34	2.28	1,476	6.70

NOTE: exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change.

3.7.2.4 Re-exports of Atlantic HMS

Re-exports are products that have been imported into the United States and then exported to another country, with or without further processing in the United States. For most HMS species, re-export activity is a small fraction of export activity, and well below reference points of 1000 mt and/or one million dollars annually. Exceptions to this include fresh yellowfin tuna re-exports which were valued at $1.5 million in 2003 and fresh and frozen yellowfin valued at $1.1 million in 2002 (Census Bureau data). In 2003, dried shark fin re-exports reached a five year maximum value of $1.6 million (34 mt).

Bluefin tuna re-exports also reached a five year maximum in 2003 at 1,184 mt valued at $18.94 million (Census Bureau data), which exceeded the amount of bluefin exports for the year, for the first time in the history of the BSD program (K. Goldsmith, pers. com.). To date, the BSD program has tracked considerably fewer 2003 BFT re-exports (Table 3.99) than indicated by Census Bureau data; however, the trend of re-exports exceeding exports remains. In 2002, Census Bureau data identified bluefin re-exports of 167 mt dw valued at a value of $2.39 million. Further investigation into BSD program data found that the recent increases in bluefin re-exports reflects the growth of the Mexican farming/mariculture industry which exports product to the U.S. for re-export to Japan.

3.7.2.5 Summary of Atlantic HMS Exports

Nationally, the value of HMS exports is dominated by bluefin tuna, albacore tuna, and shark products (from all ocean areas combined). In 2003, fresh and frozen products of these three species accounted for 12,674 mt dw or 0.6 percent of the 1,814,370 mt dw of fresh and frozen seafood products imported into the United States, as indicated in *Fisheries of the United*

States, 2003. The value of these HMS products accounted for $38.77 million, out of a national total of $9.8 billion. Swordfish are not exported from the United States.

National trade data are of limited value for describing trade of Atlantic HMS. For example, Atlantic landings of albacore tuna (commercial and recreational) for 2003 were reported in the *2004 U.S. National Report to ICCAT* as 448 mt (Table 3.94). National trade data show that over 10,000 mt of albacore were exported, which indicates that the majority of albacore exports were Pacific Ocean product. Trade tracking programs such as the BSD program, swordfish certificate of eligibility, and bigeye tuna statistical document programs are much more useful for describing the international disposition of Atlantic HMS.

3.7.3 U.S. Imports of Atlantic HMS

All import shipments must be reported to the U.S. Bureau of 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 CBP bonded warehouses. "Consumption" import data reflect the actual entry of commodities originating outside the United States into U.S. channels of consumption. As discussed previously, CBP data for certain products are provided to NMFS for use in implementing the BSD program and swordfish certificate of eligibility program. U.S. Census Bureau import data are used by NMFS as well.

3.7.3.1 Bluefin Tuna Imports

United States imports and re-exports of bluefin tuna for 1999 through 2003, as reported through both CBP and BSD program data, are shown in Table 3.99. The difference in import numbers between the CBP and BSD data may be explained by a lack of knowledge and compliance with the BSD program by importers, especially those on the Pacific coast.

The recent rise in the popularity of sashimi in the United States has generated increased imports of bluefin tuna, and dealers are reporting an expanded domestic market for both locally-caught and imported raw tuna. As discussed previously, the large amount of re-exports in 2003 resulted from the increase in importation of farmed bluefin from Mexico and re-exportation to Japan.

Table 3.99 Imports of Atlantic and Pacific bluefin tuna into the United States. Source: NMFS BSD program and CBP data.

YEAR	NMFS BSD Program		U.S. CBP Data	
	Imports (MT)	Re-exports (MT)	Imports (MT)	VALUE (US$ million)
1999	411.9	16.6	558.6	3.02
2000	361.9	99.3	453.4	7.67
2001	512.9	7.0	532.3	8.21

YEAR	NMFS BSD Program		U.S. CBP Data	
	Imports (MT)	Re-exports (MT)	Imports (MT)	VALUE (US$ million)
2002	529.3	94.1	605.0	9.75
2003	649.9	691.0	780.3	11.67

NOTE: most imports of BFT were in dressed form, and some were round and gilled/gutted fish, fillets or belly meat (dw); data are preliminary and subject to change.

3.7.3.2 Other Tuna Imports

Since January 2001, CBP has been collecting species specific import information for bigeye tuna (grouped to include all ocean areas). Previously, bigeye tuna had been included under general tuna imports. Amount and value of bigeye tuna imports have been gradually increasing over the last three years, as shown in Table 3.100.

Table 3.100 Imports of bigeye tuna into the United States from all ocean areas combined: 2001-2003. Source: Census Bureau data.

Year	Fresh		Frozen		Total for all Imports	
	MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
2001	4,684	25.70	135	.32	4,820	26.02
2002	6,312	39.84	319	.70	6,632	40.55
2003	7,312	51.01	560	1.48	7,872	52.49

NOTE: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change.

Annual yellowfin tuna imports into the United States for all ocean areas combined are given in Table 3.101. As indicated by the data in this section, yellowfin tuna are imported in the greatest quantity of all fresh and frozen tuna products. The annual value of yellowfin imports has increased gradually from 1999-2003. The total annual amount of product imported has remained fairly consistent, with a slight dip in 2000.

Table 3.101 Imports of yellowfin tuna into the United States from all ocean areas combined: 1999-2003. Source: Census Bureau data.

Year	Fresh		Frozen		Total for all Imports	
	MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
1999	11,756	63.04	9,411	24.90	21,168	87.94
2000	13,153	70.27	3,290	18.73	16,443	89.00
2001	15,563	85.50	3,967	23.45	19,530	108.95
2002	15,966	95.22	4,619	29.31	20,585	124.53

Year	Fresh		Frozen		Total for all Imports	
	MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
2003	13,157	83.39	5,579	39.67	20,878	133.71

NOTE: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change.

Imports of fresh albacore product from all ocean areas have decreased somewhat since 1999 while imports of frozen product have decreased dramatically over the last five years, with the greatest reduction occurring between 2002 and 2003 (Table 3.102). In 1999, albacore imports were valued at $144 million while in 2003 the value dropped to approximately $30 million. Products in airtight containers are not included in these data.

Table 3.102 Imports of albacore tuna into the United States from all ocean areas combined: 1999-2003. Source: Census Bureau data.

Year	Fresh		Frozen		Total for all Imports	
	MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
1999	1,776	5.39	63,284	139.50	65,060	144.89
2001	1,843	6.42	51,001	127.33	52,845	133.76
2002	1,107	3.85	40,428	105.58	41,536	109.43
2003	1,296	4.81	11,903	24.49	13,200	29.31
2004	1,062	4.12	12,569	25.90	13,632	30.02

NOTE: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change.

Skipjack tuna imports into the United States are comprised mainly of frozen product (Table 3.103). Like albacore tuna, the amount and value of skipjack imports have also decreased dramatically since 1999. The amount of product imported fell from over 8,000 mt dw in 1999 to 224 mt dw in 2003. Likewise, the value of these products during this time period fell from $6.3 million to $0.43 million.

Table 3.103 Imports of skipjack tuna from all ocean areas combined into the United States: 1999-2003. Source: U.S. Census Bureau data.

Year	Fresh		Frozen		Total for all Imports	
	MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
1999	0	0	8,238	6.30	8,238	6.30
2000	0	0	904	2.75	904	2.75
2001	<1	<0.01	377	0.61	378	0.62
2002	<1	0.01	824	0.83	825	0.84

Year	Fresh		Frozen		Total for all Imports	
	MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
2003	0	0	224	0.43	224	0.43

NOTE: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change.

3.7.3.3 Swordfish Imports

Table 3.104 summarizes swordfish import data collected by NMFS' Swordfish Import Monitoring Program for the 2003 calendar year. According to these data, most swordfish imports were Pacific Ocean product. For Atlantic product, the most imports came from Brazil (62 percent), followed by Uruguay (15 percent). CBP data located at the bottom of the table reflect a larger amount of imports than reported by the import monitoring program, and may be used by NMFS staff to follow up with importers, collect certificates of eligibility that have not been submitted, and enforce dealer reporting requirements.

Table 3.104 Swordfish import data for the 2003 calendar year collected under the NMFS Swordfish Import Monitoring Program.

Flag of Harvesting Vessel	Ocean of Origin				Total* (mt dw)
	Atlantic (mt dw)	Pacific (mt dw)	Indian (mt dw)	Not Provided (mt dw)	
Not Provided	0.3	0.7	16.5	0.0	17.5
Australia	0.0	2.4	0.0	0.0	2.4
Barbados	2.4	0.0	0.0	0.0	2.4
Brazil	698.6	0.0	0.0	0.0	698.6
Canada	62.2	0.0	0.0	0.0	62.2
Chile	0.0	664.6	0.0	0.0	664.6
Costa Rica	1.7	161.4	0.0	0.6	163.7
Ecuador	0.0	233.8	0.0	0.0	233.8
El Salvador	0.0	10.1	0.0	0.0	10.1
Fiji Island	0.0	53.6	0.0	0.0	53.6
Grenada	17.0	0.0	0.0	0.0	17.0
Indonesia	0.0	0.0	12.7	0.0	12.7
Malaysia	0.0	44.7	13.3	36.0	93.9
Mexico	0.0	249.4	0.0	0.0	249.4
Namibia	23.0	0.0	0.0	1.7	24.7
New Zealand	0.0	143.5	0.0	0.0	143.5
Nicaragua	0.0	0.3	0.0	0.0	0.3
Panama	0.0	1,065.9	0.0	0.0	1,065.9
Philippines	0.0	13.4	0.0	0.0	13.4
R.S.A.	0.0	0.0	79.3	0.0	79.3
Seychelles	0.0	0.0	0.1	1.1	1.2
Singapore	0.0	72.6	64.2	0.0	136.7
South Africa	94.1	0.0	251.3	0.0	345.4
Sri Lanka	0.0	0.0	0.0	8.8	8.8

Flag of Harvesting Vessel	Ocean of Origin				Total* (mt dw)
	Atlantic (mt dw)	Pacific (mt dw)	Indian (mt dw)	Not Provided (mt dw)	
Taiwan	0.9	407.6	1,198.8	0.0	1,607.3
Tonga	0.0	3.1	0.0	0.1	3.3
Trinidad & Tobago	31.1	0.0	0.0	0.0	31.1
Uruguay	170.0	0.0	0.0	0.0	170.0
Venezuela	20.5	0.0	0.0	0.0	20.5
Vietnam	0.0	23.4	0.0	0.0	23.4
Total Reported by COES	1,121.7	3,150.7	1,636.1	48.3	5,956.8
Total Imports Reported to CBP					13,855.0
Total Not Reported by COEs					7,898.2

* COE Data as of 7/11/04

Table 3.105 indicates the amount and value of swordfish product imports by the United States from 1999-2003, as recorded by the U.S. Census Bureau, for all ocean areas combined. The amount of each product imported per year and annual totals for product and value were fairly consistent for the time period covered.

Table 3.105 Imported swordfish products by year: 1999-2003. Source: Census Bureau data.

Year	Fresh (MT)		Frozen (MT)			Total for all Imports	
	Steaks	Other	Fillets	Steaks	Other	MT	US$ (million)
1999	81	8,595	4,377	401	386	13,842	71.70
2000	161	8,626	4,833	524	167	14,314	85.57
2001	71	8,982	3,814	710	119	13,697	81.89
2002	195	9,726	4,156	956	677	15,711	88.26
2003	147	8,079	3,929	433	560	13,150	75.62

NOTE: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change.

3.7.3.4 Shark Imports

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

The United States may be an important transshipment port for shark fins, which may be imported wet, processed and then exported dried. It is also probable that U.S.-caught shark fins are exported to Hong Kong or Singapore for processing, then imported back into the United States for consumption by urban-dwelling Asian Americans (Rose, 1996).

Table 3.106 summarizes Census Bureau data on shark imports for 1999 through 2003. Imports of fresh shark products have decreased by approximately 50 percent since 1999 while imports of shark fins have decreased by over 80 percent since 1999. The 2004 ICCAT recommendation addressing the practice of shark finning may reduce imports even further in the near future. Over the last 5 years, the overall annual amount and value of shark imports decreased fairly consistently year after year to equal approximately half the 1999 amount and value in 2003.

Table 3.106 **U.S. imports of shark products from all ocean areas combined: 1999-2003.** Source: Census Bureau data.

Year	Shark Fins Dried		Non-specified Fresh Shark		Non-specified Frozen Shark		Total For All Imports	
	MT	US$ (million)	MT	US$ (million)	MT	US$ (million)	MT	US$ (million)
1999	59	2.10	1,095	2.03	105	.62	1,260	4.76
2000	66	2.35	1,066	1.85	90	.57	1,222	4.79
2001	50	1.08	913	1.38	123	1.78	1,087	4.25
2002	39	1.02	797	1.24	91	1.09	928	3.35
2003	11	.11	515	.72	100	.99	626	1.82

NOTE: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change.

3.7.3.5 Summary of U.S. Imports of Atlantic HMS

The import data in this section show that many HMS species are part of a valuable import market. As discussed previously regarding exports, most data documenting imports include products harvested from many ocean areas, not just the Atlantic Ocean. However, the BSD program and Swordfish Import Monitoring Program provide information specifically about product harvested from the Atlantic Ocean and imported into the United States.

In 2003, the U.S. domestic market for swordfish supported a domestic fishery of 4,281 mt dw worth $18.18 million and an active import market of 13,150 mt dw valued at $75.62 million. Despite recent increases in the U.S. quota of North Atlantic swordfish (in compliance with ICCAT rebuilding programs), swordfish from the Pacific and Indian Oceans are expected to continue to supply the lucrative U.S. swordfish market during the near future.

3.7.4 The Use of Trade Data for Conservation Purposes

Trade data has been used in a number of ways to support international management of HMS. When appropriate, the SCRS uses trade data on bluefin tuna, swordfish, bigeye tuna, and yellowfin tuna that are submitted to ICCAT as an indication of landings trends. These data can then be used to augment estimates of fishing mortality rates (F) of these species, which improves scientific stock assessments. In addition, these data can be used to assist in assessing compliance with ICCAT recommendations and identify those countries whose fishing practices diminish the effectiveness of ICCAT conservation and management measures. On numerous occasions, ICCAT has adopted recommendations to address the lack of compliance with management programs for the bluefin tuna, bigeye tuna, and North and South Atlantic swordfish fisheries by ICCAT members. Penalties for non-compliance or fishing in a manner that diminishes the effectiveness of ICCAT conservation measures may include catch limit reductions and, if necessary, trade restrictive measures.

For example, an analysis of vessel sighting and Japanese BSD data led to the 1996 determination that fishing vessels from the countries of Panama, Honduras, and Belize were fishing in a manner that diminished the effectiveness of the bluefin tuna rebuilding program, and resulted in a 1996 ICCAT recommendation for sanctions against the import of bluefin tuna from these countries (

Table 3.107). In 1999, ICCAT recommended this trade restriction on Panama be lifted as a result of the Government of Panama's efforts to substantially reduce fishing vessel activities deemed inconsistent with ICCAT measures. In 2001, Honduras became a member of ICCAT, and based on this change in status and Honduras' significant efforts to control its fleet and address ICCAT concerns, ICCAT recommended lifting trade sanctions for bluefin tuna. The bluefin sanction for Belize was lifted by ICCAT in 2002.

In another example, import data from 1997–1999 revealed significant Atlantic bluefin tuna exports from Equatorial Guinea despite the fact that a zero catch limit was in effect for that country. The government of Equatorial Guinea had not responded to ICCAT inquiries and had reported no bluefin tuna catch data to ICCAT, and as a result ICCAT recommended trade restrictions as a penalty for non-compliance. Based on information regarding improved compliance presented by Equatorial Guinea at the 2004 ICCAT meeting, the trade sanction has been lifted by ICCAT.

As indicated in

Table 3.107, approximately 80 percent of the trade sanctions recommended by ICCAT since 1996 have been lifted. In fact, only trade sanctions for Bolivia and Georgia remain in effect. Thus, the imposition of trade sanctions seems to be an effective measure for ensuring that countries involved in international trade operate in a manner consistent with ICCAT recommended conservation programs. As illustrated above, the data obtained by monitoring international trade in HMS is instrumental in the development of ICCAT trade restrictions. In 2004, the European Union submitted an ICCAT working paper discussing the expanding role of statistical document programs in conservation and enforcement efforts. An intersessional meeting is scheduled for mid-2005 to further address this issue and consider any necessary program modifications in light of the new uses for these programs.

Table 3.107 **Summary and current status of ICCAT recommended trade sanctions for bluefin tuna, swordfish, and bigeye tuna implemented by the United States.**

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

3.7.5 Overview of the Processing Industry for Atlantic HMS

Understanding the harvesting and processing sectors is essential when analyzing world trade in highly migratory fish species. The processing related entities that depend on Atlantic HMS are as diverse as the species and products themselves. Processing techniques range from the simple dressing and icing of swordfish at sea, to elaborate grading and processing schemes for bluefin tuna, to processing shark fins. Like all other seafood, HMS are perishable and may pose health hazards if not handled properly. Products range from those having a long shelf-life, such as swordfish, to highly perishable species like yellowfin tuna. Improperly handled yellowfin tuna can produce histamine, swordfish and sharks may contain high levels of mercury, and shark meat requires careful handling due to the high concentrations of urea in the body of the shark. Processing companies are aware of these characteristics and their costs of doing business vary accordingly to protect consumers. The Food and Drug Administration (FDA) works closely with NOAA Office of Law Enforcement to monitor incoming shipments of seafood, including highly migratory species.

FDA's Seafood Hazard Analysis Critical Control Point (HACCP) program implemented regulations that require processors of fish and fishery products to operate preventive control systems to ensure human food safety. Among other things, processors must effectively maintain the safety of their products, systematically monitor the operation of critical control points to ensure that they are working as they should, and keep records of the results of that monitoring. Processors must also develop written HACCP plans that describe the details and operation of their HACCP systems. Each processor may tailor its HACCP system to meet its own circumstances. The best way for FDA to determine whether a processor is effectively operating a HACCP system is by inspecting the processor. Federal review of monitoring and other records generated by the HACCP system is a critical component of an inspection because it allows the inspector to match records against the practices and conditions being observed in the plant and it discourages fraud. NMFS works closely with the FDA, in support of the HACCP program.

Just as HACCP plans vary between processors, transportation of the seafood to market also varies widely from the direct domestic sale of some shark or swordfish meat by a fisherman to a restaurant (carried by truck) to the quick, and sometimes complicated, export of bluefin tuna from fisherman to dealer to broker to the Japanese auction (carried by a commercial airline carrier). Frozen swordfish and tunas are often brought to the United States by overseas shipping companies and sharks and other products may be exported from the United States, processed overseas, and imported in a final product form.

It is unknown how many U.S. companies depend on HMS fisheries, other than the registered dealers who buy fish directly from U.S. fishermen and/or who import bluefin tuna or swordfish. The proportion of those companies that depend solely on Atlantic HMS versus those that handle other seafood and/or products is also unknown. This section provides a summary of the most recent trade data that NMFS has analyzed, as well as a brief description of the processing and trade industries employed in transitioning Atlantic HMS from the ocean to the plate.

3.7.5.1 Processing and Wholesale Sectors

NMFS has limited quantitative information on the processing sector, including the amount of HMS products sold in processed forms. In addition, knowledge regarding the utilization of Atlantic HMS is largely limited to the major or most valuable product forms, such as export quality bluefin tuna.

Much of the processing of export-quality Atlantic bluefin tuna occurs onboard the vessel harvesting the fish, which serves to maximize fish quality. Bluefin are gutted and bled, and protected from the heat and sunlight by immersion in ice or an icy brine. Upon landing, bluefin are immediately graded and prepared for export to Japan’s fresh fish market. The fish are either refrigerated or exported immediately in insulated crates or “coffins” filled with ice or icepacks.

Other Atlantic tunas, especially bigeye tuna, are frequently shipped fresh to Japan in dressed form. Swordfish are sold fresh and frozen in dressed form and as processed products (*e.g.*, steaks and fillets). The utilization of sharks is also not well known since trade statistics frequently do not indicate product forms such as skins and leather, jaws, fishmeal and fertilizer, liver oil, and cartilage (Rose, 1996). Domestically-landed sandbar and blacktip shark meat may be sold to supermarkets and processors of frozen fish products. NMFS continues to work with industry to collect information specific to U.S. and foreign processing of Atlantic HMS to better track markets, conserve stocks, and manage sustainable fisheries.

The U.S. processing and wholesale sectors are dependent upon both U.S. and international HMS fisheries. Individuals involved in these businesses buy the seafood, cut it into pieces that transform it into a consumer product, and then sell it to restaurants or retail outlets. Employment varies widely among processing firms. Often employment is seasonal unless the firms also process imported seafood or a wide range of domestic seafood. The majority of firms handle other types of seafood and are not solely dependent on HMS. Other participants in the commercial trade sector include brokers, freight forwarders, and carriers (primarily commercial airlines, trucking, and shipping companies). Swordfish, tunas, and sharks are important commodities on world markets, generating significant amounts in export earnings in recent years.

NMFS has recently observed that many seafood dealers that buy and sell highly migratory species and other seafood products have expanded their operations into internet-powered trading platforms specifically designed to meet the needs of other seafood professionals. Through these platforms, interested parties can conduct very detailed negotiations with many trading partners simultaneously. Buyers and sellers can bargain over all relevant elements of a market transaction (not just price) and can specify the product needed to buy or sell in detail, using seafood-specific terminology. The platforms are purportedly very easy to use because they mimic the pattern of traditional negotiations in the seafood industry. NMFS expects that the use of the internet will continue to change the way HMS trade occurs in the future.

3.8 Bycatch, Incidental Catch, and Protected Species

The Magnuson-Stevens Act defines bycatch as fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic and regulatory discards. Fish is defined as finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds. As a result, other species such as seabirds, sea turtles, and marine mammals are considered "incidental catch." This chapter provides an overview of the actions NMFS has taken to reduce bycatch and incidental catch and any results of those actions. Additional species and fishery specific data have already been presented in Section 3.4.

3.8.1 Bycatch Reduction Strategy

The NMFS 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. Additional details on bycatch and bycatch reduction measures can be found in Section 3.5 of the Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks (NMFS, 1999), in Regulatory Amendment 1 to the 1999 FMP (NMFS, 2000), in Regulatory Adjustment 2 to the 1999 FMP (NMFS, 2002), and in Amendment 1 to the 1999 FMP (NMFS, 2003a). In addition, an HMS Bycatch Reduction Implementation Plan was developed in late 2003 which identifies priority issues to be addressed in the following areas: 1) monitoring, 2) research, 3) management, and 4) education/outreach. Individual activities in each of these areas were identified and new activities may be added or removed as they are addressed or identified.

3.8.1.1 Bycatch Reporting Methodology

NMFS utilizes self-reported data (HMS logbook program and the supplemental discard report form in the reef fish, snapper-grouper, king and Spanish mackerel, and shark logbook programs), at-sea observer data, and survey data (recreational fishery dockside and telephone surveys) to produce bycatch estimates. These data are collected with respect to fishing gear type and have been presented by gear type in this report in prior sections. The number and location of discarded fish are recorded, as is the disposition of the fish, *i.e.*, released alive vs. released dead. Post-release mortality of HMS is accounted for in stock assessments to the extent that the data allow.

Effective August 1, 2001, selected Federal permit holders in the Gulf of Mexico reef fish, South Atlantic snapper-grouper, king and Spanish mackerel, and shark fisheries must report all species and quantities of discarded (alive and dead) sea turtles, marine mammals, birds, and finfish on a supplemental discard form. A randomly selected sample of 20 percent of the vessels with active permits in the above fisheries is selected each year. The selection process is stratified across geographic area (Gulf of Mexico and South Atlantic), gear (handline, longline, troll, gillnet, and trap), and number of fishing trips (ten or less trips and more than 11 trips). Of the 3,359 vessels with Federal permits in these fisheries in 2003, a total of 452 vessels were selected to report. Of the 3,517 vessels with Federal permits in the fisheries in 2004, 428 were selected to report.

In addition to existing programs in some commercial HMS fisheries, NMFS has the authority to use observers to collect bycatch information from commercial vessels fishing for tunas and voluntarily, from vessels with HMS charter/headboat or angling permits. Many of these vessels already complete Federal and/or state logbooks (e.g., the NMFS Northeast Region Vessel Trip Report (VTR) Program), in which they are required to report all fishing information, including that for HMS. NMFS is currently evaluating various alternatives to increase logbook coverage of vessels fishing for HMS, such as selecting additional HMS vessels to report in logbooks or be selected for observer coverage, and is investigating alternatives for electronic reporting.

NMFS submits annual data (Task I) to ICCAT on mortality estimates (dead discards). These data are used and included in the SAFE report to evaluate bycatch trends in HMS fisheries.

NMFS collects recreational bycatch data from dockside surveys (the Large Pelagic Survey and the Marine Recreational Fishery Statistics Survey) for the rod and reel fishery and uses these data to estimate dead discards. However, bluefin and yellowfin tuna are currently the only species for which expanded estimates are currently made. Statistical problems associated with small sample size remain an obstacle to estimating bycatch in the rod and reel fishery. New survey methodologies are being developed, however, especially for the Charter/Headboat sector of the rod and reel fishery, which should help to address some of the problems in estimating bycatch for this fishery. In addition, selecting rod and reel vessels for logbook reporting (as discussed above) would provide bycatch information for this gear type.

3.8.1.2 Marine Mammals

NMFS relies on both fishery-dependent and fishery-independent data to produce stock assessments for marine mammals in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. The draft stock assessment reports are typically published around January and final reports are typically published in the Fall. Final 2003 and draft 2004 stock assessment reports are available and can be obtained on the web at:
http://www.nmfs.noaa.gov/prot_res/PR2/Stock_Assessment_Program/sars.html

The final 2004 MMPA List of Fisheries was published on August 10, 2004 (69 FR 48407). The Atlantic Ocean, Caribbean, and Gulf of Mexico large pelagics longline fishery is classified as Category I (frequent serious injuries and mortalities incidental to commercial fishing) and the southeastern Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities). The following Atlantic HMS fisheries are classified as Category III (remote likelihood or no known serious injuries or mortalities): Atlantic tuna purse seine; Gulf of Maine and mid-Atlantic tuna, shark and swordfish, hook-and-line/harpoon, southeastern mid-Atlantic and Gulf of Mexico shark bottom longline, and mid-Atlantic, southeastern Atlantic, and Gulf of Mexico pelagic pelagic hook-and-line/harpoon fisheries. For additional information on the fisheries categories and how fisheries are classified, see http://www.nmfs.noaa.gov/prot_res/readingrm/Fisheries/2004_final_LOF.pdf.

NMFS continues to investigate serious injuries to marine mammals as they are released from fishing gear. In April 1999, NMFS held a joint meeting of the three regional scientific review groups to further discuss the issue. NMFS is continuing to develop marine mammal serious injury guidelines and until these are published, NMFS will apply the criteria listed by the review groups to make determinations for specific fisheries. The current BiOps for HMS fisheries have resulted in a conclusion of non-jeopardy for marine mammals.

3.8.1.3 Sea Turtles

NMFS has taken several steps in the past few years to reduce sea turtle bycatch and bycatch mortality in domestic longline fisheries. On March 30, 2001, NMFS implemented via interim final rule requirements for U.S. flagged vessel with pelagic longline gear on board to have line clippers and dipnets to remove gear on incidentally captured sea turtles (66 FR 17370). The requirements to carry and to use the line clippers and dipnets have been in place since October 13, 2000 (65 FR 60889). Specific handling and release guidelines designed to minimize injury to sea turtles were also implemented.

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

On July 13, 2001 (66 FR 36711), NMFS published an emergency rule that closed the NED to pelagic longline fishing (effective July 15, 2001), modified how pelagic longline gear may be deployed effective August 1, 2001, and required that all longline vessels (pelagic and bottom) post safe handling guidelines for sea turtles in the wheelhouse. On December 13, 2001 (66 FR 64378), NMFS extended the emergency rule for 180 days through July 8, 2002. On July 9, 2002, NMFS published a final rule (67 FR 45393) that closed the Northeast Distant (NED) Area to pelagic longline fishing. As part of the Reasonable and Prudent Alternative, the BiOp required NMFS to conduct an experiment with commercial fishing vessels to test fishery-specific gear modifications to reduce sea turtle bycatch and mortality. This rule required the length of any gangions to be 10% longer than the length of any floatline on vessels where the length of both is less than 100 meters; prohibited stainless steel hooks; and required gillnet vessel operators and observers to report any whale sightings and required gillnets to be checked every 0.5 to 2 hours.

The experimental program required in the BiOp was initiated in the NED area in 2001 in cooperation with the U.S. pelagic longline fleet that historically fished on the Grand Banks fishing grounds. The goal of the experiment was to test and develop gear modifications that might prove useful in reducing the incidental catch and post-release mortality of sea turtles captured by pelagic longline gear while striving to minimize the loss of target catch. The experimental fishery had a three year duration and utilized 100% observer coverage to assess the effectiveness of the measures. The gear modifications tested in 2001 included blue dyed squid and moving gangions away from floatlines. In 2002, the NED experimental fishery examined the effectiveness of mackerel bait, circle hooks, and reduced daylight soak time. The experiment tested various hook and bait type combinations in 2003.

On November 28, 2003, based on the conclusion of the three-year NED experiment, and preliminary data that indicated that the Atlantic pelagic longline fishery may have exceeded the ITS in the June 14, 2001 BiOp, NMFS published an NOI to prepare an SEIS to assess the potential effects on the human environment of proposed alternatives and actions under a proposed rule to reduce sea turtle bycatch (68 FR 66783). A new BiOp for the Atlantic pelagic longline fishery was completed on June 1, 2004. The BiOp concluded that long-term continued operation of the Atlantic pelagic longline fishery, authorized under the 1999 FMP is not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or olive ridley sea turtles; and is likely to jeopardize the continued existence of leatherback sea turtles.

NMFS implemented additional regulations for the Atlantic pelagic longline fishery to further reduce the mortality of incidentally caught sea turtles. These measures include requirements on hook type and size, bait type and the use of dipnets, lineclippers and safe handling guidelines for the release of incidentally caught sea turtles. NMFS is working to export this new technology to pelagic longline fleets of other nations to reduce global sea turtle bycatch.

Internationally, the United States is pursuing sea turtle conservation through international, regional, and bilateral organizations such as ICCAT, the Asia Pacific Fisheries Commission, and FAO Committee on Fisheries (COFI). The United States intends to provide a summary report to FAO for distribution to its members on bycatch of sea turtles in U.S. longline fisheries and the research findings as well as recommendations to address the issue. At the 24th session of COFI, the United States distributed a concept paper for an international technical experts meeting to evaluate existing information on turtle bycatch, to facilitate and standardize collection of data, to exchange information on research, and to identify and consider solutions to reduce turtle bycatch. COFI agreed that an international technical meeting could be useful despite the lack of agreement on the specific scope of that meeting. The United States has developed a prospectus for a technical workshop to address sea turtle bycatch in longline fisheries as a first step. Other gear-specific international workshops may be considered in the future.

3.8.1.4 Seabirds

The National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries was released in February 2001. The NPOA for Seabirds 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 2 years. NMFS, in collaboration with the appropriate Councils and in consultation with the U.S. Fish and Wildlife Service, will prepare an annual report on the status of seabird mortality for each longline fishery. The United States is committed to pursuing international cooperation, through the Department of State, NMFS, and U.S. Fish and Wildlife Service, to advocate the development of National Plans of Action within relevant international fora. The HMS Management Division intends to meet with longline fishery participants and other members of the public in the future to discuss possibilities for complying with the intent of the plan of action. Because interactions appear to be relatively low in Atlantic HMS fisheries, the adoption of immediate measures is unlikely.

3.8.2 U.S. Atlantic pelagic longline fishery

Observer data from 1992 through 2003 indicate that bycatch is relatively low in the U.S. Atlantic pelagic longline fishery (Table 3.108). Since 1992, a total of 116 seabird interactions have been observed, with 79 seabirds observed killed. Approximately 80 to 100 active U.S. pelagic longline vessels currently operate in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea.

Observed bycatch has ranged from one to 18 seabirds observed dead per year and zero to 15 seabirds observed released alive per year from 1992 through 2003. Half of the seabirds observed were not identified to species (n = 58). Of those seabirds identified, gulls represent the largest group (n = 29), followed by greater shearwaters (n = 19), and northern gannets (n = 8) (Table 3.109). Greater shearwaters experienced the highest mortality (100 percent), followed by gulls (76 percent), and unidentified seabirds (67 percent). Northern gannets had the lowest mortality rate (12 percent).

Preliminary estimates of expanded seabird bycatch and bycatch rates from 1995-2002, varied by year and species with no apparent pattern (Table 3.110). The estimated number of all seabirds caught and discarded dead ranged from zero to 468 per year, while live discards ranged from zero to 292 per year. The annual bycatch rate of birds discarded dead ranged from zero to 0.0486 birds per 1,000 hooks while live discards ranged from zero to 0.0303 birds per 1,000 hooks.

3.8.3 Atlantic bottom longline shark fishery

A single pelican has been observed killed from 1994 through 2003. The pelican was caught in January 1995 off the Florida Gulf Coast (between 25^{o} 18.68 N, 81^{o} 35.47 W and 25^{o} 19.11 N, 81^{o} 23.83 W) (G. Burgess, University of Florida, Commercial Shark Fishery Observer Program, pers. comm., 2001). No expanded estimates of seabird bycatch or catch rates are available for the bottom longline fishery.

Table 3.108 Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery, 1992-2003. Source: NMFS, 2004.

Year	Month	Area	Type of Bird	Number observed	Status
1992	10	MAB	GULL	4	dead
1992	10	MAB	SHEARWATER GREATER	2	dead
1993	2	SAB	GANNET NORTHERN	2	alive
1993	2	MAB	GANNET NORTHERN	2	alive
1993	2	MAB	GULL BLACK BACKED	1	alive
1993	2	MAB	GULL BLACK BACKED	3	dead
1993	11	MAB	GULL	1	alive
1994	6	MAB	SHEARWATER GREATER	3	dead
1994	8	MAB	SHEARWATER GREATER	1	dead
1994	11	MAB	GULL	4	dead
1994	12	MAB	GULL HERRING	7	dead
1995	7	MAB	SEA BIRD	5	dead
1995	8	GOM	SEA BIRD	1	dead
1995	10	MAB	STORM PETREL	1	dead
1995	11	NEC	GANNET NORTHERN	2	alive
1995	11	NEC	GULL	1	alive
1997	6	SAB	SEA BIRD	11	dead
1997	7	MAB	SEA BIRD	1	dead
1997	7	NEC	SEA BIRD	15	alive
1997	7	NEC	SEA BIRD	6	dead
1998	2	MAB	SEA BIRD	7	dead
1998	7	NEC	SEA BIRD	1	dead
1999	6	SAB	SEA BIRD	1	dead
2000	6	SAB	GULL LAUGHING	1	alive
2000	11	NEC	GANNET NORTHERN	1	dead
2001	6	NEC	SHEARWATER GREATER	7	dead
2001	7	NEC	SHEARWATER GREATER	1	dead
2002	7	NEC	SEABIRD	1	dead
2002	8	NED	SHEARWATER GREATER	1	dead
2002	8	NED	SEABIRD	1	dead
2002	9	NED	SHEARWATER GREATER	3	dead
2002	9	NED	SEABIRD	3	alive
2002	9	NED	SHEARWATER SPP	1	dead
2002	10	NED	GANNET NORTHERN	1	alive
2002	10	NED	SHEARWATER SPP	1	dead
2002	10	NED	SEABIRD	2	dead
2002	10	MAB	GULL	3	alive
2002	10	MAB	GULL	1	dead
2002	11	MAB	GULL	3	dead
2003	1	GOM	SEABIRD	1	alive
2003	8	NED	SEABIRD	1	dead
2003	9	MAB	SEABIRD	1	dead

MAB - Mid Atlantic Bight, SAB - South Atlantic Bight, NEC - Northeast Coastal, GOM - Gulf of Mexico, NED - Northeast Distant Water

Table 3.109 **Status of Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery, 1992-2003.** Source: NMFS PLL fishery observer program (POP) data.

Species	Release Status		Total	Percent Dead
	Dead	Alive		
GULLS (incl. Blackback, Herring, Laughing, and unid. gull)	22	7	29	75.9%
UNIDENTIFIED SEABIRD	39	19	58	67.2%
GREATER SHEARWATER	18	0	18	100%
SHEARWATER SPP	2	0	2	100%
NORTHERN GANNET	1	7	8	12.5%
STORM PETREL	1	0	1	100%
ALL SEABIRDS	83	33	116	71.6%

Table 3.110 Preliminary expanded estimates of seabird bycatch and bycatch rates (D=discarded dead and A=discarded alive) in the U.S. Atlantic pelagic longline fishery, 1995-2002. Source: NMFS, 2004.

	1995		1996		1997		1998		1999		2000		2001		2002	
Species	**D**	**A**	**D**	**A**	**D**	**A**	**D**	**A**	**D**	**A**	**D**	**A**	**D**	**A**	**D**	**A**
Unid. seabirds	134	0	0	0	468	292	155	0	14	0	0	0	0	0	3	3
Gulls	0	15	0	0	0	0	0	0	0	0	0	18	0	0	14	83
Shearwaters	0	0	0	0	0	0	0	0	0	0	0	0	210	0	6	0
Northern gannet	0	30	0	0	0	0	0	0	0	0	11	0	0	0	0	1
Storm petrel	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All seabirds	170	44	0	0	468	292	155	0	14	0	11	18	210	0	23	87
Total hooks set	10,182,297		10,310,708		9,637,807		8,019,183		7,901,789		7,975,529		7,563,951		7,150,231	
Bycatch rate	0.0167	0.0044	0	0	0.0486	0.0303	0.0194	0	0.0017	0	0.0014	0.0023	0.0278	0	0.0032	0.0121

3.8.4 Bycatch of Highly Migratory Species in Other Fisheries

NMFS is concerned about bycatch mortality of Atlantic HMS in any Federal or state-managed fishery which captures them. NMFS plans to address bycatch of these species in the appropriate FMPs through coordination with the responsible management body. For example, capture of swordfish and tunas incidental to squid trawl operations is addressed in the Squid, Mackerel, and Butterfish FMP. Capture rates of tunas in coastal gillnet fisheries are being explored through issuance of exempted fishing permits and reporting requirements. NMFS continues to solicit bycatch data on HMS from all state, interjurisdictional, and federal data collection programs. NMFS supports development of an interstate management plan for coastal sharks by the Atlantic States Marine Fisheries Commission to protect sharks caught incidentally in state-managed fisheries.

3.8.4.1 Squid Mid-Water Trawl

U.S. squid trawl fishermen, using mid-water gear, landed 8.6 mt ww of yellowfin tuna, skipjack tuna, albacore tuna, bigeye tuna, and swordfish in 2003 incidental to the squid, mackerel, and butterfish trawl fishery (Table 3.111). Bycatch of HMS in other trawl fisheries may be included as a portion of the overall reported trawl landings in Table 3.111. Landings decreased from 2002 for bigeye tuna and albacore, and increased slightly for yellowfin and skipjack tuna. Swordfish landings increased by 50 percent but remain at a very low level relative to the directed fishery landings. A retention limit of five swordfish per trip allows squid trawl fishermen with swordfish limited access permits to land some of the swordfish that are encountered, although regulatory discards still occur.

Table 3.111 Atlantic HMS Landed (mt ww) Incidental to Trawl Fisheries, 1998-2003. Source: NMFS, 2004.

Species	1998	1999	2000	2001	2002	2003
Yellowfin tuna	0.7	4.1	1.76	2.7	0.3	2
Skipjack Tuna	0.2	1.0	<0.05	0.2	<0.05	0.5
Bigeye Tuna	0.5	1.2	1.7	0.4	0.5	<0.05
Albacore	2.4	0.4	<0.05	0.0	0.3	<0.05
Swordfish	5.9	7.5	10.9	2.5	3.9	6.0
Total	9.7	14.2	14.43	5.8	4.8	8.6

3.8.4.2 Menhaden Purse Seine

In the menhaden purse seine fishery, sharks were caught incidentally in approximately 30 percent of the purse seine sets observed (deSilva *et al.*, 2001). Ten species of sharks were identified with blacktip sharks being the most common species. Approximately 20 percent of the sharks were not identified to species. An estimated 30,000 sharks were taken in this fishery annually in 1994 and 1995. At the time of release, 75 percent of sharks were dead, 12 percent were disoriented, and eight percent were healthy. The odds of observing shark bycatch was highest in April and May. Stomach analyses of sharks suggest that their occurrence in the fishery is probably the result of sharks preying on gulf menhaden (deSilva *et al*., 2001). No new data are available at this time.

Industry workers in this fishery employ a fish excluder device to reduce the retention of sharks and other large species (Rester and Condrey, 1999). In addition, a recently introduced hose cage modification may prove to be effective in reducing shark bycatch. These devices vary in effectiveness and no standards exist for such bycatch reduction measures in this fishery. In addition, there are currently no reporting requirements for takes of sharks in the menhaden purse seine fishery. Recent estimates of large coastal sharks discarded in this fishery range from 24,000-26,200 individuals (Cortés, 2005).

3.8.4.3 Shrimp Trawl Fishery

Shark bycatch in the shrimp trawl fishery consists mainly of sharks too small to be highly valued in the commercial market. As a result, few sharks are retained. Bycatch estimates of LCS in this fishery have been generated and were reviewed in the most recent LCS assessment (Cortés *et al*. 2002). Cortés (2002) estimated bycatch in the south Atlantic shrimp trawl fishery (North Carolina, South Carolina, Georgia, and Florida) for Atlantic sharpnose, bonnethead, and finetooth sharks based on expansion by fishing effort. Annual estimates of bycatch ranged from zero to almost six million sharks from 1992 to 1997 (Table 3.112) (Cortés, 2002). The 2002 SCS assessment, included estimates of SCS bycatch because they were likely to exceed the actual landings for those species (Cortés, 2002). However, requirements for turtle excluder devices in this fishery have probably resulted in less bycatch because sharks are physically excluded from entering the gear.

Table 3.112 Expanded estimates of bycatch (number of fish) of bonnethead, Atlantic sharpnose, and finetooth sharks in the U.S. south Atlantic shrimp trawl fishery based on within stratum expansion by effort as trips by fishing year. Source: Cortés, 2002.

Year	Estimated number of trips	Bonnethead	Atlantic sharpnose	Finetooth
1992-93	20,181	53,674	1,753,829	0
1993-94	20,445	0	5,873,333	447,495
1995-96	23,333	34,378	0	0
1996-97	19,320	38,517	358,457	0

Bycatch of the SCS complex in the Gulf of Mexico shrimp trawl fishery consists mainly of Atlantic sharpnose and bonnethead sharks (Cortés, 2002). Estimates of the bycatch of SCS in this fishery ranged from 3.2 to 1.3 million sharks per year from 1972-2000 (Table 3.113).

Table 3.113 **Estimates (in thousands of individuals and pounds dressed weight) of the bycatch of small coastal sharks (as a complex and by species) in the shrimp trawl fishery operating in the Gulf of Mexico.** Source: S. Nichols, NMFS Pascagoula Lab., pers. comm. as cited in Cortés, 2002.

Year	All SCS (numbers)	All SCS (lbs dw)	Atlantic sharpnose (numbers)	Atlantic sharpnose (lbs dw)	Bonnethead (numbers)	Bonnethead (lbs dw)
1972	1,575	1,500	1,051	1,010	468	371
1973	1,579	1,580	831	842	620	525
1974	1,903	1,899	1,508	1,407	420	400
1975	2,055	1,997	1,587	1,473	347	313
1976	2,193	2,209	1,706	1,632	456	436
1977	2,187	2,142	1,507	1,457	520	427
1978	2,223	2,156	1,799	1,625	367	370
1979	2,829	2,754	2,384	2,254	388	341
1980	2,591	2,436	2,148	1,933	368	330
1981	2,081	2,007	1,830	1,649	242	252
1982	2,281	2,203	1,850	1,661	302	310
1983	2,138	2,193	1,856	1,821	255	250
1984	1,551	1,509	1,277	1,191	232	230
1985	1,767	1,796	1,451	1,442	260	249
1986	2,222	2,234	1,464	1,519	624	506
1987	3,216	3,123	2,636	2,392	516	519
1988	2,535	2,272	1,959	1,664	421	404
1989	2,116	2,216	1,632	1,713	336	286
1990	1,981	2,069	1,503	1,507	489	431
1991	2,350	2,322	1,784	1,756	365	323
1992	2,759	2,879	1,968	1,997	494	459
1993	2,226	2,213	1,710	1,626	416	400
1994	2,197	2,243	1,586	1,591	395	347
1995	2,401	2,362	1,806	1,636	311	299
1996	2,923	2,457	2,069	1,644	519	428
1997	2,883	2,926	1,732	1,681	486	439
1998	2,657	2,410	1,662	1,494	376	329
1999	1,282	1,257	906	848	218	198
2000	1,282	1,257	906	848	218	198

3.8.5 Analyses of the Effectiveness of the Time/Area Closures

3.8.5.1 Objectives

During the past several years, NMFS has implemented several time/area closures in the Atlantic Ocean and Gulf of Mexico to reduce discards and bycatch. During the formulation of the rules implementing these measures, NMFS utilized logbook data to estimate the effect of the closures on discarded species and target catch. Based on the nature of the data and the nature of the fishery, it is difficult to assess with any certainty what the impacts will be prior to a closure. For example, as a result of a time/area closure, fishermen may shift their effort to a different area, they may change gear, or they may leave the fishery. These decisions could change the estimates. Thus, the most effective way to assess the impact is to examine the data available in the time after a closure has been implemented.

Since most of the time/area closures were implemented in 2001 or earlier, data from 2001-2003 provide the basis for evaluating the effectiveness of the closures. The following provides an overview of the effectiveness of the closures in reducing discards and bycatch and in maintaining target catch for the entire fishery. These analyses are ongoing and additional data will be collected and reviewed annually.

3.8.5.2 Methods

Data used in these analyses were taken from the Pelagic Longline Logbook database administered through the NMFS Southeast Region. These analyses are based on self-reported data and have not been compared to observer data. Catch data for each species and the number of hooks were summarized on a monthly basis by year. The monthly and annual Atlantic wide totals were calculated for each species as well. A reference period of 1997-1999 was chosen for the initial comparisons to examine the effect of closures implemented in 2000-2001. The percent change in 2001-2003 from 1997-1999 in numbers kept and discarded were calculated for the entire Atlantic (Table 3.114). The reported distribution of hooks set by area each year was examined to evaluate trends and/or shifts in fishing effort. In addition, the reported number of fish kept and discarded in the MAB and NEC was compared to the reported numbers for all other areas combined in order to evaluate the effectiveness of the June Mid-Atlantic Bight closure.

Future analyses will include an economic analysis to estimate the impact on individual fishermen, in an attempt to evaluate changes in fishing behavior as a result of implementation of the closures.

3.8.5.3 Results

U.S. Domestic Fishery (Atlantic Ocean and Gulf of Mexico)

The cumulative effects of the individual area closures were examined by comparing the 2001-2003 catch and discards to the average for 1997-1999 throughout the entire U.S. Atlantic fishery. Changes in the numbers of fish caught and discarded were compared to the predicted values from Regulatory Amendment 1 to the 1999 FMP (NMFS, 2000). Overall effort, expressed as the number of hooks set, declined by 15 percent (Table 3.114). Declines were noted for both the numbers of kept and discards of all species examined including swordfish, tunas, sharks, billfish, and sea turtles. The number of reported discards of swordfish, bluefin, and bigeye tuna, pelagic sharks, dolphin, wahoo, blue and white marlin, sailfish, and spearfish all declined by more than 30 percent. The reported discards of blue and white marlin declined by about 50 percent and sailfish discards declined by almost 75 percent. The reported number of sea turtles caught and released declined by almost 28 percent.

The reported declines in swordfish kept and discarded, large coastal sharks kept and discarded, and dolphin kept were similar to the predicted values developed for Regulatory Amendment 1 (Table 3.114 and Table 3.115). Reported discards of bluefin tuna, pelagic sharks, all billfish with the exception of spearfish for which no predicted change was developed in Regulatory Amendment 1, and total BAYS kept all declined more than the predicted values.

Change in Effort Distribution

The distribution of effort in the Atlantic pelagic longline fishery based on reported number of hooks set does not indicate a major shift in fishing effort as a result of the time/area closures (Table 3.116). The average number of hooks reported set in 2001-2003 by area was compared to the average for 1997-1999. Declines in effort were reported for the majority of the areas. However, effort did increase in the Gulf of Mexico, by a little more than eight percent. This increase may be a result of a shift in effort due to the Florida East Coast closure. Reported effort also increased in the Sargasso (SAR) where little activity had been reported prior to 2002. This increase may also represent a shift in effort due to the closure off east Florida as well as the seasonal Charleston Bump closure. Effort in the South Atlantic Bight, where the Charleston Bump closure is located, declined by 30 percent from the 1997-1999 level. Effort in the MAB and NEC also declined, 26 and 31 percent, respectively. The June Mid-Atlantic Bight closure area is located within these two areas which probably contributed to the decline.

Table 3.114 Total number of swordfish, bluefin tuna, yellowfin tuna, bigeye tuna, total BAYS (bigeye, albacore, yellowfin and skipjack tuna), reported landed or discarded in the U.S. Atlantic pelagic longline fishery, 1997-2003. Source: Pelagic Longline Logbook (PLL) data.

Year	Number of hooks set (x1000)	Swordfish kept	Swordfish discards	Bluefin Tuna kept	Bluefin Tuna discards	Yellowfin Tuna kept	Yellowfin Tuna discards	Bigeye Tuna kept	Bigeye Tuna discards	Total BAYS kept	Total BAYS discards
1997	9,637.8	68,691	20,433	178	681	74,035	1,847	21,405	1,611	102,706	4,223
1998	8,019.2	70,310	23,234	231	1,320	54,662	2,628	19,259	874	81,610	3,932
1999	7,901.8	67,120	20,558	263	604	83,619	2,885	22,467	906	114,438	4,384
2000	7,975.5	62,978	17,074	235	737	72,385	1,769	13,678	344	94,136	2,944
2001	7,564.0	47,560	13,993	177	348	52,337	1,798	18,216	554	80,466	3,757
2002	7,150.2	49,320	13,035	178	585	59,255	1,635	13,826	277	79,917	2,552
2003	7,008.1	51,835	11,829	273	881	50,817	1,987	7,473	337	63,321	2,763
1997-99	8,519.6	68,707	21,408	224	868	70,772	2,453	21,044	1,130	99,585	4,180
2001-03	7,240.8	49,572	12,952	209	605	54,136	1,807	13,172	389	74,568	3,024
% dif	-15.0	-27.9	-39.5	-6.7	-30.3	-23.5	-26.3	-37.4	-65.6	-25.1	-27.7
Pred [1]		-24.6	-41.5		-1.0					-5.2	
Pred [2]		-13.0	-31.4		10.7					10.0	

[1] Predicted change without effort redistribution (Table 7.19, Regulatory Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks FMP; NMFS, 2000)
[2] Predicted change with effort redistribution (Table 7.19, Regulatory Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks FMP; NMFS, 2000)

Table 3.115 **Total number of pelagic sharks, large coastal sharks, dolphin (mahi mahi), and wahoo reported landed or discarded and number of billfish (blue and white marlin, sailfish, spearfish) and sea turtles caught and discarded in the U.S. Atlantic pelagic longline fishery, 1997-2003. Source: PLL data.**

Year	Pelagic Sharks kept	Pelagic Shark discards	Large Coastal Sharks kept	Large Coastal Shark discards	Dolphin kept	Dolphin discards	Wahoo kept	Wahoo discards	Blue Marlin discards	White Marlin discards	Sailfish discards	Spearfish discards	Sea Turtles
1997	5,078	81,518	13,217	7,762	62,770	1,201	4,503	90	2,290	2,422	1,735	380	267
1998	3,717	44,516	6,401	5,470	23,503	298	5,253	305	1,295	1,506	843	103	886
1999	2,894	28,967	6,382	5,442	31,536	320	5,136	128	1,253	1,969	1,407	151	631
2000	3,065	28,046	7,896	6,973	29,125	292	4,193	46	1,443	1,261	1,091	78	271
2001	3,460	23,813	6,478	4,836	27,586	325	3,068	62	635	848	356	137	424
2002	2,987	22,828	4,077	3,815	30,384	185	4,188	32	1,175	1,438	379	148	465
2003	3,037	21,705	5,326	4,813	29,372	451	3,919	126	595	809	277	108	399
1997-99	3,896	51,667	8,667	6,225	39,270	606	4,964	174	1,613	1,966	1,328	211	595
2001-03	3,161	22,782	5,294	4,488	29,114	320	3,725	73	802	1,032	337	131	429
% dif	-18.9	-55.9	-38.9	-27.9	-25.9	-47.2	-25	-58.1	-50.3	-47.5	-74.6	-37.9	-27.9
Pred [1]	-9.5	-2.0	-32.1	-42.5	-29.3				-12.0	-6.4	-29.6		-1.9
Pred [2]	4.1	8.4	-18.5	-33.3	-17.8				6.5	10.8	-14.0		7.1

[1] Predicted change without effort redistribution (Table 7.19, Regulatory Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks FMP; NMFS, 2000)
[2] Predicted change with effort redistribution (Table 7.19, Regulatory Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks FMP; NMFS, 2000)

Table 3.116 Reported distribution of hooks set by area, 1995-2003 (CAR=Caribbean, GOM=Gulf of Mexico, FEC=Florida East Coast, SAB=South Atlantic Bight, MAB=Mid-Atlantic Bight, NEC=Northeast Coastal, NED=Northeast Distant, SAR=Sargasso, NCA=North Central Atlantic, and TUNS=Tuna North & Tuna South). Source: PLL data.

Year	CAR	GOM	FEC	SAB	MAB	NEC	NED	SAR	NCA	TUNS	Total
1995	688,754	2,662,303	646,841	852,230	2,394,364	1,072,433	765,485	16,430	785,727	297,730	10,182,297
1996	651,673	3,530,127	574,284	1,588,944	1,039,594	1,137,229	588,782	87,285	501,674	611,116	10,310,708
1997	473,500	3,402,436	784,920	946,220	1,203,832	1,226,406	688,344	21,640	209,946	680,563	9,637,807
1998	333,766	3,003,054	667,592	719,125	1,319,860	883,059	503,579	3,500	247,457	338,191	8,019,183
1999	177,628	3,619,402	709,809	769,738	1,276,008	587,225	338,719	17,795	117,031	288,434	7,901,789
2000	259,369	3,648,345	700,505	810,272	1,032,173	610,103	544,549	10,959	236,864	122,390	7,975,529
2001	196,733	3,453,533	467,155	725,951	1,092,030	865,531	316,559	11,437	256,383	178,639	7,563,951
2002	169,562	3,577,753	495,245	435,231	1,011,138	550,096	456,668	104,165	215,121	135,252	7,150,231
2003	137,315	3,808,066	494,113	537,660	692,196	448,438	576,727	112,787	132,205	68,600	7,008,107
1997-99	328,298	3,341,631	720,774	811,694	1,266,567	898,897	510,214	14,312	191,478	435,729	8,519,593
2001-03	167,870	3,613,117	485,504	566,281	931,788	621,355	449,985	76,130	201,236	127,497	7,240,763
% dif	-48.9	8.1	-32.6	-30.2	-26.4	-30.9	-11.8	431.9	5.1	-70.7	-15.0

June Mid-Atlantic Bight Closure

The June Mid-Atlantic Bight (MAB) closure area was implemented as part of the implementation of the HMS consolidated regulations (64 FR 29090, May 28, 1999) in order to decrease bluefin tuna bycatch in the Atlantic pelagic longline fishery. The closure spans a portion of two reporting areas, the MAB and the NEC. The reported effort, catch and discards were combined for these two areas to evaluate the effectiveness of the closure (Table 3.117). The reported effort, catch, and discards for the remaining areas were also combined and presented.

It appears that bluefin tuna discards in the MAB & NEC have been reduced considerably since the implementation of the June closure in 1999 (Table 3.117). Reported discards of bluefin tuna prior to implementation of the closure ranged from 558 to almost 2,800 per year. Since 1999, the number of bluefin tuna reported discarded has remained below 500 per year. The number of swordfish kept in the MAB & NEC has increased since the closure was implemented while the number of billfish discarded has declined.

Table 3.117 Number of bluefin tuna (BFT), swordfish (SWO), sharks (PEL-pelagic; LCS-Large Coastal Sharks), billfish, and turtles kept and/or discarded in the Mid-Atlantic Bight (MAB) and Northeast Coastal (NEC) areas combined versus all other areas as reported in the pelagic logbook data, 1995-2003. Source: PLL Data.

			SPECIES									
AREA	**YEAR**	**Hooks set (x1000)**	**BFT kept**	**BFT discards**	**SWO kept**	**SWO discards**	**PEL shark kept**	**PEL shark discards**	**LCS kept**	**LCS discards**	**Billfish discards**	**Turtle interactions**
MAB & NEC	1995	3,466.8	95	2,755	5,824	5,382	2,647	36,395	7,717	2,121	1,454	80
	1996	2,176.8	74	1,596	3,108	871	2,456	37,638	6,433	1,975	1,179	20
	1997	2,430.2	71	558	6,247	3,642	3,043	40,085	6,423	928	800	52
	1998	2,209.2	93	1,156	9,659	4,943	2,136	27,889	1,837	907	399	54
	1999	1,863.2	70	335	8,168	4,308	1,727	12,468	1,974	746	816	174
	2000	1,892.5	29	437	11,168	3,756	2,229	15,689	4,796	1,433	262	39
	2001	1,957.6	45	200	10,559	3,981	2,506	8,903	4,383	991	307	69
	2002	1,561.2	18	380	10,704	4,212	2,324	7,005	2,331	1,207	311	40
	2003	1,140.6	67	471	10,752	2,951	2,135	6,875	2,761	1,384	169	42
All Other Areas (non-MAB/NEC)	1995	6,715.5	137	96	66,795	24,367	3,007	53,787	17,469	6,121	6,165	1,047
	1996	8,137.3	124	105	70,168	23,514	2,978	47,388	13,815	8,246	6,445	472
	1997	7,210.6	107	123	62,470	16,801	2,037	41,433	6,794	6,834	6,029	215
	1998	5,816.3	138	164	60,651	18,291	1,581	16,627	4,564	4,563	3,348	832
	1999	6,038.6	193	269	58,952	16,250	1,167	16,499	4,408	4,696	3,964	457
	2000	6,333.2	209	382	54,319	13,743	970	15,038	3,106	5,563	3,633	241
	2001	5,606.4	132	148	37,001	10,012	954	14,910	2,095	3,845	1,669	355
	2002	5,589	160	205	38,616	8,823	663	15,823	1,746	2,608	2,829	425
	2003	5,867.5	206	410	41,083	8,878	902	14,830	2,565	3,429	1,620	357

Prohibition of Live Bait in the Gulf of Mexico

Regulatory Amendment 1 to the 1999 FMP prohibited the use of live bait on pelagic longline gear in the Gulf of Mexico due to concerns over the incidental bycatch of billfish. Based on reported data, the number of hooks set with live bait or a combination of live and dead bait in the Gulf of Mexico decreased from 22.7 percent in 2000, to less than 0.1 percent in 2003 (Table 3.118). However, the number of hooks set with no bait type specified increased from zero in 1999-2001 to 3.7 percent in 2003. The reported number of hooks set in the Gulf of Mexico has increased in recent years. The reported effort in 2003 represents an increase of 13 percent from 2000. Further analysis of the effectiveness of the live bait prohibition in the Gulf of Mexico pelagic longline fishery will continue.

Table 3.118 Comparison of the number of hooks set in the Gulf of Mexico with dead or live bait, or a combination of both baits, 1999-2003 (numbers in parentheses are percent of the total number of hooks set in the Gulf of Mexico). Source: PLL data.

Bait Type	Year				
	1999	2000	2001	2002	2003
Dead	2,335,845 (70.9)	2,598,083 (77.3)	3,176,493 (98.3)	3,494,577 (97.63)	3,668,687 (96.27)
Live	372,162 (11.3)	259,256 (7.7)	5,500 (0.2)	750 (0.02)	1,514 (0.04)
Both	584,473 (17.8)	505,582 (15.0)	49,250 (1.5)	13,115 (0.37)	1,000 (0.03)
Unknown	0	0	0	71,011 (1.98)	139,569 (3.66)
Total	3,292,480	3,362,921	3,231,243	3,579,453	3,810,770

3.8.5.4 Conclusions

It appears as though the time/area closures and live bait prohibition in the Gulf of Mexico have been relatively successful at reducing bycatch in the HMS pelagic longline fishery. Reported discards of all species of billfish have all declined. The reported number of turtles caught, swordfish discarded, bluefin tuna discarded, and pelagic and large coastal shark discards have also declined. However, the reported number of target species kept such as swordfish and BAYS tuna, have decreased more than was predicted. This is contrary to the other objective of the regulations to minimize the reduction in target catch. However, all of these results should be considered preliminary. As described in the methods section of this subsection, NMFS will continue to analyze these measures as additional data becomes available and also examine the effects of ongoing regulatory change over time.

3.8.6 Smalltooth Sawfish

As of April 1, 2003, NMFS listed smalltooth sawfish as an endangered species (68 FR 15674) under the Endangered Species Act (ESA). After reviewing the best scientific and commercial information, the status review team determined that the continued existence of the U.S. DPS (Distinct Population Segment) of smalltooth sawfish is in danger of extinction throughout all or a significant portion of its range from a combination of the following four listing factors: the present or threatened destruction, modification, or curtailment of habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence.

To date there has been only one observed catch of a smalltooth sawfish in shark gillnet fisheries. The sawfish was taken on June 25, 2003, in a gillnet set off of southeast Florida and it was released alive (J. Carlson pers. comm., 2003). The set was characteristic of a typical drift gillnet set, with gear extending 30 to 40 feet deep in 50 to 60 feet of water. Prior to this event it was speculated that the depth at which drift gillnets are set above the sea floor may preclude smalltooth sawfish from being caught. Although sometimes described as a lethargic demersal species, smalltooth sawfish feed mostly on schooling fishing, thus they would occur higher in the water column during feeding activity. In fact, smalltooth sawfish and Atlantic sharks may be attracted to the same schools of fish, potentially making smalltooth sawfish quite vulnerable if present in the area fished. The previous absence of smalltooth sawfish incidental capture records is more likely attributed to the relatively low effort in this fishery and the rarity of smalltooth sawfish, especially in Federal waters. These factors may result in little overlap of the species with the gear. The recently observed smalltooth sawfish was cut from the net and released alive with no visible injuries. This indicates that smalltooth sawfish can be removed safely if entangled gear is sacrificed.

As discussed previously, gillnets are also used to “strikenet”. When strike gillnetting fishers target and encircle specific schools of sharks after visually detecting them (usually by spotter pilot). Given the large and or distinct morphology of smalltooth sawfish, this species would likely be detected visually, as well as distinguished from shark species, thus avoided. This fishing method has been shown to also reduce potential encounters by limiting the time that gear is in the water. Strike gillnet sets are typically only one to two hours in contrast to six to ten hours for each drift gillnet set. Endangered and threatened species, or protected marine mammals for that matter, have never been observed taken in strikenet sets.

Given the high rate of observer coverage in the shark gillnet fishery, NMFS believes that smalltooth sawfish takes in this fishery are very rare. The fact that there were no smalltooth sawfish caught during 2001 when 100 percent of the fishing effort was observed, indicates that smalltooth sawfish takes (observed or total) most likely do not occur on annual basis. Based on this information, the 2003 BiOp estimates that one incidental capture of a sawfish (released alive) over the next five years, will occur as a result of the use of gillnets in this fishery (NMFS, 2003a).

Smalltooth sawfish have been observed caught (seven known interactions, six released alive, one released in unknown condition) in shark bottom longline fisheries from 1994 through 2002 (A. Morgan pers. comm., 2003). Based on these observations, expanded sawfish take estimates for 1994-2002 were developed for the shark bottom longline fishery (NMFS, 2003a). A total of 466 sawfish were estimated to have been taken in this fishery during 1994-2002, resulting in an average of 52 per year. Additionally, it is important to note that all of the sawfish takes observed, except for one, were released alive.

3.8.7 Evaluation of Other Bycatch Reduction Measures

NMFS continues to monitor and evaluate bycatch in HMS fisheries through direct enumeration (pelagic and bottom longline observer programs, shark gillnet observer program), evaluation of management measures (closed areas), and vessel monitoring systems (VMS).

The following section provides a review of additional management measures or issues that may address bycatch reduction:

- Atlantic Large Whale Take Reduction Plan (ALWTRP) regulations:

Observers were placed on shark drift gillnet vessels during right whale calving season (November 15 - March 31, 2002) off the East Coast of Florida between Fort Pierce and West Palm Beach and covered 24 strikenet and 41 drift gillnet sets (Carlson and Baremore, 2002). No large whales or other marine mammals were observed caught by this gear during right whale calving season in 2002. No marine mammals or sea turtles were observed caught on strikenet sets. Three sea turtles (loggerhead and leatherback) were caught and all were released alive.

- Atlantic Bottlenose Dolphin Take Reduction Team:

Due to the observed takes of Atlantic bottlenose dolphin in the shark drift gillnet fishery, representatives of the fishery have been included in the Atlantic Bottlenose Dolphin Take Reduction Team. The Team completed initial deliberations in April of 2002 and another meeting to discuss issues specific to North Carolina and Virginia is planned for April of 2003. NMFS is working on developing a draft take reduction plan for Atlantic coastal bottlenose dolphins and expects to publish a proposed rule after the April 2003 meeting.

- MMPA List of Fisheries Update/Stock Assessment:

NMFS continues to update the MMPA List of Fisheries and the 2004 final list is available. The proposed 2005 List of Fisheries was published on December 2, 2004. Final 2003 marine mammal stock assessment reports and draft 2004 reports are also available. See Section 3.8.1.2 for information on obtaining these reports.

- Atlantic Offshore Cetacean Take Reduction Team (AOCTRT):

NMFS Office of Protected Resources has disbanded the AOCTRT due to the fact that two of the three fisheries addressed by the AOCTRT were closed by fishery management actions, leaving only the pelagic longline fishery, which has also been the subject of recent fishery management actions and increased observer coverage related to bycatch. NMFS intends to continue reviewing the fishery and any marine mammal interactions to determine if additional take reduction measures are necessary.

- Observer coverage of shark drift gillnet fleet:

On March 30, 2001, NMFS reduced the level of observer coverage required in the shark drift gillnet fishery from 100 percent year-round to 100 percent during right whale calving season and a statistically significant level during the rest of the year. Recent scientific analyses indicate that a 53 percent level of coverage is statistically significant and adequate to provide reasonable estimates of sea turtle and marine mammal takes outside of the right whale calving season. The level of observer coverage necessary will be re-evaluated annually and adjusted accordingly. In

2002, 14 strikenet and 28 driftnet sets were observed during non-right whale calving season (Carlson and Baremore, 2002). One bottlenose dolphin was discarded dead in a driftnet set. No other interactions with sea turtles or marine mammals were observed. Management options to address issues in the shark drift gillnet fishery will be considered in Amendment 2.

- Vessel monitoring systems in the pelagic longline fishery

NMFS adopted fleet-wide VMS requirements in the Atlantic pelagic longline fishery in May 1999, but was subsequently sued by an industry group. By order dated September 25, 2000, the U.S. District Court for the District of Columbia prevented any immediate implementation of VMS in the Atlantic pelagic longline fishery, and instructed to "undertake further consideration of the scope of the [VMS] requirements in light of any attendant relevant conservation benefits."

On October 15, 2002, the court issued a final order that denied plaintiff's objections to the VMS regulations. Based on this ruling NMFS implemented the VMS requirement in September 2003.

- Vessel monitoring systems in other HMS fisheries

Starting in 2004, gillnet vessels with a directed shark permit and gillnet gear onboard are required to install and operate a VMS unit during the Right Whale Calving Season (Nov. 15 – Mar. 31). In an attempt to better quantify bycatch, NMFS will attempt to include some of these vessels that are not subject to observer coverage, in its Directed Shark Gillnet Observer program. Directed shark bottom longline vessels located between 33^{o} N and 36^{o} 30' N need to install and operate a VMS unit from January through July.

3.9 HMS Permits and Tournaments

This section provides updates for the number of permits that were issued in conjunction with HMS fishing activities for 2004. Furthermore, Section Atlantic HMS Tournaments, provides a comprehensive synthesis of recreational fishing tournaments and their role in the context of HMS management.

3.9.1 History of the Program Established in the 1999 Tunas, Swordfish, and Sharks FMP

The 1999 Tunas, Swordfish, and Sharks FMP initiated the limited access permit system for commercial swordfish, shark, and tuna fisheries. The objectives of this program were to:

- Minimize, to the extent practicable, economic displacement and other adverse impacts on fishing communities during the transition from overfished fisheries to healthy ones;

- Consistent with other objectives of this FMP, manage Atlantic HMS fisheries for continuing optimum yield to provide the greatest overall benefit to the Nation, particularly with respect to food production, providing recreational opportunities, preserving traditional fisheries, and taking into account the protection of marine ecosystems;

- Reduce latent effort and overcapitalization in HMS commercial fisheries;

- Develop eligibility criteria for participation in the commercial shark and swordfish fisheries based on historical participation, including access for traditional swordfish handgear fishermen to participate fully as the stock recovers; and

- Create a management system to make fleet capacity commensurate with resource status so as to achieve the dual goals of economic efficiency and biological conservation.

This program was designed to prevent further overcapitalization of the fishery and reduce latent effort, without significantly affecting the livelihoods of those who are dependent on the fisheries. Because this program did not directly reduce the capacity in these fisheries, this program was merely meant to be the first step towards reducing capacity in the Atlantic swordfish, shark, and tuna longline fisheries.

The program implemented in the 1999 Tunas, Swordfish, and Sharks FMP set up six different limited access permit types: 1) directed swordfish, 2) incidental swordfish, 3) swordfish handgear, 4) directed shark, 5) incidental shark, and 6) tuna longline. In order to address bycatch concerns in the pelagic longline fishery, these permits were designed so that the swordfish directed and incidental permits are valid only if the permit holder also holds both a tuna longline and a shark permit. Similarly, the tuna longline permit is valid only if the permit holder also holds both a limited access swordfish (directed or incidental, not handgear) and a shark permit. Swordfish handgear and shark gillnet permits are valid without another limited access permit.

3.9.2 Status of the Permit Program Established in the 1999 Tunas, Swordfish, and Sharks FMP

NMFS' HMS Management Division continues to monitor capacity in HMS fisheries. Updated permit numbers for HMS fisheries as of late 2004, are included in Table 3.119 through Table 3.124. The overall number of limited access permits for Atlantic swordfish, tunas, and sharks declined in 2004 from 1,245 to 1,187 (Table 3.119), however, this is subject to change based upon on-going permit renewal or expiration. The overall number of tuna permits increased in some categories and declined in others (Table 3.120). The HMS Angling Permit category went into effect on March 1, 2003 (67 FR 77434, December 18, 2003), and there has been a significant increase in Angling category permits over the past few years (Table 3.120). The number of tuna dealer permits decreased from 516 to 466 (Table 3.123). The number of exempted fishing permits (EFPs) and display permits decreased from 49 to 36. Scientific research permits (SRPs) increased from 2 to 4 in 2004 (Table 3.124).

Table 3.119 Distribution of Shark, Swordfish, and Tuna longline Limited Access Permits as of October, 2004. Number of permit holders in each category, and state, is subject to change as permits are renewed or expire

State	# Directed Swordfish	# Incidental Swordfish	# Swordfish Handgear	# Directed Shark	# Incidental Shark	# Tuna Longline	# Permit Holders/# Permits
ME	2	1	5	2	5	1	12/16
NH	-	-	1	1	2	-	4/4
MA	12	3	17	4	14	6	33/56
RI	2	3	28	-	10	3	33/46

State	# Directed Swordfish	# Incidental Swordfish	# Swordfish Handgear	# Directed Shark	# Incidental Shark	# Tuna Longline	# Permit Holders/# Permits
CT	-	-	1	-	1	-	2/2
NY	17	3	10	10	12	16	30/68
NJ	31	17	12	28	32	21	60/141
DE	2	-	-	1	2	3	3/8
MD	7	1	-	4	7	6	11/25
VA	1	5	-	5	3	6	8/20
NC	9	11	2	22	17	10	39/71
SC	5	2	-	9	15	2	23/33
GA	1	-	-	2	4	1	6/8
FL	66	33	20	143	152	71	311/485
AL	1	2	-	3	2	1	6/9
MS	-	2	-	-	8	1	8/11
LA	33	9	-	4	45	49	49/140
TX	3	7	-	3	14	10	16/37
CA	1	-	-	-	1	1	1/3
IN	1	-	-	-	1	-	1/2
VI	1	-	-	-	1	-	1/2
Tot Totals **2004**	**195**	**99**	**96**	**241**	**348**	**208**	**657/1187**
2003	206	99	95	251	359	235	696/1245
2002	205	110	94	251	376	226	713/1262
2001	208	112	100	252	390	213	752/1275
2000	240	203	125	287	585	292	982/1732

3.9.3 Upgrading and Safety Issues

When the limited access program was implemented, NMFS included upgrading restrictions that were the same as those implemented by the New England Fishery Management Council (NEFMC) and Mid-Atlantic Fishery Management Council (MAFMC) in order to help minimize the number of regulations for fishermen in those areas. These regulations restrict vessels from any increase over 10 percent length overall (LOA), 10 percent gross or net tonnage, and 20 percent horsepower. NMFS continues to receive comments that these vessel upgrading restrictions are not appropriate for primarily longline fisheries, are not the preferred vessel characteristics to limit overcapitalization, and have caused safety at sea concerns. In developing the current upgrading restrictions, hold capacity was identified by constituents as a vessel characteristic that would not impact safety at sea and would meet the objective of addressing overcapitalization in HMS commercial fisheries. NMFS did not implement hold capacity as a measure to limit vessel upgrading in 1999 due to the lack of standard measurements of vessel hold capacity as well as the lack of consistent collection of this information for HMS commercial vessels as part of existing vessel registration systems. NMFS has considered other possible options including: eliminating upgrading restrictions; limiting hold capacity instead of, or in addition to, the current restrictions; allowing a greater percentage increase; and creating vessel categories. NMFS heard similar comments as those listed above from the Advisory Panel (AP) in February of 2004. NMFS is considering these options, and, as with any potential changes in the permitting system, will allow for adequate public comment during the rulemaking process before making any changes to the regulations.

3.9.4 Atlantic Tunas Permits

The number of Atlantic Tunas permit holders by category is listed in Table 3.120. The number of permits in the Longline, General, and Charter/Headboat (CHB) categories decreased from 2003 to 2004. The number of permits in the Harpoon category has increased slightly since 2003. In previous years, CHB vessels fishing for HMS only needed a CHB permit if they were fishing for Atlantic tunas.

In December 2002, NMFS published a final rule (67 FR 77434, December 18, 2002) that required the owner of each vessel used to fish recreationally for Atlantic HMS or on which Atlantic HMS are retained or possessed, to obtain an HMS Angling permit. Effective March 1, 2003, this permit replaced the Atlantic Tunas Angling category permit. It is discussed in greater detail in the HMS Angling Permit section.

Table 3.120 The number of Atlantic tuna permit holders in each category by year. The actual number of permit holders in each category is subject to change as individuals renew or allow their permits to expire.

Category	2000	2001	2002	2003	2004
Longline	292	213	226	235	213
Angling *	14,908	12,685	13,263	18,804	20,245
Harpoon	44	53	56	47	49
Trap	4	1	6	2	2
General	6,705	6,072	6,431	5,526	5,057
Purse Seine	5	5	5	5	5
CHB**	2,728	3,260	3,659	4,167	3,881
Total	**24,686**	**22,289**	**23,646**	**28,789**	**29,452**

* HMS Angling permit became effective March 1, 2003 (67 FR 77434, December 18, 2003) and includes all HMS, not just tunas.
****** No longer a tuna-only permit, now a HMS CHB permit

3.9.5 HMS CHB Permits

In 2002, NMFS published a final rule (67 FR 77434, Dec. 18, 2002) expanding the HMS recreational permit from tuna only to include all HMS and define CHB operations. This established a requirement that owners of charter boats or headboats that are used to fish for, take, retain, or possess Atlantic tunas, sharks, swordfish, or billfish must obtain a HMS CHB permit. This permit replaced the Atlantic Tunas CHB permit. A vessel issued a HMS CHB permit for a fishing year will not be issued an HMS Angling permit or any Atlantic Tunas permit in any category for that same fishing year, regardless of a change in the vessel's ownership. The total number of CHB decreased between 2003 and 2004; however, this may be due in part to those anglers who have not yet renewed their permit.

Table 3.121 CHB Permits by State as of November 2004. (Total CHB permits differ between Table 3.120 and Table 3.121 because of permits sold between November and December, 2004.)

State	CHB permits	State	CHB Permits
AL	80	NH	52
CT	85	NJ	530
DC	1	NY	342
DE	134	OH	1
FL	638	OK	1
GA	31	PA	60
LA	94	PR	24
MA	494	RI	133
MD	175	SC	124
ME	48	TN	1
MI	2	TX	144
MS	29	VA	155
NC	424	VI	14
		WV	4
Total			3820

3.9.6 HMS Angling Permit

Effective March 2003 (67 FR 77434, Dec. 18, 2002), the HMS Angling category permit allows all recreational anglers aboard permitted vessels to fish for HMS and is required to fish for, retain, or possess, including catch and release fishing, for any federally regulated HMS. These species include: sharks, swordfish, white and blue marlin, sailfish, spearfish, and federally regulated Atlantic tunas (bluefin, yellowfin, bigeye, skipjack, and albacore). Atlantic HMS caught, retained, possessed, or landed by persons on board vessels with an HMS Angling permit may not be sold or transferred to any person for a commercial purpose. By definition, recreational landings of Atlantic HMS are those that are not marketed through commercial channels, therefore it is not possible to monitor anglers' catches through ex-vessel transactions as in the commercial fishery. Instead, NMFS conducts statistical sampling surveys of the recreational fisheries. These survey programs has been used for over a decade and include the Marine Recreational Fisheries Statistics Survey (MRFSS) and the Large Pelagic Survey (LPS). A vessel issued an HMS Angling permit for a fishing year shall not be issued an HMS Charter/ Headboat permit or an Atlantic Tunas permit in any category for that same fishing year, regardless of a change in the vessel's ownership.

3.9.7 Dealer Permits

Dealer permits are required for commercial receipt of Atlantic tuna, swordfish, and sharks, and are described in further detail in the 1999 Tunas, Swordfish, and Sharks FMP. Additionally, the appropriate dealer permit is necessary for those importing bluefin tuna and/or swordfish from any ocean. Fishermen caught selling HMS to unpermitted dealers and persons without a dealer permit buying HMS from fishermen could be subject to enforcement action. Similarly, persons caught buying HMS from a non-commercial fishermen could also be subject to enforcement action. All dealer permit holders are required to submit reports detailing the nature of their business. For swordfish and shark permit holders (including those who *only* import swordfish), dealers must submit bi-weekly dealer reports on all HMS they purchase. Tuna dealers must submit, within 24 hours of the receipt of a bluefin tuna, a landing report for each bluefin purchased from U.S. fishermen. Dealers must also submit bi-weekly reports that include additional information on tunas that they purchase. To facilitate quota monitoring "negative reports" for shark and swordfish are also required from dealers when no purchases are made (i.e., NMFS can determine who has not purchased fish versus who has neglected to report). NMFS continues to automate and improve its permitting and dealer reporting systems and plans to make additional permit applications and renewals available online in the near future.

Beginning July 1, 2005, dealers who import and/or export certain HMS species will be required to obtain the NMFS HMS International Trade Permit (ITP) (69 FR 67268, November 17, 2004). The permit has been established to coordinate U.S. implementation of ICCAT and IATTC trade tracking recommendations. The HMS ITP will be required for trade of bluefin tuna, southern bluefin tuna, swordfish, and frozen bigeye tuna. Atlantic tunas and swordfish dealer permits will no longer be required for international trade of these species, and will be necessary only for domestic transactions. Additionally, the Pacific Ocean bluefin tuna dealer permit will no longer be in effect.

During the first half of 2005, an implementation plan will be developed which will identify logistical factors for the HMS ITP program including cost of the permit and how it can be obtained. Reporting associated with the HMS ITP will include biweekly reports and submission of swordfish, bluefin tuna, southern bluefin tuna and bigeye tuna statistical documents.

Table 3.122 **Number of shark and swordfish dealer permits issued in each state, or country, as of December 2004.** The actual number of permits per may change as permit holders move or sell their businesses.

State/Country	Atlantic swordfish	Atlantic sharks	# of permits
AL	2	5	7
CA	33	5	38
FL	101	90	191
GA	2	1	3
HI	9	6	15
LA	14	15	29
MA	31	20	51
MD	4	4	8
ME	4	3	7
MO	--	1	1
MS	--	1	1
NC	11	17	28
NJ	14	12	26
NY	24	10	34
OH	1	1	2
PA	2	--	2
RI	12	7	19
SC	10	20	30
TX	9	8	17

State/Country	Atlantic swordfish	Atlantic sharks	# of permits
VA	2	4	6
VI	1	1	2
WA	10	1	11
Canada	21	3	24
Chile	--	1	1
New Zealand	1	--	1
Ecuador	3	2	5
Totals 2004	**321**	**238**	**559**
2003	319	254	573
2002	321	267	588
2001	302	249	551
2000	312	251	563

Table 3.123 Number of Atlantic tunas dealer permits by state as of December 2004. Dealers may obtain a permit to sell and purchase only bluefin tuna, only BAYS tunas, or both bluefin and BAYS tunas.

State	Bluefin Only *	BAYS Only	Bluefin and BAYS	Total Atlantic Tunas Dealer Permits
AL	--	--	1	1
CA	6	--	2	8
CT	1	1	3	5
DE	--	1	3	4
FL	1	2	18	21
GA	--	--	1	1
IL	1	--	--	1
LA	3	1	14	18
MA	27	7	75	109
MD	--	--	11	11
ME	16	1	21	38
NC	6	9	32	47
NH	--	--	6	6
NJ	1	8	28	37
NY	3	12	53	68
PA	--	1	3	4
PR	--	2	2	4
RI	2	5	31	38
SC	--	4	8	12
TX	--	1	2	3
VA	1	7	14	22
VI	--	4	2	6
VT	--	--	1	1
WA	--	--	1	1
Total	**68**	**66**	**332**	**466**

*** Does not include Pacific bluefin tuna dealer permits**

3.9.8 Exempted Fishing Permits (EFPs), Display Permits, and Scientific Research Permits (SRPs)

EFPs, display permits, and SRPs are requested and issued under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.) and/or the ATCA (16 U.S.C. 971 et seq.). Regulations at 50 CFR 600.745 and 50 CFR 635.32 govern scientific research activity, exempted fishing, and exempted educational activity with respect to Atlantic HMS. Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks FMP implemented and created a separate display permitting system which operates apart from the exempted fishing activities that are focusing on scientific research. However, the application process for display permits is similar to that required for EFPs and SRPs. The quota remains at 60 mt ww for all exempted fishing activities.

Issuance of EFPs, display permits, and SRPs may be necessary because possession of certain shark and billfish species are prohibited, possession of billfishes on board commercial fishing vessels is prohibited, and because the commercial fisheries for bluefin tuna, swordfish and large coastal sharks may be closed for extended periods during which collection of live animals and/or biological samples would otherwise be prohibited. These EFPs, SRPs, and display permits would authorize collections of a limited number 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. In addition, NMFS regulations at 50 CFR 635.32 regarding implantation or attachment of archival tags in Atlantic HMS require prior authorization and a report on implantation activities.

In order to implement the chartering recommendations of ICCAT, NMFS recently published a rule on December 6, 2004 (69 FR 70396), requiring U.S. vessel owners with HMS permits to apply for and obtain a chartering permit before fishing under a chartering arrangement outside U.S. waters. These permits will be issued in a similar manner as other EFPs. Under this final rule and consistent with the ICCAT recommendations, vessels issued a chartering permit shall not be authorized to use the quota or entitlement of the United States until the chartering permit expires or is terminated. Having a chartering permit will not obviate the need to obtain a fishing license, permits, or other authorizations issued by the chartering nation in order to fish in foreign waters, or obtain other authorizations such as a High Seas Fishing Compliance Act Permit, 50 CFR 300.10 et seq. Additionally, incidental takes of, or interactions with, protected resources will be included against the authorized take levels specified in any relevant Biological Opinions. A U.S. vessel shall not be authorized to fish under more than one chartering arrangement at the same time. NMFS will issue chartering permits only if it determines that the chartering arrangement is in conformance with ICCAT's conservation and management programs.

The number of EFPs, display permits, and SRPs issued in 2004 by category and species are listed in Table 3.124. Year-end reports for permits issued for 2004 are required, and are expected to be submitted to NMFS in early 2005.

Table 3.124 Number of Exempted Fishing Permits (EFPs), Display Permits, and Scientific Research Permits (SRPs) issued as of December 2004.

Permit type		2001	2002	2003	2004
Exempted Fishing Permit	Sharks for display	8	7	8	8
	HMS for display	1	1	1	1
	Tunas for display	0	0	0	1
	Shark research on a non-scientific vessel	5	5	9	6
	Tuna research on a non-scientific vessel	8	4	5	11
	HMS research on a non-scientific vessel	4	5	18	5
	Billfish research on a non-scientific vessel	1	0	0	1
	Shark Fishing	0	1	1	0
	HMS Fishing	0	0	0	1
	Tuna Fishing	1	6	7	2
	TOTAL	28	29	49	36
Scientific Research Permit	Shark research	2	2	1	3
	Tuna research	1	1	0	0
	Billfish research	0	0	0	0
	HMS (multi-species) research	2	1	1	1
	TOTAL	5	4	2	4
Letters of Acknowledgement	Shark research	1	3	3	2
	Tuna research	0	0	0	0
	Billfish research	0	0	0	0
	HMS (multi-species) research	0	0	0	0
	TOTAL	1	3	3	2

3.9.8 Atlantic HMS Tournaments

Fishing tournaments are an important component of HMS recreational fisheries. A tournament is defined in the HMS regulations as any fishing competition involving Atlantic HMS in which participants must register or otherwise enter or in which a prize or award is offered for catching or landing such fish. Since 1999, Federal regulations have required that each HMS tournament operator register their tournament with the HMS Management Division at least four weeks prior to the commencement of tournament fishing activities. Within one week after the tournament concludes operators may be selected to report tournament results to the SEFSC.

Tournament registration and reporting is necessary because it provides an important source of information used to assess HMS fish stocks and to estimate the annual catch of Atlantic HMS. The information may be used by NMFS to plan for the assignment of tournament observers to assist in catch/effort data compilation and to obtain biological data and samples from landed fish (length/weight, stomach contents, injuries, parasites, hard and soft tissue samples for age determination, genetic and microconstituent analysis, spawning condition, fecundity, etc.). Additionally, with an accurate tournament database, NMFS may better assess the practicality of using tournaments for angler educational outreach efforts including distribution of written informational materials, notification of public hearings, and explanation of HMS regulations. HMS tournament registration and reporting information further allows NMFS, in the course of developing fishery management plans, to evaluate the economic impact of tournament angling in relation to other types of angling (*e.g.*, commercial, non-tournament recreational) and the relative effect of tournament angling on populations of various regulated HMS. Finally, the information is essential for the U.S. to meet its reporting obligations to ICCAT.

When registering an HMS tournament, the following information is required to be submitted to the HMS Management Division in St. Petersburg, FL: 1) Tournament name; 2) tournament location; 3) name, address, phone number, fax number, and e-mail address of tournament operator; 4) fishing dates; and 5) HMS species for which points or prizes are awarded. If selected for reporting, operators must submit the following information to the SEFSC: 1) Tournament name; 2) tournament dates; 3) tournament location; 4) number of boats fishing; 5) hours fished; 6) recorder's name, phone number, and e-mail address; 7) the number of each species kept; 8) the number of each species lost; 9) the number of each species tagged and released; 10) the number of each species released without a tag; 11) the number of each species released dead; and, 12) the weight and length of all fish boated. This information is routinely collected during tournament operations to award prizes. Generally, 100 percent of all billfish tournaments are selected for reporting, as this information is critical to determining billfish landings.

The reasons for participation in fishing tournaments include, but are not limited to, competition, camaraderie, and the opportunity to win valuable prizes. A recent search on the Internet for fishing tournaments (December, 2004) indicated that many saltwater tournaments target HMS. It has been estimated that approximately 300 – 400 HMS fishing tournaments occur annually along the U.S. Atlantic coast, including the Gulf of Mexico and Caribbean (NMFS, 1999). These tournaments may range from smaller, club member-only events with as few as ten participating boats (40 - 60 anglers) to larger, statewide tournaments with 250 or more participating vessels (1,000 – 1,500 anglers). For the larger tournaments, corporate sponsorship from tackle manufactures, marinas, boat dealers, beverage distributors, resorts, publications, chambers of commerce, restaurants, and others are often involved.

Many HMS fishing tournaments, particularly those that target billfish, adhere to strict conservation principles as described in their rules. For example, significant numbers of blue and white marlin tournaments are "release-only," utilizing observers, angler affidavits, polygraph tests, or photographs to document the live release of marlins. Minimum sizes for fish that are landed are oftentimes larger than state and federal requirements. Also, some tournaments prohibit treble hooks and may require circle hooks on certain baits. Because tournament participants are often well-respected anglers (*i.e*. highliners), these conservation trends and ethics likely influence the general angling population in a positive manner.

It is also important to mention that many HMS fishing tournaments support charitable and other non-profit organizations. For anglers in these tournaments, winning the prize money may not be the only motive for participation. An Internet search revealed that some of the charities which have recently benefited from fishing tournaments include the Cystic Fibrosis Foundation, Make-A-Wish Foundation, Sloan-Kettering Skin Cancer Center, Boy Scouts of America, Ducks Unlimited, The Boys and Girls Club, The Broadstreet Clinic, Core Sound Waterfowl Museum, Hope Mission Christian Ministries, Sertoma by the Bay (breast cancer research), Take A Kid Fishing, Capt. Bob Lewis Scholarship Fund, South Nassau Communities Hospital, South Texas Children's, T. H. Rogers School for Impaired Children's Home, The Billfish Foundation, Kids In Distress, and many more.

Table 3.125 presents the number of registered HMS tournaments, by state, since 2000. These numbers are likely to be less than the actual numbers of HMS tournaments that are operating due to non-compliance with the registration requirements by some tournament operators. This table indicates that HMS fishing tournaments are especially important in Florida, Texas, Louisiana, North Carolina, South Carolina, Maryland, New Jersey, New York, Puerto Rico, Virginia, Alabama, Georgia, and other coastal states. The largest numbers of registered HMS tournaments have consistently occurred in the state of Florida.

Table 3.125 **Number of Registered HMS Tournaments by State.** Source: NMFS Atlantic HMS Tournament Registration Database

	2000	2001	2002	2003	2004
ME	0	2	3	3	5
NH	0	0	0	0	0
MA	4	7	1	7	10
RI	1	2	2	3	3
CT	0	1	0	0	0
NY	2	5	4	14	14
NJ	9	11	5	18	17
DE	0	2	0	0	1
MD	7	4	2	14	14
VA	3	5	1	5	4
NC	16	11	5	15	16
SC	7	6	3	13	9
GA	4	6	1	12	3
FL	51	46	26	66	56
AL	6	7	7	9	8
MS	1	3	2	7	2
LA	11	19	0	20	22
TX	18	14	1	17	10
MI	0	1	0	0	0
PR	19	16	4	13	17
USVI	9	9	0	6	1
Bahamas[1]	0	3	2	1	2
Mexico[1]	0	1	0	0	0
Turks/Caicos[1]	0	0	0	1	0
TOTAL	168	181	68	244	214

[1]Some foreign tournaments voluntarily registered because the participants were mostly U.S. citizens.

Table 3.126 shows the number and percentage of HMS tournaments awarding points or awards for a particular HMS, based upon 2003 tournament registrations (the most recent, complete, and largest year of registrations). Blue marlin, yellowfin tuna, white marlin, and sailfish are the predominant target species in HMS fishing tournaments.

Table 3.126 Number and Percent of All 2003 HMS Tournaments Awarding Points or Prizes for a HMS. Source: NMFS Atlantic HMS Tournament Registration Database

Species	No. Tournaments	**Percent tournaments**
Blue Marlin	143	58.6%
Yellowfin Tuna	128	52.5%
White Marlin	125	51.2%
Sailfish	114	46.7%
Bluefin Tuna	59	24.2%
Bigeye Tuna	54	22.1%
Pelagic Sharks	50	20.5%
Swordfish	45	18.4%
Albacore Tuna	31	12.7%
Ridgeback Sharks	16	6.5%
Skipjack Tuna	12	4.9%
Small Coastal Sharks	7	2.9%
Non-Ridgeback Sharks	7	2.9%

Table 3.127– Table 3.129 indicate the percentage and number of 2003 HMS registered tournaments, by state (or country), for blue marlin, white marlin and sailfish, respectively.

Table 3.127 Registered Blue Marlin Tournaments, 2003. Source: NMFS Atlantic HMS Tournament Registration Database

State	**Number of 2003 Tournaments Awarding Points or Prizes for Blue Marlin**	**Percent of Total 2003 Tournaments Awarding Points or Prizes for Blue Marlin**
Florida	31	21.7%
Texas	16	11.2%
South Carolina	13	9.1%
Puerto Rico	12	8.4%
Georgia	11	7.7%
Maryland	11	7.7%
New Jersey	10	7.0%
Alabama	9	6.3%
North Carolina	9	6.3%
Virginia	5	3.5%
Louisiana	4	2.8%
Massachusetts	4	2.8%
Mississippi	3	2.1%
Rhode Island	2	1.4%
New York	1	0.7%
Bahamas	1	0.7%
Turks & Caicos	1	0.7%
TOTAL	143	100%

Table 3.128 **Registered White Marlin Tournaments, 2003.** Source: NMFS Atlantic HMS Tournament Registration Database.

State	Number of 2003 Tournaments Awarding Points or Prizes for White Marlin	Percent of Total 2003 Tournaments Awarding Points or Prizes for White Marlin
Florida	30	24.0%
Texas	15	12.0%
South Carolina	11	8.8%
Maryland	11	8.8%
New Jersey	10	8.0 %
Georgia	10	8.0%
Alabama	9	7.2%
North Carolina	8	6.4%
Virginia	4	3.2%
Massachusetts	4	3.2%
Mississippi	3	2.4%
Puerto Rico	3	2.4%
Louisiana	2	1.6%
Rhode Island	2	1.6%
New York	1	0.8%
Bahamas	1	0.8%
Turks & Caicos	1	0.8%
TOTAL	125	100%

Table 3.129 **Registered Sailfish Tournaments, 2003.** Source: NMFS Atlantic HMS Tournament Registration Database).

State	Number of 2003 Tournaments Awarding Points or Prizes for Sailfish	Percent of Total 2003 Tournaments Awarding Points or Prizes for Sailfish
Florida	40	35.1%
Texas	15	13.2%
South Carolina	10	8.8%
Georgia	10	8.8%
Alabama	9	7.9%
Maryland	9	7.9%
North Carolina	8	7.0%
Virginia	4	3.5%
Puerto Rico	4	3.5%
Louisiana	2	1.7%
Mississippi	1	0.9%
Bahamas	1	0.9%
Turks & Caicos	1	0.9%
TOTAL	114	100%

REFERENCES

References for Chapter 1.0

Casey, J.G., F.J. Mather, J.M. Mason, and J. Hoenig. 1978. Offshore fisheries of the Middle Atlantic Bight. In: Marine recreational fisheries. IGFA, NCMG, and SFI. Washington, DC: pp. 107-129.

NMFS. 1993. Fishery Management Plan for Sharks of the Atlantic Ocean. DOC/NOAA/NMFS. Silver Spring, MD.

NMFS. 1999. Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks. DOC/NOAA/NMFS. Silver Spring, MD.

NMFS. 1999. Amendment 1 to the Atlantic Billfish Fishery Management Plan. DOC/NOAA/NMFS. Silver Spring, MD.

Rae, B.B. 1962. Porbeagle sharks. Scot. Fish. Bull. 18:17-19.

SAFMC. 1985a. Source Document for the Swordfish Fishery Management Plan. Charleston, SC.

SAFMC. 1985b. Fishery Management Plan, Regulatory Impact Review, Initial Regulatory Flexibility Analysis, and Final Environmental Impact Statement for Atlantic Swordfish. Charleston, SC.

SAFMC. 1988. Fishery Management Plan, Final Environmental Impact Statement, Regulatory Impact Review, and Initial Regulatory Flexibility Analysis for the Atlantic Billfishes. Charleston, SC.

Wagner, M.H. 1966. Shark fishing gear: a historical review. Circular 238, U.S. Dept. of Interior, Fish and Wildlife Service. Washington, D.C.

White Marlin Status Review Team 2002. 2002 Atlantic White Marline Status Review Document. Report to National Marine Fisheries Service, Southeast Regional Office, September 3, 2002. 49 pp.

References for Chapter 2.0

Section 2.1

No references cited.

Section 2.2

No references cited.

Section 2.3

Bester, C. and G. Burgess. 2004. Biological Profiles – Finetooth Shark. Florida Museum of Natural History – Ichthyology Division. January 11, 2005.http://www.flmnh.ufl.edu/fish/Gallery/Descript/finetoothshark/finetoothshark.html

Carlson, J. K. and I. E. Baremore. 2003. The Directed Shark Gillnet Fishery: Catch and Bycatch, 2003. NMFS, Southeast Fisheries Science Center. December, 2003. SFD Contribution PCB-03/07.

Carlson, J. K., E. Cortes, and D. M. Betheaa. 2003. Life history and population dynamics of the finetooth shark (*Carcharhinus isodon*) in the northeastern Gulf of Mexico. Fisheries Bulletin 101:281-292.

SCRS. 2004. Report of the 2004 Meeting of the Standing Committee on Research and Statistics, Madrid, Spain, PLE-025 / 2004. October 4 to 8, 2004.

Section 2.4

IBSRC. 2005. International Bluewater Spearfishing Records Committee Rules. http://freedive.net/ibsrc/index.html.

Wescott, W. 1996. The Wanchese Green Stick Tuna Rig. North Carolina Sea Grant. UNC-SG-96-04.

References for Chapter 3.0

Section 3.2.1

Arocha, Freddy. 1997. The Reproductive Dynamics of Swordfish Xiphias Gladius L. and Management Implications in the Northwest Atlantic. University of Miami, Coral Gables, FL

Helfman, G.S., B.B. Collette, and D.E. Facey. 1997. The Diversity of Fishes. Blackwell Science, Inc. Malden, MA. 528 pp.

NMFS. 1999. Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks. U.S. Department of Commerce, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Division, Silver Spring, MD

NMFS. 2003. Stock Assessment and Fishery Evaluation Report for Atlantic Highly Migratory Species. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Highly Migratory Species Division, Silver Spring, MD.

SCRS. 2003. Report of the Standing Committee on Research and Statistics, International Commission for the Conservation of Atlantic Tunas, Standing Committee on Research and Statistics, October 6 – October 10, 2003.

SCRS. 2004. Report of the Standing Committee on Research and Statistics, International Commission for the Conservation of Atlantic Tunas, Standing Committee on Research and Statistics, October 4 – October 8 , 2004

Sections 3.2.2 and 3.2.3

U.S. National Report to ICCAT, 2003. U.S. Department of Commerce, NOAA-Fisheries. September 2004.

Report of the 2004 Meeting of the Standing Committee on Research and Statistics (SCRS), Madrid, Spain, PLE-025 / 2004. October 4 to 8, 2004.

Section 3.2.4

De Sylva, D. P. and P. R. Breder. 1997. Reproduction, gonad histology, and spawning cycles of North Atlantic Billfishes (Istiophoridae). Bulletin of Marine Science 60(3): 668-697.

Gaertner, D., F. Menard, C. Develter, J. Ariz, and A. Delgado de Molina. 2002. Bycatch of billfishes by the European tuna purse-seine fishery in the Atlantic Ocean. Fisheries Bulletin. 100:683-689.

Graves, J. E., B. E. Luckhurst, E. D. Prince. 2002. An evaluation of pop-up satellite tags for estimating postrelease survival (Makaira nigricans) from a recreational fishery. Fisheries Bulletin. 100:134-142.

Hernandez-H, A. and Ramirez-R. 1998. Spawning seasonality and length at maturity of sailfish (Istiophorus platypterus) off the Pacific coast of Mexico. Bulletin of Marine Science 63(3): 459-467.

Junior, T. V., C. M. Vooren, and R. P. Lessa. 2004. Feeding habits of four species of Istiophoridae (Pisces: Perciformes) from Northeastern Brazil. Environmental Biology of Fishes 70:293-304.

NMFS. 1999. Amendment 1 to the Atlantic Billfish Fishery Management Plan. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division, Silver Spring, MD. Public Document.

NMFS. 2003. Stock Assessment and Fishery Evaluation for Atlantic Highly Migratory Species. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division, Silver Spring, MD. Public Document.

Rosas-Alayola, J., A. Hernandez-Herrera, F. Galvan-Magana, L. A. Abitia-Cardenas, A. F. Muhila-Melo. Diet composition of sailfish (Istiophorus platypterus) from the southern Gulf of California, Mexico. Fisheries Research. 57:185.195.

SCRS. 2004. Report of the 2004 Meeting of the Standing Committee on Research & Statistics. International Commission for the Conservation of Atlantic Tunas. PLE-025/2004. Madrid, Spain, 4-8 October 2004.

Section 3.2.5

Bester, C. and G. Burgess. 2004. Biological Profiles – Finetooth Shark. Florida Museum of Natural History – Ichthyology Division. January 11, 2005. http://www.flmnh.ufl.edu/fish/Gallery/Descript/finetoothshark/finetoothshark.html

Branstetter, S. and R. Stiles. 1987. Age and growth estimates of the bull shark, *Carcharhinus leucas*, from the northern Gulf of Mexico. Environ. Biol. Fishes 20(3): 169-181.

Brown, C.A. and S.H. Gruber. 1988. Age assessment of the lemon shark, *Negaprion brevirostris*, using tetracycline validated vertebral centra. Copeia 1988(3): 747-753.

Carlson, J. K., E. Cortes, and D. M. Betheaa. 2003. Life history and population dynamics of the finetooth shark (*Carcharhinus isodon*) in the northeastern Gulf of Mexico. Fisheries Bulletin 101:281-292.

Casey, J.G. and J.J. Hoey. 1985. Estimated catch of large shark by U.S. recreational fishermen in the Atlantic and Gulf of Mexico. In: Shark catches from selected fisheries off the U.S. east coast. U.S. Dept of Commerce, NOAA Tech Report NMFS 31, July: 15-19.

Cortes, E. 2002. Stock Assessment of Small Coastal Sharks in the U.S. Atlantic and Gulf of Mexico. National Marine Fisheries Service, Southeast Fisheries Science Center, Panama City Laboratory. Panama City, FL.

Cortes, E., L. Brooks, and G. Scott 2002. Stock Assessment of Large Coastal Sharks in the U.S. Atlantic and Gulf of Mexico: Final Meeting Report of the 2002 Shark Evaluation Workshop. National Marine Fisheries Service, Southeast Fisheries Science Center, Panama City Laboratory. Panama City, FL.

COSEWIC 2004. COSEWIC assessment and status report on the porbeagle shark *Lamna Nasus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 43 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

Heist, E.J., J.E. Graves, and J.A. Musick. 1995. Population genetics of the sandbar shark, Carcharhinus plumbeus, in the Gulf of Mexico and Mid-Atlantic Bight. Copeia 1995(3): 555-562.

Restrepo, V. R., G. G. Thompson, P. M. Mace, W. L. Gabriel, L. L. Low, A. D. MacCall R. D. Methot, J. E. Powers, B. L. Taylor, P. R. Wade, and J. F. Witzig. 1998. Technical Guidance on the Use of the Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Technical Memorandum NMFS-F/SPO-###. 54pp.

SCRS. 2004. Report of the 2004 Inter-Sessional Meeting of the ICCAT Sub-Committee On By-Catches: Shark Stock Assessment. June 14-18, Tokyo, Japan. SCRS/2004/014.

Sminkey, T.R. and J.A. Musick. 1995. Age and growth of the sandbar sharks, *Carcharhinus plumbeus*, before and after population depletion. Copeia 1995(4): 871-83.

Section 3.3.1

Appeldoorn, R. and S. Meyers. 1993. Puerto Rico and Hispañola, pp. 99-158, *in:* Marine fishery resources of the Antilles: Lesser Antilles, Puerto Rico and Hispañiola, Jamaica, Cuba. Food and Agriculture Organization (FAO), Fisheries Technical Paper. No. 326. Rome, FAO, 235 pp.

Field, D.W., A.J. Reyer, P.V. Genovese, and B.D. Shearer. 1991. Coastal Wetlands of the United States; An Accounting of a Valuable National Resource. National Oceanic and Atmospheric Administration (NOAA). Silver Spring, MD. 59 pp.

Minerals Management Service (MMS), US Dept. of Interior. 1992. Comprehensive Program 1992-1997. Final Environmental Impact Statement (EIS). Outer Continental Shelf EIS/EA MMS 92-0004.

Minerals Management Service (MMS), US Dept. of Interior. 1996. Outer Continental Shelf Oil & Gas Leasing Program 1997-2002. Final Environmental Impact Statement. USDOI, MMS, OCS EIS/EA, MMS 96-0043.

National Oceanic and Atmospheric Administration (NOAA), 1997. NOAA's Estuarine Eutrophication Survey. Volume 4: Gulf of Mexico Region. Silver Spring, MD. Office of Ocean Resources Conservation Assessment. 77 pp.

Section 3.3.2

Block, B.A. 2004. Electronic tagging of Bluefin Tuna, the Tag-A-Giant Campaign. Interim report: 8/02/02-6/30/04.

Carlson, J.K., D.M. Betha, A. Middlemiss, and I.E. Baremore. 2004. Shark Nursery Grounds and Essential Fish Habitat Studies; GULFSPAN Gulf of Mexico-FY04. Report to NOAA Fisheries, Highly Migratory Species Office. NMFS, SEFSC, Panama City, FL.

Hueter, R.E. and J.P. Tyminski. In review. Shark nurseries of the U.S. Gulf of Mexico and southeast Atlantic coasts: overview of research by Mote Marine Laboratory's Center for Shark Research. In: Shark Nursery Grounds of the Gulf of Mexico and the East Coast of the United States (C. McCandless, ed.). Special Publication of the American Fisheries Society.

Kerstetter, D.W. Pers. Com. Virginia Institute of Marine Science. Gloucester Point, VA.

McCandless, C., W. D. McElroy, N.E. Kohler, C. Jensen, G. Ulrich, D. Abel, C. Belcher, and T. Curtis. 2004. 2003 Report of the Cooperative Atlantic States Shark Pupping and

Nursery (COASTSPAN) Survey. Apex Predators Program. NMFS, NEFSC, Narragansett, RI.

Prince, E.D., R.K. Cowen, E.S. Orbesen, S.A. Luthy, J.K. Llopiz, D.E. Richardson, and J.E. Serafy. In Review. Movements and spawning of white marlin (*Tetrapturus albidus*) and blue marlin (*Makaira nigricans*) off Punta Cana, Dominican Republic. NMFS, SEFSC, Miami, FL.

Section 3.4.1

Arocha, F. 1996. Taken from Hoey and Moore's Captains Report: Multi-species catch characteristics for the U.S. Atlantic pelagic longline fishery. August 1999.

Cramer, J. and H. Adams. 2000. Large Pelagic Logbook Newsletter: 1998. NOAA Tech. Memo. NOAA Fisheries-SEFSC - 433. 25 pp.

Foster, D., J. Watson, and A. Shah. 2004. 2003 NED experiment data analysis. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Pascagoula, MS. Unpublished report.

Garrison, L. P. 2003. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2001 - 2002. National Oceanic and Atmospheric Administration Technical Memorandum. NMFS-SEFSC-515. 52 pp.

Garrison, L. P. and P. M. Richards. 2004. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2003. National Oceanic and Atmospheric Administration Technical Memorandum. NMFS-SEFSC-527. 57 pp

Hoey, J. and N. Moore. 1999. Captain's report: Multi-species catch characteristics for the U.S. Atlantic pelagic longline fishery. August 1999. 78 pp.

Honolulu Advertiser with the Hawaii Longline Association. 2000.

Larkin, S. L., D. J. Lee, C. M. Adams. 1998. Costs, earnings, and returns to the U.S. Atlantic pelagic longline fleet in 1996. Staff paper series SP 98-9. University of Florida, Institute of Food and Agriculture Sciences, Food and Resource Economics Department, Gainesville, FL. 46 pp.

Larkin, S. L., C. M. Adams, D. J. Lee. 2000. Reported trip costs, gross revenues, and net returns for U.S. Atlantic pelagic longline vessels. Marine Fisheries Review 62(2): 49-60.

Larkin, S. L., L. A. Perruso, D. J. Lee, C. M. Adams. *In press*. An empirical investigation of the U.S. Atlantic pelagic longline fleet: Specification and estimation of a multi-species profit function with suggestions for missing data problems. Presented at North American Association of Fisheries Economists 1st Annual Meeting, April 2001. Revised October 2001 for proceedings.

Lewison, R.L., S.A. Freeman, L.B. Crowder. 2004. Quantifying the effects of fisheries on threatened species: the impact of pelagic longlines on loggerhead and leatherback sea turtles. Ecological Letters 7: 221-231.

National Research Council. 1990. Decline of the Sea Turtles: Causes and Prevention. National Academy Press. Washington, DC.

NMFS. 1999. Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks. U.S. Department of Commerce, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division, Silver Spring, MD.

NOAA Fisheries. 2001a. Endangered Species Act Section 7 Consultation - Reinitiation of Consultation on the Atlantic Highly Migratory Species Fishery Management Plan and Its Associated Fisheries. U.S. Department of Commerce, National Marine Fisheries Service Silver Spring, MD. June 14, 2001.

NOAA Fisheries. 2001b. Stock Assessments of Loggerhead and Leatherback Sea Turtles and an Assessment of the Impact of the Pelagic Longline fishery on the Loggerhead and Leatherback Sea Turtles of the Western North Atlantic. U.S. Department of Commerce, National Marine Fisheries Service, Miami, FL, SEFSC Contribution PRD-00/01-08.

NOAA Fisheries. 2003a. 2003 Stock Assessment and Fishery Evaluation Report for Atlantic Highly Migratory Species. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Highly Migratory Species Management Division, Silver Spring, MD. Public Document. 264 pp.

NOAA Fisheries. 2003b. U.S. National Report to ICCAT, 2003. NAT-034. 61 pp.

NOAA Fisheries. 2004a. U.S. National Report to ICCAT, 2004. NAT-035. 42 pp.

NOAA Fisheries. 2004b. Endangered Species Act-Section 7 Reinitiation of Consultation on the Atlantic Pelagic Longline Fishery for Highly Migratory Species. Biological Opinion, June1, 2004. 154 pp.

NOAA Fisheries. 2004c. 2004 Stock Assessment and Fishery Evaluation Report for Atlantic Highly Migratory Species. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Highly Migratory Species Management Division, Silver Spring, MD. Public Document. 67 pp.

NOAA Fisheries. 2004d. Final Supplemental Environmental Impact Statement for the Reduction of Sea Turtle Bycatch and Bycatch Mortality in the Atlantic Pelagic Longline Fishery. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Highly Migratory Species Management Division, Silver Spring, MD. Public Document.

Porter, R. M., M. Wendt, M. D. Travis, I. Strand. 2001. Cost-earnings study of the Atlantic-based U.S. pelagic longline fleet. Pelagic Fisheries Research Program. SOEST 01-02; JIMAR contribution 01-337. 102 pp.

SCRS. 2004. Report of the Standing Committee on Research and Statistics, ICCAT Standing Committee on Research and Statistics, October 4 - October 8, 2004.

Watson, J.W., D.G. Foster, S. Epperly, and A. Shah. 2003. Experiments in the western Atlantic northeast distant waters to evaluate sea turtle mitigation measures in the pelagic longline fishery. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Pascagoula, MS. Unpublished report.

Watson, J.W., D.G. Foster, S. Epperly, A. Shah. 2004. Experiments in the western Atlantic northeast distant waters to evaluate sea turtle mitigation measures in the pelagic longline fishery: Report on experiments conducted in 2001- 2003. February 4, 2004. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Pascagoula, MS. 123 pp.

Ward, J. and E. Hanson. 1999. The regulatory flexibility act and HMS management data needs. Presentation at the American Fisheries Society Annual Meeting. Charlotte, North Carolina.

Yeung, C. 2001. Estimates of marine mammal and marine turtle bycatch by the U.S. Atlantic pelagic longline fleet in 1999 - 2000. NOAA Technical Memorandum NOAA Fisheries-SEFSC-467. 43 pp.

Section 3.4.4

Cortés, E. and J.A. Neer. 2002. Updated catches of sharks. Shark Bowl Working Document SB/02/15. Document presented at the 2002 Shark Evaluation Workshop, NOAA Fisheries, Panama City, Florida.

Cortés, E. 2005. Updated catches of Atlantic sharks. NOAA Fisheries, Southeast Fisheries Science Center, Sustainable Fisheries Division Contribution SFD-2005-054. 57 pp.

Cramer, J, and H. Adams. 2000. Large pelagic newsletter: 1998. NOAA Tech. Memo. NMFS-SEFSC-433. 25 pp.

Graves, John E., B.E. Luckhurst, E.D. Prince. 2002. An evaluation of pop-up satellite tags for estimating postrelease survival of blue marlin (*Makaira nigricans*) from a recreational fishery. Fishery Bulletin 100(1):134-142 (2002).

NMFS. 2004. United States National Report to ICCAT, 2004. NAT-035.

SCRS. 2002. Report of the Standing Committee on Research and Statistics, ICCAT SCRS, September 30 - October 4, 2002.

Section 3.4.5

Beerkircher, L.R., E. Cortes, and M. Shivji. 2004. Characteristics of shark bycatch observed on pelagic longlines off the southeastern United States, 1992-2000. Marine Fisheries Review 64 (4) 40-49.

Berkeley, S.A., E.W. Irby, Jr., and J.W. Jolley, Jr. 1981. Florida's Commercial Swordfish Fishery: Longline Gear and Methods. MAP-14, Marine Advisory Bulletin, Florida Sea Grant College in cooperation with University of Miami, Rosenstiel School of Marine and Atmospheric Science and Florida Department of Natural Resources, Florida Cooperative Extension Service, University of Florida, Gainesville, FL. 23 pp.

Burgess, G.H. and A. Morgan. 2002. Commercial shark fishery observer program; support for an observer program monitoring the directed commercial shark fishery in the eastern Gulf of Mexico and Atlantic Ocean. Final report to Highly Migratory Species Division, National Marine Fisheries Service. Award No. NA06FM0194.

Burgess, G.H. and A. Morgan. 2003. Commercial shark fishery observer program; renewal of an observer program to monitor the directed commercial shark fishery in the Gulf of Mexico and South Atlantic 2002(2) and 2003(1) fishing seasons. Final report to Highly Migratory Species Division, National Marine Fisheries Service. Award No. NA16FM1598.

Burgess, G.H. and A. Morgan. 2004. Commercial shark fishery observer program; an observer program report on the monitoring of the directed commercial shark fishery in the eastern Gulf of Mexico and South Atlantic 2003(2) fishing season. Final report to Highly Migratory Species Division, National Marine Fisheries Service. Award No. NA03NMF4540075.

Carlson, J.K. 2000. Progress report on the directed shark gillnet fishery: right whale season, 2002. NOAA, National Marine Fisheries Service, Southeast Fisheries Science Center, Panama City, FL. Sustainable Fisheries Division Contribution SFD-99/00-90. 12 pp.

Carlson, J. and I. Baremore. 2001. The directed shark gillnet fishery: non-right whale season, 2000 and 2001. SFD Contribution PCB-01/02-002. Panama City, FL. 8pp.

Carlson, J. K. and I. Baremore. 2002a. The directed shark gillnet fishery: non-right whale season, 2002. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Panama City, FL. Sustainable Fisheries Division Contribution PCB-02/12. 10pp.

Carlson, J. K. and I. Baremore. 2002b. The directed shark gillnet fishery: right whale season, 2002. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Panama City, FL. Sustainable Fisheries Division Contribution PCB-02/13. 8pp

Carlson, J. K. and I. Baremore. 2003. The directed shark gillnet fishery: catch and bycatch, 2003. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center, Panama City, FL. Sustainable Fisheries Division Contribution PCB-03/07. 8pp

Cortés, E. and J.A. Neer. 2002. Updated catches of sharks. Shark Bowl Working Document SB/02/15. Document presented at the 2002 Shark Evaluation Workshop, NOAA Fisheries, Panama City, Florida.

Cortés, E. 2003. Updated catch of Atlantic sharks. SFD Contribution 2003-0031. NOAA Fisheries, Southeast Fisheries Science Center, Panama City, Florida. 75 p.

Garrison, L. 2003. Protected species interactions with the directed shark gillnet fishery of Florida and Georgia from 1999-2002. NOAA, NOAA Fisheries, Southeast Fisheries Science Center, Miami, FL. 10 pp.

McHugh, R.J. and T.J. Murry. 1997. An analysis of the demand for, and supply of shark. Marine Fisheries Initiative Grant No., NA57FF0052, Univ. of South Florida and Georgia State Univ.

NOAA Fisheries. 1999. Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division, Silver Spring, MD. Public Document.

NOAA Fisheries. 2003a. Endangered Species Act Section 7 Consultation: Biological Opinion on the continued operation of Atlantic shark fisheries (commercial shark bottom longline and drift gillnet fisheries and recreational shark fisheries) under the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks (HMS FMP) and the proposed Rule for Draft Amendment 1 to the HMS FMP, July 2003. NOAA Fisheries, Southeast Regional Office, Protected Resources Division, I.D. No. F/SER/2003/00953. 65 pp. + apps.

NOAA Fisheries. 2003b. 2003 Stock Assessment and Fishery Evaluation for Atlantic Highly Migratory Species. NOAA, National Marine Fisheries Service, Highly Migratory Species Management Division, Silver Spring, MD. Public Document. 264 pp.

NOAA Fisheries. 2003c. Final Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks, and Highly Migratory. NOAA, National Marine Fisheries Service, Highly Migratory Species Management Division, Silver Spring, MD. Public Document.

NOAA Fisheries. 2004. Final Supplemental Environmental Impact Statement. Reduction of sea turtle bycatch and bycatch mortality in the Atlantic pelagic longline fishery. NOAA, National Marine Fisheries Service, Office of Protected Resources, Endangered Species Division, Silver Spring, MD.

Restrepo, V.R., G.G. Thompson, P.M. Mace, W.L. Gabriel, L.L. Low, A.D. MacCall, R.D. Methot, J.E. Powers, B.L. Taylor, P.R. Wade, and J.F. Witzig. 1998. Technical Guidance On the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Technical Memorandum NMFS-F/SPO-31. July 17, 1998.

Waring, G., J.M. Quintal and C.P. Fairfield. 2002. U.S. Atlantic And Gulf of Mexico Marine Mammal Stock Assessments. U.S. DOC. NOAA Tech. Mem. NMFS-NE-169. 318 pp.

Section 3.4.6

NMFS. 2003. United States National Report to ICCAT, 2003. NAT-034.

NMFS. 2004. United States National Report to ICCAT, 2004. NAT-035.

Section 3.5

Cortes, E. 2004. Updated Catches of Atlantic Sharks. NOAA, NOAA Fisheries, Southeast Fisheries Science Center, Panama City, FL.

Ditton, R.B., D.K. Anderson, J.F. Thigpen III, B.L. Bohnsack, and S.G. Sutton. 2000.

1999 Pirates Cove Big Game Tournaments: Participants' Characteristics, Participation in Fishing, Attitudes, Expenditures, and Economic Impacts. Human Dimensions of Fisheries Laboratory Report #HD-615, Texas A & M University, College Station, TX. 126 pp.

Ditton, R.B. and D.J. Clark. 1994. Characteristics, Attitudes, Catch and Release Behavior, and Expenditures of Billfish Tournament Anglers in Puerto Rico. Report prepared for The Billfish Foundation, Ft. Lauderdale, FL. 27pp.

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

Fisher, M.R. and R.B. Ditton. 1992. Characteristics of Billfish Anglers in the U.S. Atlantic Ocean. Marine Fisheries Review 54(1): 1-6.

NMFS. 1997a. Fisheries of the United States: 1996. B.K. O'Brannon, Editor. Office of Science and Technology, Fisheries Statistics and Economics Division, NOAA, U.S. Department of Commerce. Silver Spring, MD. 169 p.

NMFS. 1997b. 1997 Shark Evaluation Report. NOAA, Southeast Fisheries Science Center, Miami, FL. 12 p.

NMFS. 1999. Amendment 1 to the Atlantic Billfish Fishery Management Plan. DOC/NOAA/NMFS. Silver Spring, MD.

NMFS. 2004a. National Report of the U.S. (to ICCAT): 2004. NOAA, U.S. Department of Commerce, Silver Spring, MD. NAT/03/06.

NMFS. 2004b. Fisheries of the U.S.: 2003. E.S. Pritchard, Editor. Office of Science and Technology, Fisheries Statistics and Economics Division, NOAA, U.S. Department of Commerce, Silver Spring, MD.

Thailing, C.E., R.B. Ditton, D.K. Anderson, T.J. Murray, J.E. Kirkley, J. Lucy. 2001.

The 2000 Virginia Beach Red, White, and Blue Fishing Tournament: Participants' Characteristics, Attitudes, Expenditures, and Economic Impacts. VIMS, College of

William and Mary, Virginia Marine Resources Report No. 2001-9, VSG-01-88, Texas A & M University, College Station, TX. 110pp.

Section 3.6

Kirkley, J.E. 2005. "The Communities of the Atlantic Highly Migratory Species (HMS) Fishery: An Overview of Change Associated with the HMS Fishery Management Plan"

NMFS 2001. "NMFS Operational Guidelines – Fishery Management Process Appendix 2(g), Guidelines for Assessment of the Social Impact of Fishery Management Actions."

Section 3.7

Goldsmith, K. NMFS Highly Migratory Species Management Division. 978/281-9140.

NMFS. 2004. U.S National Report to ICCAT, 2004. NMFS Office of Sustainable Fisheries, Silver Spring, MD. 37 p.

O'Bannon, B., Ed. 2000. Fisheries of the United States 1999. NMFS, Office of Science and Technology, Silver Spring, MD.126 p.

O'Bannon, B., Ed. 2001 Fisheries of the United States 2000. NMFS, Office of Science and Technology, Silver Spring, MD.126 p.

O'Bannon, B., Ed. 2002. Fisheries of the United States 2001. NMFS, Office of Science and Technology, Silver Spring, MD.126 p.

Pritchard, E. 2004. Fisheries of the United States 2003. NMFS, Office of Science and Technology, Silver Spring, MD.124 p.

Rose, D. 1996. An Overview of world Trade in Sharks. TRAFFIC International. 105 p.

Section 3.8

Cortés, E. 2002. Stock Assessment of Small Coastal Sharks in the U.S. Atlantic and Gulf of Mexico. NOAA, NMFS, Southeast Fisheries Science Center, Panama City, FL. SFD-02/03-177. 222 pp.

Cortés, E., L. Brooks, and G. Scott. 2002. Stock Assessment of Large Coastal Sharks in the U.S. Atlantic and Gulf of Mexico. NOAA, NMFS, Southeast Fisheries Science Center, Panama City, FL. SFD-01/02-152. 133 pp.

de Silva, J.A., R.E. Condrey, B.A. Thompson. 2001. Profile of Shark Bycatch in the U.S. Gulf Menhaden Fishery. N. Amer. J. of Fish. Mgmt. 21:111-124.

NMFS. 1999. Final Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks. NOAA, NMFS, Highly Migratory Species Management Division.

NMFS. 2000. Regulatory Amendment One to the HMS FMP. Reduction of Bycatch, Bycatch Mortality, and Incidental Catch in the Atlantic Pelagic Longline Fishery, June 14, 2000.

NMFS. 2002. Regulatory Adjustment 2 to the Atlantic Tunas, Swordfish, and Sharks Fishery Management Plan. NOAA, NMFS, Highly Migratory Species Management Division, 174 pp.

NMFS. 2003a. Final Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks. NOAA, NMFS, Highly Migratory Species Management Division.

NMFS. 2003b. National Report of the United States: 2003. NAT/034. 40 pp.

NMFS. 2004. National Report of the United States: 2004. NAT/035.

NOAA. 1998. Managing the Nation's Bycatch: Programs, Activities, and Recommendations for the National Marine Fisheries Service. 174 pp.

Section 3.9

NMFS. 1999. Amendment 1 to the Atlantic Billfish Fishery Management Plan. DOC/NOAA/NMFS. Silver Spring, MD.

Ditton, R.B., D.K. Anderson, J.F. Thigpen III, B.L. Bohnsack, and S.G. Sutton. 2000. 1999Pirates Cove Big Game Tournaments: Participants' Characteristics, Participation in Fishing, Attitudes, Expenditures, and Economic Impacts. Human Dimensions of Fisheries Laboratory Report #HD-615, Texas A & M University, College Station, TX. 126 pp.

Ditton, R.B. and D.J. Clark. 1994. Characteristics, Attitudes, Catch and Release Behavior, and Expenditures of Billfish Tournament Anglers in Puerto Rico. Report prepared for The Billfish Foundation, Ft. Lauderdale, FL. 27pp.

Fisher, M.R. and R.B. Ditton. 1992. Characteristics of Billfish Anglers in the U.S. Atlantic Ocean. Marine Fisheries Review 54(1): 1-6.

Thailing, C.E., R.B. Ditton, D.K. Anderson, T.J. Murray, J.E. Kirkley, J. Lucy. 2001. The 2000 Virginia Beach Red, White, and Blue Fishing Tournament: Participants' Characteristics, Attitudes, Expenditures, and Economic Impacts. VIMS, College of William and Mary, Virginia Marine Resources Report No. 2001-9, VSG-01-88, Texas A & M University, College Station, TX. 110pp.