2003 STOCK ASSESSMENT AND FISHERY EVALUATION FOR ATLANTIC HIGHLY MIGRATORY SPECIES

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

2003 Stock Assessment and Fishery Evaluation for Atlantic Highly Migratory Species

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

Documentation Requests:

All documents cited in the SAFE report, as well as additional copies of the report, are available from the Highly Migratory Species Management Division, Office of Sustainable Fisheries, National Marine Fisheries Service:

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Dealer Permits:

Tuna dealer permits are issued out of the Northeast Regional Office of NOAA Fisheries (978-281-9370), shark and swordfish dealer permits are issued out of the NOAA Fisheries Southeast Regional Office (727-570-5326).

Charter/Headboat Permits, Atlantic Tuna Permits & Recreational HMS Vessel Permits:

Questions regarding the Charter/Headboat permit, the Atlantic tunas permit, or recreational HMS vessel permit processes should be directed to Aquilent Customer Service at (888) 872-8862, Monday through Friday, from 8 a.m. to 5 p.m. Eastern Time. Fishermen may also listen to or view updates to the regulations via the toll-free automated telephone system or the website (www.nmfspermits.com).

Atlantic Shark and Swordfish Permits:

Questions regarding renewals or transfers of shark and swordfish limited access permits should be directed to the NOAA Fisheries Southeast Regional Office (727-570-5326).

EXECUTIVE SUMMARY

The Stock Assessment and Fishery Evaluation (SAFE) report provides a summary of the best available scientific information on the condition of stocks, marine ecosystems, and fisheries being managed under federal regulation. Consistent with the guidelines for National Standard 2 of the Magnuson-Stevens Fishery Conservation and Management Act, the SAFE report is prepared annually and used as a reference in the evaluation and refinement of fisheries management practices. The report updates the data necessary to determine appropriate annual harvest levels, documents significant trends in the resource, marine ecosystems, and fisheries over time, and identifies associated bycatch and safety issues. Through a comprehensive annual update of key biological, economic, and social indicators, the National Marine Fisheries Service (NOAA Fisheries) can ensure use of the best available scientific data in its decision making process.

The 2003 SAFE report for Highly Migratory Species (HMS) includes the latest stock assessment data, recommendations, and resolutions from the International Commission for the Conservation of Atlantic Tunas (ICCAT) and their Standing Committee on Research and Statistics (SCRS) through December 2002. The report further contains the latest domestic shark stock assessment data. The report is divided into the following ten sections: Introduction; Stock Assessment Update; Essential Fish Habitat; Fishery Data Update; Economic Status of HMS Fisheries; Community and Social Data Update; Fish Processing, Industry and Trade; Bycatch; HMS Permits; and Issues for Consideration and Outlook.

Stock Assessment Update

In 2002, the SCRS conducted new stock assessments for bigeye tuna, East Atlantic and Mediterranean bluefin tuna, western Atlantic bluefin tuna, North and South Atlantic swordfish, and white marlin. Eastern and western Atlantic bluefin tuna, North Atlantic Albacore, Atlantic blue and white marlin, West Atlantic sailfish, and North Atlantic swordfish remain overfished, and bigeye tuna may be overfished. It should be noted that North Atlantic swordfish stocks have made significant progress toward rebuilding. Yellowfin tuna and South Atlantic swordfish are considered fully fished.

Also in 2002, the United States conducted stock assessments on Atlantic large and small coastal sharks. The large coastal shark (LCS) stock assessment indicated that, in aggregate, the complex is overfished and overfishing is occurring. The assessment further indicated that sandbar sharks are no longer overfished (although they have not reached optimum yield), but continue to experience overfishing. A determination was made that blacktip sharks are neither overfished nor experiencing overfishing. The small coastal shark (SCS) stock assessment determined that the SCS complex is not overfished as a whole, but did indicate that overfishing is occurring for finetooth sharks. NOAA Fisheries must now reduce fishing mortality for finetooth sharks.

Essential Fish Habitat

Several joint federal/state surveys of shark nursery and pupping grounds along the Atlantic and Gulf of Mexico coasts were described in papers released during 2002. Also, the second phase of an investigation focused on Atlantic blue marlin spawning and nursery habitat utilization was implemented in 2002 with considerable success. Programs to track movements of adult and juvenile Atlantic bluefin tuna utilizing pop-up tags, archival tags, and ultrasonic depth-sensitive transmitters continued in 2002.

Fishery Data Update

There are multiple sources of information concerning HMS fisheries, including mandatory commercial and recreational permits, observer reports, mandatory logbook reporting in some fisheries, dealer reports, recreational surveys and reporting requirements, and an HMS tournament database. In this document, data are analyzed by gear type to more easily assess the implications for each these multi-species fisheries. Some of the more important developments regarding fishery data from 2002 are:

- Northeast distant statistical area pelagic longline experimental fishery
- HMS Angling Category permits requirement
- Continuation of HMS tournament registration
- Vessel monitoring systems
- Shark emergency rule and notice of intent to amend shark regulations
- LCS and SCS stock assessments
- New ICCAT assessments of a number of species
- HMS vessel logbook and cost-earnings reporting

Economic Status of HMS Fisheries

The 2003 SAFE report includes a section on the economic status of commercial and recreational HMS fisheries. Prior to 2002, this information was presented in association with various gear types, but the 2002 and 2003 reports combine all available economic information into one section, including: production (U.S. and international); ex-vessel prices; wholesale prices; fishing costs and revenues for commercial fisheries; costs and revenues for dealers; recreational fishing; and charter/headboat fisheries. In addition, this section provides a review of

selected rules that had, or are expected to have, a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act.

Community and Social Data Update

Analyses relative to National Standard 8 of the Magnuson-Stevens Act rely heavily on the availability of community studies and profiles. As HMS are highly migratory resources by definition, fishermen often tend to shift locations in an attempt to follow the fish. The inclusion of typical community profiles in HMS management decisions is somewhat difficult and continued social and community studies to identify the participants in these fisheries are of great importance. This section of the SAFE report includes an overview of current information and provides a summary of new research, including a social and economic examination of the fishing ports and coastal counties along the mid-Atlantic coast. This section also provides a summary of expected community and social impacts of agency actions completed during 2002.

Fish Processing, Industry and Trade

Domestic and international consumer preference continues to play a large role in HMS markets. The Fish Processing, Industry and Trade section provides an overview of U.S. trade activities relative to HMS, required documentation, and summaries of U.S. imports and exports of HMS products. Bluefin tuna trade remains strictly monitored through use of the Bluefin Statistical Document program. Sharks and shark products continue to be an important export, although the nature of reporting is much less detailed than that used for bluefin tuna. Swordfish are an important import into the United States, as indicated by data collected through the Swordfish Import Monitoring Program. Consistent with ICCAT recommendations, the United States is currently working toward implementation of a swordfish and bigeye tuna statistical document. The use of trade data to supplement existing information sources is an new important tool in the monitoring and management of HMS.

Bycatch

Bycatch and bycatch mortality of finfish, and incidental catches and fishing-induced mortality of marine mammals, sea turtles, and seabirds continue to be issues of great concern in the management of HMS. NOAA Fisheries and commercial fishermen conducted research in the pelagic longline fishery to address sea turtle interactions during 2002 to ensure compliance with the HMS FMP and a recent Biological Opinion (BO) on HMS fisheries. NOAA Fisheries is currently evaluating the efficacy of recently implemented time-area closures in the South Atlantic and Gulf of Mexico intended to reduce bycatch and discards in the pelagic longline fishery. In an effort to minimize discards of bluefin tuna, NOAA Fisheries has recently proposed to modify minimum target catch requirements for Atlantic bluefin tuna caught incidentally to pelagic longlining activities (67 FR 78404, December 24, 2002). To better account for bycatch mortality in the fishery for Atlantic sharks, NOAA Fisheries reinstated the requirement to count dead

discards against commercial quotas as of January 1, 2003. A particularly challenging aspect of effectively addressing bycatch issues in HMS fisheries is the international component. The United States continues to work through ICCAT to address bycatch issues on an Atlantic-wide basis.

HMS Permits

NOAA Fisheries continues to explore effective and equitable means to address overcapitalization problems. As of October 2002, there were 627 total shark permit holders (directed, incidental), 409 total swordfish permit holders (directed, incidental, handgear), and 226 current tuna pelagic longline permit holders. However, those participating in the directed swordfish fishery must also possess a limited access shark permit and a tuna pelagic longline permit, so the cumulative number of permits does not reflect the actual number of participants. This section provides additional management actions that may be considered to further reduce the number of permits, if deemed necessary. Options for upgrading and safety issues are also discussed.

NOAA Fisheries has made significant improvements to its Atlantic tunas permitting system, including a website where constituents can purchase and renew permits for Atlantic tunas, update permit information, and report recreational landings of bluefin tuna (www.nmfspermits.com). Increasing the level of automation in the permitting process as well as the methods of renewal (i.e., phone, fax, internet) is expected to improve constituent satisfaction and reduce administrative costs. NOAA Fisheries hopes to build upon this success and consider automating other HMS permitting processes in the future.

Issues for Consideration and Outlook

In 2003, NOAA Fisheries plans to continue implementing and evaluating the FMP measures in an attempt to rebuild stocks, address overfishing, and eliminate overcapitalization problems that affect many HMS fisheries. The HMS Management Division expects to implement VMS requirements for Atlantic pelagic longline vessels, and finalize decision-making regarding bluefin tuna incidental catch landing requirements. The agency anticipates finalizing statistical documents for bigeye tuna and swordfish to comply with international obligations. The HMS Management Division further expects to conduct in-depth examinations of, and potentially undertake rulemaking regarding, Atlantic bluefin tuna allocations, the start date for Atlantic bluefin tuna purse seine fishery, and an HMS FMP amendment regarding Atlantic sharks. In the longer-term, NOAA Fisheries intends to move forward with the collection of information, evaluation, and planning for a number of other issues including consideration for the need to update or redesignate EFH for HMS, possible extension of NED experimental measures to minimize sea turtle interactions, evaluating novel fishing gears and techniques, improving and expanding observer programs, amending the regulations pertaining to limited access permits and expanding the selection process for vessel logbook and cost earnings reporting. The HMS Management Division will also seek to improve constituent services and ease reporting burdens

by designing and implementing web-based tournament registration and both tournament and non-tournament reporting.

The 2003 HMS Advisory Panel meeting provides an excellent opportunity to discuss these and other issues raised in the SAFE report which may require further action. Through continuous public and constituent interaction, increased monitoring, ongoing life history work, and additional socio-economic assessment, NOAA Fisheries strives to continue building sustainable fisheries for all Atlantic HMS.

TABLE OF CONTENTS

1. INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a long-range, transparent, and inclusive process to sustainably manage the fisheries of the United States. The fishery management plan (FMP) is the primary management instrument established by the Magnuson-Stevens Act. A component of both the *Final Fishery Management Plan for Atlantic Tunas, Swordfish, Sharks* (HMS FMP) and *Amendment One to the Atlantic Billfish Fishery Management Plan* (Billfish Amendment) is the production of an annual Stock Assessment and Fishery Evaluation (SAFE) report. The SAFE report 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 impacts of recently implemented regulations. Consistent with the guidelines for National Standard 2 of the Magnuson-Stevens Act, the SAFE report is prepared annually and used as a reference in the evaluation and refinement of fisheries management practices. The report updates the data necessary to determine appropriate annual harvest levels, documents significant trends in the resource, marine ecosystems, and fisheries over time, and identifies associated bycatch and safety issues. Through a comprehensive annual update of key biological, economic, and social indicators, NOAA Fisheries can ensure use of the best available scientific data in its decision making process.

The 2003 SAFE report for Atlantic Highly Migratory Species is a vehicle to introduce new information, identify additional management issues that may need to be addressed, and begin preliminary assessment and evaluation of the fishery regulations. The SAFE report includes the latest stock assessment data, recommendations, and resolutions from the International Commission for the Conservation of Atlantic Tunas (ICCAT) and their Standing Committee on Research and Statistics (SCRS). The report also includes the latest domestic shark assessment information. In compliance with National Standard 2 guidelines, the report presents a comprehensive summary of the most recent Atlantic HMS fisheries-related data from a variety of sources across a wide range of disciplines. In addition, the current information is contrasted with previous years' data to highlight important trends and concerns for future management.

The SAFE report is divided into ten sections, including: Introduction; Stock Assessment Update; Essential Fish Habitat; Fishery Data Update; Economic Status of HMS Fisheries; Community and Social Data Update; Fish Processing, Industry and Trade; Bycatch; HMS Permits; and Issues for Consideration and Outlook. The structure of the SAFE report is designed to provide a cohesive view of new information and present it in a format that is easily accessible to managers, HMS and Billfish Advisory Panel members, and the public.

1.1 Update on HMS Management Division Activities During 2002

The year 2002 was very active for the HMS Management Division, with several significant

actions completed during this year. On April 1-3, 2002, a combined HMS and Billfish Advisory Panel meeting was held in Silver Spring, Maryland. These panels provided valuable comments on a suite of management actions considered during calendar year 2002. A partial list of discussion topics included the following:

- Longline incidental bluefin tuna (BFT) catch limits
  Observer Issues
- Charter/Headboat permitting issues
- Recreational HMS permitting issues
- Northeast Distant Statistical Area experimental fishery
- Recreational swordfish fishery
- Enhanced monitoring of recreational billfish fishery to ensure compliance with the ICCAT marlin landings cap
- Bycatch
- Advisory panel operating plan
- Draft compliance guide of all HMS regulations

Numerous Atlantic tuna actions were completed during 2002, with most relating to bluefin tuna, including annual quota specifications, season closure and opening notices, in-season transfers in quota distribution, and adjustments to Angling and General category retention limits. NOAA Fisheries published a final rule to clarify certain provisions pertaining to the definition and operations of HMS Charter/Headboat permitted vessels as well as requiring an Atlantic HMS recreational permit which will be effective March 1, 2003 (67 FR 77434, December 18, 2002). NOAA Fisheries also published a proposed rule to reduce discards of BFT in the Atlantic pelagic longline fishery (67 FR 78404, December 24, 2002).

NOAA Fisheries finalized a number of rules pertaining to swordfish during 2002 and early 2003. NOAA Fisheries implemented a rule (67 FR 70023, November 20, 2002) facilitating a one time transfer of up to 400 metric tons (mt) to Japan per ICCAT recommendation, and established a reserve quota for North Atlantic swordfish. In addition, NOAA Fisheries corrected trade restrictions to facilitate the enforcement of the swordfish dead discard allowance and better monitor the importation of swordfish from designated countries. In January 2003, NOAA Fisheries implemented a rule (68 FR 711, January 7, 2003) mandating reporting of recreationally caught Atlantic billfish and North Atlantic swordfish, established a recreational retention limit for

North Atlantic swordfish, and added handlines as an authorized gear for the North Atlantic swordfish fishery.

In response to receiving a petition to list the Atlantic white marlin as endangered or threatened throughout its range, and to designate critical habitat under the Endangered Species Act (ESA) in September of 2001, NOAA Fisheries convened a status review team (SRT) of experts in pelagic fish biology, fisheries management, and fisheries stock assessment. The SRT was requested to assess the species status and the degree of threat to the species in the context of the listing criteria provided by the ESA. The SRT summarized all available biological information on white marlin and conducted analyses to predict population trends under various scenarios. The status review document prepared by the SRT contains a summary of the information they assembled and constitutes the best available scientific, commercial, and recreational data on Atlantic white marlin. The document addresses the status of the species, the five ESA listing factors, and the effect of efforts underway to protect the species. NOAA Fisheries also conducted a number of public meetings to solicit information from the public about the status of white marlin during the status review process.

After reviewing the best scientific and commercial information available and the effects of current conservation efforts, on September 3, 2002, NOAA Fisheries determined that listing Atlantic white marlin as either threatened or endangered under ESA was not warranted at that time. The best available information indicated that the Atlantic white marlin population has declined greatly, but did not fall to levels that merited ESA protection. NOAA Fisheries added Atlantic white marlin to the ESA list of "candidate species of concern" and will reevaluate the need for ESA protection of Atlantic white marlin in 2007.

In 2002, pending new stock assessments, the large and small coastal shark commercial quotas were maintained at the 1997 levels via an emergency rule (66 FR 67118, December 28, 2001; extension 67 FR 37354, May 29, 2001). On May 8, 2002, NOAA Fisheries announced the availability of the first small coastal shark stock assessment since 1992 (67 FR 30879). Additionally, after conducting extensive sensitivity analyses and modeling on older data sets (67 FR 36858, May 28, 2002), NOAA Fisheries held a shark evaluation workshop that led to a new large coastal shark stock assessment (67 FR 64098, October 17, 2002). This large coastal shark stock assessment was subsequently peer reviewed. Based on these new stock assessments, NOAA Fisheries announced its intent to amend the portions of HMS FMP regarding shark management (67 FR 69180, November 15, 2002). In December 2002, NOAA Fisheries implemented an emergency rule that implemented large and small coastal shark commercial management measures based on the results of the new stock assessments pending the amendment to the HMS FMP (67 FR 78990, December 27, 2002). Four public hearings are planned to collect comments on the emergency rule (68 FR 1024, January 8, 2003).

Additionally, in 2002, NOAA Fisheries finalized regulations based on the Shark Finning Prohibition Act (67 FR 6194, February 11, 2002). Also, several applications for Exempted

Fishing Permits for capturing sharks for public display were received during the year (see Section 9 of this document for further information) and NOAA Fisheries published a proposed rule that would improve monitoring of exempted fishing activities, including those relating to the collection of sharks for display purposes (67 FR72629, December 6, 2002). In January 2002, NOAA Fisheries converted the voluntary shark bottom longline observer program to a mandatory program to ensure adequate observer coverage.

Outside of NOAA Fisheries, there were two stock assessment related documents that were partially funded by NOAA Fisheries; a small coastal shark stock assessment conducted by Mote Marine Laboratories and the University of Florida and a status review of the dusky shark by the Virginia Institute of Marine Science. There were also some international meetings related to shark management. At the 2002 meeting of parties to the Convention on International Trade in Endangers Species (CITES), whale and basking sharks were listed under Appendix II. There was also an Asia-Pacific Economic Cooperation (APEC) forum shark workshop in Mexico in December 2002.

In 2002, there were eight active lawsuits related to the Atlantic HMS fisheries. NOAA Fisheries received favorable rulings in six of the cases, which related to spotter aircraft in the bluefin tuna fishery, closure of the northeast distant statistical area to protect sea turtles, vessel monitoring systems for Atlantic pelagic longline vessels, the swordfish drift gillnet ban, limited access, and bycatch regulations under the 1999 HMS FMP. Plaintiffs filed an appeal in the spotter aircraft case. Pending cases involve challenges related to Atlantic shark management measures and western bluefin tuna rebuilding.

1.2 2002 Accomplishments of the International Commission for the Conservation of Atlantic Tunas (ICCAT)

Information in this section was summarized from the ICCAT Committee Chairman's Memo: Summary of the 2002 ICCAT Meeting.

The following summarizes the major actions taken at the 2002 ICCAT meetings held October 28 - November 04, 2002, in Bilbao, Spain.

Atlantic Tunas

ICCAT chose to increase the total allowable catch (TAC) of western Atlantic bluefin tuna by 200 mt to 2700 mt and provided the nation of Mexico, a new ICCAT contacting party, with 25 mt for bycatch in its yellowfin tuna fishery. The prior U.S. quota share of 1,387 mt was increased by 102.6 mt for 2003 and 2004. Despite U.S. concerns regarding eastern Atlantic/Mediterranean catches, ICCAT chose to establish a TAC of 32,000 for the period 2003-2006. This is significantly above SCRS advice that catches of 26,000 mt or more were not sustainable in the long-term. ICCAT adopted regulations to better protect juvenile bluefin tuna including increasing

the minimum size limit in the Mediterranean and decreasing the tolerance for undersized fish from 15 percent to 10 percent. ICCAT also adopted a recommendation that requires improved reporting of bluefin tuna farming activities. Bigeye tuna and northern albacore tuna catch limits were little changed, as was the catch limit for southern albacore.

Atlantic Swordfish

The United States sought to maintain the integrity of the international rebuilding program for North Atlantic swordfish, while allowing for a slight increase in the total allowable catch (above the 2002 level of 10,400 mt) to accommodate new ICCAT members. Despite U.S. concerns, ICCAT chose to establish a higher TAC of 14,000 mt, which lies at the outer bounds of scientific advice. The U.S. portion of the quota increased approximately 1.5 percent to 30.49 percent, raising the 2003 U.S. quota to 3877 mt and providing an additional 80 mt discard allowance. For 2004 and 2005, the U.S. quota is 3807 with no dead discard allowance. To assist Japan in repaying its North Atlantic swordfish quota overage, the recommendation also allows Japan to count up to 400 mt of swordfish taken from a specific area of the North Atlantic against its uncaught South Atlantic quota, and established another five year (2002-2005) quota block. TACs above SCRS recommendations were established for South Atlantic swordfish for the period 2003-2006. The U.S. catch limit for South Atlantic swordfish was reduced from 384 mt to 100 mt for 2003-2005, and 120 mt for 2006. Importantly, only the United States and Japan are permitted to carry forward quota underages of South Atlantic swordfish. The United States is also allowed to count up to 200 mt of swordfish caught south of the north-south management boundary (between five degrees North latitude and five degrees South latitude) against its North Atlantic swordfish quota (ICCAT Recommendation 02/02).

Atlantic Marlins

Phase one of the Atlantic marlin mortality reduction plan was extended through 2005. The critical elements of phase one include: 1) reducing commercial landings of white marlin and blue marlin by 67 percent and 50 percent, respectively, from 1999 or 1996 landings levels, which ever was higher; 2) release of all live marlin taken as bycatch in commercial fisheries, but allowing landing of marlin killed if they are not entered into commerce; 3) capping U.S. recreational marlin landings at 250 fish in aggregate and establishing observer coverage of U.S. billfish tournaments. The 2002 recommendation also provided for consideration by ICCAT of a program to improve marlin catch data in 2003 and an assessment in 2005.

1.3 Summary of HMS Actions Published in the Federal Register During 2002

During calendar year 2002, NOAA Fisheries' HMS Division completed a total of seven final rules, five proposed rules, eight in-season actions, three emergency rules, 16 notices of meetings, notices of document availability, and/or requests for comments, one notice of petition for rule making, and three corrections (two from the Office of the Federal Register and one from HMS Division) that

were published in the Federal Register. Table 1.1 provides a list of all Federal Register notices filed during 2002 relating to specific actions taken by the HMS Division. All required analytical documents (*e.g.* environmental assessments, environmental impact statements, regulatory impact reviews, etc.) accompanied these actions and are available upon request.

Table 1.1. Summary of NOAA Fisheries' HMS Division Actions

Action Type **NOAA Fisheries ID#**	**CFR Part***	**Action Description**	**Action Pub Info**
Correction by OFR to ID 032900A; RIN 0648-AN06 (see 2001 table)	635	Atlantic HMS; ICCAT Monitoring of Rec. Landings (Billfish and Swordfish) Change of CPE date from 2/25 to 2/19	67 FR 629, 01/04/2002
Notice ID 121901A	635*	M-S Act Provisions; Atl. HMS. Issuance of 2002 EFPs and SRPs. Request Comments	67 FR 1442, 01/11/2002
Emergency (Final) Rule ID 060401B; RIN 0648-AP31	635	Atlantic HMS; Pelagic Longline Fishery; Sea Turtle Protection Measures. Extension Expiration Date and Tech Amendments	67 FR 1668, 01/14/2002
Final Rule ID 041901A; RIN 0648-AP21	600 635 648	Atlantic HMS; Fisheries of the Northeastern United States; Shark Finning Prohibition	67 FR 6194, 02/11/2002
Notice (Not initiated by HMS) ID 021202B	635*	ICCAT Spring Species Working Group; Notice of Public Meeting	67 FR 7358, 02/19/2002
Correction by HMS to ID 110501B; RIN 0648-AP70 (see 2001 table)	635	Atlantic HMS; Commercial Shark Management Measures. Fishing Season Notification. Correction to DATES section	67 FR 8211, 02/22/2002
Notice ID 030602F	635*	Notification of Advisory Panel meetings	67 FR 1297, 03/20/2002
Notice of Availability (NOA) (Not initiated by HMS) EPA Publication		NOA of Environmental Impact Statement Reg. Adjustment 2 to HMS FMP	67 FR 16375, 04/05/2002
Proposed Rule ID 080901B; RIN 0648-AP49	635	Atlantic HMS; Pelagic Longine Fishery; Shark Gillnet Fishery; Sea Turtle and Whale Protection - Implement BO Measures	67 FR 17349, 04/10/2002
Proposed Rule ID 071299C; RIN 0648-AM91	635	Atlantic HMS; Fishing Vessel Permits; Charter Boat Operations	67 FR 20716, 04/26/2002
Proposed Rule Section ID 042202D	635	Notification of combined hearings on preceding two rules: 080901B and 071299C; Extension comment period on 080901B	67 FR 20944, 04/29/2002

Correction by OFR to ID 071299C; RIN 0648-AM91	635	Atlantic HMS; Fishing Vessel Permits; Charter Boat Operations Change of CPE date from 5/28 to 5/23	67 FR 22165, 05/02/2002
Notice ID 050102F	635*	M-S Act Provisions; Atlantic HMS; Exempted Fishing Permits; Request for Comments	67 FR 34675, 05/15/2002
Notice ID 051002B	635	Notice of availability large coastal shark assessment modeling paper; request for comments; announcement of large coastal shark assessment workshop.	67 FR 36858, 05/28/2002
Emergency (Final) Rule ID 110501B; RIN0648-AP70	635	Atlantic HMS; Commercial Shark Mgmt. Extension of expiration date; request for comments; fishing season notification	67 FR 37354, 05/29/2002
Notice of Availability (NOA) (Not initiated by HMS) EPA Publication		NOA of Final Supplemental Environmental Impact Statement Reg. Adjustment 2 to HMS FMP. EPA Granted 7-day waiver.	67 FR 39383, 06/07/2002
Final rule in-season action ID 053102B	635	Atl. HMS; Atl. Bluefin Tuna Rec. Fishery. Retention limit adjustments	67 FR 39869, 06/11/2002
Proposed rule ID 042602F; RIN0648-AP90	635	Atl. HMS; Atl. BFT. Initial 2002 quota specs and General category effort controls; public hearings; request for comments	67 FR 43266, 06/27/2002
Notice of Availability (NOA) (Not initiated by HMS) EPA Publication		NOA of EPA Comments on Final Environmental Impact Statement Reg. Adjustment 2 to HMS FMP	67 FR 43595, 06/28/2002
Final Rule ID 080901B; RIN0648-AP49	635	Atlantic HMS; Pelagic Longline Fishery; Shark Gillnet Fishery; Sea Turtle and Whale Protection Measures	67 FR 45393, 07/09/2001
Final Rule In-season Action ID 071202D	635	Atl. HMS; Atl. BFT. Adjustment of General category daily retention limit	67 FR 47470, 07/19/2002
Notice ID 081202D	635*	Atl. HMS; Advisory Panels Request for Nominations	67 FR 54169, 08/21/2002
Final Rule In-season Action ID 083002D	635	Atl. HMS; Atl. BFT. Adjustment of General category daily retention limit	67 FR 56934, 09/06/2002
Final Rule In-season Action ID 091302A	635	Atl. HMS; Atl. BFT. Adjustment of General category daily retention limit	67 FR 59477, 09/23/2002
Final Rule ID 042602F; RIN0648-AP90	635	Atl. HMS; Atl. BFT. Initial 2002 quota specs and General category effort controls	67 FR 61437, 10/01/2002
Final Rule In-season Action ID100702A	635	Atl. HMS; Atl. BFT; Quota transfers; General category daily retention limit adjustment.	67 FR 63854, 10/16/02

Notice of Availability ID 100102B	635*	Stock Assessment of Large Coastal Sharks in the US Atlantic and Gulf	67 FR 64098, 10/17/02
Final Rule Technical Amendment ID 091002I; RIN0648-AP89	635	Atl. HMS; NOAA Information Collection Requirements; Technical Amendment	67 FR 64311, 10/18/02
Notice ID 101702A	635*	Large Pelagics Survey; Proposed Information Collection; Req. Comments	67 FR 64873, 10/22/02
Final Rule; In-season Action ID 102202A	635	Atl. HMS; Atl. BFT General category closure	67 FR 66072, 10/30/02
Final Rule; In-season Action ID 110102E	635	Atl. HMS; Atl. BFT Opening of General Category New York Bight Set-aside Fishery	67 FR 68045, 11/08/02
Notice of Intent (NOI) ID 103102B	635	Atl. HMS; Environmental Impact Statement (EIS) for Amendment 1 to the FMP for Atl. Tunas, Swordfish and Sharks	67 FR 69180, 11/15/02
Notice ID 110102J	635	Atl. HMS; BFT Petition for Rulemaking	67 FR 69502, 11/18/02
Notice ID 102902A	635*	Atl. HMS; Notification of Advisory Panel Meetings	67 FR 69507, 11/18/02
Notice ID 111302B	635*	Vessel Monitoring System; Proposed Information Collection; Req. Comments	67 FR 69506, 11/18/02
Final Rule ID 010201A; RIN 0648-A093	635	Atl. HMS; Quotas and Fishing Areas; Trade Monitoring	67 FR 70023, 11/20/02
Final Rule; In-season Action ID 112202D	635	Atl. HMS; Atl. BFT; Quota Transfers; Fishery Reopening	67 FR 71487, 12/02/02
Proposed Rule ID031501A; RIN 0648-A079	635	Atl. HMS; Atl. BFT; Exempted Fishing Activities	67 FR 72629, 12/06/02
Final Rule; In-season Action ID 121202A	635	Atl. HMS; Atl. BFT; General Category Closure	67 FR 77433, 12/18/02
Final Rule ID 071299C; RIN0648-AM91	635	Atl. HMS; Fishing Vessel Permits; Charter Boat Operations	67 FR 77434, 12/18/02
Notice ID 120302A	635*	Magnuson-Stevens Act Provisions; Atl. HMS; Exempted Fishing and Scientific Research Permits	67 FR 77752, 12/19/02
Proposed Rule ID 110200D; RIN 0648-0A75	635	Atl. HMS; Incidental Catch Requirements of BFT	67 FR 78404, 12/24/02

Emergency Rule ID 120902A; RIN 0648-AQ39	635	Atl. HMS; Commercial Shark Management Measures	67 FR 78999, 12/27/02

* No CFR text but related to those regulations

Section One References

ICCAT 02/02. 2002, *Recommendation by ICCAT Relating to the Rebuilding Program for North Atlantic Swordfish*, ICCAT 2002.

Graves, John., Chairman, 2002. U.S. ICCAT Advisory Committee, *Memorandum: Summary of the 2002 ICCAT Meeting*, November 22, 2002.

SCRS. 2002. Report of the Standing Committee on Research and Statistics, ICCAT SCRS, September 30 - October 4, 2002.

2. STOCK ASSESSMENT UPDATES

With the exception of Atlantic sharks, stock assessments for Atlantic HMS are conducted by ICCAT and the SCRS. In 2002, the SCRS conducted stock assessments for Atlantic white marlin, North and South Atlantic swordfish, bigeye tuna, and bluefin tuna. Also in 2002, the United States conducted stock assessments for the Atlantic large and small coastal shark complexes. For other HMS stocks, a brief review of the most recent assessment information and any new species-specific (primarily biological) studies with management implications are discussed. As established in the HMS FMP, a stock is considered overfished when the biomass level (B) falls below the minimum stock size threshold (MSST) and overfishing occurs when the maximum fishing mortality threshold (MFMT) exceeds the fishing mortality rate (F).

Table 2.1 **Stock Assessment Summary Table** (stock assessment summary for Atlantic sharks can be found in section 2.5)

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Fishing Mortality Rate	Maximum Fishing Mortality Threshold	
North Atlantic Swordfish	B_{02}/B_{MSY} = 0.94 (0.75-1.24)	$0.8B_{MSY}$	F_{01}/F_{MSY} = 0.75 (0.54-1.06)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is not occurring, stock is in recovery
South Atlantic Swordfish	*Not estimated*	$0.8B_{MSY}$	*Not estimated*	F_{year}/F_{MSY} = 1.00	Fully fished; Overfishing may be occurring.*
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.*

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Fishing Mortality Rate	Maximum Fishing Mortality Threshold	Outlook
Atlantic Bigeye Tuna	B_{02}/B_{MSY} = 0.81-0.91	*$0.6B_{MSY}$ (age 2+)*	F_{01}/F_{MSY} = 1.15	F_{year}/F_{MSY} = 1.00	May be overfished; overfishing is occurring.
Atlantic Yellowfin Tuna	B_{99}/B_{MSY} = 1.03	*$0.5B_{MSY}$ (age 2+)*	F_{99}/F_{MSY} = .88-1.16	F_{year}/F_{MSY} = 1.00	Not overfished; overfishing may be occurring.
North Atlantic Albacore Tuna	B_{99}/B_{MSY} = 0.68 (0.52-0.86)	*$0.7B_{MSY}$*	$F_{99}F_{MSY}$ = 1.10 (0.99 - 1.30)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
South Atlantic Albacore Tuna	B_{99}/B_{MSY} = 1.60 (0.01-1.98)	*Not estimated*	F_{99}/F_{MSY} = 0.57 (0.34-556)	*Not estimated*	Not overfished; overfishing not occurring.*
West Atlantic Skipjack Tuna	*Unknown*	*Unknown*	*Unknown*	F_{year}/F_{MSY} = 1.00	Unknown
Atlantic Blue Marlin	B_{00}/B_{MSY} = 0.4 (0.25 - 0.6)	*$0.9B_{MSY}$*	F_{99}/F_{MSY} = 4.0 (2.5 - 6.0)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
Atlantic White Marlin	B_{01}/B_{MSY} = 0.12 (0.06-0.25)	*$0.85B_{MSY}$*	F_{00}/F_{MSY} =8.28 (4.5-15.8)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
West Atlantic Sailfish	*Not estimated*	*$0.75B_{MSY}$*	*Not estimated*	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.

* South Atlantic swordfish, South Atlantic albacore and East Atlantic bluefin tuna are not found in the U.S. EEZ and, therefore, not managed under the Magnuson-Stevens Act.

2.1 Stock Assessment Update: ATLANTIC SWORDFISH

2.1.1 Life History/Species Biology Information

This section is taken primarily from the 2002 SCRS Report which summarizes all recent data on Atlantic swordfish.

Swordfish are widely distributed in the Atlantic Ocean and Mediterranean Sea. They range from Canada to Argentina in the western Atlantic, and from Norway to South Africa in the eastern Atlantic. The management units for assessment purposes are a separate Mediterranean group, and North and South Atlantic groups separated at 5°N. This stock separation is supported by recent genetic analyses. However, the precise boundaries between stocks are uncertain, and mixing is believed to be highest in the boundary areas. As a result, there is uncertainty as to whether the management units used correspond exactly to the biological stock units.

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. They are found in the colder northern waters during summer months and all year in the subtropical and tropical areas.

Swordfish are characterized by having 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 five, at a length of about 180 cm. Known spawning areas are located in the warm tropical and subtropical waters, where swordfish spawn throughout the year in different localized areas displaying a regular seasonal pattern.

2.1.2 Recent Stock Assessment Results

A new assessment of North and South Atlantic swordfish stocks was conducted in 2002, during which updated catch per unit of effort (CPUE) and catch data were examined. Sex and age-specific catch rates for the North Atlantic, as well as biomass standardized catch rates for both the North and South Atlantic were updated from various fleets.

North Atlantic Swordfish

The SCRS noted that there has been high recruitment since 1997. The updated North Atlantic CPUE data show similar trends to previous years, and also show signs of improvement in stock status since 1998. The high recruitment in combination with other factors has resulted in an increase in the North Atlantic stock size. The biomass at the beginning of 2002 was estimated to be at 94% (range: 75 to 124%) of the biomass needed to produce MSY. 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.

South Atlantic Swordfish

The CPUE data in the South Atlantic show contradictory patterns by fleet. Lack of important CPUE information from some fleets fishing in the South Atlantic prevented SCRS from

reconciling the conflicts. As a result of inconsistencies in the available CPUE trends, reliable stock assessments could not be obtained.

2.1.3 SCRS Advice and Current Management Measures

North Atlantic Swordfish

The SCRS warned against large catch increases over the 2002 TAC for North Atlantic Swordfish, and stated that moderate catch increases (e.g. to levels below the estimated MSY) would guard against potential biases in the assessment and provide stability for the stock and fisheries. The SCRS noted that if the Commission desired to rebuild the stock to biomass levels that would support MSY by the close of 2009 with a probability of greater than 50%, then the catch could be maintained at 14,000 mt for 2003-2009. The SCRS further noted that positive signs in recent recruitment may be due, in part, to environmental factors, and it is unknown if these factors will be positive or negative in the future.

In 2000, Japan reported that it had significantly exceeded its North Atlantic swordfish quota for the last few years despite some actions taken to address this compliance problem. Because of concerns for the integrity of the 10 year swordfish rebuilding program adopted by ICCAT in 1999 and given the recent under-harvest by the United States of its North Atlantic swordfish quota, the United States, with the full support of the U.S. longline industry, agreed to assist Japan in addressing its swordfish over-harvest. Specifically, a measure was adopted that, among other things, allowed Japan access to as much as 400 mt of unused U.S. quota for 2001 only. Of this, 215 mt will be transferred to Japan to address that nation's over-harvest. The remainder will be rolled back into the U.S. quota allocation. ICCAT also continued its efforts to control illegal, unregulated, and unreported fishing activities by moving forward with implementation of an agreement to develop a statistical document program for swordfish. This program will monitor landings and trade, and assist in the collection of data. Together, these steps are designed to prevent total catches from exceeding the TAC established by the 1999 rebuilding program.

The SCRS noted that time and area closures implemented in the North Atlantic by the United States to protect small swordfish and other species caught incidentally by pelagic longline have reduced the catches attributed to the United States, and may have contributed to redistribution of the fleet. Analyses conducted to examine the impact of the area closures on CPUE did not reveal a measurable impact on catch rates in 2001.

South Atlantic

The SCRS recommended that catch should remain at about the same level of the past few years (14-15,000 MT). SCRS is concerned about the lack of availability and inconsistency of scientific data on catches, sizes, and CPUE indices in the South Atlantic and the impact of these

data limitations on future assessments.

Table 2.1.1 **Summary Table for the Status of Atlantic Swordfish Stocks**. Source: SCRS, 2002, unless otherwise indicated.

Stock (2 stocks; divided at 5°N. Lat.)	**North Atlantic**	**South Atlantic**
Age/size at Maturity	Females: 53% are mature ~ 180 cm lower jaw fork length (LJFL) (5 years) Males: 50% are mature ~ 129 cm LJFL (Arocha, 1997)	
Spawning Sites	Warm tropical and sub-tropical waters (throughout the year)	
Current Relative Biomass Level (B_{2001}/B_{MSY})	0.94 (0.75-1.24)	*Not estimated*
Minimum Stock Size Threshold	$0.8B_{MSY}$	$0.8B_{MSY}$
Current Fishing Mortality Rate F_{2001}/F_{MSY}	0.75 (0.54-1.06)	*Not estimated*
Maximum Fishing Mortality Threshold	F_{1998}/F_{MSY} = 1.00	F_{1998}/F_{MSY} = 1.00
Maximum Sustainable Yield	14,340 mt (11,580-15,530)	*Not estimated*
Current (2001) Yield[1]	9,797 mt	14,251 mt
Current (2002) Replacement Yield	~MSY	*Not estimated*
Outlook	Overfished; Overfishing is not occurring, stock is in recovery	Fully fished*; Overfishing probably continues to occur

[1] Includes an estimate of unreported catches.
* South Atlantic swordfish are not found in the U.S. EEZ and, therefore, not managed under the Magnuson-Stevens Act. The classification of the stock as fully fished is based on the definitions established in the HMS FMP and is for descriptive purposes only.

2.1.4 Evaluation of Current Management Measures

Catch limits: The North Atlantic swordfish catch limit (stock-wide) for 2001 was 10,500 mt (10,200 mt landed and 300 mt discarded dead). The reported landings were 8,605 mt and the estimated dead discards were 828 mt. Total catch was probably under-reported for 2001 due to partial compliance with ICCAT reporting obligations. The target total allowable catch in the South Atlantic for 2001 was 14,620 mt. The reported landings were 13,379 mt and reported discards were less than 1 mt.

In 2001, U.S. fishermen were limited to a 2,951 mt catch limit (including a 280 mt dead discard allowance) for North Atlantic swordfish and a self-imposed catch limit of 384 mt for South Atlantic swordfish. In the North Atlantic fishery, the estimated total swordfish catch of U.S. fishermen decreased by 913 mt in 2001 to 2,568 mt, including 293 mt of dead discards. This

catch level resulted in an under-harvest of 383 mt for the year, but an overharvest in the dead discard allowance of 53 mt. Reported landings from U.S. fishermen in the South Atlantic fishery were 43 mt, resulting in a 340 mt under-harvest.

Minimum size limit: There are two minimum size options that are applied to the entire Atlantic: 125 cm LJFL with a 15% tolerance, or 119 cm LJFL with zero tolerance and evaluation of discards. United States' fishermen must abide by the 119 cm LJFL size limit. In 2000, the percentage of swordfish reported landed (throughout the Atlantic) less than 125 cm LJFL was about 21% (in number) overall for all nations fishing in the Atlantic. If this calculation is made using reported landings plus estimated discards, then the percentage of swordfish landed that were less than 125 cm LJFL would be approximately 25%. In the absence of size data, these calculations could not be updated or examined for 2001.

The Swordfish Certificate of Eligibility program was continued in 2002 to support enforcement of the U.S. minimum size requirement. This program requires that all imported swordfish be accompanied by a document stating that the fish meets the minimum size requirement, or that if it doesn't meet minimum size requirements, that it was harvested from other than the Atlantic Ocean. Importers must submit copies of all COEs on a bi-weekly basis which are then compared to dealer reports on purchased fish, and U.S. Customs data. This program is being amended to comply with the ICCAT swordfish statistical document requirements. Table 7.5 summarizes the bi-weekly dealer report and the COE data for the 2001 calendar year.

Stock structure: NOAA Fisheries is concerned about the uncertainties in the stock structure of Atlantic swordfish and its management implications, reinforcing the importance of effective management measures throughout the Atlantic and Mediterranean.

Time/area closures/Live bait prohibition: *Please refer to Chapter 8 "Bycatch" for evaluation of these measures.*

Reporting Requirements: Evaluation of international management measures on a stock-wide basis can only occur based on *reported* landings and discards. A significant problem exists internationally with the under-reporting of fishing activities. Therefore, on an Atlantic-wide basis catch, landings, discard, and fishing mortality rate figures are likely to be underestimates.

2.2 Stock Assessment Update: ATLANTIC BLUEFIN TUNA

2.2.1 Life History/Species Biology Information

Basic information on the life history of West Atlantic bluefin tuna can be found in the HMS FMP (Sections 2.2.1 and 6.3.1.3). There are numerous research projects underway regarding the life history of West Atlantic bluefin tuna. Much of the information below is taken

from the 2002 U.S. National Report to ICCAT.

As part of its commitment to ICCAT's Bluefin Year Program (BYP), research supported by the United States has concentrated on ichthyoplankton sampling, reproductive biology, methods to evaluate hypotheses about movement patterns, spawning area fidelity and stock structure investigations. Ichthyoplankton surveys in the Gulf of Mexico during the bluefin spawning season were continued in 2001 and 2002. 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 (SCRS/02/91).

Efforts are underway to identify bluefin larvae for possible use in genetic analyses. Ichthyoplankton surveys in the Gulf of Mexico during the bluefin spawning season deploy two types of gear (bongo and nueston); the bongo samples have been used for the bluefin larval index. For about a decade two neuston nets have been fished at each station and the samples from one net have been preserved in ethanol. During 2001 and 2002 neuston samples which were preserved only in ethanol and collected throughout the 1990s have been sent for sorting. Those sent in 2001 were from 1995-2000 and have been sorted, but the identifications have not yet been verified. Samples sent for sorting in 2002 were from 1992-1994 and 2001. These samples in addition to samples already made available from 1994 when the joint cruise with the Japanese occurred, may be useful in stock discrimination analyses.

Studies related to genetic evaluations of the number of fishery management units of Atlantic bluefin are being conducted at several laboratories in the United States. The NOAA laboratory in Charleston, SC is acting as a sample archive center and has tissues from all bluefin collected for stock structure research by the NOAA Fisheries since 1996 and some or all samples collected by researchers from various institutions including the University of South Carolina, the Virginia Institute of Marine Science, the University of Maryland and the Massachusetts Division of Marine Fisheries.

Scientists at Virginia Institute of Marine Science and Texas A&M University continue to search for heterogeneous micro-satellite loci. In addition they have begun screening adult bluefin from the eastern and western management areas for micro-satellite frequencies. Regional and temporal heterogeneity of allele frequencies have been found for several loci, but consistent differences between adults captured in the eastern and western Atlantic have not been found.

Research on the feasibility of using otolith chemistry to discriminate bluefin stock continues at Texas A&M University and the University of Maryland. Current research is focused on preconcentration procedures to eliminate chemical interferences and increase sample classification accuracy. Additionally stable isotopes (d13C and d18O) have been used as recorders of environmental conditions and are being investigated for possible use in determining stock structure. Preliminary results for one isotope (d18O) for 1 year old bluefin from the

Mediterranean and the West Atlantic were markedly different with cross-validated classification success of 100%, indicating that nursery area could be accurately predicted.

Research on bluefin tuna movement patterns using electronic tags and on the associated methodology was continued in 2001 and 2002. Tagging activities continued off North Carolina (scientists from Stanford University, Monterey Bay Aquarium and NOAA Fisheries) and off northeast North America (by scientists from (1) New England Aquarium, Massachusetts Division of Marine Fisheries. and D.F.O. from Canada and (2) Stanford University and the Monterey Bay Aquarium). Report SCRS/02/92 reviewed the most recent results obtained from electronic tagging of > 500 fish by the Stanford University Team. Additionally, researchers from Stanford University and the Monterey Bay Aquarium continued studying the feasibility of tagging bluefin tuna in the Gulf of Mexico, successfully releasing 4 bluefin with electronic tags in 1999, about 10 fish in 2000, 5 fish in 2001, and 8 in 2002.

Scientists from the New England Aquarium conducted studies on a variety of topics related to bluefin tuna in addition to the tagging activities mentioned above and extensive participation in the exploratory research in the central Atlantic. Data from pop-up satellite tags is being studied to determine the reliability of the geographic information for understanding bluefin movement and behavior. Studies of the relationship between bluefin schools and surface water temperatures has been conducted. Additionally research on the bluefin movement patterns and their relationship to the environment have been investigated with respect to the utility of spotter aircraft observations for indicators of abundance. Research is also continuing on bluefin energetics, reproduction and predator prey relations.

Several documents considered the implications of mixing between eastern and western stocks. SCRS/02/93 examines recapture rates of tagged fish in three areas: 1) West Atlantic, 2) Northeast Central Atlantic, and 3) East Atlantic and Mediterranean. The use of the ICCAT tagging data for identifying stock mixing in the Northeast Central area is discussed, as is the possibility of differing reporting rates between areas. SCRS/02/87 assumed a six strata spatial structure (as identified at the September 2001 ICCAT workshop on bluefin mixing) and applied a simple age-aggregated (production) model approach with inter-stratum mixing. The results suggest that, with or without mixing, the 1997 catch levels of bluefin in the western Atlantic are sustainable; however, those in the east for 1997 are well above sustainable levels and need substantial reduction. Across a wide range of model input parameter values, even at relatively modest levels of mixing the fishery in the West is predicted to be adversely affected unless reduction in the east takes place. In SCRS/02/88, a multi-area, fleet-disaggregated, age-structured population dynamics model is used to evaluate the effectiveness of existing and alternative management measures under different mixing scenarios. The model simulates the dynamics of the two bluefin tuna stocks in the North Atlantic and of the fisheries that target them Results indicate that assessment results can be affected considerably by the level of mixing, age-specific movement patterns and gear selectivities.

SCRS/02/86 identified some improvements for the ADAPT VPA assessment and projection computations carried out at the 2000 assessment, related to plus-group mass and how this was taken into account in MSY computations. Abundance indices were developed using Canadian fishery data (SCRS/02/81), U.S. longline data (SCRS/02/90) and U.S. rod and reel data (SCRS/02/89) for a range of size classes of bluefin tuna.

2.2.2 Recent Stock Assessment Results

The two management units for Atlantic bluefin tuna are separated at 45° W above 10° N and at 25° W below the equator, with an eastward shift in the boundary between those parallels. A new stock assessment was conducted for both Atlantic bluefin tuna management units (East and West) in 2002. The West Atlantic stock assessment included projections for two scenarios about future recruitment (Table 2.2.1). One scenario assumed that future recruitment will approximate the average estimated recruitment since 1976, unless spawning stock size declines to low levels. The second scenario anticipated an increase in recruitment corresponding to an increase in spawning stock size up to a maximum level no greater than the average recruitment for 1970 - 1974. These scenarios were referred to as the low recruitment and high recruitment scenarios, respectively.

The results of projections based on the low recruitment scenario (Table 2.2.2) for the Atlantic stock indicated that a constant catch of 2,500 mt per year has a 97 percent probability of allowing rebuilding to the associated B_{MSY} level by 2018. A constant catch of 2,500 mt per year has about a 35 percent probability of allowing rebuilding to the 1975 stock size by 2018. The SCRS notes that, arguably SSB75 is appropriate as a target level for interpreting the implications of projections based on the high recruitment scenario. Under the high recruitment scenario, a constant catch of about 2,500 mt has about a 60 percent probability of allowing rebuilding to the 1975 stock size; a catch of 2,700 has about a 52 percent chance of reaching this stock size. The SCRS cautioned that these conclusions do not capture the full degree of uncertainty in the assessments and projections. The immediate rapid projected increases in stock size are strongly dependent on estimates of high levels of recent recruitment, which are the most uncertain part of the assessment. The implications of stock mixing between the east and West Atlantic add to the uncertainty.

The SCRS noted again, as it has in the past, that mixing of East and West management unit fish could have important implications for both resources. It stressed the potential adverse effect that the eastern stock fishery cold have on the western stock, and noted that significant improvements to the biological knowledge of bluefin tuna are required before an improved assessment of West Atlantic bluefin can be achieved. Based on these concerns and the mounting evidence of inter-stock mixing, in 2002, ICCAT established a working group to evaluate the issues of stock structure and mixing and charged them with developing operational management options for review in 2004.

The SCRS updated the assessment for the east Atlantic and Mediterranean stock in 2002, but noted that it lacked confidence in the analysis due to increased under-reporting and a lack of CPUE and size data. The 1998 projections (Table 2.2.3) show that current catch levels are not sustainable. Results for the 2002 analysis were similar to 1998's assessment in terms of trends but more optimistic in terms of current depletion. The SSB in 2000 was estimated to be about 86% of the 1970 level, up from the SSB_{97}/SSB_{70} of 47%. Fishing mortality has increased, especially

for older fish since 1993, which is of grave concern; F_{00} was almost 2.5 times higher than that which maximizes yield per recruit (YPR). Substantial reductions in F could support future yields at current or even higher (perhaps > 50 mt greater) levels. The SCRS expressed continued concern about the intensity of fishing pressure on small fish. This contributes substantially to growth over-fishing, and seriously reduces the long-term potential yield from the resource.

2.2.3 SCRS Advice and Current Management Measures

The SCRS' recommendation for the West Atlantic stock is based on ICCAT's 1998 Rebuilding Program, which aspires to rebuild with 50% probability to SSB_{MSY} by 2018. The SCRS concluded that in light of uncertainty in the assessment including recruitment estimates, stock mixing, and rebuilding targets, the total allowable catch (TAC) should not be changed from the current level of 2,500 mt. Based on similar advice in 2001, ICCAT did not adopt any changes to the 20 year rebuilding program at its 2001 meeting. However, in 2002 ICCAT chose to increase the TAC to 2,700 mt for the 2003 fishery.

Despite SCRS advice that current catch levels in the East Atlantic and Mediterranean are unsustainable, the total allowable catch was not reduced at the 2002 ICCAT meeting. However, ICCAT did include virtually all entities of concern in its allocation scheme which caps TAC at 32,000 mt per year through 2005, and requires a management program re-evaluation in 2005 before rollover underages may be applied. ICCAT also addressed the high fishing mortality on juvenile fish by reducing tolerances for small fish harvest and increasing the Mediterranean's minimum size from 3.2 kg to 4.8 kg. Parties are also required to develop plans to reduce catches of Mediterranean juveniles to at least reach the recommended tolerance levels.

Table 2.2.1 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)
Current (2001) Yield	2,646 mt

Short Term Sustainable Yield	Probably > 3,000 mt
Outlook	Overfished; overfishing continues to occur

Table 2.2.2 Probability of western Atlantic bluefin tuna achieving rebuilding target by 2018. From SCRS 2002.

Catch (mt)	Low Recruitment Scenario		High Recruitment Scenario	
	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%

Table 2.2.3 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 (2000) Yield	33,754 mt
Sustainable Yield (1997)	about 25,000 mt
Outlook	Overfished; overfishing continues to occur.

2.3 Stock Assessment Update: BAYS TUNAS

2.3.1 ATLANTIC BIGEYE TUNA

2.3.1.1 Life History/Species Biology Information

Information on the life history of Atlantic bigeye tuna can be found in the HMS FMP (Sections 2.2.1 and 6.3.1.2). In 1999, ICCAT began its Bigeye Tuna Year Program (BETYP) with an ambitious research agenda including conventional and pop-tagging, improvement of catch statistics, studies on genetics, growth, and natural mortality, and the development of an integrated stock assessment program. During 2001 and 2002, conventional tagging occurred in the Gulf of Guinea and Canary Islands and pop-up tagging was conducted in the Azores. Fishery statistics were improved in Ghana, and genetic, hard part, and modeling projects continued. The BETYP is scheduled to wrap-up in the near future, and the final symposium to review research findings will occur in March 2004.

2.3.1.2 Recent Stock Assessment Results

ICCAT currently manages Atlantic bigeye tuna based on an Atlantic-wide single stock hypothesis. However, the possibility of other scenarios, including north and south stocks, does exist, and should not be disregarded (SCRS 2002). The latest stock assessment of Atlantic bigeye tuna was conducted in October 2002. The assessment was hampered by a paucity of information about illegal, unregulated, or unreported (IUU) catches, limited Ghanian fishery statistics, and the lack of a reliable index of abundance for small bigeye tuna. An estimate of natural mortality for juvenile fish was computed, which will help reduce uncertainty in future assessments.

Various production models were used which estimated that the total catch was larger than the upper limit of MSY estimates for the years between 1993 and 1999, causing the stock to decline considerably (SCRS 2002). This period was followed by a leveling off of biomass in recent years as total catches decreased. These results indicate that the current biomass is about 10-20% below the biomass corresponding to MSY and that current fishing mortality is about 15% higher than the rate that would achieve MSY. In addition to the estimates from production models, yield-per-recruit (YPR) analyses and other models support the production model results indicating that the stock is being over-fished. Further YPR analysis indicates that YPR can be increased with a reduction of fishing effort in small-fish fisheries. Increases in biomass are expected with catches below 95,000 mt, and further biomass declines are expected with catches of 105,000 mt or greater.

2.3.1.3 SCRS Advice and Management Measures

Catch of undersized fish remains a major problem in the Atlantic bigeye tuna fishery. The share of bigeye tuna less than the ICCAT minimum size (3.2 kg) is estimated at up to 59 percent by number of all bigeye tuna harvested. At its 2000 meeting, ICCAT adopted a recommendation that established the first-ever catch limits for bigeye tuna, which went into effect in 2001. These

measures were continued for 2002 and 2003. While these measures will not be sufficient to rebuild the stock, bigeye tuna catches in 2000 (100,413 mt) and 2001 (96,482 mt) were down significantly from the 1999 level of 120,883 mt - first steps toward rebuilding.

The SCRS also expressed gratitude to the Commission for implementation of the bigeye tuna statistical document program. With this data collection tool in place, future assessments should be improved.

Table 2.3.1 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_{02}/B_{MSY} = 0.81 - 0.91 $0.6B_{MSY}$ (age 2+)
Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	F_{01}/F_{MSY} = 1.15 F_{year}/F_{MSY} = 1.00
Maximum Sustainable Yield	79,000 - 105,000 mt
Current (2001) Yield	96,482 mt
Current (2002) Replacement Yield	102,200 mt
Outlook	May be overfished; overfishing is occurring

2.3.2 ATLANTIC YELLOWFIN TUNA

2.3.2.1 Life History/Species Biology Information

The HMS FMP (Sections 2.2.1 and 6.3.1.5) includes summary information on the life history of yellowfin tuna. In 2002, several collaborative studies were conducted by U.S. scientists in cooperation with scientists from other countries. Cooperative research by the NOAA Fisheries and the Instituto Nacional de la Pesca (INP) in Mexico continued. 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.

2.3.2.2 Recent Stock Assessment Results

Based on movement patterns, as well as other information (e.g., time-area size frequency distributions and locations of fishing grounds), ICCAT manages Atlantic yellowfin tuna based on an Atlantic-wide single stock hypothesis. The latest stock assessment for Atlantic yellowfin tuna was conducted in 2000, but the input data were updated for this year's report. The assessment incorporated various age-structure and production models, and both equilibrium and non-equilibrium production models were examined. The data used for the equilibrium models assumed a fixed increase in fishing power of 3% per year. In contrast, the non-equilibrium model estimated changes in fishing power trends internally by fleet.

The production model analyses imply that 2001 catches were above the range of MSY levels, and that effort may be either above or below the MSY level, depending on assumptions about changes in fishing power. Consistent with these results, yield-per-recruit analyses also indicate that current fishing mortality rates could either be above, or about at, levels that could produce MSY. In summary, reported yellowfin tuna landings appear to be close to the MSY level and fishing effort and fishing mortality may be in excess of the levels associated with MSY.

2.3.2.3 SCRS Advice and Management Measures

The SCRS continues to recommend that fishing mortality on small yellowfin tuna should be reduced. Based on the results of the 2000 assessment, the SCRS reaffirmed its support for the Commission'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.

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 has not been listed as overfished, thus no rebuilding program has been adopted at this time.

Table 2.3.2 Summary Table for the Status of Atlantic Yellowfin Tuna

Age/size at Maturity	Age 3/~110 cm curved fork length
Spawning Sites	Tropical waters
Current Relative Biomass Level	B_{99}/B_{MSY} = 1.03
Minimum Stock Size Threshold	$0.5B_{MSY}$ (age 2+)

Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	F_{99}/F_{MSY} = 0.88 - 1.16 F_{year}/F_{MSY} = 1.00
Maximum Sustainable Yield	144,600 - 152,200 mt
Current (2001) Yield	157,000 mt
Current (2001) Replacement Yield	May be somewhat below the current yield
Outlook	Stock not overfished, overfishing may be occurring

2.3.3 ATLANTIC ALBACORE TUNA

2.3.3.1 Life History/Species Biology Information

The HMS FMP (Sections 2.2.1 and 6.3.1.4) includes summary information on the life history of Atlantic albacore tuna. The cooperative research initiated by the United States (NOAA Fisheries) and the Instituto Espanol de Oceanografia (IEO) of Spain in 1993 continued. In 1999, the effort was extended to analyze the catch per unit effort data for the Spanish troll and baitboat fisheries using the general linear modeling approach. Further training sessions on this topic also took place in late 2000 and was extended to standardization of eastern Atlantic bluefin tuna catch rate time series in early 2001. A U.S. scientist also provided training to Spanish IEO and other ICCAT country scientists in mid-2001.

2.3.3.2 Recent Stock Assessment Results

On the basis of the available biological information, the existence of three stocks of albacore tuna is assumed for assessment and management purposes; northern and southern Atlantic stocks (separated at 5° N) and a Mediterranean stock. U.S. fishermen caught relatively small amounts of albacore from the North Atlantic stock/management unit (322 mt in 2001), and had minor catches of South Atlantic albacore (2 mt in 2001).

The latest stock assessment for Atlantic albacore tuna was conducted in 2000. Results of the North Atlantic assessment were consistent with previous findings. Equilibrium yield analyses indicated that current spawning stock biomass is about 30% below that associated with MSY. However, there are considerable uncertainties associated with the estimates of current biomass relative to the biomass associated with MSY (B_{MSY}), due to difficulty in estimating how recruitment might decline below historical levels of stock biomass.

The South Atlantic albacore spawning stock biomass appears to have declined substantially relative to the late 1980s, but the decline may have leveled off in recent years. After the 2000 assessment, the SCRS concluded that the recent level of South Atlantic albacore landings can probably be maintained into the near future without causing a substantial decline in spawning stock biomass. However, a dramatic increase in the 2001 estimated catch and potential future repercussions of continued high catch were of great concern to the SCRS this year**.**

2.3.3.3 SCRS Advice and Management Actions

The 2002 SCRS repeated its advice from the previous year for the northern stock, which was that catch should not exceed the current catch level (34,500 mt) over the next year to maintain a stable spawning stock biomass for the near future. In order to begin increasing biomass towards the level estimated to support MSY, catches of North Atlantic albacore would need to be reduced to less than 31,000 mt. In 1998, parties agreed to limit the number of vessels

fishing for northern albacore to the average number in the period 1993-95. At a later date, the SCRS determined that effort limitations were likely to be ineffective for this stock, and recommended a 34,500 mt catch limit for 2000 and 2001. In 2000, ICCAT set a total allowable catch of 34,500 mt for the year 2001, which was renewed in 2002 and again in 2003. The 2003 quota for the United States was established at 607 mt.

For the southern stock, the SCRS recommended that catch should not exceed the estimated replacement yield of 29,200 mt for 2003. The 2001 catch exceeded both the replacement yield and MSY, and the SCRS expressed concern about the current management framework. In response, ICCAT recommended a catch limit of 29,200 mt and improved communication among parties actively fishing for southern albacore. The United States continues to have a bycatch TAC of 100 mt.

Table 2.3.3 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][1]
Current (2001) Yield	24,955 mt (25,052[1])
Current Replacement Yield	not estimated
Outlook	Overfished; overfishing is occurring

Table 2.3.4 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_{99}/B_{MSY} = 1.60 (0.01 - 1.98)
Current Relative Fishing Mortality Rate	F_{99}/F_{MSY} = 0.57 (0.34 - 556)
Maximum Sustainable Yield	30,200 mt (50 - 31,400)
Current (2001) Yield	34,616 mt (35,731[1])
Current Replacement Yield (2000)	29,200 mt (12,100 - 31,400)

Outlook	Not overfished; overfishing is not occurring

[1]This figure includes reported catch, provisional catch reported to the SCRS, and carry-overs

2.3.4 WEST ATLANTIC SKIPJACK TUNA

2.3.4.1 Life History/Species Biology Information

No new life history information is available regarding Atlantic skipjack tuna. Please refer to the HMS FMP (Sections 2.2.1 and 6.3.1.4) for information on the life history of skipjack tuna.

2.3.4.2 Most Recent Stock Assessment Data

The stock structure of Atlantic skipjack tuna is not well known, and two management units (east and west) have been established due to the development of fisheries on both sides of the Atlantic and the lack of transatlantic recoveries of tagged skipjack tuna. U.S. vessels fish on the West Atlantic stock/management unit.

The characteristics of Atlantic skipjack tuna stocks and fisheries make it extremely difficult to conduct stock assessments using current models. Continuous recruitment occurring throughout the year, but heterogeneous in time and area, makes it impossible to identify and monitor individual cohorts. Apparent variable growth between areas makes it difficult to interpret size distributions and their conversion to ages. For these reasons, the SCRS has not conducted a stock assessment for Atlantic (West or East) skipjack tuna since 1999, and few definitive conclusions on the status of the stocks can be made. Standardized abundance indices from the Brazilian baitboat fishery and Venezuelan purse seine fishery both indicated a stable status for the western stock. The SCRS did not propose any management recommendations.

Table 2.3.5 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_{1998}/F_{MSY} *Maximum Fishing Mortality Threshold*	*Unknown* $F_{year}/F_{MSY} = 1.00$
Maximum Sustainable Yield	*Not Estimated*

Current (2001) Yield	33,320 mt
Current Replacement Yield	*Not Estimated*
Outlook	*Unknown*

2.4 Stock Assessment Update: ATLANTIC BILLFISH

2.4.1 Life History/Species Biology Information

This section was taken primarily from the 2002 SCRS Report which summarizes all recent data on Atlantic billfish

Blue and White Marlin

Blue and white marlin are found throughout tropical and temperate waters of the Atlantic ocean and adjacent seas. They 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. The average size of white marlin is 20 - 30 kg. 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. Although white marlin are generally considered to be a rare and solitary species, they are known to occur in small groups consisting of several individuals. Blue marlin are considered sexually mature by ages 2 - 4, spawn in tropical and subtropical waters in the summer and fall, and are found in the colder temperate waters during the summer. Young blue marlin are one of the fastest, if not the fastest growing of all teleosts, reaching from 30 - 45 kg by age 1. Female white and blue marlin grow faster and reach a much larger maximum size than males. Very little is known about the age and growth of white marlin, although they are considered to be very fast growing, as are all the Istiophoridae.

Blue and white marlin feed on a wide variety of fish and squid. They are found predominately in the open ocean near the upper reaches of the water column and are caught most frequently as a bycatch in the offshore longline fisheries which target tropical or temperate tunas using gear intended to fish near-surface waters. However, significant bycatch landings are also made by offshore longline fisheries that target swordfish and bigeye tuna using gear intended to fish deeper in the water column. White and blue marlin are both managed using the single Atlantic stock hypothesis.

Sailfish/Spearfish

Sailfish and spearfish have a pan-tropical distribution. Although sailfish have highest concentrations in coastal waters (more than any other Istiophorid), they are still found in oceanic waters. Spearfish are most abundant in offshore temperate waters. No trans-Atlantic movements have been recorded, suggesting a lack of mixing between east and west. Although sailfish and spearfish 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. Sailfish are the most common Atlantic Istiophorid and spearfish are generally the rarest Atlantic Istiophorid.

Sailfish and spearfish are generally considered piscivorous, but have also been known to consume squid. They are found predominantly in the upper reaches of the water column and are caught as a bycatch in the offshore longline fisheries and as a directed catch in coastal fisheries. In coastal waters, artisanal fisheries use many types of shallow water gear to target sailfish.

Sailfish spawn in tropical and subtropical waters in the spring and throughout the summer. Little is known about spearfish life history due to their relatively rare abundance in offshore waters. Both sailfish and spearfish are considered to be fast growing species compared to other teleosts. Female sailfish grow faster and reach a larger maximum size than males.

Historically, ICCAT has considered Atlantic sailfish/spearfish as separate eastern and western management units. The separation of sailfish into two management units was based on the coastal orientation of the species, tag release/recapture data that suggest a lack of mixing, and morphological data. The Committee re-evaluated the stock structure of Atlantic sailfish based on the results of a genetic investigation submitted to the 2001 SCRS. The study failed to find differences, but this did not necessarily mean a lack of structure, as a very small exchange rate between east and west could produce these results. Therefore, the Committee determined that there was no basis for changing the current stock boundary at this time. However, this issue should be reviewed as more data becomes available. As a result, sailfish are currently managed under a two-stock hypothesis. NOAA Fisheries manages only the West Atlantic sailfish stock.

2.4.2 Recent Stock Assessment Results

Blue and White Marlin

The last stock assessment for Atlantic blue marlin was conducted in 2000. An assessment of Atlantic white marlin was conducted in May 2002. The SCRS suggested that substantial investments in research on the habitat requirements of marlins, as well as the verification of historical catch data, are needed to reduce uncertainties in these assessments.

The latest assessment for blue marlin is slightly more optimistic than the 1998 assessment, however, productivity is lower than previously estimated. The total Atlantic stock is approximately 40% of B_{msy}, the current fishing mortality rate is approximately four times higher than F_{msy}, and overfishing has taken place in the last 10-15 years. Blue marlin landings declined in 1999 by 14% from the 1996 level. The 2000 assessment estimated that overfishing was still occurring and that productivity (MSY and stock's capacity to replenish) was lower than previously estimated. The SCRS recommended that ICCAT take additional steps to reduce the catch of blue marlin as much as possible.

The previous two white marlin assessments, made in 1996 and 2000, indicated that the biomass of white marlin has been below B_{msy} for more than two decades. Thus, white marlin has been overfished for many years. The 2002 assessment results suggest that the total Atlantic stock in 2000 remains overfished and overfishing is continuing to occur. Given that the stock is

severely depressed, the SCRS concluded that ICCAT should take steps to reduce the catch of white marlin as much as possible. Results from the 2002 assessment indicate a MSY of 964 mt (849-1070 mt), a relative biomass (B_{2001}/B_{msy}) of 0.12 (0.06 - 0.25) and a relative fishing mortality rate (F_{2000}/F_{msy}) of 8.28 (4.5 - 15.8).

On September 4, 2001, the Biodiversity Legal Foundation and James R. Chambers petitioned the NOAA Fisheries to list the Atlantic white marlin as endangered or threatened throughout its range, and to designate critical habitat under the Endangered Species Act (ESA). On December 19, 2001, NOAA Fisheries found that the Atlantic white marlin petition presented substantial information indicating that a listing of Atlantic white marlin may be warranted and initiated a comprehensive review of the status of the species. On December 20, 2001, NOAA Fisheries published a 90-day finding (66 FR 65676) announcing this determination and the initiation of a formal Atlantic white marlin status review, as required by section 4(b)(3)(A) of the ESA. At the same time, NOAA Fisheries requested public comment and solicited additional information that might be useful in conducting the status review. The public comment period extended through February 19, 2002.

In order to conduct a comprehensive review, NOAA Fisheries convened a status review team (SRT) of experts in pelagic fish biology, fisheries management, and fisheries stock assessment. The SRT was requested to assess the species status and the degree of threat to the species in the context of the listing criteria provided by the ESA. The SRT summarized all available biological information on white marlin and conducted analyses to predict population trends under various scenarios. The status review document prepared by the SRT contains a summary of the information they assembled and constitutes the best available scientific, commercial, and recreational data on Atlantic white marlin. The document addresses the status of the species, the five ESA listing factors, and the effect of efforts underway to protect the species. NOAA Fisheries also conducted a number of public meetings to solicit information from the public about the status of white marlin during the status review process.

After reviewing the best scientific and commercial information available and the effects of current conservation efforts, on September 3, 2002, NOAA Fisheries determined that listing Atlantic white marlin as either threatened or endangered under the ESA is not warranted at this time. The best available information indicates that the Atlantic white marlin population has declined greatly, but is not at levels that merit ESA protection. NOAA Fisheries added Atlantic white marlin to the “species of concern” list and will reevaluate the need for ESA protection of Atlantic white marlin in 2007.

Sailfish/Spearfish

Longbill spearfish and sailfish landings have historically been reported together in annual ICCAT landings 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 the shortcomings of the previous assessments by improving the list of abundance indices and by separating the catch of sailfish from that of spearfish in the off-shore longline fleets.

Considerable progress was made on obtaining new, more reliable abundance indices. The new separation of sailfish/spearfish allowed assessments to be attempted on sailfish "only" data. Results from the 2001 sailfish "only" assessment indicate a recent yield (2000) of 506 mt and a 2000 replacement yield of ~ 600 mt. However, considerable uncertainties remain relating to both catches and catch rates that can only be addressed by substantial research investment in historical data validation and in investigations of the habitat requirements of sailfish.

For the western Atlantic stock, recent catch levels for sailfish/spearfish combined seem sustainable as both CPUE and catch have remained relatively constant over the last two decades. For the combined sailfish/spearfish western Atlantic stock, it is not known whether the current catch level is below or at maximum sustainable yield. For this same stock, tentative catches of sailfish "only" have averaged about 700 MT over the past two decades and the abundance indices have remained relatively stable for the same period. New analyses do not provide any information on the MSY or other stock benchmarks for the western Atlantic composite or sailfish "only" stock.

2.4.3. SCRS Advice and Management Measures

Management recommendations from SCRS during 2002 were the same as those made in 2001. SCRS (2001) stated that blue and white marlin stocks are unlikely to recover if the landings associated with the 1996 ICCAT recommendation continue into the future. Time area closures, reductions in fleet-wide effort, release of live fish, a better estimation of dead discards, and scientific observer sampling could be considered as techniques to reduce interactions/ mortality and improve the quality of assessments.

In 1997, ICCAT made several recommendations to recover billfish resources throughout the Atlantic Ocean, including a reduction of Atlantic blue and white marlin landings by at least 25 percent from 1996 levels; the promotion of the voluntary release of live Atlantic blue marlin and white marlin; and an improvement of current monitoring, data collection and reporting in all Atlantic billfish fisheries. A 1998 ICCAT recommendation required a reduced level of marlin landings through 2000. Because commercial landings of Atlantic billfish by U.S.-flagged vessels were already prohibited by the 1988 Atlantic Billfish FMP, the 25 percent reduction in blue and white marlin landings affected only recreational anglers in the United States.

In November, 2000, ICCAT made a third recommendation for Atlantic blue and white marlin by developing a two-phase rebuilding program effective in mid-2001. In November, 2002, ICCAT recommended the continuation of phase one through 2005, with re-evaluation and adjustment in 2005. During phase one, the annual amount of blue marlin that can be harvested

Table 2.4.1 Summary Table for the Status of Atlantic Billfish*

	Atlantic Blue Marlin	Atlantic White Marlin	West Atlantic Sailfish
Age/size at Maturity	2-4 years Females: 193 cm Males: 175 cm	Unknown Females: 155 cm Males: 140 cm	3 years Females: 157 cm Males: 122 cm
Spawning Sites	Tropical and subtropical waters in the summer and fall	Tropical and subtropical waters in the mid- to late spring	Tropical and subtropical waters in the spring through summer
Current Relative Biomass Level *Minimum Stock Size Threshold*	B_{2000}/B_{MSY} = 0.4 (0.25-0.6) $0.9B_{MSY}$	B_{2001}/B_{MSY} = 0.12 (0.06-0.25)[2] $0.85B_{MSY}$	B_{92-96}/B_{MSY} = 0.62 $0.75B_{MSY}$
Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	F_{99}/F_{MSY} = 4.0 (2.5 - 6.0) F_{1995}/F_{MSY} = 1.00	F_{2000}/F_{MSY} =8.28 (4.5-15.8)[2] F_{1995}/F_{MSY} = 1.00	F_{91-95}/F_{MSY} = 1.4 F_{91-95}/F_{MSY} = 1.00
Maximum Sustainable Yield	2,000 mt (2000-3000 mt)	964 mt (849-1070 mt)[2]	*Not estimated*
Recent (2000) Yield[1]	3,394 mt	(information is incomplete)	506 mt
Current Replacement Yield	~1,200 mt (840 - 1600 mt)	222 mt (101-416 mt)[2]	~600 mt
Outlook	Overfished; overfishing is occurring	Overfished; overfishing is occurring	Overfished; overfishing is occurring

[1] Estimated yield including that carried over from previous years

[2] The data used were not sufficiently informative to choose a "best case". For consistency, the data presented in this table reflects the "continuity case" which was based on data and assumptions that closely resemble the analyses made in 2000.

* Longbill spearfish are considered Atlantic billfish, but are not included in this table due to the lack of data. The SCRS has yet to complete an assessment of longbill spearfish in the Atlantic and relative biomass and fishing mortality levels are unavailable.

and retained for landing by pelagic longline and purse seine vessels must be no more than 50% of the 1996 or 1999 landing levels, whichever is greater. For white marlin, the annual amount of white marlin that can be harvested by pelagic longline and purse seine vessels and retained for landing must be no more than 33% of the 1996 or 1999 landing levels, whichever is greater. All

blue and white marlin captured by pelagic longline and purse seine vessels alive shall be released in a manner that maximizes their survival. These provisions do not apply to marlin that are dead when brought alongside of a vessel and that are not sold or entered into commerce. The United States is to monitor the landings of billfish tournaments to ensure at least 5% scientific observer coverage and to endeavor to attain 10% scientific observer coverage on billfish tournament landings by the end of 2002. The United States will also limit its landings of recreationally-caught Atlantic blue and white marlin to 250 fish in aggregate.

As recommended by the SCRS, in 2002, ICCAT also stated that during Phase One, Contracting Parties, Cooperating non-Contracting Parties, Entities or Fishing Entities (as these terms are defined by ICCAT) are encouraged to conduct research on blue marlin and white marlin, including, but not limited to: habitat requirements of white marlin, studies on post release survival rates of released fish, further verification of historical fishery data and validation, life history characteristics of marlin, and development of models for abundance estimation and stock assessment. A workshop will be held in 2003 to discuss a program to improve catch data for blue and white marlin. This program may include a statistical document program where appropriate and feasible.

During the second phase of the rebuilding program, the SCRS will conduct stock assessments of Atlantic blue and white marlin in 2005, and present its evaluation of specific stock recovery scenarios. Based on SCRS advice, at its 2005 meeting the Commission will, if necessary, develop and adopt programs to rebuild Atlantic stocks of blue and white marlin to levels that would support MSY.

2.4.4 Evaluation of Current Management Measures

Catch Limits: While some countries have already implemented the recommended 2000 ICCAT billfish catch limits, information is not yet available to evaluate the effects. The United States has limited its recreational landings of Atlantic blue and white marlin combined to 250 fish per year and has prohibited the possession of spearfish.

Minimum size limits: Amendment 1 to the Atlantic Billfish Fishery Management Plan implemented minimum size limits for Atlantic blue marlin at 99 inches (251 cm) LJFL, Atlantic white marlin at 66 inches (168 cm) LJFL, and west Atlantic sailfish at 63 inches (160 cm) LJFL. These minimum sizes are intended to provide an increase in reproductive potential, which would lead to a long-term benefit for the Atlantic-wide stock (U.S. DOC, 1999).

Prohibition on Sale: The NOAA Office for Law Enforcement has continued to expend resources responding to reports of illegal sale of Atlantic billfish. The prohibition on sale precludes the possession of Atlantic billfish by commercial fishermen, seafood dealers, and restaurants with the intent to sell. While billfish are still caught incidental to commercial fishing operations, this management measure has precluded any directed fishing effort on these species

which supports rebuilding.

Time/area closures/Live bait prohibition: *Please refer to Chapter 8 "Bycatch" for evaluation of these measures.*

2.5 Stock Assessment Update: ATLANTIC SHARKS

2.5.1 Life History/Species Biology Information

A general discussion of shark characteristics can be found in the HMS FMP (2.4.1). Additional information on shark nursery ground and essential fish habitat (EFH) research reported in 2001 can be found in section 3.1 of this report.

Ongoing Research

The Northeast Fishery Science Center (NEFSC) is involved in a number of shark studies including life history, species biology, stock assessment, tagging, and migration studies which are described briefly below.

Fishery Independent Survey: The NEFSC conducts a bi-annual fishery-independent survey of Atlantic large and small coastal sharks in U.S. waters from Florida to Delaware to: 1) monitor the species composition, distribution, and abundance of sharks in the coastal Atlantic; 2) tag sharks for migration studies; 3) collect biological samples for age and growth, feeding ecology, and reproductive studies; 4) tag sharks whenever feasible for age validation studies; and 5) collect morphometric data for other studies. The time series of abundance indices (CPUE) from this survey are critical to the evaluation of coastal Atlantic shark species. This survey will be conducted in 2003.

Age and Growth of Pelagic Sharks: Re-examination of the age and growth of the shortfin mako, *Isurus oxyrinchus*, and preliminary studies on age and growth of the thresher shark, *Alopias vulpinus*, and white shark, *Carcharodon carcharias*, are being conducted. Vertebrae, length-frequency data, and tag/recapture data collected between 1962 and 2001 are being analyzed on each of these species to obtain von Bertalanffy growth function parameters. Methodology and the problems associated with validation and verification of age estimates of highly migratory species are being addressed.

Biology of the Porbeagle Shark: Life history studies of the porbeagle shark, *Lamna nasus*, continued under a cooperative United States/Canada research program and a paper on the validated age and growth of the porbeagle shark in the western North Atlantic Ocean was published in 2002. Two other manuscripts on the population dynamics and the reproduction of the porbeagle are in press, and information on their feeding ecology was summarized for an International Council for Exploration of the Sea (ICES) document. In addition, a preliminary

analysis of porbeagle tagging and recapture data was begun using information from U.S., Canadian, and Norwegian sources.

Predator-Prey Interactions Between Shortfin Mako and Bluefish: The objective of this research is to quantify whether the level of dependence of shortfin mako and other shark species on bluefish, *Pomatomus saltatrix*, has changed from historic levels. Analyses will determine the relationship between bluefish distribution and abundance and the distribution and abundance of species of sharks that prey on, or compete with, bluefish for food.

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. An age and growth study conducted cooperatively with Massachusetts Division of Marine Fisheries staff has been completed and a manuscript is in press. Research on the food and feeding ecology of the blue shark is being conducted cooperatively with University of Rhode Island staff with a manuscript under revision. Recent focus is 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. This research is a collaboration between NOAA Fisheries scientists in the NEFSC, Apex Predators Program, Narragansett, RI, the NOAA Fisheries, Fisheries Statistics Division, Silver Spring, MD, 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 two manuscripts describing Atlantic-wide movements and migrations and stock structure based on tag and release data from the NOAA Fisheries Cooperative Shark Tagging Program (CSTP). Preparation of standardized catch rate and size composition data compatible with pelagic longline observer data is the next step in this data recovery process. As part of this comprehensive program, cooperative research is underway with the Irish Marine Institute and Central Fisheries Board on mark-recapture databases including coordination of formats and programs with the NOAA Fisheries CSTP for joint data analyses.

Blacktip Shark Migrations: Movements of the blacktip shark, *Carcharhinus limbatus*, in the western North Atlantic and Gulf of Mexico based on release and recapture data were analyzed and utilized at the 2002 Shark Evaluation Workshop with general migration patterns and exchange between and within regions of U.S. and Mexican waters discussed.

Cooperative Atlantic States Shark Pupping and Nursery Survey (COASTSPAN): NEFSC, Apex Predators Program staff manage and coordinate this project that uses researchers in each major coastal Atlantic state 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.

Monitoring and assessment of Delaware Bay Sandbar Shark: NEFSC staff conduct this part of the COASTSPAN monitoring and assessment project for the juvenile sandbar shark, *Carcharhinus plumbeus*, 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 and Monitoring of Delaware Bay Sandbar Shark: This research is a study of the movements of juvenile sandbar sharks in Delaware Bay, a known nursery area, to quantify their habitat use and activity patterns using acoustic techniques. Acquired data allows quantification of home range (minimum area required) and, when coupled with environmental data, 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.

Investigations into Nurse Shark Mating and Nursery Grounds in the Florida Keys: An analysis of the reproductive biology and habits of the nurse shark, *Ginglymostoma cirratum*, is ongoing in the Dry Tortugas, FL to understand its life history and ecology. Information from this research will be utilized to define essential fish habitat and manage this coastal shark species.

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, Apex Predators Program staff co-convened a symposium at the 2002 American Fisheries Society Annual Meeting in Baltimore, MD, titled "Shark Essential Fish Habitat: Towards Ecosystem Management" and are editing a report describing 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 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. To investigate post-release survivorship, a two-phase study was undertaken utilizing sharks made available by the COASTSPAN Delaware Bay sampling program (Spargo *et al*., 2001). The first phase involved a field study that would mimic the natural conditions facing sandbar sharks when subjected to angling and would quantify the effects of exhaustive exercise. The second phase, with the sharks in captivity, experimentally reproduced the recovery phase that would naturally occur after exposure to exhaustive exercise. The purpose of this study was to quantify physiological changes in blood chemistry that occur during catch and release angling in sandbar sharks and to assess recovery and survivorship. This study attempted to assess blood

parameters associated with stress and the effect of independent environmental variables on the stress reaction. Overall, this study was able to quantify the physiological changes that occurred in sandbar sharks during exhaustive exercise and follow the sharks through their metabolic recovery. Most metabolites returned to normal within 6-10 hours, indicating that sandbar sharks are able to physiologically recover after the exhaustive exercise associated with rod and reel angling. Therefore, catch and release fishing may not severely impact neonatal and juvenile sandbar sharks in important nursery areas (Spargo *et al*., 2001). This work will provide an important benchmark to evaluate the effects of capture and release on similar wild sharks, and hopefully aid fisheries managers in determining catch and release management strategies.

Natanson *et al*., (2001) estimated porbeagle shark maturation, age and growth, and longevity parameters in a cooperative study with Canada. The study is the first to use validated vertebral band pair counts in conjunction with length-frequency and tag-recapture analyses to provide consistent and accurate age estimates for porbeagle sharks. Results have shown that male porbeagles mature at about 174 cm (8 years) and females at 218 cm (13 years). Males and females grew at similar rates until the size of male maturity, after which the relative growth of the males declined. The growth rate of females declined in a similar manner at the onset of maturity. Maximum age, based on vertebral band pair counts, was 25 and 24 years for males and females, respectively. Longevity calculations, however, indicated a maximum age of 45 to 46 years in an unfished population.

Skomal and Natanson (2001) derived age and growth estimates for the blue shark. Males and females were aged to 16 and 13 years, respectively. Both sexes grew similarly to age seven when growth rates decreased in males and remained constant in females. Growth rates from tag-recaptures agreed with those derived from vertebral annuli for smaller sharks but appeared overestimated for larger sharks. The species was found to grow faster and have a shorter life span than previously reported for the North Atlantic Ocean.

Natanson (2001) reports on re-examination of the age and growth of the shortfin mako shark and preliminary studies on the age and growth of thresher and white sharks. Vertebrae, length-frequency, and tag-recapture data collected between 1962 and 2001 are being analyzed on each of these species to obtain von Bertalanffy growth function parameters. Preliminary results indicate that the vertebral centra are appropriate structures to use for aging these species.

Tagging Studies

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 Mexican waters. In 2001, nearly 6000 sharks were tagged and 510 were recaptured. Between 1962 and 2001, more than 165,700 sharks of 40 species have been tagged and 9,500 sharks of 32 species have been recaptured, as a result of the CSTP

(Hueter, 2003). Eighty-seven percent of the tags are represented by eight species: blue shark, sandbar shark, tiger shark, dusky shark, shortfin mako, blacktip shark, Atlantic sharpnose shark, and scalloped hammerhead. The number of sharks tagged varies from two for the smalleye hammerhead to 93,489 for the blue shark. Numbers of recaptures by species range from one for the Greenland shark to 5,760 for the blue shark. Eighty-eight percent of the recaptures are made up of seven species: blue shark, sandbar shark, shortfin mako, tiger shark, lemon shark, blacktip shark, and dusky shark.

To date, the Mote Marine Laboratory Center for Shark Research (CSR) has tagged 9,741 sharks of 16 species and has received data on 355 recaptures (3.6 percent). Of these recaptures, the maximum distance traveled was 280 nm (by a blacktip shark) and the longest time at large was 2,461 days (by an Atlantic sharpnose shark). A trend of philopatric behavior, possibly resulting in natal homing, has emerged from these data. Tagged sharks of several species, in particular blacknose, bonnethead, and blacktip, have been recaptured in essentially the same location after significant periods at large and on annual cycles, i.e. approximately 1.0, 2.0, 3.0, etc. years later. In some cases, sharks have been recaptured on the same grassflat where they were originally tagged after being at large for five or more years. Current research utilizing both genetic analysis and acoustic tagging technology is testing the philopatry hypothesis with respect to the blacktip shark. To date, three 1 year-old juvenile blacktip sharks and two 2 year-olds have returned to their natal nursery on annual cycles, as detected using acoustic telemetry.

Two fishery independent bottom longline surveys were conducted by NOAA Fisheries in 2001. In April and May, the Apex Predators Program shark survey was conducted from Key West, Florida, to the Maryland/Delaware border. The majority of sets were made in the 11-20 fathom depth zone. Standard gear used was a Florida commercial-style bottom longline with a 940 lb test monofilament mainline, 12 foot gangions of 730 lb test monofilament, 300 3/0 hooks baited with spiny dogfish chunks, 5-7 lb weights attached to the mainline every 15 hooks, and a bullet float and 15 lb weight attached every 50 hooks. The gear was fished for 3 hours after completion of setting with an average of 6 hours from start of setting to completion of haulback. A total of 668 fish (652 sharks), representing 26 species (13 shark species) were caught on 85 sets. One leatherback turtle was entangled around the neck and flipper and was dead upon retrieval; resuscitation attempts were unsuccessful. Sharks represented 98 percent of the total catch, with sandbar sharks the most common (n=309), followed by tiger (n=136) and dusky sharks (n=71). The catch per unit effort for sharks was 2.6/100 hooks with a mean catch of sharks of 45.2/10,000 hook hours.

In June, the MEXUS-Gulf coastal shark survey was staged from Veracruz, Mexico on the R/V ONJUKU, and was conducted in the Gulf of Mexico along the Yucatan peninsula coast of the Bay of Compeche, Mexico. Gear included a one nautical mile monofilament mainline (940 lb test), 12 foot gangions of 730 lb test monofilament, #15/0 circle hooks baited with Atlantic bonito, and 11 lb weights at the start, mid, and end of the mainline. Bottom longline effort was 100 hooks fished for one hour (time from the last radar buoy being deployed to the first radar

bouy being retrieved). The survey produced 37 sharks represented by 3 species caught in 38 sets. The most frequently captured shark was the Atlantic sharpnose shark (n=30), followed by the blacknose shark (n=4), and bonnethead (n=3). All viable live sharks were tagged and released (n=33). Seventeen species of incidental catch (n=117) were recorded including red drum (n=23), hardhead catfish (n=23), red snapper (n=4), and southern stingray (n=16).

Kohler *et al.*, (2001), summarized tag and recapture data from the Cooperative Shark Tagging Program for blue, shortfin mako, and porbeagle sharks from 1962-2000. For blue sharks, tag and catch data suggest that there are distinct seasonal abundances and latitudinal migrations in discrete parts of the population although blue sharks of the North Atlantic constitute a single stock. Trans-Atlantic movements are frequent between the western and eastern regions, utilizing the major North Atlantic current systems. Four tag returns indicate some partial exchange between the North and South Atlantic Oceans.

For the shortfin mako, tag and catch data indicate that, with the exception of the Grand Banks area, all other areas had the complete size range with larger mean lengths found off the Southeastern United States and Gulf of Mexico (Kohler *et al*., 2001). In the Grand Banks, shortfin makos as small or smaller than reported at birth were tagged and released. The sex ratio changed with increasing size with a preponderance of females above 240 cm fork length. Kohler *et al*., (2001), report on a seasonal cycle of abundance off the Northeastern United States with shortfin makos common along the western margin of the Gulf Stream and off Cape Hatteras in January. Beginning in April and May, makos move northward onto the continental shelf between Cape Hatteras and the southern part of Georges Bank. Makos are frequently caught off southern New Jersey in early June and off New York and southern New England by late June. From June through October, they are caught between Cape Hatteras and Cape Cod on the continental shelf and between the continental shelf and the Gulf Stream from Cape Hatteras and the southern tip of the Grand Banks. During November and December, shortfin makos move to offshore wintering grounds in the Gulf Stream and the Sargasso Sea (*Kohler* et al., 2001). Tagging results also support frequent exchange between the western and Central North Atlantic, however, there is not enough evidence at this time to support or reject the existence of one stock for the shortfin mako in the North Atlantic.

For the porbeagle, tagging was concentrated in the western North Atlantic and eastern North Atlantic Ocean. In the western North Atlantic, the overall sex ratio was 1:1 whereas in the eastern North Atlantic the sex ratio favored males (1:0.25); the size ranges were similar in both areas *(*Kohler *et al.*, 2001). Over 90 percent of the porbeagles traveled less than 500 nautical miles from the original tagging location and no movements between areas occurred. Tagging and catch data from the entire Atlantic give clear evidence that the eastern and western Atlantic stocks of porbeagles are distinct (Kohler *et al.*, 2001).

The CSR has also conducted tagging studies with the cooperation of the Instituto Nacional de la Pesca (INP) in Mexico. In the six field trips to date (1995, 1996, 1997, 1998,

2000, 2001), a total of 390 gillnet sets have been made resulting in the capture and tagging of 1,160 juvenile blacktip sharks with Spanish/English dart tags. In addition to blacktip sharks, several other shark species have been documented inside the lagoon including the bonnethead, lemon shark, nurse shark and Atlantic sharpnose shark.

To date, 22.3 percent of tagged blacktip sharks have been recaptured and reported, mostly by Mexican commercial fishermen. This is a very high recapture rate as compared with the CSR's U.S. tagging program, which yields only about 4-5 percent recaptures of tagged sharks. The longest time at liberty for these recaptures was 793 days; the longest distance traveled was 362 km for a blacktip tagged in central Yalahau and recaptured west of Celestun after being at large for 168 days. All 134 recaptures have been reported from Mexican coastal waters of the Yucatan peninsula, both east and west of Isla Holbox and inside the lagoon.

The high recapture rate indicates that fishing pressure on the blacktip juveniles is significant, which may or may not be a concern for the stock depending on the total number of pups produced in the lagoon, their natural mortality, demographic parameters and other factors. Estimates using a Peterson mark-recapture technique concluded that approximately 1,000-1,500 blacktip pups utilize Yalahau lagoon annually. The limited migratory data suggest that these juvenile sharks spend at least the first year or two along the Mexican Yucatan coast without venturing into deeper water or territorial waters of other nations.

In the western Gulf of Mexico, preliminary NOAA Fisheries tag-recapture data has indicated a north-south migration of juvenile sharks between U.S. and Mexican waters. These data indicate that blacktip sharks born in Texas/Louisiana nurseries in the spring are encountered in the Mexican artisanal fishery during their fall (southward) migrations. Likewise, it appears that sharks inhabiting Mexican coastal waters of the southwestern Gulf of Mexico may be returning to U.S. territorial waters during their spring (northward) migrations. To gain a better understanding of these movements of sharks between Mexico and U.S. Gulf states, directed CSR tagging efforts have concentrated along the Gulf coasts of Texas in the United States and Tamaulipas in Mexico. This work focuses on the blacktip shark and utilizes the skills of artisanal fishermen in Mexico and recreational fishermen in the United States to locate and catch the sharks for tagging. A total of 450 sharks of 10 species have been tagged and released with 14 recaptures, including four recovered in Mexico that were tagged in Texas. The longest distance traveled was 330 nm for a finetooth shark tagged in Corpus Christi, Texas and recaptured in Pueblo Viejo, Veracruz.

2.5.2 Most Recent Stock Assessment Data

Large Coastal Sharks

The 2002 large coastal sharks (LCS) stock assessment included additional catch estimates, new biological data, and a number of fishery-independent and fishery-dependent catch rate series. Additionally, the 2002 LCS stock assessment used several stock assessment models, including the model used in the 1992 LCS stock assessment, to estimate the status of LCS stocks and project

their future abundance under a variety of future catch levels in waters off the U.S. Atlantic and Gulf of Mexico coasts. The 2002 LCS stock assessment concluded that:

1. The LCS complex as a whole is overfished and overfishing is occurring;
2. Sandbar sharks are no longer overfished although biomass levels have not reached optimum yield (the point at which they would be considered healthy) and that overfishing is occurring; and,
3. Blacktip shark populations are healthy and overfishing is not occurring.

Tables 2.5.1 and 2.5.2 provide the biomass and fishing mortality estimates used to make these determinations. Because of the large number of models and sensitivity runs presented in the LCS stock assessment, only a few of the models and sensitivity runs are summarized in tables 2.5.1 and 2.5.2. The particular models shown were chosen to be consistent with the phase plots presented in figures 71, 73, and 76 of the 2002 LCS stock assessment.

Directed commercial longline fishing vessels currently catch primarily sandbar and blacktip sharks. Sandbar and blacktip sharks make up approximately 60 to 75 percent of the commercial catch (GSAFDF, 1996). In 2000 and 2001, sandbar and blacktip sharks made up approximately 84 and 71 percent of the landings, respectively (Cortes and Neer, 2002, Table 2.5.1). In 2000 and 2001, approximately 3 and 21 percent of the landings were reported as unclassified sharks, respectively (Cortes and Neer, 2002). The remainder of the catch is comprised mostly of dusky, bull, bignose, tiger, sand tiger, lemon, spinner, scalloped hammerhead and great hammerhead sharks, with catch composition varying by region (GSAFDF, 1996). These species are less marketable and are often released, so they are reflected in the overall catch but not the landings. Approximately 84 to 91 percent of LCS came from the Southeast region, mainly Louisiana, Florida, and North Carolina, although Texas and South Carolina had a large percentage in 2001 (Cortes and Neer, 2002). Observer data indicates that LCS discarded from the fishery accounts for approximately 5.7 percent of the total LCS mortality (Cortes and Neer, 2002).

Small Coastal Sharks

In 2002, NOAA Fisheries conducted the first small coastal shark (SCS) stock assessment since 1992. This stock assessment used additional biological data, improved fisheries statistics, and bycatch estimates from the shrimp trawl fishery. Additionally, the stock assessment used new or extended fishery-dependent and independent catch rate series and several stock assessment models. The stock assessment determined that the SCS complex as a whole, Atlantic sharpnose, bonnethead, and blacknose sharks are not overfished and that overfishing is not occurring (Tables 2.5.3 and 2.5.4). The stock assessment also concluded that finetooth sharks are not overfished, but that overfishing is occurring (Tables 2.5.3 and 2.5.4). Thus, NOAA Fisheries has one year to design a rebuilding plan for finetooth sharks.

Also, in 2002, the Mote Marine Laboratory and the University of Florida conducted a stock assessment for SCS using similar data, but different models. The results were similar in that current biomass levels for Atlantic sharpnose, bonnethead, and blacknose were at least 69 percent of the biomass in 1972 while the current biomass level for finetooth sharks was only 9 percent the level in 1972. Both stock assessments note that the data used for finetooth sharks is not as high a quality as the data used for Atlantic sharpnose due to shorter catch per unit effort (CPUE) and catch series, lack of bycatch estimates, and no catches reported in some years.

Small coastal sharks are targeted in localized fisheries in the southern United States, caught incidentally in other commercial fisheries, and are commonly used for bait. The majority of commercial harvest occurs in the South Atlantic region (57 percent) with gillnets. Finetooth, Atlantic sharpnose, and blacknose sharks comprise most of the commercial landings (34, 24, and 30 percent in 2000, respectively; 42, 27, and 22 percent in 2001, respectively) with bonnethead shark landings less than 12 percent in both 2000 and 2001.

Dusky Shark Status Review

The dusky shark was listed on the Endangered Species Act (ESA) Candidate Species List in 1997 due to its depleted stock status and concern for further stock declines. Inclusion on the Candidate Species List does not have any regulatory impact; it is meant to highlight concern for the species and to encourage proactive conservation measures. In 1999, regulations implementing the HMS FMP added the dusky shark to the prohibited species management group and prohibited possession of the dusky shark in commercial and recreational fisheries; however, a court injunction prevented implementation of the prohibition in commercial fisheries until June 2000. In order for a species to be considered for a proposal for listing as threatened or endangered under ESA, a review of the population status and sources of mortality must be conducted. NOAA Fisheries solicited this status review for dusky sharks, which was completed in 2001.

Data collected by the Florida Museum of Natural History, Commercial Shark Fishery Observer Program (CSFOP) from 1994-2000 in the South Atlantic and off Florida (Atlantic and Gulf regions) were analyzed for catch rates, length frequencies, mortality estimates, and life history parameters. Data collected by a fishery-independent shark monitoring program at the Virginia Institute of Marine Science (VIMS) from 1973-1999 were also analyzed for catch rates, relative abundance, and reproductive parameters.

Length frequency analyses of CSFOP data indicate a distinct shift in catch composition from a widely scattered size distribution in 1994 to catches comprised primarily of sharks less than 110 cm FL (0-2 age classes) in 1999 (Romine *et al*., 2001). VIMS data show a decrease in relative abundance from 1980 to 1992, however recent years (1997 to 2000), have shown an increase in relative abundance. CSFOP catch rate data show an increase from 1974 to 1999, particularly for dusky sharks less than 110 cm FL, although catch rates of sharks greater than 170 cm FL declined over the period. The decrease in catch rates of older mature animals was also

seen in the VIMS data. The increase in catch rates of small sharks does not appear to be caused by a shift of the fishery to inshore waters where small sharks are more abundant because depth of set locations increased for the time period (Romine *et al*., 2001).

Hooking mortality increased as shark size decreased with mature dusky sharks (> 230 cm FL) experiencing 37 percent mortality and immature sharks < 110 cm FL experiencing 79 percent mortality. Reproductive data suggest a gestation period of approximately 20-22 months and at least a one-year resting period such that the total reproductive cycle of this species is 3 years (Romine *et al*., 2001).

Canadian Assessment of Porbeagles

An analytical assessment of the porbeagle population in the Northwest Atlantic, with estimates of long-term sustainable yield, was conducted by the Canadian Science Advisory Secretariat in 2001. After an intensive fishery with catch levels of about 4500 tons that collapsed in the 1960s, the fishery appeared sustainable during the 1970s and 1980s when annual landings averaged about 350 tons and the population slowly recovered. Catches of 1000-2000 tons throughout the 1990s appear to have once again reduced population abundance, resulting in very low catch rates and numbers of females. In 1998, an intensive research program was initiated with the support and funding of the shark fishing industry and in collaboration with the Apex Predator Investigation of NOAA Fisheries. Research to date has led to the development of a confirmed growth model, established the presence of a single stock in the Northwest Atlantic, suggested size- and sex-specific migration patterns, determined fecundity and maturity ogives by length and age, revealed highly specific temperature and depth associations, determined diet, and resulted in estimates for a natural mortality rate of 0.10, which increase after sexual maturity (0.20 in females) (Campana *et al.*, 2001).

The current assessment confirms the unsustainability of fishing at $F_{0.1}$ for porbeagles and indicates that a fishing mortality above 0.08 will cause the population to decline. A fishing mortality of 0.04-0.05 is required if the population is to recover. Independent estimates of recent fishing mortality based on Petersen analysis of tag recaptures, Paloheimo Zs, and an age- and sex-structured population model all suggest that F is now about 0.20. A standardized catch rate analysis indicated that the relative abundance of young porbeagle sharks in 2000 was 30 percent of its 1991 level, while the standardized catch rate of mature porbeagles decline to 10 percent of its 1992 level. Current population size appears to be at 10-20 percent of virgin levels. An annual catch of 200-250 tons would correspond to fishing at MSY and would allow population recovery. Annual catches of 400 tons would not allow any population growth, nor room for error in the estimates. The 850 ton catch level of the past two years is close to the MSY of a healthy population. However, the current population is seriously depleted and will require a greatly reduced fishing mortality if recovery is to occur (Campana et al. 2001).

Table 2.5.1 Summary table of the status of the biomass of large coastal sharks. Sources: 2002 LCS stock assessment; E. Cortes, personal communication; L. Brooks, personal communication.

Species	Current Biomass N_{2001}	N_{MSY}	Current Relative Biomass Level N_{2001}/N_{MSY}	Biomass Target B_{OY} = 125%B_{MSY}	Outlook
Large Coastal Complex	2,940 - 10,156	4,469 - 8,371	0.46 - 1.18	5,586 - 10,464	STOCK IS OVERFISHED. $B_{2001}<B_{OY}$ The majority of the models, including the models not summarized here, indicate that the resource is overfished. Even in the models where the resource is not overfished, the rebuilding target (B_{OY}) has not been met.
Sandbar	1,027 - 4.86 E8	786 - 1.50 E12	3.25 E-4 - 2.22	983 - 1.88 E12	STOCK IS NOT OVERFISHED; REBUILDING IS STILL NEEDED. $B_{2001}<B_{OY}$ The models have conflicting results. These conflicts are due, in part, to the sensitivity of certain models to catch or CPUE series. The Bayesian SPM models and SSLRSG models appear to correspond with each other, have good convergence[2], and fit well with CPUE data. These models generally indicate that the biomass is at or above B_{MSY} levels and below B_{OY} levels.
Blacktip	5,587 - 3.16 E7	3,43 - 1.90 E7	0.79 - 1.66	4,288 - 2.38 E7	STOCK IS NOT OVERFISHED AND IS REBUILT. $B_{2001}>B_{OY}$ The majority of the models indicate that biomass levels exceed B_{MSY} and B_{OY}. Some of the models that were very optimistic had difficulty converging. The other models were sensitive to the catch series.

1 MSC for age structures models is in biomass, not numbers.
2. Convergence indicates that the algorithm has become stable and come to an optimal solution.

Table 2.5.2 Summary table of the status of the fishing mortality on large coastal sharks. Sources: 2002 LCS stock assessment; E. Cortes, personal communication.

Species	Current F F_{2001}	Maximum Fishing Mortality Threshold MFFT = F_{MSY}	Current Relative Fishing Mortality Rate F_{2001}/F_{MSY}	Fishing Mortality Target $F_{OY} = 0.75F_{MSY}$	Outlook
Large Coastal Complex	0.07 - 0.21	0.05 - 0.10	0.89 - 4.48	0.05 - 0.08	OVERFISHING $F_{2001}>F_{OY}$ The majority of the models indicate that current F levels exceed F_{MSY}.
Sandbar	0.0001 - 0.70	0.05 - 0.46	0.00156 - 2.45	0.03 - 0.34	OVERFISHING $F_{2001}>F_{OY}$ The majority of the models indicate the overfishing is occurring. Most of the models that indicate overfishing also indicated that biomass levels are at or above MSY.
Blacktip	0.01 - 0.21	0.06 - 0.18	0.13 - 1.72	0.04 - 0.14	NOT OVERFISHING $F_{2001}<F_{OY}$ The majority of the models indicate that current fishing rates are below F_{OY}. Most of these models are the same models that indicate biomass levels are above B_{MSY}.

Table 2.5.3 Summary table of the status of the biomass of small coastal sharks. Sources: 2002 SCS stock assessment; E. Cortes, personal communication.

Species	Current Biomass B_{2001}	B_{MSY}	Current Relative Biomass Level B_{2001}/B_{MSY}	Minimum Stock Size Threshold MSST = (1-M)B_{MSY} if M<0.5 MSST = 0.5 B_{MSY} if M>=0.5	Minimum Biomass Flag Bflag = (1-M)B_{OY}	Biomass Target B_{OY} = 125%B_{MSY}	MSY	Outlook
Sharpnose	72.7 - 73.2	23 - 43.3	1.69 - 3.16	11.5 - 33.4	9.0 - 41.8	28.75 - 54.12	7.8 mill lb dw to 1.9 mill lb dw	Stock not overfished $B_{2001} > B_{OY}$
Bonnethead	12.8 - 13.4	4.6 - 9.2	1.46 - 2.78	2.3 - 7.3	0.8 - 9.2	5.75 - 11.50	1.8 mill lb dw to 0.5 mill lb dw	Stock not overfished $B_{2001} > B_{OY}$
Blacknose	10.4	3.3 - 5.4	1.92 - 3.15	1.6 - 4.5	2.0 - 5.6	4.12 - 6.75	0.8 mill lb dw to 0.2 mill lb dw	Stock not overfished $B_{2001} > B_{OY}$
Finetooth	1.9 - 2.3	0.8 - 1.65	1.39 - 2.37	0.4 - 1.4	0.5 - 1.7	1.00 - 2.06	0.26 mill lb dw to 0.05 mill lb dw	Stock not overfished $B_{2001} > B_{OY}$
SCS aggregate	77.1 - 83.8	32.3 - 60.75	1.38 - 2.39	16.2 - 50.2	12.4 - 62.7	40.38 - 75.94	7.0 mill lb dw to 2.2 mill lb dw	Stock not overfished $B_{20010} > B_{OY}$

Table 2.5.4 Summary table of the status of the biomass of small coastal sharks. Sources: 2002 SCS stock assessment; E. Cortes, personal communication.

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Species	Current F F_{2000}	Maximum Fishing Mortality Threshold MFFT = F_{MSY}	Current Relative fishing Mortality Rate F_{2000}/F_{MSY}	Fishing Mortality Target $F_{OY} = 0.75F_{MSY}$	Outlook
Sharpnose	0.02 - 0.06	0.04 - 0.42	0.14 - 0.42	0.03 - 0.31	Not overfishing
Bonnethead	0.03 - 0.18	0.05 - 0.53	0.35 - 0.56	0.04 - 0.40	Not overfishing
Blacknose	0.02 - 0.19	0.03 - 0.32	0.61 - 0.65	0.02 - 0.24	Not overfishing
Finetooth	0.13 - 1.50	0.03 - 0.44	3.42 - 4.13	0.02 - 0.33	OVERFISHING
SCS aggregate	0.03 - 0.24	0.04 - 0.28	0.24 - 0.78	0.03 - 0.21	Not overfishing but F_{2000} >= F_{OY}

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3. ESSENTIAL FISH HABITAT

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 Fishery Management Plans (FMPs) describe and identify essential fish habitat (EFH) within the U.S. Exclusive Economic Zone (EEZ) for all life stages of each species in a fishery management unit. Available information should be interpreted with a risk-averse approach to ensure that adequate areas are protected as EFH for the managed species. The HMS FMP addresses EFH for species managed under that plan in Chapter 6; the Billfish Amendment provides a description of EFH and related issues in Chapter 4. The EFH regulations also specify that new EFH funding information should be reviewed as it becomes available, and reported as part of the SAFE report. The FMP EFH provisions should be revised or amended, as warranted, based on the available information.

3.1 Atlantic Sharks

It has been recognized that a limiting factor on shark populations is the amount of suitable nursery habitat available. The importance of coastal and inshore nursery habitat to shark productivity has been recognized in the HMS FMP such that known shark nursery areas were designated EFH. The FMP also identified the need for further delineation of these areas and the determination of habitat relationships, information that is vital to the successful management of these species. To that effect, the HMS Management Division recently sponsored the preparation of an overarching document that provides a summary of a number of detailed studies of U.S. coastal shark nursery grounds in nearly all of the coastal states from New England to Texas. In addition to providing summaries of their findings, the researchers involved, representing universities and state and federal agencies, also provided raw data on juvenile shark catch and environmental parameters associates with these catches. GIS analyses of this data have resulted in further delineation of shark nursery habitat in the Atlantic Ocean and the Gulf of Mexico. This information will serve as the basis for updating early life stage EFH designations for a number of shark species in Amendment 1 to the HMS FMP, which will be developed in 2003.

2001 Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey
(McCandless and Pratt, 2002)

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 where many sharks come closest to man's influence.

In 1998, the NOAA Fisheries Apex Predators Program (APP) formed the Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey. This is an alliance of NOAA Fisheries and state cooperators conducting ongoing investigations of shark nursery grounds along the East Coast of the United States. Results presented here are a summary of the work conducted in 2001, the fourth year of this study. In subsequent years, the program plans to continue the delineation of shark nursery areas, develop relative indices of abundance of neonate and juvenile sharks in these nursery areas, use the environmental data and bycatch collected to determine habitat relationships, and use tag and recapture data to determine if sharks return to their natal nurseries and define the overwintering nursery grounds.

State cooperators in 2001 included the North Carolina Division of Marine Fisheries, the South Carolina Department of Natural Resources, and the University of Georgia Marine Extension Service. Researchers from the NOAA Fisheries APP and the University of Rhode Island conducted the COASTSPAN study in Delaware Bay. COASTSPAN is funded by the NOAA Fisheries Highly Migratory Species Management Division.

COASTSPAN cooperators sampled a total of 2,706 sharks in 2001. Seven hundred and eight of the sharks sampled were tagged with fin tags and released. Juvenile sharks caught by the cooperators included the following: Atlantic sharpnose, blacknose, blacktip, bonnethead, finetooth, lemon, nurse, sandbar, sand tiger, scalloped hammerhead, tiger, and spinner sharks, and smooth dogfish.

DELAWARE BAY: COASTSPAN results show the importance of Delaware Bay as a pupping and nursery ground for sandbar sharks, and in the HMS FMP it has been designated EFH for the species. In addition, the middle and lower Bay has been designated a Habitat Area of Particular Concern for this species, consistent with provisions of the EFH regulations. Sandbar sharks in the Bay were captured from June through September of 2001 in waters with temperatures ranging from 17.5° to 26.0° C, salinity from 16.7 to 31.7 ppt, and depths from 0.6 to 27.4 m. They ranged in size from, 44 to 135 cm FL. Neonates were found from Port Mahon to Broadkill Beach on the Delaware coast with the highest abundance noted in July off of Broadkill Beach. On the New Jersey side of the Bay, neonates were found in highest abundance at Deadman's Shoal in July and off Villas in September. Neonates did not appear to utilize the higher current areas found in the center near the shipping channel and mouth of the Bay during sampling in 2001. Only during September, when the neonates are preparing for their first migration south for the winter, were neonates found in the center and mouth of the Bay. Juvenile (age 1+) sandbar sharks had a wide distribution throughout the Bay during their 2001 nursery season. These juveniles were most abundant in the lower current areas of the Bay above Mispillion, DE and Cape May, NJ. Although abundance within the mouth and center of the Bay along the shipping channel was low for juveniles (age 1+), there still appears to be some utilization of these areas throughout the nursery season. In 2001, 264 sharks were tagged and released in Delaware Bay and 3 (1%) of these sharks have been recaptured to date. There was also a six-year recapture in 2001 of a sandbar shark tagged in Delaware Bay in 1995.

Sand tiger sharks were captured in water temperatures ranging from 19 to 25 ºC, salinity from 23.1 to 29.8 ppt, and a depth range from 2.8 m to 7.0 m. Captured sand tiger sharks ranged in size from 120 cm to 145 cm FL. Based on size all three of the sand tiger sharks captured were juveniles.

NORTH CAROLINA: Due to funding and logistical constraints there was no COASTSPAN sampling in North Carolina waters in 2001. There is only tag recapture data from previous years of COASTSPAN sampling in North Carolina's waters to report in 2001. There were eight recaptures of sharks tagged in North Carolina waters during the COASTSPAN survey in previous years. These consisted of seven young-of-year-year sandbar sharks and one Atlantic sharpnose shark, all tagged in 2000.

SOUTH CAROLINA: Sharks in South Carolina were sampled from April to December of 2001, with a total of 2,095 captured, and 763 tagged and released. The majority sampled were Atlantic sharpnose (1,052) and smooth dogfish sharks (280). Other species captured were blacknose, blacktip, bonnethead, finetooth, sandbar, scalloped hammerhead, spinner, lemon, and tiger sharks. These occurred primarily in Bulls Bay, St Helena Sound, North Edisto Estuary, and off Charleston Harbor. Water temperatures where the sharks were captured ranged from 25.0° to 31.2° C, salinities from 24.0 to 36.0 ppt, and water depths from 1.5 to 22.5 m. A number of finetooth, bonnethead, sandbar, scalloped hammerhead, and spinner sharks that were tagged in 2000 and 2001 were recaptured during the 2001 tagging season.

GEORGIA: Sharks in Georgia waters were sampled from April to September of 2001, with effort focused in the Doboy, Sapelo, St. Catherines, and Ossabaw sound systems. A total of 333 sharks were captured, and 104 tagged and released. Species composition consisted of Atlantic sharpnose, blacktip, bonnethead, finetooth, sandbar, scalloped hammerhead, spinner, and bull sharks. Atlantic sharpnose sharks were the most prevalent (250), followed by bonnethead (42), and blacktip sharks (16). Water temperatures where the sharks were captured ranged from 21.1° to 30.4° C, salinity from 23.3 to 33.4 ppt, and water depths from 3.1 to 11.0 m.

COASTSPAN Nurse Shark Mating and Nursery Grounds Project (Pratt and Carrier, 2002)

The Nurse Shark Mating and Nursery Grounds Project, conducted cooperatively by the NOAA Fisheries AAP, and Albion College (Albion, Michigan) has recently been included in the COASTSPAN program. Since 1991, the researchers, currently with support from the HMS Management Division, have undertaken studies on nurse shark (*Ginglymostoma cirratum*) behavioral ecology in the Dry Tortugas National Park, Florida, focusing on habitat utilization for mating and as nursery grounds. The area is a nearly pristine archipelago providing an ideal natural laboratory for *in situ* studies of this species, which lends itself to such investigations as it inhabits relatively shallow waters and is not far ranging. Also, the nurse shark is fairly docile, and individuals may be repeatedly observed and recaptured while still existing in a wild, uncompromised state. Thus, using diver identifiable tags, ultrasonic telemetry, systematic

observation over many years, and DNA fingerprinting, the researchers are beginning to answer management questions such as location and utilization of nursery grounds and season of mating and parturition. They have been able to study neonate, juvenile and adult distribution in local reefs, define elements of social structure and elucidate complex reproductive behaviors. Understanding how this habitat functions as breeding and nursery grounds will set a broad foundation from which to conduct life history, habitat, and behavioral studies of other species of sharks.

Since 1993, 183 nurse sharks (67 adults and 116 juveniles) have been tagged in the Dry Tortugas study population, with about 50 of the identified adults subsequently recaptured at least once. In the 617 mating events observed to date, known adults have been identified 274 times. Most identified adult males visit the study site faithfully every year; it appears that adult females visit the study area to seek refuge and mate in alternate years; consistently high juvenile recapture rates confirm that the juvenile population is largely site specific. Observations of neonates in June confirmed that the area is indeed a primary pupping and nursery ground as well as mating grounds. Future telemetry should provide a detailed record of activities of adults when they are present in the study area. Also, completing the DNA work will enable the researchers to determine the population structure and better understand social dynamics and reproductive success. Ultimately, this information should provide a basis for understanding such aspects of other shark species, as well.

From the continuing investigations, the researchers have learned that mating activities are vulnerable to the disruptive effects of wading, diving, electronic flash photography, boat traffic, including personal water craft (jet skis and kayaks), and to human presence. To reduce disruptive activities during the mating season, a proposal has been submitted to the National Park Service. The continued presence of neonate and older juveniles in the coral heads and on the adjacent grass flats is an encouraging sign that the area closure is effective and the presence of the research team not overly disruptive.

3.2 Atlantic Billfish

Blue Marlin Spawning and Nursery Habitat: 2002 Research Accomplishments

The blue marlin (*Makaira nigricans*) is a valuable, apex predator that has sustained several decades of heavy overfishing. The Atlantic stock, according to the most recent stock assessment, currently stands at ~40% of the level needed to provide maximum sustainable yield. Despite its economic and ecological importance, there is a dearth of information on precisely when, where and how often the blue marlin reproduces or on the factors that determine spawning success and the survival of their young. Without knowledge of the spatio-temporal extent of spawning and nursery grounds, fishery managers cannot consider the use of measures such as time-area fishing closures and protecting critical habitats.

The Southeast Fisheries Science Center (SEFSC) and the University of Miami (UM) have been cooperating over the last two years on a project that examines EFH for blue marlin focusing on Exuma Sound, a semi-enclosed body of water bounded by the islands of the Bahamas (Serafy *et al.*, 2003) . Together, the SEFSC-UM team have conducted larval billfish surveys of surface waters of the Sound for three consecutive years. In 2002, the second phase of this project was implemented, whereby information gained from larval distribution, abundance and size-structure was used to guide the electronic tagging of adults for information on potential spawning areas and behavior. Specifically, state-of-the-art pop-up satellite tags were used to track the movements of adult blue marlin in waters upstream of Exuma Sound during June, 2002.

Both the adult tagging and the larval research components were highly successful in 2002. Twenty five adult blue marlin were tagged with pop-up satellite tags and less than a month later very high concentrations of larval blue marlin were collected in this area for a third time in three years. Fifteen of the 25 adults tagged traveled an average distance of 390 nautical miles in less that 40 days; travel distances ranged from 18 to 906 nautical miles. The researchers are currently in the process of analyzing adult movement tracks and larval distribution data for publication in peer-reviewed journals. This work will provide valuable insight into the nursery habitats of the Atlantic marlins as well as into the extent of adult movement during peak spawning periods. Over time, the ongoing investigations will provide critical information for the identification and protection of spawning and nursery habitats for the Atlantic marlins and possibly other billfishes in the region.

3.3 Atlantic Bluefin Tuna

Distribution of Western Atlantic Bluefin Tuna

The Tag-A-Giant (TAG) program, a collaborative effort among scientists from Stanford University, the Monterey Bay Aquarium, and NOAA Fisheries, was initiated in 1996 to examine the migrations and biology of giant bluefin tuna. These studies utilize several types of archival tags, including pop-up satellite archival tags, which download data to a computer via satellite once released from the fish, and archival tags that are implanted in the fish where they continuously record data. A total of 560 tags have been deployed in feeding grounds off the East Coast of North America (offshore waters of North Carolina and Massachusetts), and in breeding grounds of the Gulf of Mexico and the Mediterranean Sea. A comprehensive overview of the research and results to-date were included in the 2002 SAFE Report, based on Block *et. al.*, 2001. The most recent report to ICCAT (SCRS, 2002) primarily addresses the latest information obtained from archival tags that were surgically inserted in 279 tunas off the coast of North Carolina between 1996 and 1999, and in January 2002 to collect data from the organism and its surroundings. Of the 279 tags, 57 (20.4%) have been recaptured as of July 1, 2002. The information obtained from these sources has provided an insight into the seasonal movements and environmental preferences of the species.

Current data appears to substantiate that information previously published in Block *et al*., 2001. Generally, tunas tagged with archival tags off North Carolina were recaptured primarily from waters off New England and the Mediterranean Sea. Seasonal movement was from off the Carolinas in winter, into the Gulf stream in spring, and to New England waters in summer. Tuna tagged in the Gulf of Mexico surfaced west of the Loop Current, and to points north and east of the Current. Individuals also exited from the Gulf through the Straits of Florida and moving along the North American continental shelf. Results are consistent with other tagging data showing strong linkages between the Carolina and New England feeding areas, most importantly with a particular fidelity by tuna 10 years of age and younger in winter and summer, respectively. These size classes of fish make up a large proportion of the western fishery and appear to remain along the continental shelf during their adolescent and potentially their early breeding years. Three New England fish have shown a directed movement to the Gulf of Mexico breeding ground and in one case fidelity back to New England waters. Integration of remote sensing data substantiates that bluefin are concentrated in regions of peak oceanic primary productivity on winter and summer feeding grounds. The TAG program is continuing forward with plans to implant archival tags in more bluefin tuna in the Western Atlantic, as the multi-year tracks are extremely informative on ocean basin scales (SCRS, 2002).

Chapter 3 References

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4. FISHERY DATA UPDATE

In this section of the 2003 SAFE report, HMS fishery data, with the exception of some data on Atlantic sharks, are analyzed by gear type; section 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 more 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 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 highly migratory species (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 handgear fishery - rod and reel, handline, bandit gear; tuna purse seine fishery - purse seine; tuna recreational fishery- rod and reel, handline; tuna handgear fishery - rod and reel, harpoon, handline, bandit gear; and tuna harpoon fishery - harpoon. 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 Secretary of Commerce 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 4.1 depicts a summary of U.S. and international HMS catches by species rather than gear type. International catch levels are taken from the 2002 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 4.1) 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 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 HMS FMP. International catch and landings tables are included for the longline and purse seine fisheries in Sections 4.1.3 and 4.2.3 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 4.1 **Calendar Year 2001 U.S. vs International Catch of HMS (mt ww) other than sharks.** Source: SCRS, 2002; NOAA Fisheries, 2002b).

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	39,486* (includes N. & S. Atlantic and Mediterranean)	North Atlantic (NA)	10,323*	2,505	24.27%	6.45%
		South Atlantic (SA)	14,539*	43	0.30%	
Atlantic Bluefin Tuna	Unknown**	West Atlantic	2,395	1,212 (173 mt discards)	50.61%	3.36%
Atlantic Bigeye Tuna	96,482	Total Atlantic	96,482	1085	1.12%	1.12%
Atlantic Yellowfin Tuna	157,269	West Atlantic	37,814	6,703	17.73%	4.26%
Atlantic Albacore Tuna	66,640 (includes N. & S. Atlantic and Mediterranean)	North Atlantic	24,955	322	1.29%	0.49%
		South Atlantic	34,616	2	0.005%	
Atlantic Skipjack Tuna	143,217	West Atlantic	33,230	70	0.21%	0.05%
Atlantic Blue Marlin	1,915	North Atlantic	515	39	7.57%	2.04%
Atlantic White Marlin	622	North Atlantic	222	19.6	8.83%	3.15%
Atlantic Sailfish	1741	West Atlantic	835	72.7	8.62%	4.17%

* Actual catches are likely higher given significant non-compliance with ICCAT reporting requirements.
** Significant non-compliance with ICCAT reporting requirements prevented SCRS from estimating aggregate 2001 eastern Atlantic bluefin tuna catches.

4.1 Fishery Data: PELAGIC LONGLINE

4.1.1 Overview of History and Current Management

U.S. pelagic longline fishermen began targeting HMS in the Atlantic Ocean in the early 1960s. However, U.S. landings of swordfish did not exceed 1500 mt (ww) until the mid-1970s. Since that time, the gear deployed has evolved several times. The majority of fishermen use monofilament mainline that is rigged differently depending upon whether the vessel is "targeting" tunas or swordfish. The term "targeting" is used because there are differences in the location, timing, and gear configuration that are specific to the tuna or swordfish target. For example, fishing for yellowfin tuna tends to occur during the day, while swordfish fishing usually occurs at night. However, the use of pelagic longline gear also results in the incidental catch of other pelagic species. The incidental catch includes species that are retained or discarded for economic and regulatory reasons. A complete discussion of the pelagic longline fishery may be found in the final environmental impact statement (EIS) to reduce bycatch in the Atlantic pelagic longline fishery (NOAA Fisheries, 2000) and in the final supplemental EIS to reduce sea turtle bycatch (NOAA Fisheries, 2002). This gear type is possibly the most regulated of all HMS gear types due to the nature of the gear and its catch/bycatch.

Bycatch in the pelagic longline fishery is discussed in Section 4.1.4 and in Section 8 of this document. Like fishermen using other fishing gears, pelagic longline fishermen are subject to minimum sizes for yellowfin, bigeye, and bluefin tuna, and swordfish to reduce the mortality of small fish. Pelagic longline fishermen are also subject to target catch requirements in order to retain bluefin tuna. These regulatory discards compose a large portion of the bycatch in the fishery. In some areas and at certain times of the year, much of the bycatch in this fishery is released dead. Because it is difficult for pelagic longline fishermen to avoid undersized fish in some areas, NOAA Fisheries has closed areas in the Gulf of Mexico and along the east coast. The intention 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, NOAA Fisheries issued a rule to require all pelagic longline vessels to report positions on an approved vessel monitoring system (VMS), but this rule was suspended due to ongoing litigation. A court recently upheld the validity of the rule, and NOAA Fisheries is taking necessary steps to implement the VMS program.

In addition to regulations designed to reduce bycatch and bycatch mortality, pelagic longline fishermen are subject to quota management for swordfish, sharks, and bluefin tuna. Quota monitoring requires seasonal regulations, closures, and in some cases target catch requirements. In order to document catch and effort, pelagic longline fishermen are subject to permitting and reporting requirements, including logbooks and observer coverage. In 1999, NOAA Fisheries established a limited entry system for swordfish, shark, and tuna longline category permits. Pelagic longline fishermen who target swordfish or BAYS tunas must have

swordfish, shark, and tuna longline category permits. NOAA Fisheries is re-evaluating the limited access program and may consider gear-specific permits in the future. Refer to Section 9 for information relating to limited access permits.

4.1.2 Most Recent Catch and Landings Data

Pelagic longline fishermen encounter as many as 40 different species in a trip. Table 4.1.1 indicates the 1997-2001 catches of HMS by U.S. pelagic longline fishermen in the Atlantic Ocean.

Table 4.1.1 Estimated U.S. Pelagic Longline HMS Catches: Calendar Years 1997-2001 (mt ww)*. Source: NOAA Fisheries 2002 National Report.

	1997	1998	1999	2000	2001
Swordfish *landings*	3,350.1	3,158.9	3,047.6	2,968.6	2,526.2
Swordfish *dead discards***	446	433	494	490	293
Yellowfin Tuna	3,773.6	2,447.9	3,374.9	2,901.2	2,200.1
Bigeye Tuna	794.8	695.3	929.1	531.9	682.5
Bluefin Tuna *landings*	49.8	48.8	73.5	66.1	37.5
Bluefin Tuna *dead discards****	37.1 - 148	64 - 102	30 - 151	67 - 173	25 - 86
Albacore Tuna	189.1	179.7	194.5	147.3	193.8
Skipjack Tuna	3.5	1.3	2.0	1.8	4.3
Blue Marlin*****	138.1	51.8	82.1	59.6	22.4
White Marlin*****	70.8	32.1	56.7	40.8	16.5
Sailfish*****	57.7	27.1	71.6	45.4	10.7
Total	**8,910.6 - 9,021.5**	**7,139.9 - 7,177.9**	**8,356.0 - 8,477.0**	**7,319.7 - 7,425.7**	**6,012.0 - 6,073.0**

* Atlantic sharks are caught on pelagic longlines, however, the methods for reporting data on Atlantic sharks do not allow for their inclusion in this table. The table also does not include other species caught by this gear, e.g., dolphin, wahoo, etc.

** Post-release mortality of swordfish released alive is not estimated by NOAA Fisheries at this time. Source: SCRS 2002.

*** Estimates of bluefin tuna discards vary depending upon the method used to calculate discards.

**** Indicates longline *dead discards* of these species.

4.1.3 U.S. vs. International Catch

For 2001, the provisional estimate of U.S. vessel landings and dead discards of swordfish

(North and South Atlantic) was 2,568.4 mt (98 percent of these are longline landings and discards). This estimate is 27 percent lower than the estimate of 3,497.1 mt for 2000. A decline in U.S. landings of swordfish in recent years is partially due to the U.S. implementation of quotas. The large decrease from 2000 to 2001 is attributable to the closures in the Gulf of Mexico, off the southeast coast, and in the northeast distant area. The 2002 stock assessment demonstrated that the status of North Atlantic swordfish has improved dramatically due to high levels of recruitment since 1997 and the catch restrictions implemented as part of the ICCAT recovery plan. Anecdotal evidence indicates that more small swordfish are being encountered by pelagic longline fishermen throughout the Atlantic Ocean. The following table shows the proportion of the total longline harvest that is landed by the United States.

Table 4.1.2 Estimated International Longline Landings of HMS, other than Sharks, for All Countries in the Atlantic: 1997-2001 (mt ww)*. Source: SCRS, 2002

	1997	1998	1999	2000	2001
Swordfish (N.Atl + S. Atl)	30,425	24,432	25,362	24,934	21,420
Yellowfin Tuna (W. Atl)**	8,823	8,795	11,805	11,370	11,816
Bigeye Tuna	68,251	71,825	78,864	70,377	55,159
Bluefin Tuna (W. Atl.)**	382	764	914	859	540
Albacore Tuna (N. Atl + S. Atl)	23,491	23,574	27,181	28,814	29,626
Skipjack Tuna (N. Atl + S. Atl)	65	99	51	60	70
Blue Marlin (N. Atl. + S. Atl.)***	3,477	2,467	2,378	2,108	1,499
White Marlin (N. Atl. + S. Atl.)***	905	885	923	854	557
Sailfish (W. Atl.)***	439	1,229	719	934	531
Total	**136,258**	**134,070**	**148,197**	**140,310**	**121,218**
U.S. Longline Landings (from U.S. Natl. Report, 2000)#	**8,910.6**	**7,139.9**	**8,356.0**	**7,319.7**	**6,012.0**
U.S. Longline Landings as a Percent of Total Longline Landings	**6.5**	**5.3**	**5.6**	**5.2**	**5.0**

* Landings include those classified by the SCRS as longline landings for all areas
** 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.
***Includes U.S. *dead discards.*
Includes swordfish longline discards and bluefin tuna discards.

The U.S. longline fleet has historically accounted for a small percent of total Atlantic landings of HMS. Even when including U.S. discards for bluefin tuna, swordfish, blue marlin,

white marlin, and sailfish, the U.S. percentage still remains around 5 to 6 percent of all longline landings reported to ICCAT. The United States continues to work internationally to encourage other nations to protect overfished HMS.

4.1.4 Bycatch Issues and Data Associated with the Pelagic Longline Fishery

Fish are discarded in pelagic longline fisheries for a variety reasons. As in other HMS fisheries, 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 and protected species including mammals, sea turtles, and seabirds are required to be released. In the past, swordfish have been discarded when the swordfish season is closed.

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. NOAA Fisheries is also concerned about serious injuries to sea turtles and marine mammals as a result of interactions with pelagic longline gear. In order to minimize bycatch and bycatch mortality in the pelagic longline fishery, NOAA Fisheries implemented regulations to close areas to longline fishing (Figure 4.1.1) and has banned the use of live bait by longline vessels in the Gulf of Mexico.

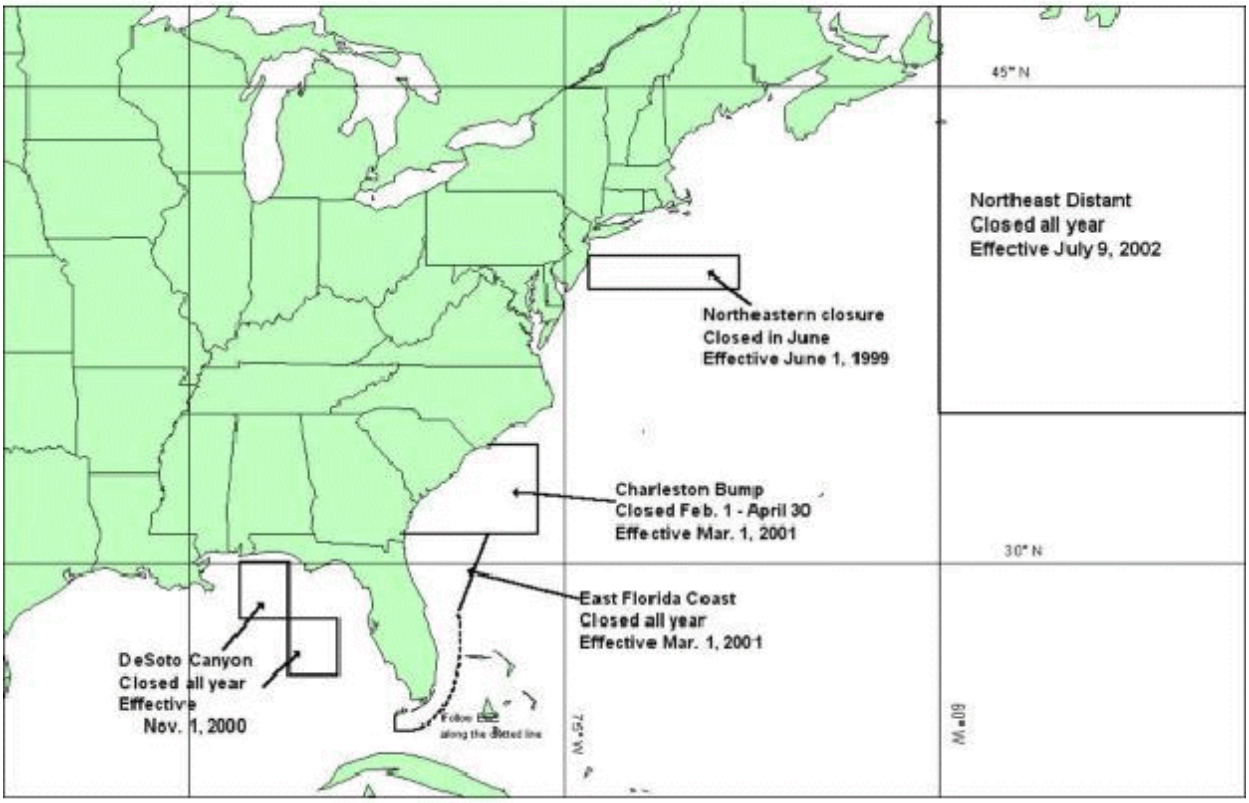


Figure 4.1.1. Areas Closed to Pelagic Longline Fishing by U.S.- Flagged Vessels.

Observer Program

Five hundred ninety-one longline sets were observed and recorded by NOAA Fisheries observers in 2001 (6.3% overall coverage - 100% coverage in the northeast distant statistical sampling area (NED); and 4.2% coverage in remaining areas). Table 4.1.3 compares the amount of observer coverage in past years for this fleet. The HMS BiOp requires that 5 percent of the pelagic longline trips be selected for observer coverage. In addition, ICCAT requires 5 percent observer coverage for all trips targeting yellowfin tuna and/or bigeye tuna. Unfortunately, due to logistical problems, it has not been possible to place observers on all selected trips. NOAA Fisheries 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 4.1.3 Observer Coverage of the Pelagic Longline Fishery. Source: Yeung, 2001 & Lee pers.com..

Year	Number of Sets Observed	Percentage of Total Number of Sets
1995	696	5.2
1996	361	2.5
1997	448	3.1
1998	287	2.9
1999	420	3.8
2000	464	4.2
2001	591	6.3

Marine Mammals

In accordance with the Marine Mammal Protection Act (MMPA), NOAA Fisheries published draft stock assessment reports for Atlantic and Gulf of Mexico marine mammals. These species are sometimes captured on pelagic longline gear and fishermen report takes of mammals to NOAA Fisheries in a marine mammal logbook. The Atlantic pelagic longline fishery is considered a Category I fishery under MMPA. In 2000, there were 14 observed takes of marine mammals by pelagic longlines. This number has been extrapolated out to an estimated 403 mammals fleet-wide (32 common dolphin, 93 Rissa's dolphin, 231 pilot whale, 19 whale, 29 pygmy sperm whale) (Yeung, 2001). In addition to mammals released *dead* from fishing gear, which is uncommon in the pelagic longline fishery, NOAA Fisheries must consider post-release mortality of mammals released *alive*.

Sea Turtles

The Atlantic pelagic longline fishery exceeded the authorized level of takes of loggerhead sea turtles in 1999. A Biological Opinion was completed on June 14, 2001, that found that the actions of the pelagic longline fishery jeopardized the continued existence of loggerhead and leatherback sea turtles. The document reported that the pelagic longline fishery interacted with an estimated 991 loggerhead and 1012 leatherback sea turtles in 1999. The estimated take levels for 2000 are 1256 loggerhead and 769 leatherback sea turtles (Yeung 2001). An emergency rule was published on July 13, 2001, (66 FR 36711) that closed the NED area and modified how pelagic longline gear could be deployed. On December 13, 2001, NOAA Fisheries extended the emergency rule for 180 days (66 FR 64378). On July 9, 2002, NOAA Fisheries published a final rule (67 FR 45393) implementing the NED area closure and required gear modifications.

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 NOAA Fisheries observer data from 2002, seven gulls, seven unidentified seabirds, four greater shearwaters, two shearwaters, and one northern gannet were hooked between June and November. 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 sinks and the birds are subsequently drowned.

The United States has developed a National Plan of Action in response to the FAO International Plan of Action to reduce the incidental take of seabirds (www.nmfs.gov.gov/NPOA-S.html). Although Atlantic pelagic longline interactions will be considered in the plan, NOAA Fisheries 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.

Finfish

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, undersized swordfish, and sea turtles. Furthermore, the data have been used for scientific analyses by both ICCAT and the Inter-American Tropical Tuna Commission for a number of years.

The estimated aggregate weight of dead discards of swordfish, sailfish, blue marlin, and white marlin decreased in 2000 compared to 1999 levels. The weight of pelagic, blue, night, dusky and silky sharks discarded dead decreased, while the weight of coastal and hammerhead sharks discarded dead increased (Cramer, pers. comm.). The most recent longline bycatch data are available in the 2002 U.S. National Report to ICCAT (NMFS, 2002). Dead discards of swordfish in the pelagic longline fishery in 2001 were estimated at 293 mt ww, a decrease from the 2000 level of 490 mt ww (SCRS, 2002).

Longline bycatch of billfish decreased substantially in every area except in the Caribbean, where it remained fairly constant. in 2001 compared to 2000. Estimated billfish dead discards from commercial longlines were 22.4 mt for blue marlin, 16.5 mt for white marlin, and 10.7 mt for sailfish in 2001. In 2000, 59.6 mt of blue marlin, 40.8 mt of white marlin, and 45.2 mt of sailfish were reported as dead discards. Bluefin tuna dead discards from the pelagic longline fishery were 25 to 113 mt in 2001, depending on the methodology used for estimation, which is a decrease

from the 2000 levels of 67 to 173 mt.

4.1.5 Northeast Distant Area Experimental Fishery

The June 14, 2001, Biological Opinion included a recommendation that NOAA Fisheries conduct a three-year experimental fishery in the northeast distant statistical reporting area to attempt to reduce the interactions between pelagic longline gear and sea turtles. In the fall of 2001, NOAA Fisheries conducted the first year of the experimental fishery. The measures that were examined included the use of blue-dyed bait and spacing the gangions lines farther away from the float lines. During the course of the experiment, 184.5 sets were observed with 100 percent observer coverage. The participating vessels captured 111 loggerhead and 76 leatherback sea turtles. All the sea turtles were released alive and 16 loggerheads were tagged with satellite tags. In addition to the sea turtles, the vessels interacted with 4 Rissa's dolphin, 1 northern bottlenose whale, and 1 striped dolphin. Following an examination of the data, NOAA Fisheries discovered that the measures had no significant effect upon the catch of sea turtles.

In the summer and fall of 2002, NOAA Fisheries conducted the second year of the experimental fishery. The use of circle hooks, mackerel bait, and shortened daylight soak time were tested to examine their usefulness in reducing the capture of sea turtles. Based on the preliminary information, there were 495 sets made with 100 percent observer coverage by 14 vessels. 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 1 unidentified marine mammal, 1 unidentified dolphin, 1 common dolphin, 1 longfin pilot whale, and 4 Rissa's dolphins; all were released alive. NOAA Fisheries is currently waiting for statistical analyses to be performed to assess the effectiveness of the experimental fishing measures.

4.1.6 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 the longline may cause injuries due to hooking. Like all other HMS fisheries, longline fishermen are exposed to unpredictable weather. NOAA Fisheries does not wish to exacerbate unsafe conditions through the implementation of regulations. Therefore, NOAA Fisheries 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. NOAA Fisheries seeks comments from fishermen on any safety concerns they 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. NOAA Fisheries encourages fishermen to be responsible in fishing and maintenance activities.

4.2 Fishery Data: PURSE SEINE

4.2.1 Overview of History and Current Management

Domestic aspects of the Atlantic tunas purse seine fisheries are described in Section 2.2.3 of the HMS FMP. Social and economic aspects of the fisheries are described in Section 2.2.4.

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 targeted and landed 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 seine vessels was established in 1982, and effectively excluded any new entrants to the permit category. Under this system, equal quotas are assigned to individual vessels by regulation. The IVQ system is possible largely because of the small pool of ownership in the purse seine fishery. Currently, only five vessels comprise the bluefin tuna purse seine fleet and the quotas were made transferable among the five vessels in 1996.

The HMS FMP and its final implementing regulations established percentage quota shares for bluefin tuna for each of the domestic fishing categories. The total amount of large medium and giant bluefin tuna that may be landed by the purse seine sector is 18.6 percent of the overall U.S. bluefin tuna landings quota. The initial 2002 allocation for the purse seine sector was 258 mt (ww). The initial allocation was adjusted to account for a 59.7 mt underage of the 2001 quota allocation. Accordingly, the adjusted 2002 bluefin tuna quota allocation for the purse seine sector was 317.7 mt (ww).

4.2.2 Most Recent Catch and Landings Data

Table 4.2.1 shows purse seine landings of Atlantic tunas from 1997 through 2001. Purse seine landings make up approximately 20% of the total annual U.S. landings of bluefin tuna on average (about 25% of total commercial landings), but account for only a small percentage, if any, of the landings of other HMS. In the 1980's and early 1990's, however, purse seine landings of yellowfin tuna were often over several hundred metric tons. Over 4,000 mt of yellowfin were recorded landed in 1985.

Table 4.2.1 Domestic Atlantic Tuna Landings for the Purse Seine Fishery: 1997-2001 (mt ww). NW Atlantic Fishing Area.

Species	1997	1998	1999	2000	
Bluefin Tuna	249.7	248.6	247.9	275.2	195.9
Yellowfin Tuna	0	0	0	0	0
Skipjack Tuna	0	0	0	0	0

4.2.3 U.S. vs. International 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 4.2.2 Estimated International Purse Seine Atlantic Tuna Landings in the Atlantic and Mediterranean: 1997-2001 (mt ww).

Species	1997	1998	1999	2000	2001
Bluefin Tuna	25,256	21,857	15,884	17,616	8,122
Yellowfin Tuna	90,074	87,357	84,104	80,414	101,850
Skipjack Tuna	75,200	74,108	93,395	79,996	71,410
Bigeye Tuna	19,057	16,370	21,437	18,378	22,060
Total	**209,587**	**199,692**	**214,820**	**196,404**	**203,442**
U.S. Total	**249.7**	**248.6**	**247.9**	**275.2**	**195.9**
U.S. Percentage	**0.12%**	**0.13%**	**0.12%**	**0.14%**	**0.10%**

At the 1999 ICCAT meeting, the Commission agreed to continue the implementation of an area in the Gulf of Guinea closed to the use of fish aggregation devices (FADs). The closure (which became mandatory in mid-1999) was in response to concern over catches of juvenile and undersize tunas by purse seiners relying on FADs. At its 2000 meeting, the SCRS evaluated the success of the closure. Although the closure only became mandatory in mid-1999, the SCRS evaluation showed that the regulation appears effective in reducing fishing mortality of juvenile bigeye tuna, at least for the purse seine fishery. For juvenile yellowfin tuna, for which the closure was not designed, the impacts on mortality were not as evident. The closure was designed more to reduce/limit mortality on juvenile bigeye, and was implemented for November through January. Juvenile yellowfin are caught at a different time of year (March-April) relative to bigeye. At its 2000 meeting, ICCAT did not take any further action to modify the time/area closure, which will continue into the future.

The SCRS evaluated the time/area closure at its 2002 meeting, and the results of the evaluation were similar to those of the previous years. The SCRS concluded that the catches of juvenile bigeye tuna would have been higher if the time/area closure were not in place. The SCRS also concluded that the time/area closure would have been more effective at reducing catches of

juvenile bigeye if compliance with the closure had been better. No changes to the time/area closure were proposed or adopted at the 2002 ICCAT meeting, and the time/area closure will continue.

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, it is NOAA Fisheries' biological opinion 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.[1] 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, and in an effort to gather information on the interaction of tuna purse seine gear with demersal species, and to allow the purse seine fleet to utilize their allocated quota of bluefin tuna and avoid conflicts with other gear types, NOAA Fisheries issued Experimental Fishing Permits (EFPs) to the purse seine fleet, and placed observers on the vessels. This allowed the purse seine vessels to fish in the closed area and successfully prosecute the tuna fishery, and provided NOAA Fisheries with additional data on purse seine operations and gear interactions.

Only four observed purse seine sets were made in the closed areas during the 2001 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

[1]Since the implementation of the closed areas in 1994, only lobster and hagfish pot gear, ocean quahog and surf clam dredge gear, pelagic longline, hook and line, midwater trawls and recently scallop dredge gear on a limited basis, have been allowed in the closed areas.

seine fleet to utilize their allocated quota of bluefin tuna for 2002 and avoid conflicts with other gear types, NOAA Fisheries issued EFPs to the purse seine fleet again in 2002. The New England Fisheries Management Council is investigating revising the list of exempted gear to allow the tuna purse seiners access to the closed areas without EFPs. The Council will utilize the data collected during the 2000, 2001, and 2002 experimental fisheries, and should have a final decision before the 2003 purse seine season.

4.3 Fishery Data: COMMERCIAL HANDGEAR

Handgear are used for Atlantic HMS by fishermen on private vessels, charter vessels, and headboat vessels. Operations, frequency, target species, 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 HMS FMP.

The proportion of domestic HMS landings harvested with handgear varies by species, with Atlantic tunas (particularly bluefin tuna) comprising the majority of commercial landings. There is no commercial sale of Atlantic billfish. Commercial handgear landings of all Atlantic HMS (other than sharks) in the United States are shown in Table 4.3.1. The fishery is most active during the summer and fall months, although in the South Atlantic and the Gulf of Mexico fishing also occurs during the winter months. For bluefin tuna, 2001 commercial handgear landings accounted for approximately 63 percent of total U.S. landings, and almost 83 percent of commercial bluefin landings. The commercial handgear fishery for bluefin tuna occurs mainly in New England, with vessels targeting large-medium and giant bluefin tuna using rod and reel, handline, harpoon, and bandit gear. Beyond these general patterns, the availability of bluefin tuna at a specific time and location is highly dependent upon 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 (rod and reel, handline, and bandit gear) fishing for bigeye, albacore, yellowfin, and skipjack tunas takes place in the northwest Atlantic Ocean. Rod and reel gear is also used by recreational fishermen, which is addressed in Section 4.4 of this report. In 2001, four percent of the total yellowfin catch, or 12 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 15 percent of total skipjack landings, or about 51 percent of commercial skipjack landings. For albacore, commercial handgear landings accounted for less than two percent of total albacore landings, and approximately two percent of commercial albacore landings. Commercial handgear landings of bigeye tuna accounted for approximately three percent of total bigeye landings, and approximately five percent of commercial bigeye landings.

Swordfish are landed using harpoons and/or handlines. While commercial handgear is

periodically used by New England fishermen, fishermen in the southeast may increase their handgear landings as the swordfish stock increases. Commercial handgear landings of swordfish are shown in Table 4.3.1, and account for a very small percentage of the total U.S. swordfish catch (less than 0.7 percent). However, in 2001 U.S. commercial handgear landings of swordfish increased by 72 percent over 2000 landings.

The HMS FMP established a limited access program for the commercial swordfish and shark fisheries (all gears), as well as for tunas (longline only). See Chapter 9 of this document for further information on permitting, including limited access permits.

A number of sharks are landed by fishermen using commercial handgear. However, the nature of the data collected and assessed for Atlantic sharks does not readily allow a breakdown into various commercial gear types. Anecdotal evidence suggests that many charter and headboat captains target sharks as an alternative when other species are unavailable. The Sutton and Ditton study on the Gulf charter/party boat industry (discussed further in Section 5.2.4) indicates that 65 percent of party boat operators targeted sharks at least once during the study period. Further information on Atlantic sharks catch and landings is found in Section 4.5.

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 HMS FMP. Social and economic aspects of the domestic handgear fisheries are described in section 2.2.4 of the HMS FMP and later in this document (Section 5). For bluefin tuna, information regarding prices and markets, costs and expenses in the commercial fishery, exports and imports, processing and trade, charter/headboat fishing, and recreational fishing can be found in Section 2.2.4.1 of the HMS FMP. Section 2.2.4.2 of the HMS FMP details Commercial Fishing, Charter/Headboat Fishing, and Recreational Fishing for BAYS tunas.

The domestic swordfish fisheries are discussed in Section 2.3.3 of the FMP. Social and economic aspects of the domestic swordfish fishery are described in Section 2.3.4 of the HMS FMP, and later in this document in Sections 5 and 6.

The domestic shark fisheries are discussed in Section 2.4.3 of the FMP. Directed fisheries for Atlantic sharks are conducted by vessels using bottom longline, gillnet, and rod and reel gear and are discussed more fully in Section 4.5 of this report. Social and economic aspects of the domestic handgear shark fisheries are described in Section 2.4.4 of the FMP, as well as in Sections 5 and 6 of this document.

4.3.2 Most Recent Catch and Landings Data

Updated tables of landings for the commercial handgear fisheries by gear and by area for 1997 - 2001 are presented in Tables 4.3.1 and 4.3.2 of this document. As commercial shark

landings are not recorded/disaggregated by gear type, commercial handgear landings are not provided in this section. A complete discussion of the Atlantic shark fishery is found in Section 4.5 of this document. In the HMS FMP, domestic landings of Atlantic bluefin tuna (1983 through 1997) and BAYS tunas (1995 through 1997) are presented in Section 2.2.3, and domestic swordfish catches (landings and discards) are presented in Section 2.3.3. A summary of the historic domestic recreational and commercial yellowfin landings (1981-1998) was presented in section 4.3.2 of the 2000 HMS SAFE Report.

Table 4.3.1 Domestic Landings for the Commercial Handgear Fishery, by Species and Gear, for 1997-2001 (mt ww). Source: U.S. National Report to ICCAT: 2002.

Species	Gear	1997	1998	1999	2000	
Bluefin Tuna	Rod and Reel	617.8	603.4	643.6	579.3	889.7
	Handline	17.4	29.2	15.5	3.2	9.0
	Harpoon	97.5	133.4	115.8	184.2	101.9
	TOTAL	**732.7**	**766.0**	**774.9**	**766.7**	**1,000.6**
Bigeye Tuna	Troll	3.9	4.0	0	0	0
	Handline	2.7	0.1	12.3	5.7	33.7
	TOTAL	**6.6**	**4.1**	**12.3**	**5.7**	**33.7**
Albacore Tuna	Troll	5.2	5.8	0	0	0
	Handline	4.8	0	4.4	7.9	3.9
	TOTAL	**10.0**	**5.8**	**4.4**	**7.9**	**3.9**
Yellowfin Tuna	Troll	237.6	177.5	0	0	0
	Handline	90.6	64.7	219.2	283.7	300.2
	TOTAL	**328.2**	**242.2**	**219.2**	**283.7**	**300.2**
Skipjack Tuna	Troll	7.9	0.4	0	0	0
	Handline	0.1	0	6.4	9.7	10.5
	TOTAL	**8.0**	**0.4**	**6.4**	**9.7**	**10.5**
Swordfish	Troll	0.4	0.7	0	0	0
	Handline	1.3	0	5.0	8.9	8.9
	Harpoon	0.7	1.5	0	0.6	7.4
	TOTAL	**2.4**	**2.2**	**5.0**	**9.5**	**16.3**

Table 4.3.2 Domestic Landings for the Commercial Handgear Fishery by Species and Region for 1997-2001 (mt ww). Source: U.S. National Report to ICCAT: 2002.

Species	Region	1997	1998	1999	2000	2001
Bluefin Tuna	NW Atl	732.7	766.0	774.4	766.7	1,000.6
Bigeye Tuna	NW Atl	6.6	4.0	11.9	4.1	33.2
	GOM	0	0.1	0.2	0.1	0.5
	Caribbean	0	0	0.2	1.5	0
Albacore Tuna	NW Atl	6.4	5.8	0.6	2.9	1.7
	GOM	0	0	$\leq$ .05	0	0
	Caribbean	3.6	0	3.8	5.0	2.2
Yellowfin Tuna	NW Atl	252.3	177.5	192.0	235.7	242.5
	GOM	55.6	60.8	12.7	28.6	43.4
	Caribbean	20.3	3.9	14.5	19.4	14.3
Skipjack Tuna	NW Atl	0.7	0.4	0.2	0.2	0.2
	GOM	0	0	0.4	0.7	0
	Caribbean	7.3	0	5.8	8.8	10.3
Swordfish	NW Atl	2.4	2.2	5.0	8.3	16.0
	GOM	0	0	$\leq$ .05	1.2	0.3

Handgear Trip Estimates

Tables 4.3.3a and 4.3.3.b display the estimated number of rod & reel and handline trips targeting large pelagic species in 2000 and 2001. The trips include both commercial and recreational trips, and are not specific to any particular species. One can assume that most trips in MA, NH, and ME targeted bluefin tuna, and that most of these trips were commercial, as over 90 percent of Atlantic tuna vessel permit holders in these states have commercial general category tuna permits. For the other states, the majority of the trips are presumed to be recreational (in that the fish are not sold), with the predominant targeted species consisting of yellowfin and

bluefin tunas, and sharks. It should be noted that these estimates remain preliminary and may be subject to change.

Table 4.3.3a Estimated total trips targeting large pelagic species from June 5 through November 5, 2000
Source: LPS telephone and dockside interviews.

State/Area	Private Vessel Trips	Charter Trips	
VA	930	198	1,128
MD/DE	1,008	915	1,923
NJ	2,934	1,279	4,213
NY	1,093	468	1,561
CT/RI	1,096	372	1,468
MA	6,390	1,108	7,498
NH/ME	1,221	233	1,454
Total	**14,672**	**4,573**	**19,245**

Table 4.3.3b Estimated total trips targeting large pelagic species from June 4 through November 4, 2001.
Source: LPS telephone and dockside interviews.

State/Area	Private Vessel Trips	Charter Trips	Total
VA	910	307	1,217
MD/DE and Cape May County, NJ	2,675	655	3,330
NJ (not including Cape May County)	3,040	660	3,700
NY	2,039	280	2,319
CT/RI	497	203	700
MA	3,641	567	4,208
NH/ME	1,944	133	2,077
Total	**14,746**	**2,805**	**17,551**

4.3.3 U.S. vs. International Catch

SCRS data do not break down international landings into a commercial handgear category. While some countries report rod and reel landings, these numbers may include both commercial and recreational landings. However, international catches of all Atlantic HMS for 2001 are summarized in Table 4.1.

4.3.4 Bycatch Issues and Data Associated with the Fishery

Compared to other commercial gear types, commercial handgear produces relatively low 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 hand gear section (4.4.4), as are new efforts to document 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 information suggests that there may be small amounts of bluefin, yellowfin, and bigeye tuna discards, but there is no supporting documentation at this point. Some regulatory discards likely occur because fishermen must comply with minimum size restrictions.

4.3.5 Safety Issues Associated with the Fishery

Section 3.9 of the HMS FMP describes the safety of human life at sea, as it pertains to Atlantic HMS fisheries. 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. During the busy fall general category bluefin tuna season the USCG oftentimes concentrates patrol activities on General category bluefin tuna boats and follows the fleet south of Cape Cod. Boarding officers indicate that the majority of General category vessels have the necessary safety equipment. However, many part-time fishermen operating smaller vessels do not meet the necessary safety standards. Over the last several years, there has been a significant General category BFT fishery from late September through October (and even into the early November) occurring off southeastern New England. The fishery is prosecuted approximately 60 - 70 miles from shore, in weather conditions that are often marginal. 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 an Atlantic tunas 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 an Atlantic Tunas General category permit, NOAA Fisheries cannot be certain that all participants in the commercial bluefin fishery are adequately prepared for the conditions they may encounter. NOAA Fisheries is concerned about the safety of all vessels participating in the General category and is working with the USCG to improve communication of vessel safety requirements to general category 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) without assistance from another vessel, except when shown by the operator that the safety of the vessel or its crew is jeopardized or when other circumstances exist that are beyond the control of the operator. NOAA Fisheries Enforcement and USCG boarding officers have 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 inadequately-equipped vessels may jeopardize the crew in that such vessels may not be able to return safely to shore due to insufficient fuel or due to adverse weather conditions without assistance from larger vessels.

If a vessel is boarded at sea and found to be without major survival equipment, the USCG will terminate the trip and escort the vessel back to the dock. Over the last few years, the USCG has focused their boardings on small vessels, especially those owned by “part-time” commercial bluefin fishermen, and has terminated several dozen trips due to a lack of safety equipment on board.

NOAA Fisheries has received comments from some General category participants that effort controls, particularly restricted-fishing days (RFDs), allow fishermen to rest and to make needed vessel repairs, thereby improving vessel safety. However, there is also a perception by many General category participants that every open day must be fished, regardless of conditions. The issue of effort controls alleviating fatigue problems was discussed in the FMP, but vessel repairs were not. NOAA Fisheries continues to receive comments, as discussed in the FMP, indicating that RFDs may encourage fishermen to fish during conditions in which they would otherwise not fish because the day is open, and that a season without RFDs would allow fishermen to choose their own schedule of fishing days, thereby alleviating safety concerns and derby-style fisheries.

NOAA Fisheries will consider all safety-related comments and information, including those from the USCG and NOAA Fisheries Enforcement, when planning future General category effort controls and will discuss these issues in future meetings with the Advisory Panel.

4.4 Fishery Data: RECREATIONAL HANDGEAR

This section of the SAFE report 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 HMS FMP. The recreational billfish fishery is described fully in Section 2.1.3 of the Billfish Amendment. In summary, the commercial sale, barter or trade of Atlantic billfish by U.S. commercial interests is prohibited, so only recreational landings are authorized.

4.4.1 Overview of History and Current Management

Atlantic tunas, swordfish, and sharks are managed under the HMS 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 HMS 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 will be 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). Bluefin tuna are the only HMS species managed using a recreational quota for which the fishing season closes after achieving the quota.

The recreational swordfish fishery has been managed through the use of a minimum size requirement. 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, to be effective March 2003. Regardless of the length of a trip, no more than the daily limit of North Atlantic swordfish will be allowed to be possessed on board 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. In contrast, 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 2.4 of this report.

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 both the HMS FMP and the Billfish Amendment in Sections 2.6.2 and 2.3.2, respectively.

Reported domestic landings of Atlantic bluefin tuna (1983 through 1998) and BAYS tuna (1995 through 1997) are presented in Section 2.2.3 of the HMS FMP. As landings figures for 1997 and 1998 were preliminary in the HMS FMP, updated tables of landings for these recreational rod and reel fisheries in 1996-2001 are presented below with updates of other HMS species. 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.

Table 4.4.1 Updated Domestic Landings for the Atlantic Tunas, Swordfish and Billfish Recreational Rod and Reel Fishery: Calendar years 1996-2001 (mt ww)*. Sources: NOAA Fisheries, 2000 and 2001a, Large Pelagic Survey, SEFSC Recreational Billfish Survey. (Recreational shark landings are provided in Tables 4.2.2 and 4.2.3).

Species	Region	1996	1997	1998	1999	2000	
Bluefin tuna**	NW Atlantic	362	299	184	99.9	49.5	249.3
	GOM	0	0	0	0.4	0.9	1.7
	Total	**362**	**299**	**184**	**100.3**	**50.4**	**251**
Bigeye tuna	NW Atlantic	108.2	333.5	228.0	316.1	34.4	366.2

Species	Region	1996	1997	1998	1999	2000	2001
	GOM	0	0	0	1.8	0	0
	Total	**108.2**	**333.5**	**228.0**	**317.9**	**34.4**	**366.2**
Albacore	NW Atlantic	277.8	269.5	601.1	90.1	250.75	122.3
	GOM	61.7	65.2	0	0	0	0
	Total	**339.5**	**334.7**	**601.1**	**90.1**	**250.75**	**122.3**
Yellowfin tuna	NW Atlantic	4,484.8	3,560.9	2,845.7	3,818.2	3,809.5	3690.5
	GOM	13.2	7.7	80.9	149.4	52.3	494.2
	Total	**4,498**	**3,569**	**2,927**	**3,967.6**	**3,861.8**	**4184.7**
Skipjack tuna	NW Atlantic	48.1	42.0	49.5	63.6	13.1	32.9
	GOM	36.4	21.7	37.0	34.8	16.7	16.1
	Total	**84.5**	**63.7**	**86.5**	**98.4**	**29.8**	**49.0**
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**
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**
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**
Swordfish	**Total**	**5.9**	**10.9**	**4.7**	**21.3**	**15.6**	**15.6**

* 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 Recreational Billfish Survey (RBS) provides a preliminary source for analyzing recreational billfish landings. Table 4.4.2 documents the number of billfish landed in 2000 and 2001, as documented by the RBS.

Table 4.4.2 Preliminary RBS Recreational Billfish Landings (calendar year). Source: NOAA Fisheries Recreational Billfish Survey.

Species	2000	2001
Blue Marlin	119	75
White Marlin	8	22
Sailfish	16	11

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 United States 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 Recreational Billfish Survey Program, as well as available size information. Document SCRS/01/138 estimated United States sailfish catch estimates from various recreational fishery surveys.

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 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 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.

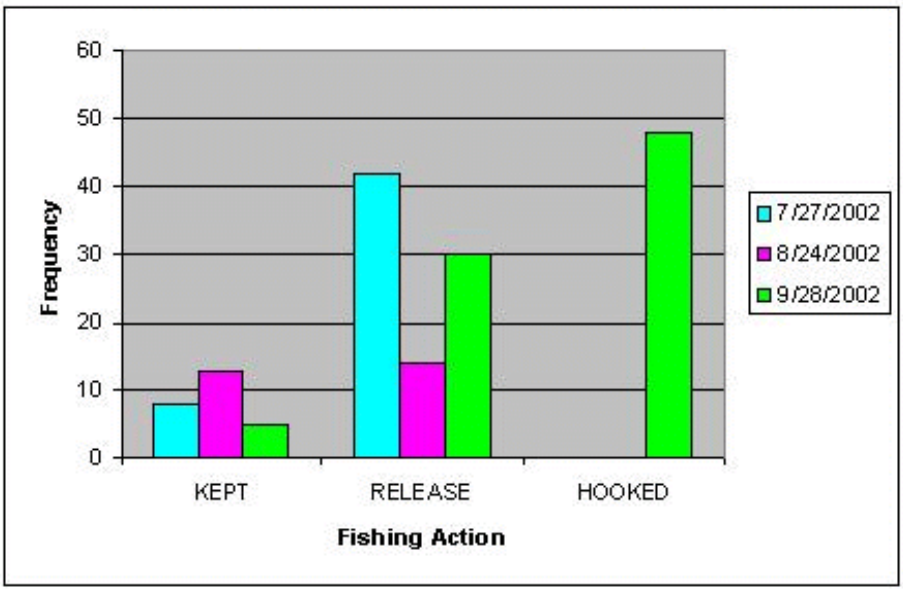
Historically, fishery survey strategies have not captured all landings of recreational handgear-caught swordfish. Although some handgear swordfish fishermen have commercial permits[2], many others land swordfish strictly for personal consumption. Therefore, NOAA Fisheries recently published regulations 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 will become 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 in process has 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.

Figure 4.4.1 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 LJFL.

Figure 4.4.1. Total Number of Swordfish Caught, Kept and Released in Three Sampled Recreational Swordfish Tournaments off Southeast Florida during 2002 (J. Levesque, pers. comm. 2003).

[2]Access to the commercial swordfish fishery is limited; hand gear fishermen however may purchase permits from other permitted fishermen because the permits are transferable.



Sizes for landed swordfish ranged from 130 - 230 cm fork length. The mean size for landed swordfish was 160 cm fork length. Weights for landed swordfish ranged from 36 - 144 kg. The mean weight for the landed swordfish was 62.6 kg. Estimated weights for the released swordfish ranged from 13 - 32 kg. The mean estimated weight for released swordfish was 19.5 kg.

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.

Table 4.4.3 **Estimates of Total Recreational Harvest of Atlantic Sharks: 1998-2001 (numbers of fish in thousands)**. 2000-2001 data are preliminary. Source: Cortés and Neer 2002, and E. Cortés, 2002, pers. comm.

LCS	165.5	91.0	137.4	134.2
Pelagic	11.8	11.1	13.3	3.8
SCS	169.6	115.8	184.7	189.5

Table 4.4.4 **Recreational Harvest of Atlantic LCS by Species, in number of fish: 1998-2001.** Source: Cortés and Neer 2002, and E. Cortés, 2002, pers. comm. Species-specific data for 2000-2001 are preliminary.

LCS Species	1998	1999	2000	2001
Basking**	none reported	none reported	none	none reported
Bignose*	none reported	none reported	none	none reported
Bigeye sand tiger**	none reported	none reported	none	none reported
Blacktip	82,288	34,962	74,055	48,848
Bull	1,850	3,107	6,045	3,751
Caribbean Reef*	74	3	182	none reported
Dusky*	4,499	5,570	2,397	5,703
Galapagos*	none reported	none reported	none	none reported
Hammerhead, Great	467	352	921	3,367
Hammerhead, Scalloped	1,920	1,349	3,517	1,108
Hammerhead, Smooth	375	1	none	703
Hammerhead, Unclassified	390	75	3,693	none reported
Lemon	2,120	146	2,801	5,946
Night*	133	50	none	none reported
Nurse	2,455	1,503	2,138	4,280
Sandbar	35,766	20,553	10,743	35,880
Sand tiger**	none reported	none reported	none	604
Silky	5,376	3,863	5,109	4,070
Spinner	7,522	6,391	6,355	2,896
Tiger	1,380	153	1,479	784
Whale**	none reported	none reported	none	none reported
White**	none reported	none reported	none	none reported
Large Coastal Unclassified	18,925	12,953	17,949	16,284
Total:	165,540	91,031	137,384	134,224

*indicates species that were prohibited in the recreational fishery as of July 1, 1999.

** indicates species that were prohibited as of April 1997.

Table 4.4.5 Recreational Harvest of Atlantic Pelagic sharks by Species, in number of fish: 1998-2001. Cortés and Neer 2002, and E. Cortés, 2002, pers. comm. Species-specific data for 2000-2001 are preliminary.

Pelagic Shark Species	1998	1999	2000	2001
Bigeye thresher*	none reported	none reported	none reported	none reported
Bigeye sixgill*	none reported	none reported	none reported	none reported
Blue	6,085	5,218	7,010	950
Mako, Longfin*	none reported	none reported	none reported	none reported
Mako, Shortfin	5,633	1,383	5,808	2,882
Mako, Unclassified	8	9	none reported	none reported
Oceanic whitetip	none reported	none reported	none reported	none reported
Porbeagle	none reported	none reported	none reported	none reported
Sevengill*	none reported	none reported	none reported	none reported
Sixgill*	none reported	none reported	none reported	none reported
Thresher	36	4,512	528	none reported
Total:	11,762	11,122	13,346	3,832

* indicates species that were prohibited in the recreational fishery as of July 1, 1999.

Table 4.4.6 Recreational Harvest of Atlantic SCS by Species, in number of fish: 1998-2001. Source: Cortés and Neer 2002, and E. Cortés, 2002, pers. comm. Species-specific data for 2000-2001 are preliminary.

SCS Species	1998	1999	2000	
Atlantic Angel*	110	none reported	none reported	none reported
Blacknose	10,523	6,019	10,463	15,059
Bonnethead	29,606	41,128	57,405	58,600
Finetooth	1,124	78	1,786	6,729
Sharpnose, Atlantic	128,254	68,621	114,973	109,114
Sharpnose, Caribbean*	none reported	none reported	none reported	none reported
Smalltail*	none reported	4	29	none reported
Total:	169,617	115,850	184,656	189,502

* indicates species that were prohibited in the recreational fishery as of July 1, 1999.

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 artisanal 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 assesed 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 the time this 2003 SAFE report was prepared, additional information was not available regarding international HMS recreational catches.

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 legally 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 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. NOAA Fisheries 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 Large Pelagic Survey (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 HMS FMP presented the "raw" data for bycatch species in the rod and reel fishery from the 1997 LPS database in summary format (for all areas) in Table 3.38. The table below presents preliminary 2001 data that was included in the 2002 SAFE Report.

Table 4.4.6 Reported Catch* of HMS in the Rod and Reel Fishery. Source: Large Pelagic Survey (LPS) Preliminary Data.

Species	Number of Fish Kept									
	1997	1998	1999	2000	2001	1997	1998	1999	2000	
White Marlin**	7	11	6	4	21	203	465	156	705	285
Blue Marlin**	2	3	3	0	0	30	27	28	1,886	68
Sailfish**	0	1	0	-	-	2	2	3	-	-
Swordfish	5	1	3	0	15	6	5	1	0	57
Bluefin Tuna	749	653	396	-	-	1,181	1,105	327	1,789	-
Bigeye Tuna***	17	17	27	2,116	39	6	9	0	0	8
Yellowfin Tuna***	1,632	2,646	2,501	26,727	11,833	224	645	682	1,436	546
Skipjack Tuna	285	261	146	-	0	468	267	88	0	0

	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Albacore Tuna	189	558	133	0	3,406	43	92	52	0	122
Thresher Shark	3	7	3	11	35	2	2	2	36	0
Mako Shark	51	78	49	0	120	86	92	49	0	486
Sandbar Shark	5	2	2	89	39	30	56	6	2	51
Dusky Shark	16	6	1	0	0	50	54	7	42	17
Tiger Shark	0	2	0	-	0	5	5	0	0	0
Blue Shark***	68	26	11	473	6	1,897	780	572	13,769	2,019
Hammerhead Shark	1	1	1	3	4	4	4	5	0	2
Wahoo	6	71	45	803	125	1	2	0	0	14
Dolphinfish	920	7,263	2,139	7,753	8,364	61	194	73	4,878	345
King Mackerel***	174	198	141	1,352	100	1	10	8	83	62
Atlantic Bonito***	336	328	254	5,258	180	203	300	166	1,067	127
Little Tunny	587	1,231	97	403	216	1,015	1,507	133	783	204
Amberjack ***	3	6	9	3,154	55	18	40	24	463	0
Spanish Mackerel	-	-	-	190	23	-	-	-	0	0

*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 discard estimates for other species, NOAA Fisheries may estimate discard estimates of other bycatch 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.
***2000 estimates for these species have likely been “expanded.”

Outreach programs to address bycatch were included in the HMS 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 is expected to occur in 2003.

A recent study by Graves *et al.*, 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.

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 HMS 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 4.3.5. The USCG does compile statistics on recreational boating accidents and casualties, independent of the activity in which they are engaged. 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 flybridge. Both of these situations can lead to people falling overboard. In 2001, approximately 73 percent of all boating casualties were due to drowning and in approximately 84 percent of all the drowning deaths, the victim was not wearing

a personal floatation device (PFD).

Table 4.4.7 2001 Reported Boating Accident Types (USCG Lt. Bruce Schmidt, pers. comm.).

Accident Type	# Accidents	# of Injuries	# of Fatalities	
Capsizing	466	280	210	$1,554,496
Carbon Monoxide	14	29	4	$0
Collision with Fixed Object	643	467	49	$3,762,104
Collision with Floating Object	109	52	2	$322,023
Collision with Submerged Object	3	1	0	$8,500
Vessel Collision	2,062	1,366	68	$8,997,570
Departed Vessel	16	2	15	$0
Ejected from Vessel	18	3	17	$4,700
Electrocution	4	4	4	$0
Fall in Boat	284	307	7	$48,685
Fall Overboard	514	367	176	$313,789
Fire/Explosion (fuel)	153	73	2	$313,789
Fire/Explosion (other than fuel)	112	18	1	$3,179,323
Flooding or Swamping	339	74	47	$3,001,106
Grounding	412	255	10	$2,138,094
Other	253	175	18	$3,792,817
Sinking	150	25	15	$1,855,357
Skier Mishap	439	454	9	$2,200
Struck by Boat	166	153	6	$827,502

Struck by Motor	100	100	5	$15,701
Struck fixed Object	1	1	0	$0
Struck Submerged Object	125	35	10	$793,466
Unknown	36	33	6	$107,566
Total	**6,419**	**4,274**	**681**	**$31,307,488**

Table 4.4.6 2001 Reported Boating Accident Cause- of-Death Statistics (USCG Lt. Bruce Schmidt, personal communication).

Cause of Death	# Fatalities	PFD Worn	
		Yes	No
Carbon Monoxide Poisoning	4	0	4
Drowning	498	78	420
Hypothermia	28	16	12
Other	28	7	21
Trauma	109	44	65
Unknown	14	4	10
Total	**681**	**149**	**532**

4.5 Fishery Data: ATLANTIC SHARKS

4.5.1 Overview of History and Current Management

Atlantic sharks are targeted primarily through bottom longline, drift gillnet, and rod and reel (commercial, recreational, and charter/headboats) gear types. Although discussions on other fisheries have been broken down by gear type, the nature of the shark catch and the method of data collection lend themselves to a stock-based analysis. As a result, some of the information overlaps with that found in other sections of the report.

The HMS FMP contained numerous new management measures for Atlantic sharks, including rebuilding programs for ridgeback and non-ridgeback large coastal sharks (LCS) and precautionary measures for pelagic and small coastal sharks (SCS). The HMS FMP:

- reduced commercial LCS and SCS quotas,
- established ridgeback and non-ridgeback subgroups of LCS,
- implemented a minimum size for ridgeback LCS,
- reduced the non-ridgeback LCS commercial quota,
- established a commercial quota for blue sharks,
- established a species-specific quota for porbeagle sharks and reduced the pelagic shark commercial quota accordingly,
- reduced recreational retention limits for all sharks,
- expanded the list of prohibited shark species,
- implemented limited access in commercial fisheries,
- established new procedures for counting dead discards and state landings of sharks after federal fishing season closures against federal quotas, and

- established season-specific overharvest/underharvest adjustment procedures.

The implementing regulations were published on May 28, 1999 (64 FR 29090).

While the HMS FMP measures for the recreational fishery went into effect on July 1, 1999, many of the measures for the commercial fishery were not effective due to a court order. The commercial measures that did go into effect onto July 1, 1999, included limited access (including incidental catch limits), trip limits (4,000 lb LCS), and shark gillnet observer coverage. The commercial quotas for LCS, pelagic sharks, and SCS in 1999 and 2000 were the same as the 1997 quotas (1,285 mt dw, 580 mt dw, and 1,760 mt dw, respectively) due to the court order. Additionally, the prohibited species provisions did not go into effect for the commercial fishery until June 2000, and the minimum size on ridgeback LCS have not been implemented in the commercial fishery.

On November 21, 2000, SOFA *et al*. and NOAA Fisheries reached a settlement agreement for both lawsuits. On December 7, 2000, Judge Merryday entered an order approving the settlement agreement. The settlement agreement required, among other things, an independent (i.e., non-NOAA Fisheries) review of the 1998 LCS stock assessment. NOAA Fisheries received the results of the complete peer reviews in October 2001. The settlement agreement did not address any regulations affecting the pelagic shark, prohibited species, or recreational shark fisheries. On March 6, 2001, NOAA Fisheries published an emergency rule implementing the settlement agreement (66 FR 13441).

Taking into consideration the settlement agreement, the peer reviews, current catch rates, and the best available scientific information (not including the 1998 stock assessment projections), NOAA Fisheries implemented another emergency rule, suspending 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, NOAA Fisheries 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. This emergency rule expires on December 30, 2002.

On May 8, 2002, NOAA Fisheries announced the availability of the first SCS stock assessment since 1992 (67 FR 30879). The Mote Marine Laboratory and the University of Florida provided NOAA Fisheries with another SCS assessment in August 2002. Both of these stock assessments indicate that overfishing is occurring on finetooth sharks. The three other species in the SCS complex (Atlantic sharpnose, bonnethead, and blacknose) are not overfished and overfishing is not occurring. NOAA Fisheries announced the availability of the LCS stock assessment on October 17, 2002 (67 FR 64098). The results of this stock assessment indicate

that the LCS complex is still overfished and overfishing is occurring, that sandbar sharks are no longer overfished and that overfishing is still occurring, and that blacktip sharks are rebuilt and overfishing is not occurring. The peer review for the 2002 LCS stock assessment is expected to be complete in mid-December. At the time of the preparation of this document, the peer review was not available for summary.

On November 15, 2002, NOAA Fisheries announced the intent to prepare an Environmental Impact Statement (EIS) regarding Atlantic shark management measures during 2003 to address management concerns resulting from the 2002 LCS and SCS stock assessments. The amendment will examine management alternatives available to rebuild or prevent overfishing of Atlantic sharks.

NOAA Fisheries finalized an emergency rule on December 27, 2002, effective for 180 days until June 30, 2003. that implements annual quotas of 783 metric tons (mt) dressed weight (dw) and 931 mt dw for the commercial ridgeback and non-ridgeback large coastal shark fisheries, respectively, and implement an annual quota of 326 mt dw for the commercial small coastal shark fishery. The emergency rule also addresses suspension of the regulation regarding the commercial ridgeback large coastal shark minimum size, season-specific quota adjustments, and accounting procedures for dead discards and state landings after a federal closure against the commercial quota.

Modifications to Observer Coverage Requirements

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.

As of January 2002, the observer coverage requirements in the bottom longline fishery for sharks changed from voluntary participation in the observer program to mandatory participation if selected. NOAA Fisheries has selected approximately 41 vessels, operating out of three major winter shark fishing areas in the North Carolina/South Atlantic Bight, Florida East Coast, and Florida Gulf Coast areas, for mandatory participation in the observer program during 2003.

Alabama Shark Gillnet Fishery

Previous reports to NOAA Fisheries indicated that a group of about six fishermen in

Alabama were beginning a directed fishery for sharks using gillnets with 8-12 inch mesh and more than 2,000 yards of net. The information available to NOAA Fisheries was that the fishery would operate solely in state waters. As of December 2002, the fishery does not appear to be operating due to lack of profitable markets (J. Carlson, pers. comm.).

Directed Shark Observer Programs

The University of Florida and Florida Museum of Natural History are continuing an observer program of the directed bottom longline commercial shark fishery in the Atlantic and Gulf of Mexico to enhance the reliability of management strategies for the shark fishery. Observers provide baseline characterization information, by region, on the species composition, relative abundance, and size composition within species for the large coastal and small coastal bottom longline shark fisheries.

During 2002, three observers were placed on 10 vessels with a total fleet coverage of 2 percent during the first season and six observers on 19 vessels with a total fleet coverage of 4 percent during the second fishing season. Coverage spanned from New Jersey to Louisiana and a total of 60 trips, 133 sets and 214 sea days were observed during the whole year (G. Burgess, pers. comm. 2002).

The 2002 observed catches of sharks in the directed bottom longline fishery are dominated by large coastal sharks (72 percent), with small coastal sharks comprising 28 percent and pelagic sharks comprising 0.3 percent (Table 4.5.1; G. Burgess, pers. comm. 2002). Sandbar sharks dominate the large coastal catch and landings (34.7 and 47.0 percent, respectively), followed by blacktip sharks (23.1 and 30.5 percent, respectively), tiger sharks (19.5 and 6.5 percent, respectively), and nurse sharks (7.4 and 0 percent, respectively). Tiger sharks represent 62.6 percent of large coastal sharks tagged and released (Table 4.5.1).

Atlantic sharpnose sharks dominate the catches of small coastal sharks at 73.6 percent (Table 4.5.1). Approximately 76.3 percent of small coastal sharks are used for bait in this fishery (371 out of 1,562 individuals were landed). Only 18 pelagic sharks were caught, 17 of which were landed and all of which were shortfin mako (Table 4.5.1).

Table 4.5.1 Directed bottom longline shark observed catch and disposition for 2002. Source: G. Burgess, pers. comm. 2002.

	FLORID EAST COAST				FLORIDA GULF COAST				Carolinas and Georgia				TOTAL			
Species	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**
Sandbar	291	287			582	573	4	1	536	525	3	2	1409	1385	7	3
Blacktip	215	208	7		571	542	24	1	151	148	2		937	898	33	1
Dusky	2		1	1	6		3	3	17		14	3	25		18	7
Silky	8	8			69	48	13	8	13	5	8		90	61	21	8
Bull	16	14			53	48			4	3			72	65		
Bignose					1			1					1			1
Spinner	6	4	2		46	39	4	1	4	3	1		56	46	7	1
Night					17	2	15		1			1	18	2	15	1
Lemon	18	17			130	123			4	4			152	144		
Scalloped HH	59	41	18		66	49	16		11	8	2	1	136	98	36	
Great HH	4	1	3		56	50	6		7	4	3		67	55	12	
Nurse	29			28	267			264	5			5	301			297
Tiger	139	34	5	97	137	37	10	92	515	127	43	345	791	193	58	534
Sand tiger	1			1									1			1
White																
Unidentified																
Atlantic sharpnose	315	3	312		321	68	251	2	513	111	402		1149	182	965	2
Bonnethead	1		1										1		1	
Blacknose	22	13	9		355	155	197	4	33	20	13		411	188	219	4

	FLORID EAST COAST				FLORIDA GULF COAST				Carolinas and Georgia				TOTAL			
Species	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**
Finetooth									1	1			1	1		
Thresher																
Shortfin mako									18	17			18	17		
LCS	788	614	36	125	2001	1506	95	371	1268	827	76	357	4057	2947	207	853
SCS	338	16	322	0	676	223	448	6	547	132	415	0	1562	371	1185	6
Pelagic									18	17			18	17		
Total	**1126**	**630**	**358**	**125**	**2677**	**1729**	**543**	**377**	**1833**	**976**	**491**	**357**	**5637**	**3335**	**1392**	**859**

As previously mentioned, NOAA Fisheries conducts an observer program in the southeast shark drift gillnet fishery. Gillnet sets are generally made via drifting and strikenetting. Drift gillnet sets are made with one vessel and the gillnet is set in a straight line and allowed to fish passively. Strikenets are either set rapidly in a circle around a school of sharks with more than one vessel (a smaller strike vessel working with a larger driftnet vessel) or set directly behind the wake of a shrimp vessel when it begins haulback. In the latter case, only the driftnet vessel is required (Carlson, 2001).

During the 2002 right whale calving season, a total of 41 drift gillnet sets and 24 strikenet sets were observed. Approximately 61 additional strikenet trips were made when the observer was on board but no strike was made due to inability to locate schooling sharks, sharks being located in state waters, and poor weather conditions. Observed catches on drift gillnet sets were comprised of 10 species of sharks (90.7 percent of numbers caught), 26 species of teleosts and rays (9.2 percent were teleosts and rays), two species of sea turtle (0.05 percent; Tables 4.5.2, 4.5.10, and 4.5.11) (Carlson, 2002). By number, three species of sharks made up 86.9 percent of the sharks caught (Carlson, 2002). By weight, the shark catch was made up primarily of blacktip (42.1 percent), blacknose (17.6 percent), and Atlantic sharpnose (15.4 percent).

Observed catches on strikenet sets during the 2002 right whale calving season were comprised of four species of sharks (99.3 percent of numbers caught) and three species of teleosts and rays (0.7 percent; Tables 4.5.3 and 4.5.12) (Carlson, 2002). No marine mammals or sea turtles were caught while strikenetting. Blacktip sharks made up 99.3 percent of the shark catch when strikenetting. Bycatch included great barracuda, cownose ray, and houndfish (Carlson 2002).

Table 4.5.2 Total Shark Catch in NOAA Fisheries Observed Drift Gillnet Sets During 2002 Critical Right Whale Season: Source: Carlson, 2002.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	
Blacktip	1,777	98.4	0.0	1.6
Bonnethead	402	97.5	0.2	2.3
Atlantic sharpnose	1,885	97.9	0.5	1.6
Finetooth	125	100.0	0.0	0.0
Blacknose	1531	99.9	0.1	0.0
Scalloped hammerhead	38	97.3	0.0	2.7
Spinner	132	100.0	0.0	0.0
Great hammerhead	75	61.4	0.0	38.6

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	
Tiger	3	66.6	0.0	33.4
Common thresher	1	100.0	0.0	0.0

Table 4.5.3 Total Shark Catch in NOAA Fisheries Observed Strikenet Sets During 2002 Critical Right Whale Season: Source: Carlson, 2002.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Blacktip	4,179	99.8	0.2	0.0
Great Hammerhead	1	0.0	0.0	100.0
Spinner	13	100.0	0.0	0.0
Blacknose	13	100.0	0.0	0.0

Outside the right whale calving season (April 1 through November 14), a total of 28 drift gillnet sets were observed from April through October and a total of 14 strikenet sets were observed from August to October (Carlson and Baremore, 2002). The observed drift gillnet catch consisted of 12 species of sharks, 26 species of teleosts and rays, and 1 species of marine mammals (Tables 4.5.4 and 4.5.13). Total observed catch composition (percent of numbers caught) were 84.9 percent sharks, 15.0 percent teleosts, 0.1 percent rays, and 0.01 percent marine mammals. Four species of sharks made up 96.5 percent by number of the shark catch: Atlantic sharpnose (67.4 percent), finetooth (13.7 percent), blacknose (7.9 percent), and blacktip sharks (5.4 percent). By weight, Atlantic sharpnose sharks made up 39.3 percent, finetooth 23.2 percent, blacknose sharks 10.7 percent, and blacktip sharks 15.0 percent.

Observed catch in strikenet sets outside of right whale calving season consisted of three species of sharks (100.0 percent of the total number caught) (Table 4.5.5) (Carlson and Baremore, 2002). No teleosts, sea turtles, or marine mammals were observed caught. The blacknose shark made up 53.1 percent of the total number of sharks caught.

Table 4.5.4 Total drift gillnet shark catch by species during all observer trips, 2002, outside of right whale calving season. Source: Carlson and Baremore, 2002.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	
Atlantic sharpnose	7,332	98.9	0.4	0.7
Blacknose	859	100.0	0.0	0.0
Blacktip	572	1.2	30.9	67.8
Finetooth	1490	100.0	0.0	0.0
Bonnethead	305	100.0	0.0	0.0
Scalloped hammerhead	37	2.7	5.4	91.9
Tiger	2	50.0	50.0	0.0
Spinner	17	23.6	5.8	70.6
Sandbar shark	2	0.0	0.0	100.0
Lemon shark	1	0.0	0.0	100.0
Great hammerhead	18	0.0	0.0	100.0

Table 4.5.5 Total strikenet shark catch by species during all observer trips, 2002, outside of right whale calving season. Source: Carlson and Baremore, 2002.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Blacknose	620	100.0	0.0	0.0
Blacktip	547	99.8	0.2	0.0
Bonnethead	1	100.0	0.0	100.0

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 Appendix A.

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.

4.5.2 Most Recent Catch and Landings Data

Landings estimates for 2001 indicate that, compared to landings in 2000, commercial landings for LCS decreased slightly by approximately 12,000 fish (Table 4.5.6). Landings estimates for pelagic sharks for 2001 increased by six mt dw (Table 4.5.8). Species-specific landings estimates for LCS during 2001 indicate that sandbar sharks are the most abundant species landed in the LCS complex (39.4 percent), as compared to landings estimates in 2000 where blacktip sharks dominated with 44.0 percent (Table 4.5.7). Finetooth sharks (42.0 percent) continue to prevail as the most abundant species landed in the SCS complex during 2001 (Table 4.5.9).

Table 4.5.6 Estimates of Total Landings and Dead Discards for Large Coastal Sharks: 1981-2001 (numbers of fish in thousands). Source: Cortes, 2002.

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	119.971	25.1	428.1
1982	16.2	0.9	413.9	N/A	0.9	81.913	25.1	538.9
1983	17.5	0.9	746.6	N/A	1.0	85.437	25.1	876.5
1984	23.9	1.3	254.6	N/A	1.4	120.684	25.1	426.9
1985	22.2	1.2	365.6	N/A	1.3	87.748	25.1	503.1
1986	54.0	2.9	426.1	24.9	3.1	81.835	25.1	617.9
1987	104.7	9.7	314.4	70.3	5.9	80.160	25.1	610.3
1988	274.6	11.4	300.6	113.3	15.5	89.290	25.1	829.8
1989	351.0	10.5	221.1	96.3	19.9	105.562	25.1	829.4
1990	267.5	8.0	213.2	52.1	15.1	122.220	25.1	703.3
1991	200.2	7.5	293.4	11.3	11.3	95.695	25.1	644.5
1992	215.2	20.9	304.9	N/A	12.2	103.366	25.1	681.6
1993	169.4	7.3	249.0	N/A	11.3	119.820	25.1	581.9
1994	228.0	8.8	160.9	N/A	16.3	110.734	26.2	550.9
1995	222.4	5.2	176.3	N/A	13.9	95.996	24.0	537.8

1996	160.6	5.7	188.5	N/A	7.6	106.057	25.1	493.6
1997	130.6	5.6	165.1	N/A	8.3	83.051	25.1	417.8
1998	174.9	4.3	169.8	N/A	9.9	74.136	25.1	458.1
1999	111.5	9.0	90.1	N/A	3.8	57.061	25.1	297.5
2000	111.2	9.4	140.4	N/A	4.8	52.057	25.1	343.0
2001	99.2	9.4	142.0	N/A	6.3	52.057	25.1	334.1

Table 4.5.7 Commercial landings of Large Coastal Sharks in lb dw: 1997-2001. Source: Cortes, 2002.

Large Coastal Sharks	1997	1998	1999	2000	
Basking**	none reported	none reported	none reported	none reported	none reported
Bignose*	2,132	50	9,035	672	1442
Bigeye sand tiger**	none reported	none reported	none reported	none reported	none reported
Blacktip	1,506,182	1,893,805	1,286,979	1,633,919	1,135,199
Bull	40,247	27,389	25,426	24,980	27,037
Caribbean Reef*	3,548	100	none reported	none reported	none reported
Dusky*	80,930	81,124	110,950	205,746	871
Dusky, fins*	none reported	none reported	none reported	none reported	89
Galapagos*	none reported	none reported	none reported	none reported	none reported
Hammerhead, Great	none reported	none reported	none reported	none reported	none reported
Hammerhead, Scalloped	none reported	none reported	none reported	none reported	none reported
Hammerhead, Smooth	none reported	none reported	none reported	none reported	none reported
Hammerhead, Unclassified	79,685	59,802	53,394	35,060	69,355
Large Coastal					172,494
Lemon	20,595	23,232	23,604	45,269	24,453
Narrowtooth*	none reported	none reported	none reported	none reported	none reported
Night*	33	3,289	4,287	none reported	none reported
Nurse	8,864	2,846	1,168	429	387
Sandbar	890,881	1,077,161	1,299,987	1,491,908	1,404,360
Sandbar, fins				996	2364
Sand tiger**	8,425	38,791	6,401	6,554	1,248
Silky	13,920	13,615	8,649	31,959	14,197
Spinner	6,039	16,900	629	14,473	6,970
Tiger	6,603	12,174	30,274	24,443	26,973
Whale**	none reported	none reported	none reported	none reported	none reported
White**	1,315	none reported	82	1,201	26
Large Coastal Unclassified	1,177,539	1,258,027	978,312	108,692	569,605
Unclassified fins	140,638	76,588	80,393	86,824	105,475
Total	3,987,576 (1,809 mt	4,584,893 (2,080 mt dw)	3,919,570 (1,778 mt	3,713,125 (1,684 mt	3,562,546 (1,616 mt dw)

Large Coastal Sharks	1997	1998	1999	2000	2001
	dw)		dw)	dw)	

* indicates species that were prohibited in the commercial fishery as of June 21, 2000.

** indicates species that were prohibited as of April 1997.

Table 4.5.8 Commercial landings of Pelagic Sharks in lb dw: 1997-2001. Source: Cortes, 2002, Cortes, 2001, and Cortes, 2000.

Pelagic Sharks	1997	1998	1999	2000	2001
Bigeye thresher*	5,308	1,403	17,759	4,376	330
Bigeye sixgill*	none reported	none reported	none reported	none reported	none reported
Blue	904	706	1,111	3,508	65
Mako, Longfin*	7,867	4,971	4,619	6,560	12,930
Mako, Shortfin	224,362	224,421	170,860	129,088	173,143
Mako, Unclassified	71,371	79,773	58,344	74,690	73,556
Oceanic whitetip	2,764	22,049	698	657	922
Porbeagle	4,222	19,795	5,362	5,272	1,208
Probeagle, fins	none reported	none reported	none reported	none reported	12
Sevengill*	none reported	none reported	none reported	none reported	none reported
Sixgill*	none reported	none reported	none reported	none reported	none reported
Thresher	145,253	102,531	96,012	81,624	56,893
Thresher, fins	none reported	none reported	none reported	none reported	201
Unclassified pelagic	75,543	49,626	46,056	41,184	31,639
Unclassified pelagic, fins	none reported	none reported	none reported	3,746	12,026
Total:	537,594 (244 mt dw)	505,275 (229 mt dw)	400,821 (182 mt dw)	350,705 (159 mt dw)	362,925 (165 mt dw)

* indicates species that were prohibited in the commercial fishery as of June 21, 2000.

** in metric tons dressed weight.

Table 4.5.9 Commercial Landings of Small Coastal Sharks in lb dw: 1997-2001. Source: Cortes, 2002 and Cortes, 2000.

Small coastal sharks	1997	1998	1999	2000	2001
Atlantic Angel*	none reported	none reported	none reported	86	none reported
Blacknose	202,781	119,689	130,317	178,083	160,990
Bonnethead	75,787	13,949	53,702	69,411	62,980
Finetooth	169,733	267,224	246,404	202,572	299,788
Sharpnose, Atlantic	256,562	230,920	239,647	142,511	195,257
Sharpnose, Atlantic, fins	none reported	none reported	none reported	none reported	209
Sharpnose, Caribbean*	none reported	none reported	2,039	353	205
Unclassified Small Coastal	51	82	136	11	55
Total:	704,914 (320 mt dw)	631,864 (287 mt dw)	672,245 (305 mt dw)	593,027 (269 mt dw)	719,484 (326 mt dw)

* indicates species that were prohibited in the commercial fishery as of June 21, 2000.

4.5.3 U.S. vs. International Breakdown of Landings

As previously stated, there is 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. 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.

4.5.4 Bycatch Issues and Data Associated with the Fishery

General

Bycatch of sharks occurs in many fisheries, including trawl, set-net, and hook and line fisheries. Estimates of shark dead discards from the pelagic longline fishery range from 4,300 to 9,000 fish in 1998 and 1999 (Cramer, 1999; Cramer and Adams, 2000; Cortes, 2002). Observer data collected from the directed bottom longline shark fishery indicate that LCS discarded dead represent approximately 5.7 percent of the total mortality of these species in that fishery from 1994 through 2001 (Cortes, 2002). Pelagic longline and coastal dead discards combined represented about 2.8 percent of total mortality of LCS in 2001 (Cortes, 2002) (Table 4.5.6). Observer data in the Gulf of Mexico menhaden fishery for the period 1994-1995 indicate that 75 percent of the sharks encountered died (Cortes, 2000). In 2002, the Gulf of Mexico menhaden fishery accounted for approximately 7.5 percent of the total mortality of LCS (Table 4.5.6).

Shark Bottom Longline Fisheries

Bottom longlining for sharks has relatively low observed bycatch rates. In 1998, observer data indicate that approximately 6,277 sharks were caught compared to 594 other fish, 12 invertebrates, and three sea turtles (Burgess and Johns, 1999). In terms of bycatch rates, observed shark catches constitute 91.1 percent of the 6,886 total animals caught, with other fish comprising 8.6 percent, invertebrates 0.17 percent, and sea turtles 0.04 percent. One delphinid was observed caught and released alive between 1994 and 1999 (G. Burgess, pers. comm. 2000). One pelican was observed caught and killed off the Florida Gulf Coast in January 1995 (G. Burgess, pers. comm. 2001).

NOAA Fisheries (NOAA Fisheries, 2002) anticipates that the continued operation of the shark bottom longline fishery will result in the annual capture of the following numbers of sea turtles: Leatherback - 2; loggerhead - 12; green - 2; hawksbill - 2; Kemp's ridley - 2.

Shark Drift Gillnet and Strikenet Fisheries

During the 2002 right whale calving season, observed drift gillnets sets caught 26 species of teleosts and rays (9.2 percent of the total number of animals caught were teleosts and rays), and two species of sea turtle (0.05 percent; Tables 4.5.10) (Carlson, 2002).

Three teleost and ray species made up 56.2 percent by number of the overall non-shark catch: little tunny (29.2 percent), king mackerel (15.2 percent), and great barracuda (11.8 percent). The highest proportion of species discarded dead (for those species with observed catch greater than 10 individuals) was for Atlantic sailfish (97.7 percent), and cobia (25.7 percent). Note that retention of billfish caught by gear other than rod and reel is prohibited. Remoras had the highest live discard proportion (72.2 percent) (Carlson, 2002).

Table 4.5.10 Total Teleost and Ray Bycatch in NOAA Fisheries Observed Drift Gillnet Sets During 2002 Right Whale Season. Source: Carlson 2002

Species	Total Number Caught	Kept (%)	Discard Alive (%)	
King mackerel	93	75.3	0.0	24.7
Cownose ray	6	33.3	66.6	0.0
Cobia	66	68.2	6.1	25.7
Great barracuda	72	100.0	0.0	0.0
Bluefish	9	44.4	0.0	55.5
Spanish mackerel	16	87.5	0.0	12.5
Little tunny	178	96.1	0.0	3.9
Spotted eagle ray	9	0.0	100.0	0.0
Crevalle jack	41	97.5	2.5	0.0
Remora	11	0.0	72.7	27.3
Atlantic manta ray	2	0.0	100.0	0.0
Tripletail	3	100.0	0.0	0.0
Atlantic sailfish	43	0.0	2.3	97.7
Wahoo	2	100.0	0.0	0.0
Atlantic thread herring	3	0.0	33.3	66.7
Blackfin tuna	4	100.0	0.0	0.0
Blue runner	2	100.0	0.0	0.0
Tarpon	3	0.0	33.3	66.7
Gag grouper	1	100.0	0.0	0.0
Atlantic bumper	2	0.0	50.0	50.0
Dolphin	3	100.0	0.0	0.0
Atlantic bonito	20	100.0	0.0	0.0

Species	Total Number Caught	Kept (%)	Discard Alive (%)	
Atlantic moonfish	3	66.7	0.0	33.3
Devil ray	6	0.0	33.3	66.7
Permit	2	100.0	0.0	0.0
Sea basses	2	0.0	0.0	100.0
Silver perch	1	100.0	0.0	0.0
Jacks	1	100.0	0.0	0.0

Interactions with three sea turtles and zero marine mammals occurred in 41 separate drift gillnet sets (Carlson, 2002). Two leatherback turtles and one loggerhead turtle were encountered (Table 4.5.11). All three sea turtles were released alive (Carlson, 2002).

Table 4.5.11 Protected Species Interactions in Drift Gillnet Sets During Right Whale Calving Season, 2002. Source: Carlson, 2002.

Species	Total Number Caught	Released Alive	Discarded Dead	
Leatherback turtle	2	2	0.0	0.0
Loggerhead turtle	1	1	0.0	0.0

During the 2002 right whale calving season, observed strikenet sets caught three species of teleosts and rays and no sea turtles or marine mammals (Tables 4.5.12) (Carlson, 2002). Only the great barracuda were retained, with all remaining bycatch discarded alive (Carlson, 2002).

Table 4.5.12 Total Bycatch in NOAA Fisheries Observed Strikenet Sets During 2002 Right Whale Season. Source: Carlson 2002

Species	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)
Great barracuda	26	84.6	11.6	3.8
Cownose ray	1	0.0	100.0	0.0
Houndfish	1	0.0	100.0	0.0

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 (Tables 4.5.13). 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 (Table 4.5.13) (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 (Table 4.5.13) (Carlson and Baremore, 2002).

Table 4.5.13 Total Bycatch in NOAA Fisheries Observed Drift Gillnet Sets Outside of 2002 Right Whale Calving Seasons. Source: Carlson 2002

Species	Total Number Caught	Kept (%)	Discard Alive (%)	
Little tunny	817	94.5	0.0	5.5
King mackerel	386	41.7	1.0	57.3
Barracuda	231	100.0	0.0	0.0
Blue runner	21	100.0	0.0	0.0
Cownose ray	32	0.0	78.1	21.9
Cobia	72	80.5	7.0	12.5
Remora	21	0.0	90.5	9.5
Atlantic moonfish	174	72.4	22.4	5.2
Crevalle jack	29	3.5	24.1	72.4
Atlantic sailfish	4	0.0	0.0	100.0
Blackfin tuna	1	100.0	0.0	0.0
Spotted eagle ray	1	0.0	100.0	0.0
Manta ray	3	0.0	100.0	0.0
African pompano	2	100.0	0.0	0.0
Tarpon	22	0.0	22.7	77.3
Spanish mackerel	3	100.0	0.0	0.0
Red Drum	28	0.0	50.0	50.0
Bullet	21	100.0	0.0	0.0
Permit	6	0.0	16.6	83.4

Species	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)
Dolphin	2	100.0	0.0	0.0
Atlantic Sturgeon	1	0.0	100.0	0.0
Balloonfish	1	100.0	0.0	0.0
Skipjack tuna	1	100.0	0.0	0.0
Atlantic manta ray	1	0.0	0.0	100.0
Devil ray	1	100.0	0.0	0.0
Bottlenose dolphin	1	0.0	0.0	100.0

Observed catch in strikenet sets outside of right whale calving season consisted of three species of sharks (Table 4.5.5) (Carlson and Baremore, 2002). No teleosts, sea turtles, or marine mammals were observed caught.

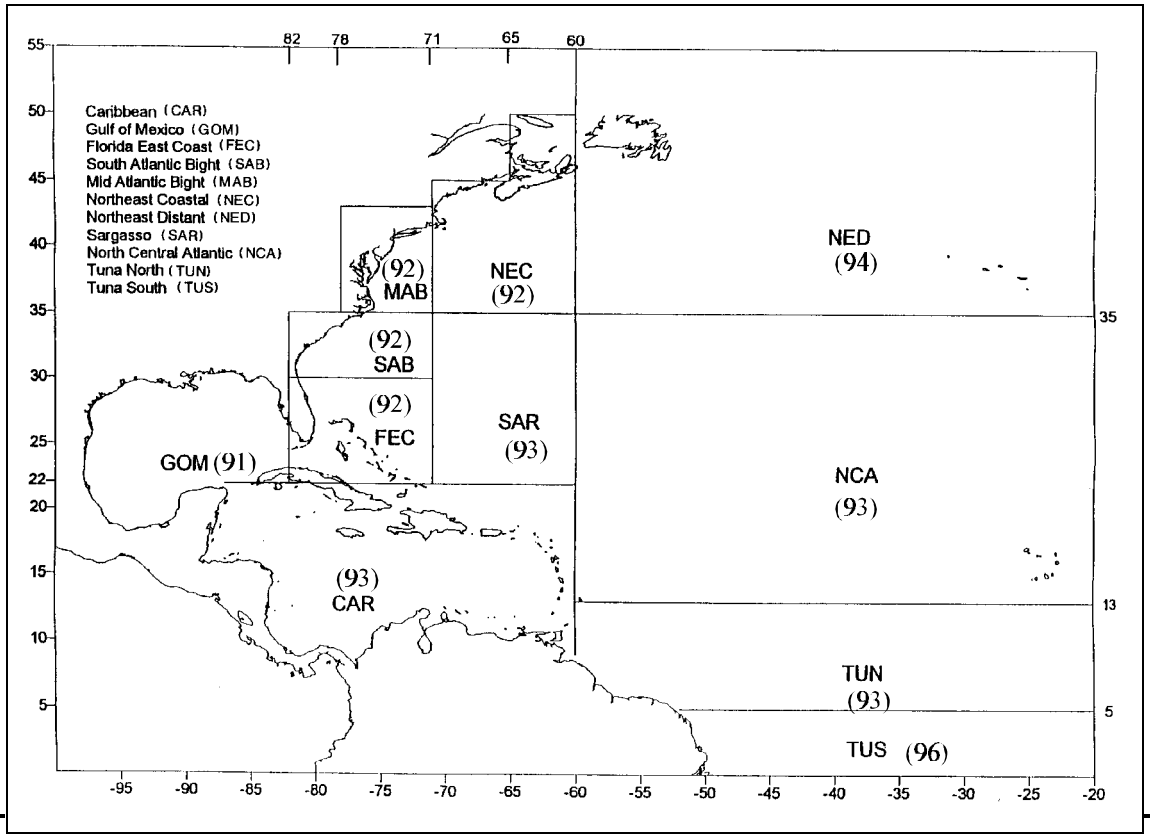
4.6 Fishery Data: LANDINGS BY SPECIES

The following tables are taken from the 2002 National Report of the United States to ICCAT (NAT/02/06). 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 2001 HMS SAFE report.

Figure 4.6.1. Geographic areas used in summaries of pelagic logbook data from 1992 - 1998; ICCAT areas (91 to 96) are also shown (Cramer and Adams, 2000).

Table 4.6.1. U.S. Landings (mt) of Bluefin Tuna by Gear and Area for 1997 to 2001.

Area	Gear	1997	1998	1999	2000	2001
NW Atlantic	Longline	26.0	30.5	25.1	22.8	17.7
	Handline	17.4	29.2	15.5	3.2	9.0
	Purse Seine	249.7	248.6	247.9	275.2	195.9
	Harpoon	97.5	133.1	115.8	184.2	101.9
	*Rod and reel (>145 cm LJFL)	752.6	610.4	657.5	632.8	993.4
	*Rod and reel (<145 cm LJFL)	178.9	166.3	103.0	49.5	249.3
	Unclassified	2.2	0.6	0.1	0.2	0.5



Gulf of Mexico	Longline	23.8	18.3	48.4	43.3	19.8
	*Rod and reel	0.0	0.0	0.4	0.9	1.7
	All Gears	1348.1	1237	1213.7	1212.1	1589.2

* 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 4.6.2. U.S. Landings (mt) of Yellowfin Tuna by Gear and Area from 1997 to 2001.

Area	Gear	1997	1998	1999	2000	2001
NW Atlantic	Longline	838.9	464.9	581.3	734.45	631.8
	Rod and reel*	3560.9	2845.7	3818.2	3809.47	3690.5
	Troll	218	177.5	0.0	0.0	0.0
	Purse seine	0.0	0.0	0.0	0.0	0.0
	Gillnet	1.3	1.7	0.2	0.21	7.6
	Trawl	1.9	0.7	4.1	1.76	2.7
	Harpoon	0.0	0.0	0.0	0.0	0.0
	Handline	34.3	0.0	192	235.7	242.5
	Trap	**	0.1	0.8	0.53	0.1
	Unclassified	0.0	0.0	2.1	1.31	6.8
Gulf of Mexico	Longline	2571.3	1864.5	2736.6	2133	1505.5
	Rod and reel*	7.7	80.9	149.4	52.26	494.2
	Handline	55.6	60.8	12.7	28.57	43.4
	Gillnet	0.0	0.0	**	0.0	0.0
	Uncl	0.0	0.0	0.0	0.0	0.0
Caribbean	Longline	135.4	58.6	24.4	11.77	23.1
	Troll	19.6	0.0	0.0	0.0	0.0
	Handline	0.7	3.9	14.5	19.41	14.3
	Gillnet	**	0.0	0.0	0.09	0.3
	Trap	0.1	0.0	0.1	0.28	0.3
NC Area 94a	Longline	6.1	4.6	0.2	2.11	3.5
SW Atlantic	Longline	221.9	55.3	32.4	19.76	36.2
All Gears		7673.7	5619.2	7569	7050.68	6702.8

** <= 0.05 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 4.6.3. U.S. Landings (mt) of Skipjack Tuna by Gear and Area from 1997 to 2001.

Area	Gear	1997	1998	1999	2000	2001
NW Atlantic	Longline	1.0	0.7	0.3	0.0	0.1
	Rod and reel*	42.0	49.5	63.6	13.12	32.9
	Troll	0.6	0.4	0.0	0.0	0.0
	Purse seine	0.0	0.0	0.0	0.0	0.0
	Gillnet	8.9	16.9	26.5	1.86	3.6
	Trawl	0.0	0.2	1.0	0.04	0.2
	Handline	0.1	0.0	0.2	0.23	0.2
	Trap	0.0	0.0	17.5	0.0	0.0
	Pound	0.0	0.0	0.0	0.0	0.0
	uncl	0.0	0.0	0.0	0.0	0.0
Gulf of Mexico	Longline	1.3	0.6	0.4	0.23	0.2
	Rod and reel*	21.7	37.0	34.8	16.67	16.1
	Handline	0.0	0.0	0.4	0.65	0.0
	Trap	0.0	0.0	0.0	0.0	0.0
	Uncl	0.0	0.0	0.0	0.04	0.0
Caribbean	Longline	1.2	0.0	1.3	1.62	4.0
	Gillnet	0.2	0.0	0.4	0.59	1.6
	Harpoon	0.0	0.0	0.0	0.0	0.0
	Handline	0.0	0.0	5.8	8.8	10.3
	Trap	**	0.0	0.1	0.28	0.4
	Troll	7.3	0.0	0.0	0.0	0.0
	uncl	0.0	0.0	0.0	0.0	0.0
SW Atlantic	Longline	**	0.0	0.0	0.0	0.0
All Gears		84.3	105.3	152.3	44.1	69.6

** $\leq$= 0.05 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 4.6.4. U.S. Landings (mt) of Bigeye Tuna by Area and Gear for 1996-2000.

Area	Gear	1997	1998	1999	2000	2001
NW Atlantic	Longline	476.3	544.3	737.8	333.2	506.1
	Rod and reel*	333.5	228.0	316.1	34.4	366.2
	Troll	3.9	4.0	0.0	0.0	0.0
	Gillnet	**	0.4	0.2	0.0	0.2
	Handline	2.7	0.0	11.9	4.1	33.2
	Pairtrawl	0.0	0.0	0.0	0.0	0.0
	Trawl	1.0	0.5	1.2	1.7	0.4
	Harpoon	0.0	0.0	0.0	0.0	0.0
	Haul Seine	0.0	0.0	0.0	0.0	0.0
	Uncl	0.5	0.0	0.9	0.0	1.8
Gulf of Mexico	Longline	33.9	25.6	54.6	44.5	15.3
	Rod and reel*	0.0	0.0	1.8	0.0	0.0
	Handline	**	0.1	0.2	0.1	0.5
Caribbean	Longline	50.0	48.5	23.2	13.7	31.9
	Handline	0.0	0.0	0.2	1.5	0.0
NC Area 94a	Longline	91.8	48.4	35.3	63.1	61.0
SW Atlantic	Longline	142.8	28.5	78.2	77.4	68.2
All Gears		1136.4	928.3	1261.6	573.7	1084.8

** $\leq$= 0.05

* 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 4.6.5. U.S. Landings (mt) of Albacore Tuna by Gear and Area for 1997 to 2001.

Area	Gear	1997	1998	1999	2000	2001
NW Atlantic	Longline	140.0	155.4	179.5	130.52	171.7
	Gillnet	42.8	40.1	27.0	0.78	3.3
	Handline	4.8	0.0	0.6	2.93	1.7
	Trawl	2.6	2.4	0.4	0.03	0.0
	Troll	1.6	5.8	0.0	0.0	0.0
	Rod and reel*	220.2	601.1	90.1	250.75	122.3
	Pair Trawl	0.0	0.0	0.0	0.0	0.0
	Pound	1.3	0.9	0.4	0.0	0.0
	Uncl	0.2	0.0	0.0	0.12	0.1
Gulf of Mexico	Longline	16.9	3.9	3.8	4.13	4.9
	Rod and reel*	49.3	0.0	0.0	0.0	0.0
	Handline	0.0	0.0	**	0.0	0.0
Caribbean	Longline	16.1	17.8	8.3	9.24	8.7
	Troll	3.6	0.0	0.0	0.0	0.0
	Gillnet	**	0.0	0.2	0.13	0.5
	Trap	**	0.0	**	0.22	0.3
	Handline	0.0	0.0	3.8	5.01	2.2
NC Area 94a	Longline	11.4	1.6	1.5	2.6	6.1
SW Atlantic	Longline	4.7	1.4	1.4	0.89	2.4
All Gears		515.5	830.4	317	407.35	324.2

** $\leq$= 0.05 mt

* Rod and Reel landings are estimates of landings and dead discards, when available.

Table 4.6.6. U.S. Catches and Landings (mt) of Swordfish by Gear and Area for 1997 to 2001.

Area	Gear	1997	1998	1999	2000	2001
NW Atlantic	* Longline	1262.2	1624.1	1872.3	1547.6	1220.8
	Gillnet	0.4	36.3	0.0	0.0	0.0
	Pair Trawl	0.0	0.0	0.0	0.0	0.0
	Handline	1.3	0.0	5.0	7.7	8.6
	Trawl	8.0	5.9	7.5	10.9	2.5
	Troll	0.4	0.7	0.0	0.0	0.0
	* unclassified	11.9	9.1	3.8	1.4	1.8
	Harpoon	0.7	1.5	0.0	0.6	7.4
	** Rod and Reel	10.91	4.71	21.32	15.6	1.5
	Trap	0.0	0.1	**	0.0	0.0
Gulf of Mexico	* Longline	759.9	633.1	579.6	631.7	494.6
	Handline	0.0	0.0	**	1.2	0.3
Caribbean	* Longline	688.9	516.0	260.5	331.9	347.0
	Trap				0.3	0.0
NC Atlantic	* Longline	688.2	658.6	650.0	804.6	420.6
SW Atlantic	* Longline	417.9	170.1	185.2	143.8	43.2
All Gears		3850.71	3660.21	3585	3497.1	2548.3

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

** $\leq$ = 0.5 mt

Table 4.6.7. U.S. Landings (mt) and dead discards of Blue Marlin, White Marlin and Sailfish by Gear and Area for 1998-2001.

		Blue Marlin				White Marlin				Sailfish			
Area	**Gear**	**1998**	**1999**	**2000**	**2001**	**1998**	**1999**	**2000**	**2001**	**1998**	**1999**	**2000**	**2001**
NW Atlantic	Longline*	23.3	22.0	28.8	10.9	15.3	18.6	10.3	5.1	6.4	13.7	11.2	2.2
	Unclassified*	0.62	0.0	0.1	0.0	0.7	0.06	0.0	0.0	0.06		0.0	0.0
	Rod and reel**	34.1	24.8	13.75	9.0	2.4	1.5	0.23	2.8	0.1	0.07	1.75	61.2
Gulf of Mexico	Longline*	18.5	55.2	29.6	9.4	11.8	31.5	29.9	10.1	17.0	57.4	33.9	8.2
	Rod and reel**	4.5	7.5	4.7	5.1	0.2	0.1	0.0	0.3	1.0	0.6	0.24	0.6
Caribbean	Longline*	2.3	1.6	0.5	1.2	1.3	5.04	0.5	0.7	0.2	0.46	0.1	0.0
	Rod and reel**	10.6	4.6	5.7	2.3	0.02	0.0	0.0	0.0	0.05	0.0	0.06	0.0
	Other	0.0	0.0	0.0	0.0	0.0	0.0	n/a	0.0	0.0	0.0	0.0	0.0
Unknown & NC Area 94a	Longline*	6.1	1.6	0.7	0.9	2.8	1.08	0.1	0.6	0.8	0.02	0.1	0.3
SW Atlantic	Longline*	1.6	1.7	0.0	0.0	0.9	0.45	0.0	0.0	2.7	0.02	0.1	0.0
All Gears		101.6	119.0	83.7	38.8	35.4	58.3	41.0	19.6	28.3	72.3	47.3	72.5

* 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).

Section 4 References

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5. ECONOMIC STATUS OF HMS FISHERIES

Under the Magnuson-Stevens Act, NOAA Fisheries 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 recreational and commercial fishing interests, communities, and industries.

In 1996, the Small Business Regulatory Enforcement Fairness Act amended the Regulatory Flexibility Act (RFA). This amendment added section 610 to the RFA. Section 610 requires NOAA Fisheries to periodically review rules that had or will have a significant economic impact on a substantial number of small entities. The purpose of this review is to determine whether the significant rules should be continued without change or if they should be amended or rescinded in order to minimize the impact on small entities. The review should examine the impact of these rules consistent with the stated objectives of applicable statutes. NOAA Fisheries has 10 years after the adoption of each rule in which to review the impact of the rule.

Thus, both the SAFE report and Section 610 to the RFA require similar information. For this reason, NOAA Fisheries believes that the following section of the 2003 SAFE Report should fulfill NOAA Fisheries' requirements under both the Magnuson-Stevens Act and Section 610 of the RFA. In addition to the information needed to fulfill Section 610 of RFA, this section will provide comprehensive economic information for all components of HMS fisheries including price and cost information.

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, NOAA Fisheries decided to use 1996 as a baseline. NOAA Fisheries believes that this baseline is appropriate because RFA was amended in 1996, the Magnuson-Stevens Act was amended in 1996, NOAA Fisheries 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 HMS 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. Where noted, NOAA Fisheries converted 2001 dollars to 1996 dollars using the consumer price index in order to help comparisons between years.

5.1 Commercial Fisheries

5.1.1 Economics of Commercial Fisheries across the United States in General[1]

In 2001, the total commercial landings at ports in the 50 states by U.S. fishermen were 9.5 billion pounds and were valued at $3.2 billion. While this was a four percent increase from 2000 landings, the overall value decreased by $321.2 million. Compared to 1996, this was an increase of one percent from the estimated 1996 landings and $258.5 million from the estimated 1996 value. The total value of commercial HMS landings in 2001 was $120.9 million (table 5.2). The 2001 ex-vessel price index indicated that 18 species of the 34 species tracked had increasing ex-vessel prices,11 species had decreasing ex-vessel prices, four species maintained ex-vessel prices, and ex-vessel prices were unavailable for one species.

The estimated value of the 2001 domestic production of all fishery products was $7.4 billion. This is $731.5 million less than the estimated value in 2000. The estimated value of domestic production in 1996 was $7.4 billion. The estimated value of U.S. production of HMS was 969.4 million in 2003 (table 5.3). The total import value of fishery products was $18.5 billion in 2001. This is an decrease of $466.3 million from 2000. The total import value in 1996 was $13.1 billion. The total export value of fishery products was $11.8 billion in 2001. This is an increase of $1.1 billion from 2000. The total export value in 1996 was $8.7 billion.

Consumers spent an estimated $55.3 billion for fishery products in 2001 including $38.2 billion at food service establishments, $16.8 billion for home consumption, and $276.3 million for industrial fish products. The commercial marine fishing industry contributed $28.6 billion to the U.S. Gross National Product in 2001. 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.

In both 1996 and 2001, Alaska, Louisiana, Massachusetts, and Maine ranked in the top five states in value of commercial landings (Table 5.1). No HMS ranked in the top ten species for the United States in terms of landings or value for 1996 or 2001. The value of all HMS species (both Atlantic and Pacific) constituted 9.5 percent and 8.2 percent in 1996 and 2001, respectively, of the total U.S. finfish value. The ex-vessel values of HMS landings are listed in Table 5.2. Domestic landings of swordfish and sharks decreased in 2001, as compared to 1996 landings, by 54.3 percent and 33.6 percent respectively. Values for United States production of fresh and frozen fillets for swordfish and sharks also decreased by 71.3 percent and 23.4 percent

[1] All the information and data presented in this section were obtained from NOAA Fisheries 1997a and NOAA Fisheries 2002a. None of the 2001 prices in this section were converted to 1996 prices.

respectively. The values of processed HMS products are listed in Table 5.3.

Table 5.1 **The top five states in the United States as ranked by value of commercial landings (in thousands of dollars).** Source: NOAA Fisheries, 1997a; NOAA Fisheries, 2002a. 2001 dollars are not converted to 1996 dollars.

Rank in value of commercial landings	1996		2001	
	State	Value	State	Value
1	Alaska	$1,200,000	Alaska	$869,900
2	Louisiana	$267,300	Louisiana	$342,700
3	Massachusetts	$231,400	Massachusetts	$281,100
4	Florida	$205,200	Maine	$251,400
5	Maine	$200,900	Texas	$218,000

Table 5.2 **U.S. domestic commercial landings in thousand dollars of HMS, by Species.** Note: Value includes Atlantic and Pacific landings. Source: NOAA Fisheries, 1997a; NOAA Fisheries, 2002a. 2001 dollars are not converted to 1996 dollars.

Species		1996	
Sharks	Dogfish	$11,804	$1,778
	Other	$10,824	$5,822
	Total	$22,628	$7,600
Swordfish		$36,494	$19,831
Tunas	Albacore	$30,157	$25,149
	Bigeye	$23,673	$25,588
	Bluefin	$21,857	$18,900
	Little (Tunny)	--	$430
	Skipjack	$7,084	$2,176
	Yellowfin	$27,060	$20,860
	Unknown	$425	$394
	Total	$110,256	$93,497

Species	1996	
Total value all HMS	$169,378	$120,928
Total value all finfish species	$1,790,966	$1,479,988

Table 5.3 U.S. production in thousand dollars of HMS, by Species. Note: Value includes Atlantic and Pacific caught fish. Source: NOAA Fisheries, 1997a; NOAA Fisheries, 2002a. 2001 dollars are not converted to 1996 dollars.

Product	Species		1996	2001
Fresh and Frozen Fillets	Shark		$5,992	$1,401
	Swordfish		$34,277	$24,425
	Tuna		$62,456	$49,627
	Total HMS		$102,725	$75,453
Fresh and Frozen Steaks	Shark		$27	-
	Swordfish		$12,725	$7,496
	Tuna		$14,669	$11,860
	Total HMS		$27,421	$19,356
Total Fillets and Steaks, all finfish			$885,665	$914,987
Canned products	Tuna	Albacore	$362,690	$371,518
		Light meat	$594,234	$286,637
		Total	$956,924	$658,155
	Total, all finfish		$1,298,489	$969,362

5.1.2 Ex-Vessel Prices of Atlantic HMS

The average ex-vessel prices per pound dressed weight (dw) for 1996 and 2001 by Atlantic HMS, major gear types, and area are summarized in Table 5.4. The average ex-vessel prices per lb. dw for 1996 and 2001 by species and area are summarized in Table 5.5. For both of these tables, 2001 dollars are converted to 1996 dollars using the consumer price index conversion factor of 0.886. This conversion allows for easy comparisons in price. The ex-vessel price indices for some HMS for aggregate national commercial landings in the United States can be found in Table 5.6. The ex-vessel price depends on 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.

Tables 5.4 and 5.5 indicate that the average ex-vessel prices for bigeye tuna have generally increased in three of the four regions assessed. The gears used also influenced the average price of bigeye tuna with longline-caught fish bringing the highest average value in 2001 in the Mid and South Atlantic while trawl-caught bigeye tuna received the highest average value in the North-Atlantic. The Mid-Atlantic region is the only region that had consistent use of gear types in both 1996 and 2001. This region also showed a switch from high average values for bigeye tuna caught with net or trawl gear to high average values for net- and bottom long line-caught bigeye tuna.

Average ex-vessel prices for bluefin tuna have generally declined in all regions (Tables 5.4 and 5.5). This is contrary to the ex-vessel value of bluefin tuna across the United States, which increased from 1998 through 2000 (Table 5.6). The highest average ex-vessel prices were found in the North Atlantic (Table 5.5). As with bigeye tuna, the combination of region and gear used to land bluefin tuna made a difference in the ex-vessel price (Table 5.4). In the North Atlantic, bluefin tuna caught with handgear had the highest average ex-vessel price in 2001. In 1996, bluefin tuna caught with handgear had higher average prices than those caught with longline, but purse seine-caught fish had the highest ex-vessel prices in the North Atlantic, and gillnet-caught fish (although few in number) had the highest average price in the Mid-Atlantic. The ex-vessel prices for bluefin tuna can be influenced by many factors, including market supply and the Japanese Yen/U.S. Dollar (¥/$) exchange rate. Figure 5.1 shows the average ¥/$ exchange rate, plotted with average ex-vessel bluefin tuna prices, from 1971 to 2001.

The average ex-vessel prices for yellowfin tuna have decreased slightly in the South and Mid-Atlantic and have increased in the North-Atlantic (Table 5.5). No data was available from 1996 in the Gulf of Mexico region. In the United States, even though the ex-vessel price has increased since 1996, the ex-vessel price of all yellowfin tuna has generally decreased since 1995 (Table 5.6). Gears influenced the average prices, but changed between regions (Table 5.4).

The average ex-vessel prices for other tunas have generally decreased in all regions except the Gulf of Mexico, where it increased. (Table 5.5). The average price of other tunas is lowest in the South Atlantic compared to the other regions. In the North and South Atlantic regions, the highest average price was obtained using bottom longline gear (Table 5.4). In the Mid-Atlantic, the highest average price was obtained using handgear.

In the South and North Atlantic regions, the average ex-vessel price for swordfish has generally increased while the average ex-vessel price has decreased in the Mid-Atlantic region (Table 5.5). Overall in the United States the ex-vessel price has decreased from 1996 to 2001 (Table 5.6). The highest average ex-vessel prices changed by area, region, and year and did not have a discernable pattern (Table 5.4).

The average ex-vessel price for large coastal sharks (LCS) increased in the Gulf of Mexico, Mid-Atlantic and North Atlantic regions and decreased slightly in the South Atlantic

region (Table 5.5). Average prices changed across regions and gear-type (Table 5.4).

The average ex-vessel price for pelagic sharks decreased in the Gulf of Mexico, Mid-, and North Atlantic regions (Table 5.5). The highest average prices were found with a variety of gears, mainly longline and handgear (Table 5.4). Small coastal sharks (SCS) have the lowest average ex-

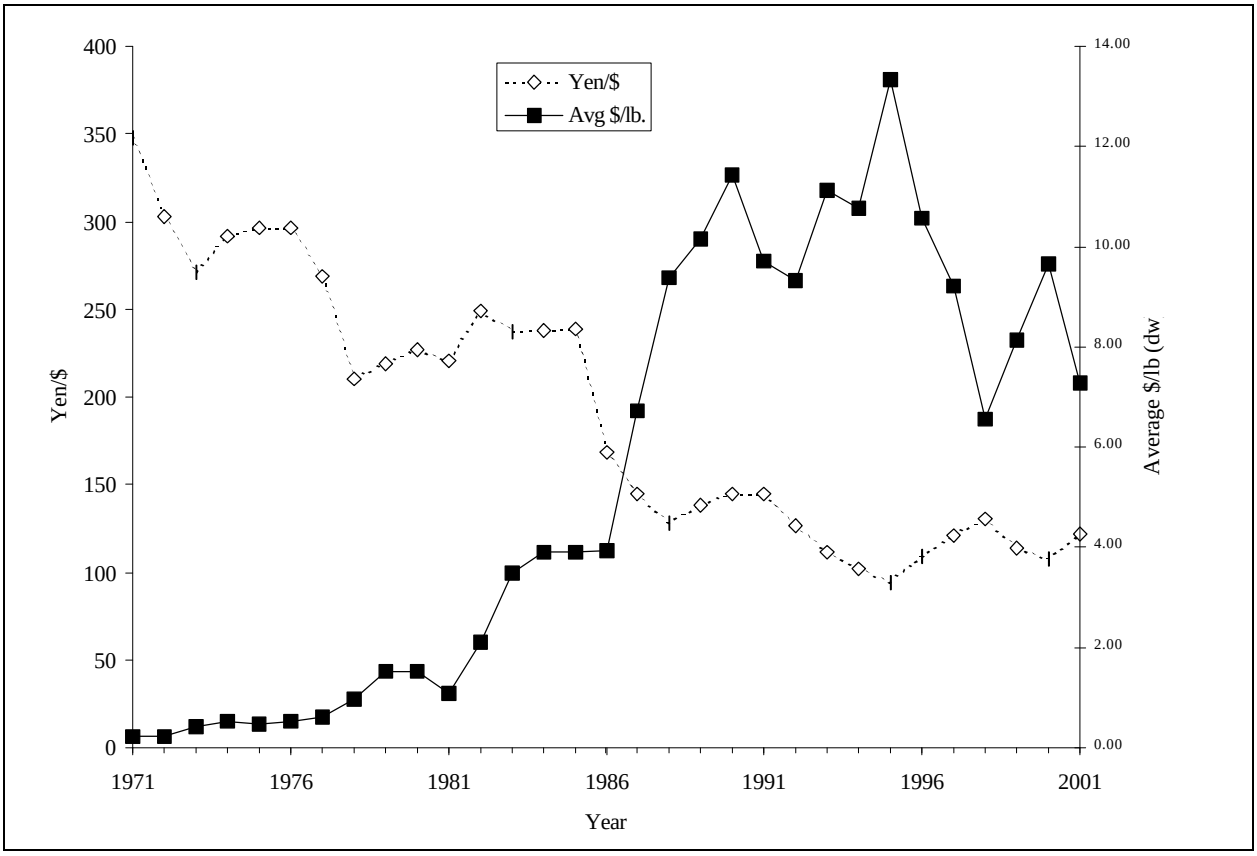

Figure 5.1 Average Annual Yen/$ Exchange Rate and Average U.S. BFT Ex-vessel $/lb (dw) for all gears: 1971-2001. Source: Federal Reserve Bank (www.stls.frb.org) and Northeast Regional Office.

vessel price of all shark species but this price generally increased in all regions (Table 5.5).

The average ex-vessel price for shark fins has generally increased in the South and North Atlantic (Table 5.5). In the mid-Atlantic prices decreased slightly (Table 5.5). No data was available in 1996 in the Gulf of Mexico or in 2001 in the Mid or North Atlantic regions (Table 5.5). The highest average values are generally found in the Gulf of Mexico and North Atlantic regions (Table 5.4).

Table 5.7 summarizes the average value of the fishery based on average ex-vessel prices and the weight reported landed as per the United States National Report (NOAA Fisheries 2002b), the 1997 and 2002 Shark Evaluation Reports (NOAA Fisheries, 1997b; Cortes, 2002), information given to ICCAT (Cortes, 2001), as well as prices and weights reported to the NOAA Fisheries Northeast Regional Office by Atlantic bluefin tuna dealers. These values indicate that the estimated total value of Atlantic HMS fisheries in 1996 dollars has increased 16.1 percent from approximately $68.1 million in 1996 to approximately $81.2 million in 2001. The bigeye tuna, yellowfin tuna, other tunas, small coastal shark, and shark fins fisheries were the only Atlantic HMS fisheries that increased in value (by 58 percent, 55 percent, 54 percent, 77 percent, and 52 percent respectively). The value of the pelagic shark fishery decreased the most (51 percent) followed by the fisheries for swordfish (31 percent), large coastal shark (17 percent), and bluefin tuna (9 percent).

Table 5.4 **Average ex-vessel prices per lb. dw for Atlantic HMS by gear and area.** 2001 dollars are converted to 1996 dollars using the consumer price index conversion factor of 0.886. 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, and trolls, PLL=Pelagic longline, BLL=Bottom longline, Net=Gillnets and pound nets, TWL=Trawls, SEN=Seines. 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.

Species	Gear	Gulf of Mexico		S. Atlantic		Mid-Atlantic			
		1996	2001	1996	2001	1996	2001	1996	
Bigeye tuna	HND	$0.68	$1.61	$1.30	$1.90	$5.74	$3.83	$3.69	$5.32
	PLL	-	$2.34	$1.33	$2.46	$3.51	$3.38	$3.36	$3.03
	BLL	-	$0.44	$1.30	$2.33	$2.61	$3.87	$2.15	-
	NET	-	-	$1.30	-	$3.87	$3.99	$3.31	-
	TWL	-	-	-	-	$4.68	-	$8.00	$3.14
Bluefin tuna	HND	-	$1.11	-	$3.12	$14.70	$4.37	$10.73	$7.27
	PLL	$5.83	-	$4.62	$4.27	$6.12	$6.05	$5.56	$4.64
	NET	-	-	-	-	$15.71	$1.98	-	$3.77
	SEN	-	-	-	-	-	-	$11.05	$6.58
	TWL								$3.37
	BLL	-	-	-	$3.20	-	$6.20		-
Yellowfin tuna	HND	-	$2.26	$1.55	$1.25	$2.49	$1.87	$2.50	$2.54
	PLL	-	$2.88	$1.63	$1.90	$2.51	$2.04	$2.14	$2.67

Species	Gear	Gulf of Mexico		S. Atlantic		Mid-Atlantic			
		1996	2001	1996	2001	1996	2001	1996	
	BLL	-	$2.93	$1.41	$2.17	$3.28	$1.87	$2.03	$3.34
	NET	-	-	-	$1.07	$1.07	$1.32	$2.43	-
	TWL	-	-	-	-	$2.40	$1.36	$2.67	$1.86
Other tunas	HND	$0.28	$0.70	$0.75	$0.54	$1.34	$0.79	$1.90	$2.12
	PLL	-	$0.62	$0.79	$1.18	$1.84	$0.78	$0.98	$0.62
	BLL	-	$0.66	$0.87	$1.65	-	$0.69	$1.50	$2.66
	NET	$0.38	$0.29	$0.35	$0.20	$0.45	$0.43	$0.73	$0.32
	TWL	-	$0.69	$0.31	$0.42	$0.45	$0.42	$1.08	$0.71
	SEN	-	$0.54	-	-	-	-	-	-
	TRP	-		-	$0.16	-	-	-	-
Swordfish	HND	-	$2.52	$2.48	$3.76	$3.61	$3.28	$5.20	$5.04
	PLL	-	$3.02	$2.88	$2.90	$4.31	$3.07	$4.01	$3.17
	BLL	-	$2.88	$2.46	$2.78	$4.88	$3.06	$3.07	-
	NET	-	-	-	-	$4.63	$3.71	$5.62	-
	TWL	-	-	-	-	$4.56	$2.53	$3.08	$4.21
Large Coastal Sharks	HND	$0.23	$0.45	$0.72	$0.85	$0.74	$0.78	-	$0.44
	PLL	-	$0.40	$1.54	$1.50	$0.58	$2.32	$1.03	$1.07
	BLL	$0.60	$0.39	$0.73	$0.79	$0.54	$0.49	$0.99	$1.27
	NET	$0.38	$0.44	$1.30	$1.32	$0.45	$0.79	$0.83	$0.88
	TWL	$0.15	$0.22	$0.86	$0.45	$0.47	$0.49	$0.80	$0.82
Pelagic sharks	HND	-	$1.31	$0.82	$0.63	$1.47	$1.12	$1.60	$1.22
	PLL	-	$1.17	$0.68	$0.84	$1.25	$1.38	$1.26	$1.21
	BLL	-	$1.26	$0.59	$0.69	$1.47	$0.86	$1.85	-
	NET	-	-	$0.33	$0.32	$0.99	$0.90	$1.12	$0.87
	TWL	-	-	-	$0.23	$1.00	$0.61	$0.96	$1.05
Small Coastal sharks	HND	-	$0.33	$0.25	$0.41	-	$0.35	-	-
	PLL	-	$0.66	-	$0.56	$0.25	$0.43	-	-
	BLL	-	$0.54	-	$0.47	-	$0.45	-	-
	NET	-	$0.40	$0.25	$0.48	-	$0.39	-	$1.34
	TWL	-	-	-	$0.20	-	$0.84	-	
	TRP	-	$0.66	-	-		-	-	

Species	Gear	Gulf of Mexico		S. Atlantic		Mid-Atlantic			
		1996	2001	1996	2001	1996	2001	1996	
Shark fins	HND	-	$14.09	$14.00	$17.50	$2.74	-	-	-
	PLL	-	$18.68	-	$10.14	$7.79	-	$4.25	-
	BLL	-	$19.05	$14.00	$19.68	$8.00	-	$3.00	-
	NET	-	$9.76	-	$9.39	$4.77	-	$1.96	-
	TWL	-	-	$9.11	$10.78	$1.99	-	$2.32	-

Table 5.5 **Average ex-vessel prices per lb. for Atlantic HMS by area.** 2001 dollars are converted to 1996 dollars using the consumer price index conversion factor of 0.886.

Species	Gulf of Mexico		S. Atlantic		Mid-Atlantic			
	1996	2001	1996	2001	1996	2001	1996	
Bigeye tuna	$0.68	$1.72	$1.32	$2.28	$3.99	$3.77	$3.59	$3.83
Bluefin tuna	$5.83	$1.11	$4.62	$3.54	$9.48	$4.65	$10.78	$5.13
Yellowfin tuna	-	$2.64	$1.56	$1.51	$2.43	$1.69	$2.35	$2.60
Other tunas	$0.29	$0.67	$0.62	$0.51	$1.10	$0.62	$1.31	$1.29
Swordfish	-	$2.93	$2.79	$3.04	$4.43	$3.13	$4.09	$4.14
Large coastal sharks	$0.21	$0.39	$1.02	$0.99	$0.55	$0.97	$0.88	$0.90
Pelagic sharks	-	$1.26	$0.62	$0.60	$1.21	$0.97	$1.31	$1.09
Small coastal sharks	-	$0.51	$0.25	$0.46	$0.25	$0.49	-	$1.34
Shark fins	-	$18.52	$10.74	$16.33	$4.60	-	$2.69	-

Table 5.6 **Indices of ex-vessel prices for HMS, except sharks, by years 1993-2001.** 1982 is the base year and has a value of 100. 1996 and 2001 are in bold for easier referencing. Note: Indices based on Atlantic and Pacific ex-vessel prices. Source: NOAA Fisheries, 2002a.

Year	Swordfish	Albacore	Bluefin	Skipjack	Yellowfin	
1993	92	132	766	85	112	117
1994	107	125	666	127	205	181
1995	104	120	954	83	283	212
1996	**103**	**130**	**229**	**82**	**113**	**105**
1997	91	124	353	93	126	118
1998	70	99	295	79	100	96

Year	Swordfish	Albacore	Bluefin	Skipjack	Yellowfin	
1999	76	125	736	63	88	94
2000	78	134	760	52	122	109
2001	**77**	**132**	**706**	**74**	**120**	**116**

Table 5.7 **Estimates of the total ex-vessel value of Atlantic HMS fisheries.** Note: Average ex-vessel prices are the average of the values noted in Table 5.5 and may have some weighting errors, except for bluefin tuna which is based on a fleet-wide average. 2001 prices are converted to 1996 dollars using a conversion factor of .886. Sources: NOAA Fisheries, 1997b; NOAA Fisheries, 2002; Cortes, 2000; Cortes, 2001; Cortes, 2002; and bluefin tuna dealer reports from the Northeast Regional Office.

Species	1996			2001		
	Ex-vessel price ($/lb dw)	Weight (lb dw)	Fishery Value	Ex-vessel price ($/lb dw)	Weight (lb dw)	Fishery Value
Bigeye tuna	$2.40	1,212,706	$2,904,432	$2.90	2,391,350	$6,934,915
Bluefin tuna	$10.58	1,652,989	$17,488,624	$7.29	2,176,016	$15,863,157
Yellowfin tuna	$2.11	6,679,938	$14,116,936	$2.11	14,777,800	$31,181,158
Other tunas*	$0.83	368,433	$305,799	$0.77	867,960	$668,329
Total tuna	--	--	$34,815,791	--	--	$54,647,559
Swordfish	$3.77	7,170,619	$27,033,234	$3.31	5,662,350	$18,742,379
Large coastal sharks	$0.67	5,262,314	$3,499,439	$0.81	3,562,546	$2,885,662
Pelagic sharks	$1.05	695,531	$727,989	$0.98	362,925	$355,667
Small coastal sharks	$0.25	460,667	$115,167	$0.70	719,484	$503,639
Shark fins (weight = 5% of all sharks landed)	$6.01	320,926	$1,928,763	$17.43	232,248	$4,048,078
Total sharks	--	--	$6,271,358	--	--	$7,793,046
Total HMS	--	--	$68,120,382	--	--	$81,182,984

* Other tunas includes skipjack and albacore.

5.1.3 Wholesale Prices of Atlantic HMS

Currently, NOAA Fisheries does not collect wholesale price information from dealers. However, the wholesale price of some fish species is available off the web (www.st.nmfs.gov/st1/market_news/index.html). The wholesale prices presented in Tables 5.8 through 5.11 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, tables 5.8 through 5.11 indicate that the average wholesale price of HMS sold in Atlantic and Gulf of Mexico states decreased by approximately 19.6 percent from 1996 to 2001. The wholesale price of swordfish weighing between 26 and 49 lbs decreased the most (34.7 percent), followed by the wholesale price of yellowfin tuna #1 by the fish (30.4 percent) and the wholesale price of yellowfin tuna #2 by the fish (29.6 percent). The wholesale price of thresher sharks was the only increase (11.0 percent). The wholesale price of mako sharks decreased the least (4.0 percent). Additionally, swordfish and tunas that are cut into pieces are generally worth more than a whole fish, although the larger fish are generally worth more than smaller fish.

Table 5.8 **Average fresh wholesale price per lb of sharks sold in Atlantic and Gulf of Mexico states as reported by the Fulton Fish Market**. Note: 2001 dollars are converted to 1996 dollars using the conversion factor 0.886. "0.00" means that some information was provided for that year and species. " - " means that no information was provided for that year and species.

State	Species	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
FL	Blacktip	96	0.00	1.00	0.00	1.25	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	1.01	0.89	0.00	0.00	0.00	0.00	0.61	0.82	0.00	0.00	0.00	0.00
	Mako	96	0.00	2.50	0.00	0.00	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Thresher	96	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
NC	Blacktip	96	1.13	1.07	1.01	1.25	1.14	0.89	0.72	1.06	0.00	0.00	1.05	0.00
		01	1.05	0.00	1.04	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Mako	96	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	0.00	0.00	0.00	2.44	2.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thresher	96	-	-	-	-	-	-	-	-	-	-	-	-
		01	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NY	Blacktip	96	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

State	Species	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		01	-	-	-	-	-	-	-	-	-	-	-	-
VA	Blacktip	96	0.00	1.01	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Mako	96	0.00	2.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Thresher	96	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.9 **Average fresh wholesale price per lb of swordfish sold in Atlantic and Gulf of Mexico states as reported by the Fulton Fish Market**. Note: 2001 dollars are converted to 1996 dollars using the conversion factor 0.886. "0.00" means that some information was provided for that year and species. " - " means that no information was provided for that year and species.

State	Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
FL	100# Up	96	0.00	6.58	6.25	6.80	6.38	6.58	7.13	6.17	6.00	0.00	6.50	0.00
		01	4.65	5.10	5.05	5.47	5.32	4.87	4.21	0.00	0.00	3.54	3.32	0.00
	50-99#	96	0.00	0.00	6.25	7.00	5.63	6.38	6.75	0.00	5.50	0.00	6.00	0.00
		01	4.78	4.00	4.38	4.17	3.80	4.61	4.10	0.00	5.01	0.00	3.19	3.19
	26-49#	96	0.00	0.00	5.75	6.00	6.00	6.00	6.00	0.00	0.00	0.00	5.50	0.00
		01	3.64	3.64	3.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cuts	96	0.00	7.38	7.50	8.17	7.88	8.00	8.50	8.50	7.50	0.00	8.75	0.00
		01	6.28	5.37	6.27	6.08	5.99	6.38	5.47	6.38	0.00	0.00	5.01	5.24
LA	100# Up	96	-	-	-	-	-	-	-	-	-	-	-	-
		01	0.00	0.00	5.32	0.00	4.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50-99#	96	-	-	-	-	-	-	-	-	-	-	-	-
		01	0.00	0.00	4.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cuts	96	-	-	-	-	-	-	-	-	-	-	-	-
		01	0.00	0.00	6.65	0.00	5.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MA	100# Up	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25	0.00	0.00	5.50	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	4.87	0.00	0.00	0.00	0.00	0.00
	50-99#	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.75	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Cuts	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.50	0.00	0.00	7.00	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.20	0.00	0.00	0.00	0.00

State	Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NC	100# Up	96	0.00	5.75	0.00	6.63	6.25	0.00	0.00	0.00	0.00	6.13	5.25	5.65
		01	4.87	5.09	0.00	0.00	5.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50-99#	96	0.00	5.13	0.00	7.50	6.38	0.00	0.00	0.00	0.00	5.63	4.75	5.30
		01	0.00	4.55	0.00	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	26-49#	96	0.00	5.25	0.00	7.25	5.75	0.00	0.00	0.00	0.00	5.13	4.00	4.75
		01	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cuts	96	0.00	6.88	0.00	8.13	7.50	0.00	0.00	0.00	0.00	7.13	7.13	6.50
		01	6.20	6.32	0.00	0.00	6.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NY	100# Up	96	0.00	0.00	0.00	0.00	0.00	0.00	7.38	6.50	6.00	6.38	6.00	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	5.21	4.43	0.00	4.80	0.00	0.00
	50-99#	96	0.00	0.00	0.00	0.00	0.00	0.00	7.50	0.00	5.63	5.63	5.75	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	4.65	4.32	0.00	4.06	0.00	0.00
	26-49#	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.75	5.13	5.25	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.54	0.00	0.00
	Cuts	96	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	7.50	7.50	7.50	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.76	5.76	0.00	5.91	0.00

Table 5.10 **Average fresh wholesale price per lb of yellowfin tuna (Y) sold in Atlantic and Gulf of Mexico states as reported by the Fulton Fish Market**. Note: 2001 dollars are converted to 1996 dollars using the conversion factor 0.886. #'s indicate quality (1 is highest, 3 is lowest). "BTF" means "by the fish".

State	Species and Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
FL	Y#2BTF	96	0.00	5.50	4.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	2.66	3.96	0.00	0.00	0.00	0.00
	Y#2cut	96	0.00	7.50	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	4.43	5.76	0.00	0.00	0.00	0.00
LA	Y#1BTF	96	-	-	-	-	-	-	-	-	-	-	-	-
		01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.87	0.00	0.00	0.00	0.00
	Y#1cut	96	-	-	-	-	-	-	-	-	-	-	-	-
		01	0.00	0.00	0.00	0.00	7.52	0.00	7.06	0.00	0.00	0.00	0.00	0.00
	Y#2BTF	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.75	0.00	0.00	5.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	3.54	3.99	0.00	3.10	0.00	0.00

State	Species and Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
	Y#2cut	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	7.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	4.87	5.98	0.00	4.87	0.00	0.00
NC	Y#2BTF	96	0.00	4.75	0.00	6.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y#2cut	96	0.00	6.50	0.00	8.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y20-30#BTF	96	2.08	2.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.25	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y30-40#BTF	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y40-50#BTF	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.75	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
NJ	Y#1BTF	96	0.00	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y#1cut	96	0.00	0.00	0.00	9.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y#2BTF	96	0.00	0.00	0.00	5.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.99	3.10	0.00	0.00	0.00
	Y#2cut	96	0.00	0.00	0.00	7.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.05	5.32	0.00	0.00	0.00
NY	Y#1BTF	96	0.00	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y#1cut	96	0.00	0.00	0.00	9.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y#2BTF	96	4.75	4.75	0.00	5.50	0.00	4.13	4.63	3.83	3.63	3.58	3.38	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	3.77	3.99	3.10	0.00	0.00	0.00
	Y#2cut	96	0.00	7.00	0.00	7.50	0.00	5.88	6.38	5.60	5.56	5.25	5.13	0.00
		01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.76	4.87	0.00	0.00
	Y40-60#BTF	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50	0.00	2.50	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
TX	Y#2BTF	96	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00

State	Species and Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y#2cut	96	0.00	0.00	0.00	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y40-60#BTF	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.25	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-
	Y60-80# BTF	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.75	0.00	0.00	0.00	0.00
		01	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.11 **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: 1999 dollars are converted to 1996 dollars using the conversion factor 0.94. 2000 dollars are converted to 1996 dollars using the conversion factor 0.911. 2001 dollars are converted to 1996 dollars using the conversion factor 0.886. #'s indicate quality (1 is highest, 3 is lowest); BTF is by the fish. No data reported in 1996 or 2001 for bigeye tuna or #3 yellowfin tuna.

Species	Description	1996 Price/lb	1999 Price/lb	2000 Price/lb	2001 Price/lb	
Blacktip	--	$1.05	$0.98	$0.95	$0.93	-11.4%
Mako	--	$2.77	$2.58	$2.90	$2.66	-4.0%
Thresher	--	$1.00	$0.86	$0.75	$1.11	11.0%
Swordfish	100# and up	$6.28	$4.94	$4.79	$4.80	-23.6%
	50-99#	$6.02	$4.27	$4.30	$4.26	-29.2%
	26-49#	$5.50	$3.16	$3.26	$3.59	-34.7%
	Cuts	$7.74	$6.16	$5.96	$5.96	-23.0%
Yellowfin tuna	#1: BTF	$7.00	$5.61	$5.18	$4.87	-30.4%
	#1: Cuts	$9.38	$7.74	$7.29	$7.29	-22.3%
	#2: BTF	$5.00	$3.99	$3.97	$3.52	-29.6%
	#2: Cuts	$6.52	$5.85	$5.65	$5.32	-18.4%
	#3: BTF	--	$2.82	--	--	--
	#3: Cuts	--	$4.23	--	--	--

Species	Description	1996 Price/lb	1999 Price/lb	2000 Price/lb	2001 Price/lb	Percent Change 1996 to 2001
Bigeye tuna	#1: BTF	--	$3.76	--	--	--
	#1: Cuts	--	$5.17	--	--	--
	#2: BTF	--	$4.00	--	--	--
	#2: Cuts	--	$5.64	--	--	--

5.1.4 Fishing Costs and Revenues for Atlantic Commercial Fishermen

Except for pelagic longline gear, there are little additional data or new reports regarding fishing costs and revenues. Unless otherwise stated, the information included here is a summary of the information included in previous SAFE reports and the HMS FMP.

In general, a vessel owner will need to pay for supplies and provisions for each fishing trip (e.g. hooks, bait, light sticks, ice, fuel, groceries, etc.), vessel and gear repairs as needed, crew members (the number of crew members may change depending on the type of fishing trip and the gear used), and for the proper permits (the information here does not include the price of the permit which is small for an annual renewal but may be large for someone trying to enter a limited access fishery). Fishing trips themselves can be expensive and there is no guarantee that the revenues from the harvest will be enough to cover the owner's expenses for that trip.

Pelagic longline

The amount of data available for this gear type is increasing although current information is needed. Since 1996, NOAA Fisheries 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. Compared to the number of logbook reports, few economic data have been collected (Table 5.12). Beginning in 2003, NOAA Fisheries will initiate mandatory cost earnings reporting for selected vessels in order to improve the economic data available for all HMS fisheries. This mandatory program could be applied to other gear-types as well. Mandatory submission of this economic data is needed for NOAA Fisheries to accurately assess the economic impacts of proposed fishery management regulations on fishermen and their communities as required by 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 NOAA Fisheries develop and improve fishery management strategies.

Currently, there are a few studies that have examined voluntary data (Larkin *et al.*,1998;

Ward and Hanson,1999; Larkin *et al*., 2000; and Larkin *et al*., in press). Additionally, in 1998, Porter *et al*., 2001, conducted a survey of pelagic longline vessel fishing operations in 1997. Because Porter *et al.* (2001), Larkin *et al*. (1998; 2000), and Ward and Hanson (1999) were discussed in the 2002 SAFE report, those studies will not be discussed in this SAFE report.

Bottom Longline

This gear is mainly used to target sharks. The fishing costs for this gear type should be similar to the fishing costs for pelagic longline. McHugh and Murray (1997) found that a seven day trip had an average profit (owner's share of catch minus all expenses) of $1,589. Vessels between 40 and 49 feet had an average profit of $1,975 for a seven day trip. Additional data are needed for this fishery. NOAA Fisheries will also begin collection of cost-earnings information for this fishery in 2003.

Purse Seine

In 2000, NOAA Fisheries distributed a voluntary survey to the owners of the five Atlantic tuna purse seine vessels in a continuing effort to collect economic data on the Atlantic tuna purse seine vessels. Unfortunately, very little information was provided on which to assess seasonal and/or yearly costs incurred by the purse seine fishing fleet. Accurate cost information is particularly useful when addressing the impact of regulations on Atlantic tuna fishery participants, including purse seiners, to ensure that the agency conducts adequate analyses as required under various legal mandates.

Handgear

The commercial handgear fishery targets mainly tunas, particularly bluefin tuna. For this reason, most of the economic information regarding this fishery is related to bluefin tuna. In 1999, researchers at the University of Rhode Island finalized a project that: 1) evaluated the influence of factors such as quantity supplied, time of harvest, and quality characteristics on the price of U.S. Atlantic bluefin tuna sold on the Japanese wholesale market; 2) determined the relationship between prices in Japan and ex-vessel prices received by U.S. fishermen, and 3) determined how different fishery management options influence gross revenues received by U.S. fishermen. The final report concluded that regulations should be developed and implemented that would help the fishery avoid capture seasons that are condensed into sporadic intervals. The report also recommended that consumer preferences should be considered for the efficient exploitation and trade of bluefin tuna in order to help increase revenues for the industry and to eliminate economic inefficiencies generated by public management. Specifically, the report suggests a more dispersed allocation of harvest planned in conjunction with periods of the year when fish seem to possess consumer-favored characteristics, such as high fat content. The researchers at the University of Rhode Island have continued their work, concentrating on the following research objectives: 1) to formally evaluate, using a hedonic model, the degree to which price of U.S. fresh bluefin tuna is determined by those quality attributes of each fish, rather than

by just the quantity supplied; 2) to attempt to show how the quality of U.S. bluefin tuna depends on harvest practices; and 3) to combine the results from the hedonic model and production model estimates to find quota allocations that could result in the highest payoffs to the industry.

Gillnets

In 1999, the use of pelagic driftnets was prohibited in both the swordfish and Atlantic tunas fisheries. Currently, the only fishermen allowed to use this gear are fishermen targeting sharks. NOAA Fisheries knows of six vessels that actively participated in this fishery in recent years. NOAA Fisheries has very little economic information on the fishing costs related to this gear type. However, it is expected that the cost per trip would be less than those of a pelagic or bottom longline fishing trip because the trips are usually shorter in duration (an average of 18 hours per trip), vessels do not fish far offshore (within 30 nautical miles from port), and the gear does not need hooks, bait, or light sticks. Other costs may be incurred as the holes in the gear need to be repaired regularly. NOAA Fisheries estimates based on recent landings and average ex-vessel prices that most drift gillnet vessel has a gross revenues per trip of $380 to $9,000 with an average of $3,700.

Additionally, some shark drift gillnet vessels fish in a strike-net method. This method requires the use of a small vessel (used to run the net around the school of sharks) and a spotter plane. While the cost per trip is higher than the traditional drift gillnet method, bycatch in this method is extremely low, catch rates of the target species is high, and vessels can complete a set in less time. NOAA Fisheries estimates that the smaller vessel could cost between $2,000 and $14,000 to buy. Because these second vessels need to be sturdy enough to hold the gillnet and move quicky around the school of sharks, it is likely that vessel owners would need to re-fit any vessel bought for this purpose. Additionally, a second vessel requires additional fuel and maintenance costs. Spotter planes in other fisheries are paid based on the percentage of the proceeds from the trip, generally 10 to 25 percent of gross revenues. Thus, given the average gross revenues per trip, converting a drift gillnet vessel to a strikenet vessel could be prohibitive.

5.1.5 Costs and Revenues for Atlantic Dealers

NOAA Fisheries does not currently have information regarding the costs to HMS dealers. In general, dealer costs include: purchasing fish; paying employees to process the fish; rent or mortgage on the appropriate building; and supplies to process the fish. Some dealers may provide loans to the vessel owner money for vessel repairs, fuel, ice, bait, etc. In general, outlays and revenues of dealers are not as variable or unpredictable as those of a vessel owner; however, dealer costs may fluctuate depending upon supply of fish, labor costs and equipment repair.

Although NOAA Fisheries does not have specifics regarding HMS dealers, there is some information on the number of employees for processors and wholesalers in the United States provided in the HMS FMP (Section 2.2.4). Table 5.15 provides a summary of available

information. Recent trends indicate that while the number of fish processing facilities have decreased, the number of employees have increased. Florida and New York appear to have the largest number of processing facilities and employees on the Atlantic coast.

NOAA Fisheries also has information regarding the mark-up percentage paid by consumers. A mark-up or margin is the difference between the price paid for the product by the consumer and the wholesale or dockside value for an equivalent weight of the product. This information is presented in Table 5.16. In both 1996 and 2001, the mark up was over 90 percent.

Table 5.15 **The number of plants and employees for Atlantic processors and wholesalers , by State, in 1996 and 2000.** Source: NOAA Fisheries, 1998; NOAA Fisheries, 2002a. 2001 data is not yet available.

State	1996			
	Number of plants	Number of employees	Number of plants	
Maine	267	3,353	270	2,953
New Hampshire	37	455	37	425
Massachusetts	374	4,964	345	5,025
Rhode Island	82	793	69	790
Connecticut	44	339	44	429
New York	339	2,622	362	2,779
New Jersey	150	2,090	131	2,072
Pennsylvania	68	2,017	71	2,400
Delaware	-	-	(2)	(2)
District of Columbia	7	73	(2)	(2)
Maryland	126	1,889	99	1,626
Virginia	129	2,115	113	2,087
N. Carolina	145	2,064	140	1,952
S. Carolina	37	337	30	177
Georgia	66	1,649	61	1,788
Florida	504	5,794	464	6,111
Alabama	144	2,425	125	2,194
Mississippi	64	1,142	70	2,887
Louisiana	311	4,280	268	3,344
Texas	136	2,384	142	3,061
Total	3,030	40,785	2,845	42,104

Table 5.16 Summary of the mark-up and consumer expenditure for the primary wholesale and processing of domestic commercial marine fishery products on a nationwide basis: 1996 and 2001. Source: NOAA Fisheries, 1997a and NOAA Fisheries, 2002a.

	1996	2001
Purchase of Fishery inputs	$5,377,442	$6,281,066
Percent mark-up of fishery inputs	96.6%	99.9%
Total mark-up	$5,192,619	$6,271,680
Total value of fishery inputs	$10,570,061	$12,555,745

5.2 Recreational Fisheries

5.2.1 Economics of Recreational Fisheries across the United States in General[2]

Although NOAA Fisheries believes that recreational fisheries have a large influence on the economies of coastal communities, NOAA Fisheries has little current 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[3] 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

[2] Unless stated otherwise, all the information and data presented in this section is from NOAA Fisheries 1997a and NOAA Fisheries 2002.

[3] 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.

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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).

In general, most anglers did not target HMS in 1996 or 2001. In 1996, over 8 million people made 64 million recreational fishing trips in the United States and caught over 313 million fish (over 50 percent were released alive). In the Atlantic and Gulf of Mexico alone, 8.8 marine recreational fishing participants took 56 million trips and caught a total of 280 million fish. The most commonly caught species by number overall were spotted seatrout, summer flounder, Atlantic croaker, black sea bass, bluefish, and striped bass. Thirteen percent of the total recreational harvest came from the Atlantic and Gulf of Mexico Exclusive Eeconomic Zone (EEZ). The species most commonly caught in federally managed waters were black sea bass, Atlantic mackerel, dolphin, red snapper, and bluefish.

In 2001, over 12 million people made 84 million marine recreational fishing trips in the United States and caught over 442 million fish (over 57 percent were released alive). Along the Atlantic and Gulf of Mexico, over 9.4 million participants took over 75.8 million trips and caught a total of more than 407 million fish. Of the trips that occurred in the Atlantic, 24 percent were made in east Florida, 14 percent in New Jersey, and 13 percent in North Carolina. The most commonly caught species by number in the Atlantic were summer flounder, Atlantic croaker, bluefish, black sea bass, and striped bass. The top five most commonly caught fish by weight included yellowfin tuna, the only HMS in that list. The most commonly caught species in federally managed waters were black sea bass, dolphin, Atlantic cod, summer flounder, Atlantic mackerel, and bluefish. Of the trips that occurred in the Gulf of Mexico, 72 percent originated in Florida, 16 percent in Louisiana, and 12 percent in both Alabama and Mississippi. The most commonly caught species by number were spotted and sand seatrouts, red drum, white grunt, blue runner, Spanish mackerel, and Atlantic croaker. No HMS made the top five list for most commonly caught species by weight in the Gulf of Mexico. The most commonly caught species by number in federally managed waters were white grunt, red snapper, black sea bass, dolphin, and greater amberjack.

5.2.2 Willingness to Pay to Fish for Atlantic HMS

There are little additional data or new reports regarding willingness to pay to fish for Atlantic HMS. Unless otherwise stated, the information included here is a summary of the information included in previous SAFE reports and the HMS FMP.

The most recent data NOAA Fisheries has comes from a 1994 survey of anglers in New England and the Mid-Atlantic (Hicks *et al.*, 1999). The data collected were used to estimate expenditures and economic value of the various groups of recreational fisheries in this area. One category of fishing, called “Big Game” consisted primarily of HMS, including sharks, billfish, and

tunas. Although this study is not an exhaustive picture of the entire HMS recreational fishery, the results provide considerable insight into the absolute and relative values of the recreational fisheries for HMS. Overall average willingness to pay (WTP) for a one-day fishing trip ranged from a low of less than a dollar in New Hampshire to a high of $42 in Virginia. Aggregate WTP (average WTP times the number of trips) ranged from $18,000 in New Hampshire to nearly $1 million in Virginia. Using model results, it was possible to estimate the WTP for a one fish increase in the expected catch rate across all sites in the choice set. The highest average value was attributed to big game fish, ranging from $5 to $7 per trip (about $5.40 on average), in addition to the value of the trip. The marginal value of an increase in catch per trip was highest for big game fish, and lowest for bottom fish.

The 1994 survey results also indicated that boat fees were responsible for the greatest percentage of expenditures. Roughly 70% and 53% of total expenditures went for private/rental boats and charter/party boats, respectively. Travel expenses were the smallest portion of expenditures, although travel costs for those fishing on party/charter vessels were about twice as high as for those fishing on private/rental boats ($28 *vs*. $16).

Angler WTP depends, in part, on the species sought and on the location. Ditton *et al*. (1998) found that the WTP for bluefin tuna in North Carolina ranged from $344 to $388 per person. Fisher and Ditton (1992a) found that anglers were willing to pay an additional $105 per trip rather than stop fishing for sharks.

While these results are useful in considering the economic value of HMS recreational fisheries, specific surveys focusing on HMS are preferable in order to consider the particular nature of these fisheries. NOAA Fisheries will continue to pursue options for funding economic surveys of the recreational HMS fisheries.

5.2.3 Atlantic HMS Tournaments

There are little additional data or new reports regarding Atlantic HMS tournaments. Unless otherwise stated, the information included here is a summary of the information included in previous SAFE reports and the HMS FMP.

The most recent economic information associated with HMS tournaments can be found in the HMS FMP and the Billfish Amendment. A recent search for HMS tournaments on the web found a number of tournaments targeting HMS. This search found that HMS tournaments charge large fees for a team ($395 to $5000). This entry fee would pay for a maximum of two to six anglers per team during the course of the tournament. Additional anglers could 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. For example, in 2001 and 2002, Bisbee's Black and Blue Marlin Jackpot Tournament had a $5,000 entry fee for teams consisting of a maximum of four anglers. This tournament awarded a total of $1.7 million in both 2001 and 2002. Conversely, the

$15,000 New Jersey Shark tournament has an entry fee of $395 for a team with a maximum of five anglers. This tournament awarded a total of $15,000 in prizes with a possibility of a $50,000 bonus if a state record is landed. The number of vessels and participants at each tournament is also diverse. The smallest tournament found on the web had 18 vessels and 58 anglers participating. Some of the larger tournaments had between 250 and 400 vessels and over 1,300 anglers participating.

In general, it appears that billfish and tuna tournaments charge higher entry fees and award more prize money than shark tournaments although all species have a wide range. The web search found that while some tournaments award between $500 and $50,000 in prizes (third through first place) others award much larger prizes ranging from $81,000 to $840,000 in prizes. Some tournaments hand out equipments such as new cars, boats, fishing tackle with, or instead of, monetary prizes. The total amount of prize money distributed at any one tournament ranged from $9,500 to $2,385,900.

Most tournaments also have a type of betting called a "calcutta" where anglers pay between $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 on 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 web pages, 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.

Tournaments can bring in a lot of money for the surrounding communities and local businesses. Besides the entry fee to the tournament and possibly the calcutta, anglers 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 (1992b) found that the average angler who attended a billfish tournament spent $2,147 per trip and that billfish tournament anglers spent an estimated $180 million in 1989. Ditton and Clark (1994) estimated that the total annual net economic benefits of billfish tournaments in Puerto Rico was $18 million. These impacts have likely increased.

5.2.4 Atlantic HMS Charter and Party Boat Operations

There are little additional data or new reports regarding Atlantic HMS charter and party boat operations. Unless otherwise stated, the information included here is a summary of the information included in previous SAFE reports and the HMS FMP.

Currently, specific information on the economic impact of HMS charter/headboat operations is sparse. NOAA Fisheries will begin collecting cost-earnings information from the charter and party operations during 2003 to supplement data currently available. Most of the data, as reported in the HMS FMP, are related to the bluefin tuna fishery and other tunas. There are, however, limited data on charter/headboats in general. The information below was also reported in the 2001 SAFE report. In 2001, HMS required all charter/headboat vessels fishing for Atlantic HMS to have a permit. This information indicates that a few thousand vessels either target, or feel they could catch, Atlantic HMS.

In 1998, a survey was completed of a number of charterboats (96 of an estimated 430) and party boats (21 out of 23) throughout Alabama, Mississippi, Louisiana, and Texas (Sutton *et al*., 1999). This study provides some economic information related to HMS. They defined charter boats as for-hire vessels that carry six or fewer passengers in addition to the crew while party boats are for-hire vessels that carry more than six passengers (up to 150 passengers). They found that the average charter boat base fees were $417 for a half day trip, $762 for a full day trip, and $1,993 for an overnight trip and 60 percent of all trips were taken May through August. The average party boat base fees were $41 for a half day trip, $64 for a full day trip, and $200 for an overnight trip and 48 percent were taken May through August. They found that 55 percent of charter boat operators reported targeting tuna at least once, 38 percent targeted sharks at least once, 41 percent reported targeting billfish at least once. Percentages by state are summarized in Table 5.17. Snapper (49 percent), king mackerel (10 percent) red drum (6 percent), cobia (6 percent), tuna (5 percent) and speckled trout (5 percent) were the species that received the largest percentage of effort by charter boat operators.

In the Sutton *et al*. study, party boat operators did not frequently target sharks, tunas or billfish. A total of 65 percent of party boat operators reported targeting sharks at least once; 55 percent indicated they had targeted tunas at least one time. Ninety percent reported that they did not target billfish. Snapper (70 percent), king mackerel (12 percent), amberjack (5 percent) and sharks (5 percent) were the species that received the largest percentage of effort by party boat operators. The economic information estimated in this study can be found in Table 5.18.

Holland *et al*. (1999) conducted a similar study on charter (boats that carry six or less passengers and charge for the entire boat) and headboats (boats that carry 10 or more passengers and charge by the person) in Florida, Georgia, South Carolina, and North Carolina. The survey interviewed 403 charter operators (24 percent of the estimated number of charter boats) and 52 head boat operators (35 percent of the estimated number of headboats). The average fees for charter and headboats are listed in Table 5.19. Charterboat and headboat operators did not target HMS as frequently as they did other species such as mackerel, grouper, snapper, dolphin, red drum. The percentage of charter and headboat operators who report targeting HMS can be found in Table 5.20. Table 5.21 shows the economic information regarding these businesses. Unlike similar businesses in the Gulf of Mexico, the Holland study indicates that these businesses appear to be profitable except for charter boats in Florida which are, on average, unprofitable.

Overall, charter/headboats appear to provide a substantial amount of employment and are economically important to coastal communities. Although HMS are targeted, they do not appear to be the primary objective for the majority of operations, and as such, HMS charter/headboat fisheries probably do not contribute as substantially to the economies of these communities compared to other fisheries such as mackerel and snapper.

Table 5.17 The percent of charter boat operators in Alabama, Louisiana, Mississippi, and Texas who reported targeting HMS at least once. Source: Sutton *et al*., 1999.

Target		Alabama	Louisiana	Mississippi	
Tuna	Yes	61.9	66.7	6.3	65.2
	No	38.1	33.3	93.8	32.6
	Incidental	0.0	0.0	0.0	2.2
Sharks	Yes	4.5	16.7	75.0	67.4
	No	95.5	66.7	18.8	42.7
	Incidental	0.0	16.7	6.3	32.6
Billfish	Yes	61.9	41.7	6.3	43.5
	No	38.1	58.3	93.8	56.5
	Incidental	0.0	0.0	0.0	0.0

Table 5.18. The financial operations and economic impact of charter and party boat operators in Alabama, Louisiana, Mississippi, and Texas. Source: Sutton *et al*., 1999.

		Charter boats	
Average capital investment	Hull and superstructure	$97,713	$214,922
	Engine	$9,058	$2,571
	Electronics	$5,231	$7,429
	Other equipment and tackle	$7,298	$6,686
Annual costs	Wages and Salaries	$19,725	$64,064
	New hull or superstructure	$18,300	$23,076
	Maintenance and repair	$8,584	$26,919
	Engine	$4,890	$15,153
	Insurance	$3,799	$11,491
	Other costs	$6,020	$28,404
Average annual gross revenues		$68,934	$137,308
Average annual net revenues (includes capital expenses - e.g. purchase of new hull)		-$12,099	-$128,703
Average annual operating profit (does not include capital expenses - e.g. purchase of new hull)		$14,650	-$73,064
Economic output	Alabama	$13.8 M	$0.8 M
	Mississippi	$6.6 M	-
	Louisiana	$4.4 M	-
	Texas	$17.6 M	$3.5 M
Employment generated	Alabama	$5.6 M (282 jobs)	$0.3 M (16 jobs)
	Mississippi	$2.1 M (211 jobs)	-
	Louisiana	$1.8 M (118 jobs)	-
	Texas	$6.1 M (385 jobs)	$1.7 M (77 jobs)

Table 5.19 **The average fees for charter and headboats in Florida, Georgia, South Carolina, and North Carolina.** Source: Holland *et al*., 1999.

State	Length of trip	Charter boat	Headboat
Florida	Half-day	$348	$29
	Full day	$554	$45
	Overnight	$1,349	--
Georgia	Half-day	$320	--
	Full day	$562	--
	Overnight	$1000-$2000	--
South Carolina	Half-day	$296	$34
	Full day	$661	$61
	Overnight	$1000-$2000	--
North Carolina	Half-day	$292	$34
	Full day	$701	$61
	Overnight	$1000-$2000	--

Table 5.20 **The percent of charter and headboat operators in Florida, Georgia, South Carolina, and North Carolina who reported targeting HMS at least once.** Source: Holland *et al*., 1999.

Target species	Florida		Georgia		S. Carolina			
	Charter	Head	Charter	Head	Charter	Head	Charter	
Tuna	8.5	0.0	8.3	-	0.0	-	60.0	-
Sharks	22.6	9.7	33.3	-	35.0	-	23.3	-
Billfish	9.9	0.0	8.3	-	20.0	-	40.0	-

Table 5.21. The financial operations and economic impact of charter and party boat operators in Florida, Georgia, South Carolina, and North Carolina. Source: Holland *et al*., 1999.

		Charter boats		Party boats	
		Florida	**Other states**	**Florida**	**Other states**
Average capital investment	Hull and superstructure	$90,989	$39,445	$214,158	$178,833
	Engine	$40,518	$5,900	$40,000	$38,181
	Electronics	$5,568	$5,900	$5,560	$6,277
	Other equipment and tackle	$5,878	$4,463	$9,183	$3,600
Annual costs	Wages and Salaries	$25,810	$17,928	$52,000	$33,077
	New hull or superstructure	$3,020	$793-1,340	$3,333	$0.00
	Maintenance and repair	$5,720	$4,991-6,910	$13,385	$16,577
	Engine	$6,334	$172-2,738	$9,450	$14,545
	Insurance	$2,970	--	$8,570	--
	Other costs	$24,723	$971-18,883	$48,999	$40,846
Average annual gross revenues		$56,264	$26,304-$60,135	$140,714	$123,000
Average annual net revenues (Gross revenues - Annual costs)		-$12,313	$3,069-13,237	$4,977	$17,955
Economic output		$128 M	$34.4 M	$23.4 M	$5.8 M
Employment generated		$31 M (3,074 jobs)	$15.6 M (1,066 jobs)	$5.8 M (450 jobs)	$2.2 (81 jobs)

5.2.5 Other Recreational Fishing Costs Information

In addition to charterboat fees, recreational anglers can incur other costs associated with fishing. These may include the costs of owning, outfitting, and operating personal vessels used for fishing. NOAA Fisheries has no current data on the cost of recreational boat ownership and operating costs.

5.3 Periodic Review Under Section 610 of the Regulatory Flexibility Act

5.3.1 Introduction

In 1996, the Small Business Regulatory Enforcement Fairness Act amended the Regulatory Flexibility Act (RFA). This amendment added section 610 to the RFA. Section 610 requires NOAA Fisheries to periodically review rules that had or will have a significant economic impact on a substantial number of small entities. The purpose of this review is to determine whether significant rules should be continued without change or if they should be amended or rescinded in order to minimize the impact on small entities. The review should examine the impact of these rules consistent with the stated objectives of applicable statutes. NOAA Fisheries has 10 years after the adoption of each rule in which to review the impact of the rule. Section 610 states that NOAA Fisheries must consider the following factors in its review:

- the continued need for the rule;
- the nature of complaints or comments received concerning the rule from the public;
- the complexity of the rule;
- the extent to which the rule overlaps, duplicates or conflicts with other federal rules, and to the extent feasible, with state and local governmental rules; and,
- the length of time since the rule has been evaluated or the degree to which technology, economic conditions, or other factors have changed in the area affected by the rule.

5.3.2 Description of Rules Implemented Since 1996 that have been Classified as Economically Significant

A list of final regulations that were found significant under RFA or E.O. 12866[4] and were implemented by NOAA Fisheries regarding HMS since 1996 can be found in Table 5.22. No regulations that were significant under RFA or E.O. 12866 were published during 2001, and one significant rule was published in 2002.

[4] NOAA Fisheries is required to conduct economic analyses under E.O. 12866 as well as RFA. Unlike RFA, E.O. 12866 is concerned with economic impacts to the nation as a whole along with economic impacts on individual businesses.

Table 5.22. HMS regulations that were implemented after 1996 and were classified as significant under either RFA or E. O. 12866.

Rule	Date published	FR cite	Action	
1.	4/7/97	62 FR 16648	Atlantic shark fisheries; Quotas, bag limits, prohibitions, and requirements and large coastal shark species: Final rule that reduced large coastal shark quota and the recreational bag limits and prohibited 5 shark species	Not significant under RFA or E. O. 12866. On 05/20/98, NOAA Fisheries announced availability of a document examining the economic impacts as requested by Judge Merryday. This document states that 1997 quotas may have a significant economic impact on a substantial number of small entities.
2.	1/27/99	64 FR 4055	Atlantic swordfish fishery; Management of driftnet gear: Final rule that prohibited the use of driftnet gear in the N. Atlantic swordfish fishery.	Will have a significant economic impact on a substantial number of small entities. Not significant under E. O. 12866.
3.	5/28/99	64 FR 29090	Atlantic highly migratory species fisheries; Fishery management plan, plan amendment, and consolidation of regulations: Final rule implementing the HMS FMP and Billfish Amendment 1.	Will have a significant economic impact on a substantial number of small entities. Significant under E. O. 12866.
4.	8/1/00	65 FR 47214	Atlantic highly migratory species; Pelagic longline management: Final rule that closed certain times and area to fishermen using pelagic longline gear and prohibited the use of live bait by fishermen using pelagic longline gear in the Gulf of Mexico.	Will have a significant economic impact on a substantial number of small entities. Not significant under E. O. 12866.
5.	10/13/00	65 FR 60889	Atlantic highly migratory species; Pelagic longline fishery; Sea turtle protection measures: Emergency rule that implemented a time/area closure in the Northeast Distant Sampling area and required fishermen using pelagic longline gear to carry and use dipnets and line clippers.	Exempt from RFA requirements. Significant under E. O. 12866.

Rule	Date published	FR cite	Action	Classification
6.	12/12/00	65 FR 77523	Atlantic highly migratory species fisheries; Implementation of ICCAT recommendations: Final rule that implemented swordfish quotas through 2002, established a dead discard allowance for the swordfish fishery through 2002, and took several actions regarding import restrictions.	Could have a significant economic impact on a substantial number of small entities. Not significant under E. O. 12866
7.	07/09/02	67 FR 45393	Atlantic highly migratory species fisheries; Pelagic longline fishery; shark gillnet fishery; sea turtle and whale protection measures; Final rule that closed the northeast distant statistical reporting area, revised gangions length requirements, and prohibited vessels from having hooks on board other than corrodible, non-stainless steel hooks.	Could have a significant economic impact on a substantial number of small entities. Not significant under E.O. 12866.

Rule 1 in Table 5.22 reduced the LCS commercial quota by 50 percent, reduced the recreational bag limit for all shark species by 50 percent, established a commercial quota for SCS, prohibited the retention of five species of sharks, and prohibited the filleting of sharks at sea. The intent of the rule was to reduce effective fishing mortality, stabilize the LCS population, facilitate enforcement, and improve management of the Atlantic sharks. The economic analyses conducted for this rule concluded that because the shark fisheries are so diversified and because there were alternative fisheries for fishermen to enter, that the reduction in the commercial quota and recreational bag limit would not have a significant economic impact. Similarly, the analyses found that the prohibited species regulations were similar to status quo and the prohibition of filleting at sea would have minimal impacts on fishing costs. In May 1997, a number of commercial fishermen and dealers sued NOAA Fisheries regarding the commercial quota in this regulation. In February 1998, the Court remanded the economic analyses to the agency. In May 1998, NOAA Fisheries announced the availability of the new economic analyses for the commercial quota reduction implemented with this regulation. The new analyses found that nearly all shark fishery operators are active in other fisheries. Despite this, NOAA Fisheries concluded that the quota cuts may have had a significant economic impact on a substantial number of small entities and that these impacts may put a number of fishermen out of business. This case was resolved through a settlement agreement.

Rule 2 in Table 5.22 prohibited the use of driftnet gear in the North Atlantic swordfish fishery. The intent of this regulation was to reduce the bycatch of protected resources in a manner that maximizes the benefit to the Nation. The economic analyses for this rule found that

the 17 fishermen who used this gear type could: 1) transfer fishing effort into the longline/harpoon category and continue fishing for swordfish; 2) fish for other species with other gears; 3) use driftnet for other HMS including Pacific species; and 4) exit the fishery. In general, the analyses found that the rule would have a significant economic impact on a substantial number of small entities.

Rule 3 in Table 5.22 changed a number of regulations and fishing operations in the Atlantic HMS fisheries including tunas, swordfish, sharks, and billfish. These changes included, but are not limited to, limited access for shark, swordfish, and tuna longline fishermen, a time/area closure for pelagic longline fishermen in the month of June, reduction in the bluefin tuna quota, establishing a recreational bag limit for yellowfin tuna, changing the shark commercial quota and recreational bag limit, and requiring VMS for all vessels with pelagic longline onboard. The intent of the regulations were to meet the new requirements of the Magnuson-Stevens Act, implement the recommendations of ICCAT, consolidate the HMS regulations into one part of the Code of Federal Regulations, and re-implement all previous regulations that were still necessary. The specific regulations were intended to meet a number of objectives, including but not limited to: prevent or end overfishing of Atlantic tuna, swordfish, sharks, and billfish and adopt the precautionary approach to fishery management; rebuild overfished fisheries in as short a time as possible and control all components of fishing mortality to ensure the long-term sustainability of the stocks; minimize economic displacement during the transition from overfished fisheries to healthy ones; and, minimize bycatch of living marine resources and the mortality of such bycatch.

The economic analyses conducted for these regulations found that even though HMS fishermen fish for other species in addition to HMS, including mackerel, snapper-grouper, reef fish, dolphin, and oilfish, overall the final actions will have a significant economic impact on fishermen and related industries such as processors and suppliers. Soon after the regulations were published in the Federal Register, a number of different groups sued NOAA Fisheries on different aspects of the regulations, claiming among other things that the regulations were not consistent with the RFA. After a remand in one case, the courts upheld the agency's RFA analyses. Generally, the most recent economic data available only includes data for 2000. With approximately 1.5 years of data, a few economic impacts can be examined and are discussed in this document.

Rule 4 in Table 5.22 prohibited fishing with pelagic longline in a number of different times and areas within the Atlantic EEZ and prohibited the use of live bait in the Gulf of Mexico. The intent of the regulation was to reduce bycatch and incidental catch of overfished and protected species by pelagic longline fishermen who target HMS. The economic analyses found there were 450 commercial fishermen, 125 dealers, and a number of recreational businesses that might be affected by these regulations; that the average annual gross revenues for commercial fishermen might decrease by about 5 percent; that 14 percent of the vessels could experience a 50 percent decrease in gross revenues; and, that a number of dealers may also experience a decrease in the average weight of fish handled of at least 5 percent. Overall, the regulation was found to have a significant economic impact on a substantial number of small entities. NOAA Fisheries was sued

on this regulation by three different organizations. In October 2002, a court upheld the regulation, finding, that NOAA Fisheries supported its economic ecological and social analyses in the record.

Rule 5 in Table 5.22 implemented a time/area closure for pelagic longline gear in the Northeast Distant Statistical Area (NED) from October 10, 2000, through April 9, 2001 and requires all pelagic longline vessels to carry and use line clippers and dipnets. The intent of this regulation was to reduce bycatch and bycatch mortality of loggerhead and leatherback sea turtles by the Atlantic pelagic longline fishery. The economic analyses for this regulation found that the requirement of line clippers and dipnets would have minimal economic impacts; that closing the area could reduce gross revenues by 25 to 40 percent for the vessels fishing in the NED area assuming those vessels decide not to fish; and that while individual fishermen and processors are likely to be impacted, the fishery as a whole would not be because of the limited duration and scope of this rule. Because this rule was an emergency rule it was exempt from the economic analyses under RFA; however, it was found significant under E.O. 12866.

Rule 6 in Table 5.22 implemented, consistent with ICCAT recommendations, the swordfish annual landings quota for the fishing years 2000, 2001, and 2002, established dead discard allowances for 2000, 2001, and 2002 for the swordfish fishery, and implemented several import restrictions for bluefin tuna and swordfish from several countries. The intent of this rule was to improve the conservation and management of Atlantic swordfish and bluefin tuna while allowing harvests consistent with the recommendations of ICCAT. The economic analyses found that in the short-term, the quota reductions and dead discard allowance would reduce ex-vessel swordfish revenues for a substantial portion of the fleet. However, the estimated impacts could be lower if rule 5, above, is effective at reducing swordfish dead discards. The analyses also found that in the long-term, any negative short-term impacts would turn into positive impacts as the stock is rebuilt. The restrictions on importation of bluefin tuna and swordfish are unlikely to have an economic impacts because the relevant countries do not currently export to the United States.

Rule 7 in Table 5.22 closed the northeast distant statistical reporting area, revised gangions length requirements, and prohibited vessels from having hooks on board other than corrodible, non-stainless steel hooks. The intent of this rule was to reduce the incidental take rate of sea turtles by the U. S. Atlantic pelagic longline fleet consistent with the Biological Opinion finalized on June 14, 2001. The economic analyses found that closure of the northeast distant waters would impact approximately 15 vessels, which land twenty percent of all domestically caught Atlantic swordfish. Rule 7 effectively replaced Rule 5 as described above.

5.3.3 Economic Impact of the Regulations

The actual economic impact of any specific regulation is difficult to quantify because of changing factors that are not a result of the regulation such as changing consumer demand, weather patterns, and additional regulations in either that specific fishery or in related fisheries.

For that reason, the actual impacts are not quantified but discussed qualitatively.

Rule 1 in Table 5.22 reduced the LCS commercial quota by 50 percent and reduced the recreational bag limit by 50 percent. The LSC fishery continued to operate under the 1997 commercial quota through 2002 via a series of emergency rules. Tables 5.5 and 5.7 indicate that in general from 1996 to 2001, the ex-vessel price of LCS, SCS, and fins increased whereas, the pelagic shark prices decreased. This indicates that the commercial quota reduction may have positively impacted the price of LCS and SCS meat and shark fins. Except for thresher sharks, wholesale prices of shark meat have declined since 1996 (Table 5.11). This reduction could be due to the reduction in availability of LCS and SCS meat. While the reduction in the recreational bag limit may have had some impact on the recreational fishery, the exact degree is hard to quantify given the paucity of economic data directly related to HMS and the fact that the recreational bag limit was further reduced in July 1999. However, given the fact that most anglers do not target HMS in general, or sharks specifically, relative to the total salt water angler population, NOAA Fisheries does not feel that the 1997 bag limit reduction had a significant impact on the recreational fishery.

Rule 2 in Table 5.22 prohibited the use of driftnet in the Atlantic swordfish fishery. The ex-vessel and wholesale prices of swordfish have declined since 1996. However, it is unlikely that the prohibition on driftnet gear caused this decline because few swordfish were landed using this gear type and only a few vessels were active in this fishery (10-12 vessels).

Rule 3 in Table 5.22 implemented the HMS FMP and the Billfish Amendment in order to prevent overfishing and rebuild HMS stocks. These two documents and Rule 3 replaced the existing regulations for all HMS. Preparation and scoping for these documents began in 1997 with the formation of the Advisory Panels for HMS. It is likely that anticipation of these documents and its implementing regulations impacted all HMS fisheries economically. Generally, the value of HMS fisheries as a whole as increased, particularly the value of small coastal sharks, yellowfin tuna and other tunas (Table 5.7). However, the value of some of the major HMS fisheries, particularly swordfish, have continued to decline (Table 5.5, 5.6, and 5.7). Wholesale prices of HMS have also declined since 1996 (Table 5.11). Increases in some fisheries, such as bigeye tuna, could be due to substitution of bigeye tuna for other HMS. These declines could be due to reduced availability of HMS due to management measures in this rule such as reduced quotas, limited access, closed areas, and gear restrictions rather than environmental concerns or general economic concerns. This impression is strengthened if you look at the status of U.S. commercial fisheries in aggregate versus Atlantic HMS commercial fisheries. Since 1996, commercial landings have increased, the value of U.S. fisheries has increased, and per capita consumer consumption has increased. Contrary to Atlantic HMS commercial fisheries, Atlantic HMS recreational fisheries appear to be relatively healthy, from an economic perspective, compared to 1996. For instance the number of charter/headboat permits have increased in recent years and HMS tournaments are still popular with many anglers and bring in a lot of money to local economies. Additional consideration of this rule on HMS fisheries will be easier as more data related specifically to HMS fisheries are collected over a longer period of time.

Rules 4, 5, 6, and 7 of Table 5.22 all focus on time area closures to reduce the incidental take of sea turtles and marine mammals. Economic impacts that may result from time and area closures include reduction in annual gross revenues, increased trip expenses, relocation expenses, and other indirect economic impacts on fishing communities. As additional data become available, NOAA Fisheries will examine the economic impact.

5.3.4 Continued Need for the Regulations

Rule 1 in Table 5.22 was promulgated on the basis of the 1996 stock assessment and shark evaluation workshop discussions. NOAA Fisheries recently announced the availability of the 2002 SCS and LCS stock assessments (CFR 67 FR 30879 and 67 FR 64098). The SCS assessment indicates that overfishing is occurring on finetooth sharks. The three other species in the SCS complex (Atlantic sharpnose, bonnethead, and blacknose) are not overfished and overfishing is not occurring. The results of the LCS stock assessment indicates that the LCS complex is still overfished and overfishing is occurring, that sandbar sharks are no longer overfished and that overfishing is still occurring, and that blacktip sharks are rebuild and overfishing is not occurring. As such, NOAA Fisheries has replaced Rule 1 with an emergency rule and intends to further adjust management measures via amendment in 2003.

Rule 2 was effective in 1999 and emergency regulations prohibited this gear type for most of 1998. NOAA Fisheries implemented these regulations because of concerns over the number of interactions with protected species. These concerns are still relevant today. As such, NOAA Fisheries believes that these regulations are still needed.

Rules 3 through 7 in Table 5.22 are all regulations implemented within the last three years. Rules 4 through 7 focus on minimizing bycatch to the extent practicable in HMS fisheries. NOAA Fisheries is currently examining Rules 4, 6, and 7 (refer to Chapter 8 of this report) and should have additional information for inclusion in next year's periodic review section of the SAFE report.

5.3.5 Comments Received on Each Rule

NOAA Fisheries always invites comments on current and proposed regulations through public hearings, formal requests for comments, the HMS and Billfish Advisory Panels and other means. Despite a transparent public input process, however, comments on existing regulations are periodically followed by litigation from impacted constituents. For instance, a number of different commercial shark fishermen and dealers sued NOAA Fisheries regarding Rule 1, a commercial driftnet fisherman sued NOAA Fisheries on a takings claim for Rule 2, seven different groups of plaintiffs composed of recreational, commercial, and environmental interest groups sued

NOAA Fisheries on different aspects of Rule 3 in Table 5.22[5], three different groups sued NOAA Fisheries on Rule 4, and one group sued NOAA Fisheries on Rule 5. Almost all of these lawsuits include claims that NOAA Fisheries did not comply with RFA and various National Standards. NOAA Fisheries is working with lawyers, plaintiffs, and constituents to ensure that all concerns are considered.

In 2000 and 2001, NOAA Fisheries also received comments when commercial and recreational fishing groups took their concerns to Congress. Some of the bills that were introduced include: time/area closures similar to those in Rule 4 in Table 5.22 and a buy-back program for a number of vessels and permits; a bill to prohibit shark finning and monitor the trade of shark fins; and a bill to prohibit the use of spotter planes in the bluefin tuna fishery. Many of these bills originated because certain parties felt that NOAA Fisheries had not done enough for the fishery, or that NOAA Fisheries had done too much and did not consider all aspects of the fishery. In all cases, NOAA Fisheries gave Congress comments on the proposed bills and continues to work with constituents to ensure all concerns are considered. In some cases Congress has passed and the President has signed bills that require NOAA Fisheries to promulgate regulations (e.g. the Shark Finning Prohibition Act of 2000).

Outside of litigation and legislation, NOAA Fisheries continues to receive comments during public comment periods on certain regulations and restrictions, at AP meetings, and during public comment periods of advanced notice of proposed rulemakings. NOAA Fisheries is currently considering many of the comments received, some of which are outlined in chapter 10 of this document.

5.3.6 Complexity of Each Rule

Neither Rule 1 nor Rule 2 on Table 5.22 were particularly complex. In the case of Rule 1, the regulations related to the recreational bag limits were simplified. The regulations in Rule 3 are complex and complicated because they involve all the regulations for all HMS: sharks, swordfish, tunas, and billfish. However, because this rule consolidated the regulations and removed duplicative text, this rule actually simplified the process of finding the regulations for Atlantic HMS. In general, many of the regulations in Rule 3 remained unchanged or similar to earlier regulations so individual fisherman should be able to understand the regulations relatively easily. The parts of the regulations that were new and also complex generated many phone calls. These parts included the qualifications and application process for limited access permits and the VMS requirement for pelagic longline fishermen (also complicated by repeated delays and finally a court remand). Other regulations that are not new but that still generate a substantial number of

[5] These claims included, but are not limited to, the pelagic longline VMS requirement, shark commercial quotas, shark recreational bag limits, time/area closures, bycatch measures, bluefin tuna rebuilding plan, bluefin tuna purse seine cap, yellowfin tuna bag limit, and a limited access permit claim.

comments include the BFT catch limits for pelagic longline fishermen and effort controls in the BFT fishery. Rules 4, 5, and 7 on Table 5.22 are not particularly complex in that they close areas and times to pelagic longline fishing, prohibit the use of live bait in the Gulf of Mexico, and requiring the use of line clippers and dipnets. These regulations do not include any additional reporting requirements. Rule 6 was not particularly complex in that it established a set landings quota for three years and determined the dead discard allowance for each year. Fishermen did not have to change their activities in order to comply with this regulation.

Overall, the complexity of the regulations have increased over time as loopholes in the regulations are fixed and new restrictions are added. NOAA Fisheries is aware of this situation and has tried to make it easy for fishermen and other constituents to obtain the information they need to make informed decisions. Besides publishing the regulations in the Federal Register (see Table 1.1), NOAA Fisheries efforts include faxing notices of rulemakings, season closures, brochures and other information to dealers and marinas over our fax network, updating the HMS telephone information hotline, publishing compliance guides in an easy to read question/answer format, placing documents on the HMS website, and answering phone calls. Additionally, in 2001 NOAA Fisheries implemented Fishnews, an electronic summary of current events and changes to regulations across the country. Any fisherman or interested constituent with access to email can sign up for this free service. The HMS Management Division often has major events announced on Fishnews. Also in 2002, NOAA Fisheries revised the overall compliance guide for all Atlantic HMS regulations.

5.3.7 Extent to Which the Rule(s) Overlaps, Duplicates or Conflicts with Other Federal Rules, and, to the Extent Feasible, with State and Local Governmental Rules

NOAA Fisheries believes that all its regulations are consistent with and do not overlap with other Federal rules, except where necessary. In some cases, NOAA Fisheries' regulations may overlap or be inconsistent with State regulations. In all cases, NOAA Fisheries continues to work with the States to ensure consistent regulations where possible.

5.3.8 Length of Time Since the Rule Has Been Evaluated, and the Degree to Which Technology, Economic Conditions, or Other Factors Have Changed in the Area Affected by the Rule

All of the regulations listed in Table 5.22 were evaluated in 1999 HMS FMP or after and again in the 2002 SAFE report. Because it has been so short of a time period, there has not been a great deal of change in technology, economic conditions, or other factors that would have affected fishing communities on the Atlantic. NOAA Fisheries continues to evaluate all regulations as new information becomes available.

5.3.9 Conclusion

If ex-vessel and wholesale prices are a good indicator, the economic health of Atlantic

HMS commercial fisheries has declined slightly since 1996 (Tables 5.7 and 5.11). At this point, it is unknown to what degree the economic health of the recreational fisheries has changed since 1996 although these fisheries appear to be relatively healthy from an economics perspective. Given the status of HMS stocks, NOAA Fisheries feels that all its current regulations are necessary and will benefit the fisheries economically in the long-term. NOAA Fisheries continues to work for sustainable HMS fisheries and welcomes comments on any of its regulations and on improving its methods of public outreach.

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6. COMMUNITY AND SOCIAL DATA UPDATE

According to National Standard 8 (NS 8), conservation and management measures should attempt to both provide for the continued participation of a community and minimize the economic effects on the community. Complying with NS 8 is contingent upon the availability of community studies and profiles as well as regional economic analyses. 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.

6.1 Overview of Current Information and Rationale

The Magnuson-Stevens Act requires all FMPs to include a fishery impact statement intended to assess, specify, and describe the likely effects of the measures on fishermen and fishing communities (§303(a)). When establishing any new regulations, the cultural and social framework relevant to the fishery and any affected fishing communities (§303(b)(6)) must be taken into account.

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" [NEPA section 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 which 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.

NOAA Fisheries (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 HMS FMP and the Billfish Amendment, NOAA Fisheries 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 four species groups (tunas, swordfish, sharks, and billfish) 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 HMS FMP and the 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 HMS FMP and Chapter 7 of the Billfish Amendment. In 2002, NOAA Fisheries contracted the Virginia Institute of Marine Science (VIMS) at the College of William and Mary to re-evaluate several of the baseline communities.

6.2 Social Impacts of Selected 2002 Regulatory Actions

Emergency Rule to Implement Management Measures in the Atlantic Shark Fisheries Based on the Results of the Independent Peer Review and a Court-Approved Settlement Agreement (66 FR 67118, December 28, 2001)

This action re-established 1997 commercial LCS and SCS quota levels and catch accounting/monitoring procedures, pending independent review. Because 1997 commercial quotas and catch accounting/monitoring procedures were the status quo due to the court injunction, no changes in social impacts were expected due to this action. In the long-term, however, negative social impacts may be experienced if reductions in commercial quota or restrictions on fishery operation procedures are necessary to rebuild LCS and prevent overfishing of SCS. The following towns were identified during the HMS FMP development and are analyzed for social impacts in this action due to the importance of large and small coastal shark fishing to the community: Wanchese, NC; Madeira Beach, FL; Panama City, FL; and Dulac, LA. The impacts of this action are expected to be minor in all of these communities in the short-term.

Final Rule to Reduce Sea Turtle Bycatch and Bycatch Mortality in Highly Migratory Species Fisheries (67 FR 45393, July 9, 2002)

This final rule implemented measures required by the June 14, 2001, Biological Opinion (BiOp) on Atlantic highly migratory species (HMS) fisheries. In the HMS pelagic longline fishery, NOAA Fisheries closed the northeast distant statistical reporting (NED) area, required the length of any gangions to be 10 percent longer than the length of any floatline if the total length of any gangions 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 NOAA Fisheries 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. This final rule also required all HMS bottom and pelagic longline vessels to post sea turtle handling and release guidelines in the wheelhouse. The intent of these actions is to reduce the incidental catch and post-release mortality of sea turtles and other protected species in HMS fisheries.

The 2001 BiOp stipulates that the NED area is to be closed and that an experimental fishery should be conducted for no more than three years to examine the possibility of developing modified fishing practices to avoid the incidental take of sea turtles. NOAA Fisheries feels that the NED area experimental fishery offers the affected vessels an opportunity to avoid significant social and economic impacts from the closed area, if they participate. After the NED area was closed by emergency rule on July 13, 2001 (66 FR 36711), there were eight vessels that participated in the 2001 pelagic longline experimental fishery in the NED closed area. These vessels were allowed to retain and sell their catch in addition to being compensated $4,150 per set for their participation. Because of the availability of the experimental fishery, NOAA Fisheries does not expect any significant social or community impacts to result from the closure in the short-term. If vessels do not participate or are not eligible to participate in the experimental fishery, they may experience economic and social impacts. However, there are other areas, perhaps not as lucrative, available to fishing activities.

The HMS pelagic longline fishery gear modifications required by NOAA Fisheries in this regulation include requiring the length of any gangions to be 110 percent of the length of any floatline in sets where the total length of any gangions and any floatline is less than 100 meters and requiring the use of corrodible hooks. This regulation also requires that the captain of a vessel using pelagic longline gear to target HMS report a lethal sea turtle take within 48 hours of returning to port. The gangions length requirement was made effective in the 2001 BiOp emergency rule (66 FR 64378, July13, 2001) so the affected fishermen should have already altered their usual fishing behavior/gear to comply with the regulation. To comply with this regulation, fishermen could lengthen their gangions. This option will require fishermen to buy additional monofilament and replace existing gangions. Alternatively, fishermen could shorten their floatlines. Both options will require additional labor in the short-term to adjust the length of the existing gear. The corrodible hook requirement will have a delayed effective date which should allow the impacted fishermen to spread the cost of purchasing hooks over a few months. As many fishermen already use these hooks, NOAA Fisheries does not expect this regulation to have large social impacts. Reporting lethal sea turtle takes within 48 hours of returning to port is not expected to have an impact as this occurrence is rare.

NOAA Fisheries also implemented several regulations impacting the shark drift gillnet fishery. On a shark gillnet vessel, both the vessel operator and the observer are responsible for sighting whales. The shark gillnet vessel operator is also responsible for contacting NOAA Fisheries in the event one is incidentally taken in this fishery. Both of these actions will allow NOAA Fisheries to gather more complete data concerning bycatch in these two fisheries. Because the fishing operators are not greatly affected, NOAA Fisheries expects few, if any, social impacts. NOAA Fisheries is also requiring shark gillnet fishermen to conduct net checks every 0.5 to 2 hours to look for and remove any entangled sea turtles or marine mammals from the gear. Most shark gillnet fishermen already check the net so this action will have few impacts. It is unlikely that this alternative will affect fishing communities especially given the small number of vessels in the shark gillnet fishery.

Final Rule to Amend the Highly Migratory Species Fishery Regulations Associated with Charter/Headboat Operations, and Require Permits for Vessels Fishing Recreationally for Highly Migratory Species (67 FR 77434, December 18, 2002)

NOAA Fisheries amended the regulations governing the Atlantic HMS fisheries to define operations and regulations for HMS charter/headboats (CHBs), require an Atlantic HMS recreational permit, adjust the time frame for permit category changes for Atlantic HMS and Atlantic tunas permits, clarify the regulations regarding the retention of Atlantic bluefin tuna in the Gulf of Mexico by recreational and HMS CHB vessels, and allow NOAA Fisheries to set differential bluefin tuna retention limits by vessel type. Vessels that possess the HMS CHB permit in combination with the limited access swordfish handgear and/or shark permit may experience positive social and economic impacts due to their ability to fish recreationally for sharks and swordfish when the commercial fisheries are closed, thus not impacting their ability to book charters. Vessels with these permit combinations would also maintain their ability to fish commercially which would have positive social and economic impacts when the commercial fisheries are open due to their ability to retain sharks and swordfish in excess of the recreational limits.

Requiring all recreational fishermen to participate in an annual permit process increases the regulatory burden. This could have a minor negative economic impacts for those vessels that need to obtain a $27.00 Atlantic HMS recreational permit. However, the regulatory burden for both anglers and NOAA Fisheries should be substantially reduced by incorporating the existing recreational permitting requirement (Angling category permit for Atlantic tunas) into the expanded Atlantic HMS permit requirement. Many saltwater fishermen target multiple HMS; for example, some who target billfish also catch other large pelagic species like tuna and sharks. Tuna anglers are already required to hold a recreational permit, so the new permitting burden will be borne by those anglers that participate in the recreational fisheries for sharks, swordfish, or billfish, but have not participated in the tuna fishery. Due to the internet-based permitting system, NOAA Fisheries allows the one permit category change to occur until the first day of the fishing year, June 1. In addition, NOAA Fisheries will allow the one permit category change to occur after June 1, so long as it occurs with the renewal for that year. This provides added flexibility to fishery participants to make knowledgeable choices on permit category selection, and prevents situations where persons that purchase new vessels are unknowingly limited to the permit category of the previous owner from past years. This regulation should result in both positive social and economic impacts to fishery participants.

This alternative would modify the current regulations to clarify them and ensure that they are consistent with ICCAT recommendations on BFT fishing in the Gulf of Mexico. Clarification of this regulatory language should decrease, if not eliminate, recreational harvest of BFT in the Gulf of Mexico and should have positive ecological impacts. Vessels that may have been misinterpreting the current regulations and targeting BFT recreationally, may experience both negative and positive social impacts. NOAA Fisheries set a differential BFT retention limit for

headboats (Coast Guard inspected vessels) in 2001, which provided headboat operators the chance to book trips and enhance recreational fishing opportunities in a sector of the fishery that they had not participated in over the last several years (66 FR 42805, August 15, 2001). The social and economic impacts of this regulation should be positive.

Final Rule to Implement Quota Recommendations from the 2000 Meeting of the International Convention for the Conservation of Atlantic Tunas (ICCAT) and to Re-Establish Prohibitions Regarding Possession of Fish in Violation of International Regulations (67 FR 70023, November 20, 2002)

In implementing the ICCAT recommendations from the 2000 meeting, NOAA Fisheries does not expect significant social impacts. The rule established a reserve quota category of North American swordfish; maintained the status quo for North Atlantic albacore, South Atlantic albacore, and South Atlantic swordfish; reinstated the prohibition regarding possession of fish in violation of international agreements; clarified fishing areas for Atlantic HMS; and implemented trade restrictions. Establishing a reserve quota category is not expected to negatively impact the incidental and recreational swordfish catches. The gross ex-vessel revenue from 300.8 mt dw would be $2.3 million ($3.51 per pound for 661,410 lbs [300.8 mt dw * 2204.6 lbs/mt dw]). However, NOAA Fisheries and the pelagic longline industry representatives agree that the current U.S. pelagic longline fleet operating in the Atlantic Ocean is not likely to be able to harvest the 400 mt ww (300.8 mt dw) that would be allocated to the reserve quota category, in addition to the under-harvest from the 2000 and 2001 fishing years. Therefore, the set-aside of 400 mt ww (300.8 mt dw) from the U.S. landings quota is not expected to have significant economic impacts on U.S. fishermen. Instead, using U.S. quota to support conservation efforts could result in a long-term economic gain, albeit one that is unquantifiable. Social benefits may increase over the long-term if the establishment of a reserve quota allows the North Atlantic Swordfish stock to rebuild over the next decade. In the long-term, the economic impacts of the quota transfer will not be significant, since the availability of future U.S. quota will not be affected.

Maintaining the status quo regulations in the North Atlantic albacore, South Atlantic albacore, and South Atlantic swordfish fisheries is not expected to have any economic or social effects as no changes in the fishery are expected. Additionally, reinstating the prohibition regarding possession of fish in violation of international regulations, clarifying authorized fishing areas for Atlantic HMS, and implementing trade restrictions are expected to have minimal economic and social impacts.

6.3 Summary of New Social and Economic Data Available

6.3.1 Social Science Publications

In an effort to improve the understanding of the social impacts upon HMS fishermen, their

families, and the related communities, NOAA Fisheries provides the following abstracts from recent publications examining social science topics.

Conway, F.D.L., J. Gilden, and A. Zvonkovic. 2002. *Changing communication and roles: Innovations in Oregon's fishing families, communities, and management*. Fisheries 27(10): 20-29.

Abstract. Fisheries throughout the United States are undergoing dramatic change. Oregon Sea Grant's Adapting to Change project documented how fishing families, communities, and the commercial fishing industry are adjusting to these changes. Using interviews, focus groups, surveys, and educational outreach programs with members of the trawl and troll fleets, we examined how changes in communication and roles among fishing families, communities, and fisheries management may combine to produce desirable innovations at these three levels. With women's increasing involvement in fisheries management and the emergence of industry-wide support networks, decisions are being made in different ways among fishing families and communities, as well as at the management level. Our research found that changing the lines of communication alone, however, does not guarantee that innovation will occur. The article concludes with highlights of positive changes brought on by flexible roles and increased communication, while noting issues still plaguing family, community, and management contexts.

Ditton, R.B., S.M. Holland, and D.K. Anderson. 2002. *Recreational fishing as tourism*. Fisheries 27(3):17-24.

Abstract. In addition to being an outdoor recreation activity for residents in each state, fishing can also be considered a form of tourism when anglers cross state lines to go fishing. Efforts are underway in each state to promote tourism, including recreational fishing, in the name of economic development. These efforts are usually independent from fishery management. Data from the "1995 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation" were analyzed to indicate the extent that various states attract anglers to their states as well as supply anglers to others. The top five destination states in terms of days of fishing by nonresidents were Minnesota, Florida, Wisconsin, North Carolina, and New York. The top five states in numbers of resident fishing days exported to other states were Illinois, Texas, Pennsylvania, California, and Virginia. A stakeholder perspective including managers and resident anglers is presented to illustrate the diversity of thought on the fishing as tourism issue. Ecotourism is defined, illustrated with examples, and offered as a future means for coping with the fishing days being exported to various states. Fishery managers need to acquire a greater awareness of fishing tourism in their states and develop effective partnerships with state and local tourism promotion organizations.

Fedler, A.J. and R.B. Ditton. 2001. *Dropping out and dropping in: A study of factors for changing recreational fishing participation*. North American Journal of Fisheries Management 21:283-292.

Abstract. We used a longitudinal study design to understand the factors that cause changes in recreational fishing participation over time for a sample of anglers who had purchased a fishing license in 1989 and responded to a 1990 Texas statewide angler survey. License records from 1991 were used to identify subsequent license purchasers. In 1994, we sent a follow-up mail survey to a random sample of 1,600 respondents to the 1990 statewide survey. One-half had purchased a Texas fishing license in 1989 but had not obtained a 1991 license; the remaining 800 purchased Texas fishing licenses during both license years (1989 and 1991). There were four combinations among the original sample of 1989 license buyers. Those who did not follow up and purchase licenses in 1991 and 1994 were termed "inactive anglers"

(17%). The second group participated again in 1991 but not in 1994; this group was termed "recent dropouts" (6%). A third group of 1989 license purchasers did not participate in 1991 but did so again in 1994; this group was labeled "drop ins" (27%). The fourth group of 1989 license purchasers also participated in 1991 and 1994; this group was labeled "active anglers" (50%). Whereas the four groups studied did not differ in race, household size and composition, and marital status, gender was found to play a role in the consistency of recreational fishing participation. Women comprised a larger percentage of recent dropouts and inactive anglers. Results showed that nearly 25% of the anglers in a particular year will become inactive within 1 or 2 years. Whereas anglers cited "a lack of time" as their most common constraint, it was also their most important reason for quitting fishing. Pending replication elsewhere, these results will yield a more realistic understanding of the angler base population.

Hall-Arber, M., C. Dyer, J. Poggie, J. McNally, and R. Gagne. 2001. *New England's Fishing Communities. MIT Sea Grant College Program*. Cambridge, MA.

This publication addresses the conceptual framework of fishing communities, measuring fishing dependency and externalities in New England, and vulnerability, infrastructure and gentrification among fishing dependent communities.

Excerpts from Introduction. Change between and within fishing depending communities is occurring at an ever-accelerating pace. Driven by externalities of development, changes transform the linkages between communities and regions and modify the contexts within which people live and work. In New England, the significant forces of gentrification are modifying the coastal areas. Gentrification is a nation-wide trend as more people of means are attracted to coastal areas as places to live, play, and own property. This trend often plays out as a direct threat to established enclaves and communities dedicated to commercial fishing.

...Such transformations strain the ability of fishing enclaves and communities to reproduce their particular forms of total capital. Thus, social networks, access to marine resources, and commitment to the occupation of fishing and devalued, while other aspects such as recreational fishing, tourism, and vacation residence construction begin to dominate. The argument can be made that maintaining a mixed economy, which allows for both fishing dependent populations and new wave populations to co-exist, is a viable option. Yet, evidence shows that when the momentum for transformation to non-traditional (gentrified) processes takes hold without protection for existing fishing operations, essential and irreplaceable fishing infrastructure (ice houses, marine railways, fish processors) is often lost.

Jacob, S., F.L. Farmer, M. Jepson, and C. Adams. 2001. *Landing a definition of fishing dependent communities: Potential social science contributions to meeting National Standard 8*. Fisheries 26(10):16-22.

Abstract. Under the Magnuson-Stevens Fishery Conservation and Management Act National Standard 8, federal policy now mandates that fishery management plans identify and consider the social and economic consequ4ences of fisheries management actions on fishing communities (MSFCMA Section 301[a][8]). This mandate is based on the recognition that conservation and management efforts have expansive social and economic impacts. The act's definition of a fishing-dependent community is "a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such a community" (PL97-265). The definition of fishing

community in the act is workable only if the meaning of the phrase, "substantially dependent on or substantially engaged" is defined. Yet the law is not specific as to what constitutes fishing dependence. Consequently, section 301 (a) and 303 (b) of the Magnuson-Stevens Act as it relates to National Standard 8 (considering the social and economic impacts on fishing-dependent communities) has not been consistently implemented. This article explores the issues related to empirically defining such fishing-dependent communities and suggests a protocol for their identification.

Sharma, K.R. 2001. *Economic impacts of catch reallocation from the commercial fishery to the recreational fishery in Hawaii.* North American Journal of Fisheries Management 21:125-134

Abstract. The recent expansion of the longline commercial fishery has heightened the conflicts among various fisheries in Hawaii, especially between long-liners and other commercial fishing boats (troll and handline) and recreational boats. A recent court ruling against longline fishing in some waters around the Hawaiian Islands may provide an impetus for the expansion of non-longline commercial activities, which may in turn give rise to conflicts between that fishery and the recreational fishery. This study examines the economic impacts of reallocating the catch of one non-longline commercial fishing trip to the recreational fishery using the 1992 input-output model for Hawaii. The results show that by itself this shift raises value added per unit of fish landed but lowers overall income and employment. When trade and distribution services are included in the analysis, value added, income, and employment are all lower. When the effects of the decrease in personal consumption expenditures on other sectors as a result of the increase in expenditures on recreational fishing are also taken into account, the total losses in value added, income, and employment are even greater. However, the total indirect impacts of the shift from commercial to recreational fishing on value added, income, and employment are positive in all cases.

Wilson, D.C., B.J. McCay, V. Rowan, and B. Grandin. 2002. *Institutional differences among marine fisheries scientists' views of their working conditions, discipline, and fisheries management.* Fisheries 27(8): 14-24.

Abstract. We surveyed 349 U.S. marine fisheries scientists to ask them about their working conditions, their options about the state of the discipline of fisheries science, and their views about fisheries management. Fisheries scientists were largely engaged in applied work, with only a fifth of them significantly engaged in pure research. Among scientists working in management agencies, state scientists were more directly and immediately involved in a wide range of management tasks than were scientists working for the National Marine Fisheries Service. Although their views of both disciplinary issues and fisheries management reflected the problems they confront in their day-today work, the degree of consensus found among fisheries scientists on many issues was quite high. For example, there was both strong and broad support for the precautionary approach to management Some areas of systematic disagreement were found, however. Scientists working in management agencies were somewhat more positive about working with the fishing industry and more negative about using predefined management standards than were scientists working in conservation groups and universities. State scientists were found to be at the edge of the spectrum of several variables related both to working conditions and fisheries management.

6.4 Evaluation of Current Level of Social Data

As was mentioned previously, there are not many current social science studies addressing

the HMS fisheries. From a management perspective, this makes it difficult to assess the impact of promulgated regulations on the individual fishermen, their families, and the community. While NOAA Fisheries can assume the economic effect of a specific regulation will create a negative impact in the social arena, the only venue available to receive constituent feedback is public hearings. Because these are only scheduled as a result of promulgated regulations, it is difficult to receive comments concerning the social environment of HMS fisheries.

To improve the assessments of the social impacts upon HMS communities, continued research needs to be conducted to update current knowledge. Ideally, the work will specifically target HMS fisheries and assess the impacts of the existing regulations, particularly determining the accuracy of the social impacts assessments. To increase the level of social knowledge, HMS needs to increase its demographic data. Also, to improve the understanding of fishing behavior, HMS should improve its knowledge of resource use patterns (for example who fishes, with what gear, how frequently, and where). This would assist the HMS staff in determining the overall social impacts of fishing regulations. Until these areas are addressed, NOAA Fisheries must utilize the current available information.

6.5 Conclusion

Social impact analyses should continue to be conducted and refined in terms of the techniques employed and how they can best be incorporated into management measures. Updating data and supplementing fishery information is vital to improving the knowledge of managers with regard to each specific fishery. For example, combining census and other public data with per-trip crew information, will allow fisheries managers to estimate regional differences in fishing effort and movement between fisheries. In addition, it will allow assessment of differing social service, employment, and retraining needs in different communities. Ethnographic data will further the understanding of regional and even extra-regional patterns of fishing and attitudes toward fishing and fisheries management, as well as the place of fishing within individual communities. These data will also provide the detailed information necessary to allow fishermens' knowledge of fishing and the environment to be usefully incorporated into fisheries management.

Section 6 References

Conway, F.D.L., J. Gilden, and A. Zvonkovic. 2002. *Changing communication and roles: Innovations in Oregon's fishing families, communities, and management*. Fisheries 27(10): 20-29.

Ditton, R.B., S.M. Holland, and D.K. Anderson. 2002. *Recreational fishing as tourism*. Fisheries 27(3):17-24.

Fedler, A.J. and R.B. Ditton. 2001. *Dropping out and dropping in: A study of factors for changing recreational fishing participation*. North American Journal of Fisheries Management 21:283-292.

Hall-Arber, M., C. Dyer, J. Poggie, J. McNally, and R. Gagne. 2001. *New England's Fishing Communities. MIT Sea Grant College Program*. Cambridge, MA.

Jacob, S., F.L. Farmer, M. Jepson, and C. Adams. 2001. *Landing a definition of fishing dependent communities: Potential social science contributions to meeting National Standard 8*. Fisheries 26(10):16-22.

NMFS. 2001. "NMFS Operational Guidelines - Fishery Management Process Appendix 2(g), Guidelines for Assessment of the Social Impact of Fishery Management Actions." *mimeo*.

Sharma, K.R. 2001. *Economic impacts of catch reallocation from the commercial fishery to the recreational fishery in Hawaii.* North American Journal of Fisheries Management 21:125-134

Wilson, D.C., B.J. McCay, V. Rowan, and B. Grandin. 2002. *Institutional differences among marine fisheries scientists' views of their working conditions, discipline, and fisheries management*. Fisheries 27(8): 14-24.

7. FISH PROCESSING, INDUSTRY, AND TRADE

Over the past several years, the United States has taken steps to use international trade information to further domestic conservation policy related to Atlantic HMS. While this process is slow, it is important to note that by working multi-laterally, management actions taken by the United States are strengthened and provide protection from a challenge before the World Trade Organization. U.S. actions related to trade must be consistent not just with domestic fisheries legislation, but also with the General Agreements of Tariffs and Trade (GATT).

Because there are "missing links" surrounding the capture, processing, and trade of Atlantic HMS, NOAA Fisheries cannot re-create information about stock production based on trade data. Nevertheless, trade data is used to update information on international and domestic activities related to these fisheries and to question compliance with ICCAT management measures. Sharks are not included in ICCAT recommendations, however, in December 2000, a bill was signed that required the Secretary of Commerce to ban shark finning in the United States and to begin discussions on developing international agreements to prohibit shark finning. Section 7.1 reviews species-specific U.S. trade information collected in the past year. Section 7.2 provides information about the use of trade data for conservation purposes.

7.1 Overview of U.S. Trade Activities for HMS

Processing

The processing and trade-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 to assess whether the system is operating properly and is appropriate for the circumstances. 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. NOAA Fisheries 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 those who buy fish directly from U.S. fishermen and those 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 NOAA Fisheries 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.

Processing and Wholesale Sectors

Quantitatively, NOAA Fisheries has limited information on the processing sector, i.e., the amount of HMS products sold in processed forms. In addition, knowledge regarding the utilization of Atlantic HMS is largely limited to the major product forms. For example, bluefin tuna are usually shipped and sold in dressed form at fish auctions in Japan. Information on the processing sector of the Atlantic bluefin tuna fishery is detailed in the HMS FMP (Section 2.2.4.1). 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. NOAA Fisheries 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.

NOAA Fisheries has recently observed many seafood dealers that buy and sell highly migratory species and other seafood products expand 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. NOAA Fisheries expects that the use of the internet will change the way HMS trade occurs in the future. NOAA Fisheries staff intends to continue to learn about the new technologies being used by our constituents.

Monitoring International Trade of HMS

Understanding the harvesting and processing sectors is essential when analyzing world trade in highly migratory fish species. Trade data for Atlantic HMS are of limited use as a conservation tool unless they indicate the flag of the harvesting vessel, the ocean of origin, and the particular species landed. Under the authority of the Atlantic Tunas Convention Act and the Magnuson-Stevens Act, NOAA Fisheries collects this information while monitoring international trade of bluefin tuna and swordfish. The bluefin tuna and swordfish monitoring programs (and upcoming bigeye tuna program) 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 documents may be found on the HMS webpage at www.nmfs.noaa.gov/sfa/hmspg.html.

Bluefin Tuna Statistical Document

Of the Atlantic HMS, the international trade of bluefin tuna is perhaps the best tracked due to international adoption of an ICCAT recommendation to implement the Bluefin Statistical Document (BSD) program. This process is bolstered by Japan's support for the program as a major importer of bluefin tuna. Each bluefin tuna is tagged and documented and the BSD travels with each shipment until the final point of destination. This document tracks *imports* and *exports* of bluefin tuna by most ICCAT nations. If bluefin tuna are exported from, or imported to, the United States, the document is submitted to NOAA Fisheries as part of the monitoring program.

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 into the United States and is then forwarded to NOAA Fisheries's Southwest Regional Office. The form is *not* required for fresh tuna, animal food, or canned petfood made from tuna.

Swordfish Certificate of Eligibility

The United States also monitors the trade of swordfish, but only as it relates to the sale of Atlantic swordfish in U.S. markets. Monitoring U.S. imports of swordfish is facilitated by the use of U.S. Customs data, the Certificate of Eligibility (COE), and importer activity reports. The U.S. COE program was established to implement an ICCAT recommendation that allows countries to ban the sale of swordfish less than the minimize size. The United States is successfully monitoring swordfish imports through this program and is providing useful information on Atlantic swordfishing activities to ICCAT. If swordfish shipments enter the United States under the swordfish tariff codes required by U.S. Customs regulations, the shipments can be cross-checked with a COE that indicates the flag of the harvesting vessel and the ocean of origin. Furthermore, the COE validates that the imported swordfish is not less than the U.S. minimum size of 33 lb dressed weight. Japan implemented a swordfish monitoring program in 2000 that is similar to the U.S. COE program in order to implement a 1999 ICCAT recommendation to prohibit the import of swordfish harvested by Belize and Honduras. In addition, at its 2000 meeting, ICCAT agreed to develop international statistical documentation programs for Atlantic swordfish and bigeye tuna.

Billfish Certificate of Eligibility

A Certificate of Eligibility is used to document 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. There is not a specified document, although NOAA Fisheries developed a document that can be used. Any statement that contains the specified information is sufficient to meet the documentation requirements.

Future Plans

At its 2000 meeting, ICCAT adopted a recommendation to develop statistical documentation programs for swordfish and bigeye tuna, modeled in principle on the BSD program. The new programs will monitor trade in these species and assist in the collection of data. Data collected by the programs will improve scientific stock assessments and enhance the ability of ICCAT to develop effective conservation measures, such as identifying and imposing trade sanctions on nations involved in illegal, unregulated, and unreported fishing activities. A meeting of technical experts was hosted by the United States in July 2001 to resolve issues

relating to the implementation of the programs. The technical experts meeting forwarded a report to the Commission that included specific draft recommendations and forms for consideration at the 2001 Commission meeting. These recommendations and forms were adopted, with some modifications, at the 2001 ICCAT meeting, and implementation of the programs are expected to begin in 2003.

7.1.1 Exports

Existing programs at NOAA Fisheries monitor exports of fish products and provide Bureau of the Census data online for the public at www.st.nmfs.gov/st1/trade/index. NOAA Fisheries also collects detailed export data on Atlantic bluefin tuna, all of which are accompanied by a bluefin statistical document. "Exports" may include merchandise of both domestic and foreign origin. Census 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.

Bluefin Tuna Exports

Table 7.1 indicates levels of bluefin tuna exports from the United States. Recent decreases in Atlantic BFT exports reflect the growing U.S. market for high-quality fresh bluefin tuna meat and the weakened Japanese yen.

Table 7.1 **United States Exports (mt dw) of Bluefin Tuna (Atlantic and Pacific). As reported through the Bluefin Tuna Statistical Document Program, 1997 - 2001.** U.S. BSD Program, NOAA Fisheries NERO.

	Commercial Landings of Atlantic BFT	Exports of Atlantic BFT	Exports of Pacific BFT	Total U.S. Exports of BFT
1997	826.8	698.7	917.4	1,616.1
1998	849.1	660.2	702.4	1,362.6
1999	876.0	735.6	95.7	831.3
2000	903.9	758.0	76.0	834.0
2001	987.0	812.3	67.0	879.0

Note: most exports of Pacific BFT were in round (whole) form, although some exports were of dressed and gilled/gutted fish

Information on exports of bluefin tuna for the first half (January through June) of 2002 is also available. Preliminary data indicate that 6.7 mt of West Atlantic bluefin tuna, and 0.0 mt of Pacific bluefin tuna were exported from the United States during this time period. These figures are lower than in 2000 and 2001 in the same time period. Most landings (and exports) of bluefin tuna in the United States occur during the second half of the calendar year.

Shark Exports

NOAA Fisheries also collects trade data on the export of sharks, although not in the level of detail found in the BSD program. Some regional entities, including the FAO, work to conserve sharks worldwide and gather trade information on shark species. Shark exports are not identified by species code with the exception of dogfish. In addition, they are not identified by specific product code other than fresh or frozen meat and fins. Shark shipments are not identified with respect to the flag of the harvesting vessel or the ocean of origin. Due to the popular trade in shark fins and their high relative value compared to shark meat, shark fins are tracked as a specific product code by U.S. Customs. In 1999, exported shark fins averaged $8.54/kg ($8.95/kg in 1998). In that same year, exported fresh and frozen shark meat averaged $1.80 and $2.97/kg, respectively. Table 7.2 indicates the magnitude of shark exports by the United States from 1997-2001. Errors in the Bureau of Census data for dried shark fin exports for the years 2000 and 2001 prevent its inclusion in the table and discussion. Corrected data will be made available to the public when it is received by NOAA Fisheries.

Sharks are targeted in the coastal Pacific ocean by the driftnet thresher fishery and are caught incidental to the Bering Sea groundfish (trawl) fishery, and tuna and swordfish longline fisheries in the Western Pacific ocean. However, the Atlantic fishery catches a large number of sandbar and blacktip sharks which are thought to be sold domestically. As a result, it is unknown what percentage of total exports can be attributed to the Atlantic fishery.

Table 7.2 1997-2001 U.S. Exports of Shark Products (kg). Bureau of the Census data.

Year	Shark Fins Dried (kg, US$)		Non-specified Fresh Shark (kg, US$)		Non-specified Frozen Shark (kg, US$)		Total for all Products (kg, US$)	
1997	NA*	NA*	459,542	920,887	439,992	884,588	899,534	1,805,475
1998	141,149	1,264,077	524,249	814,319	102,939	250,107	768,337	2,328,503
1999	106,723	911,671	270,343	487,610	155,275	461,362	532,341	1,860,643
2000	NA**	NA**	430,725	784,704	345,942	814,456	776,667!	1,599,160!
2001	NA**	NA**	332,948	545,568	634,060	2,341,215	967,008!	2,886,783!

* There was no product code for the export of shark fins prior to 1998. Therefore, any exported shark fins may have been identified as unspecified shark product or as unspecified dried fish.
** Table will be updated as values become available.
! Values do not include dried shark fin data.

Note that exports of shark increased substantially in 2000 and 2001 over 1999 values. The volume of non-specific frozen shark exports increased in 2001 by 83.3 percent from 2000, while the volume of non-specific fresh shark exports decreased by 22.7 percent in 2001. The average price quoted for exports of fresh shark remained relatively constant from 1999-2000 ($1.82/kg in 2000), but decreased slightly in 2001 to $1.64/kg. Frozen shark product decreased in value slightly in 2000 to $2.35/kg, but increased significantly to $3.69/kg in 2001.

It should be noted that there is no tracking of other shark products besides meat and fins. Therefore, NOAA Fisheries cannot track trade in shark leather, oil, or shark cartilage products. Additionally, the United States has reported its imports of shark fins since 1964, but has only recently obtained a tariff code for exporting shark fins. Until that time, they were classified under a general heading.

Consistent with the directives of Section 5 of the Shark Finning Prohibition Act, the Department of Commerce and the Department of State have initiated an ongoing consultation regarding the development of international agreements. Discussions have focused on possible bilateral, multilateral and regional agreements with other nations. The law calls for the U.S. to pursue an international ban on shark finning, and to encourage improved data collection (including biological data, stock abundance and bycatch levels, and information on the nature and extent of shark finning and trade). The Secretary of Commerce is required to annually provide Congress with a list of nations whose vessels conduct shark finning, including estimates of harvest and value of fins, and recommendations to ensure that U.S. actions are consistent with international obligations. Determining the nature and extent of shark finning is the first step toward reaching agreements that will decrease the practice of finning worldwide.

Summary of Atlantic HMS Exports

In 2001, the United States exported 1,163,458 mt of edible fishery products in aggregate worth $3.2 billion. Fresh and frozen items (non-canned) were 999,665 mt, valued at $2.3 billion. Atlantic HMS exports are dominated by bluefin tuna and sharks. According to the *Fisheries of the United States, 2001*, 1,429 mt ww of bluefin tuna were landed in the United States in 2001 from all oceans. This represents a minor decrease from the previous year, but is less than half of the annual average for 1995-1999. Large fluctuations reflect landings of Pacific bluefin, as landings of Atlantic bluefin have remained relatively stable. Comparing total 2001 U.S. landings of bluefin with data from U.S. BSD program, after applying a 1.25 multiplier to estimate ww (most Pacific exports were dressed weight), it appears that roughly 77 percent of bluefin tuna landed in the Unites States were exported. For Atlantic bluefin tuna only, about 82 percent of landings were exported, which is consistent with recent levels.

The nature of export reporting on sharks, particularly distinctions between fins and whole fish, makes an analysis of exports too difficult. However, overseas markets provide a profitable outlet for many U.S. Atlantic HMS fishermen and may provide superior markets compared to those found in the United States.

7.1.2 Imports

All seafood import shipments are required to be accompanied by a 7501 Customs entry form. The information submitted on this form is analyzed by NOAA Fisheries and those data are available online at www.st.nmfs.gov/st1/trade/index. As mentioned on the web page, two methods are used to track imports: "general" imports are reported when a commodity enters the country, and "consumption" imports consist of entries into the United States for immediate consumption combined with withdrawals from Customs bonded warehouses. “Consumption” import data reflect the actual entry of commodities originating outside the United States into U.S. channels of consumption. These are the data used by NOAA Fisheries. Additional detailed information is collected by NOAA Fisheries on bluefin tuna and swordfish imports and is discussed in further depth below. For both bluefin tuna and swordfish imports, NOAA Fisheries accesses multiple sources of data and can therefore cross-check reports to ensure compliance with reporting requirements. For example, if a swordfish shipment enters the United States, NOAA Fisheries receives general data about that shipment (exporting country, date of entry, weight of shipment, general product form) on the entry form. NOAA Fisheries could then ensure that an importer activity report had been submitted detailing prices and specific product forms. NOAA Fisheries could also check for a Certificate of Eligibility accompanying the shipment to indicate the flag of the harvesting vessel (sometimes different from exporting country), ocean of origin, and verification that, if it was an Atlantic swordfish, it weighed more than 33 lbs dressed weight when harvested.

Bluefin Tuna Imports

Importers of bluefin tuna are required to obtain an annual tuna dealer permit and to report

through the BSD program. Since 1997, NOAA Fisheries has received U.S. Customs data (derived from Entry Form 7501) on imports of fresh and frozen bluefin tuna and swordfish on a monthly basis. These data allow NOAA Fisheries to track shipments of bluefin tuna and enforce dealer reporting requirements. United States imports and re-exports of bluefin tuna for 1997 through 2001, as reported through both U.S. Customs and the BSD program, are shown in Table 7.3. The difference in import numbers between the U.S. Customs 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. As awareness of the BSD program has improved among importers, the gap between imports reported through the BSD program and Customs has narrowed, largely due to efforts by NOAA Fisheries in the Northeast Regional Office.

In general, industry sources report that imports of bluefin tuna into the United States are on the rise as the international value of the dollar remains high relative to other currencies. The recent rise in the popularity of raw tuna in the United States has also generated increased imports of bluefin tuna, and dealers are reporting an expanded domestic market for both locally-caught and imported raw tuna. Improvements in BSD compliance combined with the growing U.S. popularity of bluefin tuna are primarily responsible for the large differences between earlier and more recent imports shown in Table 7.3.

Table 7.3 **Imports of Bluefin Tuna into the United States**. As reported through the BSD program and U.S. Customs, 1997-2001, in metric tons.

	U.S. BSD Program		U.S. Customs Data
	Imports	Re-exports	
1997	7.0	0.8	109.5
1998	182.6	1.8	225.6
1999	411.9	16.6	558.6
2000	361.9	99.3	453.4
2001	512.9	7.0	532.3

Note: most imports BFT were in dressed form, although some imports were of round and gilled/gutted fish. There were also some imports of BFT fillets and belly meat.

Information on imports and re-exports of bluefin tuna for the first half (January through June) of 2002 is also available through the BSD program. Preliminary data indicate that 270.6 mt were imported into the United States, and 0.0 mt were re-exported during this period.

Bigeye Tuna Imports

As mentioned above, ICCAT adopted a recommendation at its 2001 meeting to implement a statistical document program for bigeye tuna. ICCAT members are required to implement the bigeye statistical document program by July 1, 2002, or as soon as possible thereafter. U.S.

implementation of the program is expected to begin in 2003. Similar to when the bluefin statistical program was first implemented, the bigeye statistical document will only be required to accompany shipments of frozen bigeye. The statistical document program will likely be expanded to fresh bigeye at some later date.

Since January 2001, the U.S. Customs Service has been collecting species specific import information for bigeye tuna. Previously, bigeye tuna had been included under general tuna imports. In 2001, the United States imported over 4,820 mt of bigeye tuna averaging $5.40/kg, over 97 percent of which was fresh product. The leading exporters to the U.S. were Trinidad and Tobago, Brazil, and Costa Rica, together accounting for over 67 percent of U.S. imports. Bigeye tuna import data for the 2001 calendar year are shown in Table 7.4.

Table 7.4 Imports of Bigeye Tuna into the United States: 2001. Bureau of the Census data.

Year	Fresh		Frozen		Total for all Products	
	kg	US$	kg	US$	kg	US$
2001	4,684,847	25,703,005	135,192	322,158	4,820,039	26,025,163

Swordfish Imports

Since the United States is a dominant swordfish market and demand for swordfish may provide incentive for nations to export Atlantic swordfish to the United States, NOAA Fisheries reports imports of swordfish to ICCAT every year in November as part of the U.S. National Report. Data are collected from Customs entry forms, certificates of eligibility, and U.S. importer activity reports. This program has been in place since June 1999. Table 7.5 summarizes the bi-weekly dealer report and the COE data for the 2001 calendar year. Table 7.6 indicates the magnitude of swordfish product imports by the United States from 1997-2001.

Table 7.5 Swordfish import data collected under the Swordfish Import Monitoring Program (mt dw) for the 2001 calendar year.

	Ocean of Origin			
Flag of Harvesting Vessel	**Atlantic**	**Pacific**	**Indian**	**Total***
Australia	0.0	195.9	206.6	448.7
Barbados	4.8	0.0	0.0	4.8
Bolivia	20.1	0.0	0.0	20.1
Brazil	834.1	0.0	0.0	836.3
Canada	448.4	0.0	0.0	448.4
Chile	0.0	798.6	0.0	798.6
Costa Rica	0.0	406.9	0.0	406.9
Ecuador	0.0	326.3	0.0	326.3
El Salvador	0.0	44.6	0.0	44.6
Fiji Islands	0.0	25.5	0.0	25.5
Grenada	17.1	0.2	0.0	17.3
Indonesia	0.0	0.0	23.5	23.5
Japan	0.0	72.2	0.0	79.1
Mexico	0.0	284.8	0.0	284.8
Namibia	91.0	0.0	0.0	91.0
Netherland Antilles	3.3	0.9	0.0	4.7
New Zealand	0.0	236.4	0.0	248.8
Nicaragua	0.0	1.3	0.0	1.3
Panama	0.0	93.0	0.0	93.0
Philippines	0.0	32.4	0.0	74.9
Samoa	0.0	0.7	0.0	0.7
South Africa	214.3	0.0	0.0	225.2
Taiwan	171.8	26.2	2,633.4	2,831.5
Tonga	0.0	3.2	0.0	3.2
Trinidad & Tobago	16.1	0.0	0.0	16.4
United States	0.7	0.0	0.0	0.7
Uruguay	184.2	0.0	0.0	184.2
Venezuela	8.6	0.7	0.0	25.9
Vietnam	0.0	51.0	0.0	51.0
TOTAL	2,014.6	2,600.8	2,863.5	7,617.3
% of total swordfish imports	26.4	34.1	37.6	100.0

* Total value may not equal the sum of *Ocean of Origin* cells due to landings from unspecified waters.

Table 7.6 Swordfish Products imported: 1997-2001. Bureau of the Census data.

Year	Frozen (kg)			Fresh (kg)		Total for all products (kg)	
	Fillets	Steaks	Other	Steaks	Other	kg	$
1997	6,872,850	129,935	117,983	282,106	8,195,182	15,598,056	95,423,460
1998	7,224,329	207,816	259,675	92,560	8,497,451	16,281,831	82,577,668
1999	4,377,159	401,870	386,865	81,233	8,595,843	13,842,970	71,700,000
2000	4,833,867	524,148	167,441	161,763	8,626,856	14,314,075	85,579,449
2001	3,814,454	710,003	119,211	71,323	8,982,601	13,697,592	81,899,112

note: Prior to 1997, Customs codes specific to products beyond the frozen and fresh designations, did not exist.

Recent reports indicated that swordfish and shark, as well as some other large predatory fish, may contain methyl mercury levels in excess of the Food and Drug Administration's one part per million (ppm) limit which may decrease demand by the public. FDA scientists responsible for seafood safety are also concerned about the safety of the eating these types of fish, but they agree that the fish are safe, provided they are eaten infrequently (no more than once a week) as part of a balanced diet. In January 2001, the FDA changed its consumer guidance to women who are or may become pregnant recommending they avoid consuming swordfish or shark. Previous guidance recommended limiting consumption of these fish to once per month. The FDA refuses entry to any tested swordfish that exceeds FDA standards for mercury. For more information about seafood safety, refer to the FDA homepage at http://vm.cfsan.fda.gov/~dms/mercury.html.

On March 15, 2001 a bill was introduced into the Senate entitled “Mercury-Safe Seafood Act of 2001". The bill would have lowered the tolerance for mercury in seafood potentially as low as 0.2 ppm. If such a bill were signed into law, implementing regulations could be very costly to the seafood industry. Congress failed to take action on the “Mercury-Safe Seafood Act of 2001" during the 107th Congress.

Shark Imports

The United States imports both fresh and frozen shark meat. These imports and shark fins can be tracked using data from the Customs 7501 entry form. NOAA Fisheries does not require importers to submit additional data regarding shark shipments. These meat products are reported to be high-quality and are supplied to restaurants and other seafood dealers that import other high-quality seafood products (Rose, 1996). NOAA Fisheries does not have specific product information on imported shark meat such as the proportion of fillets, steaks, or loins. NOAA Fisheries also has no data on imports of the condition of shark fins; i.e., wet, dried, or further processed products such as canned shark fin soup. The United States may be an important trans-shipment port for shark fins; shark fins may be imported wet 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 Chinese Americans (Rose, 1996). There is no longer a separate tariff code for shark leather, making it impossible to track imports of shark leather through analysis data from the Customs 7501 entry form. Imports of frozen sharks have increased by more than 107 percent since 1997 while imports of shark fins have decreased by approximately 35 percent (by weight) (Table 7.7).

Table 7.7 1996-2001 U.S. Imports of Shark Products. Bureau of the Census data

Year	Shark Fins Dried		Non-specified Fresh Shark		Non-specified Frozen Shark		Total For All Products	
	kg	US$	kg	US$	kg	US$	kg	US$
1997	77,626	3,060,438	1,191,044	3,044,984	59,641	914,783	1,328,278	7,020,205
1998	62,169	1,698,646	947,545	2,160,985	148,167	1,125,994	1,157,881	4,985,625
1999	59,872	2,104,846	1,095,119	2,038,016	105,398	621,499	1,260,389	4,764,361
2000	66,107	2,355,575	1,066,144	1,859,203	90,166	575,226	1,222,417	4,790,004
2001	50,664	1,086,716	913,421	1,389,054	123,809	1,780,726	1,087,894	4,256,496

In 2001, dried shark fin imports decreased by 15,443 kg and non-specific fresh shark decreased by 152,723 kg. Non-specific frozen shark imports increased by 33,643 kg. Imported shark fins averaged $21.45/kg, decreasing from $35.63/kg in 2000. Fresh shark averaged $1.52/kg, decreasing from $1.74/kg in 2000. Prices for non-specific frozen shark increased dramatically from $6.38/kg in 2000 to $14.38/kg in 2001. NOAA Fisheries is attempting to identify the cause and validity of this apparent price spike. The prices for imported dried shark fins decreased 39.8 percent from the previous year's values. The Shark Finning Prohibition Act was enacted in December of 2000, therefore, decreases in shark fin trade are to be expected.

Summary of Imported HMS

Atlantic swordfish is an important U.S. import. According to the *Fisheries of the United States, 2001*, approximately $19.8 million of swordfish was landed commercially from all oceans by U.S. fishermen in 2001 (4,268 mt or $2.11/lb). In contrast, $81.9 million (13,698 mt or $2.71/lb) of swordfish was imported. U.S. consumer preference continues to be a driving force for the world's swordfish fisheries and level of demand will no doubt play a role in future harvesting strategies. Despite increases in the U.S. quota of N. Atlantic swordfish, that are in compliance with ICCAT rebuilding programs, swordfish from the Pacific and Indian Oceans will continue to supply the U.S. market over the next few years. Tunas are also imported in great quantity, although it is difficult to identify the source and species of processed tuna products. Bluefin tuna are frequently imported into the United States for transshipment to Japan, the dominant market for high-quality bluefin. However, tracking systems like the U.S. BSD program assist in providing NOAA Fisheries with information on tuna trade.

Excluding shark fin data, the value and volume of imported shark products exceeded exports in 2000 and 2001. Shark fin data was excluded due to previously identified data problems. In the past, small amounts of both fins and frozen shark have been re-exported.

7.2 The Use of Trade Data for Conservation Purposes

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 are 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. ICCAT has adopted recommendations to address the lack of compliance with quotas in the bluefin 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.

An analysis of vessel sighting and Japanese BSD data led to the determination that Panama, Honduras, and Belize were fishing in a manner that diminished the effectiveness of the bluefin tuna rebuilding program. On August 21, 1997, NOAA Fisheries implemented a 1996 ICCAT recommendation to prohibit the importation of Atlantic bluefin tuna and its products from Panama, Honduras, and Belize (62 FR 44422). Since that time, ICCAT has continued to communicate with these nations in an attempt to encourage compliance with ICCAT measures. In 1999, ICCAT recommended that the trade restrictions on Panama be lifted as a result of the Government of Panama's recent efforts to substantially reduce fishing vessel activities deemed inconsistent with ICCAT measures.

In 1999, ICCAT identified Equatorial Guinea, an ICCAT member, as a country whose vessels were fishing in a manner that diminishes the effectiveness of ICCAT conservation and management measures for Atlantic bluefin tuna. Import data from 1997-1999 reveal significant exports of Atlantic bluefin tuna by Equatorial Guinea despite the fact that the country had a zero catch limit during that time period. The Government of Equatorial Guinea has not responded to ICCAT inquiries and has reported no bluefin tuna catch data to ICCAT. As a result, ICCAT recommended trade restrictions as a penalty for non-compliance. Therefore, consistent with the 1999 ICCAT recommendation, NOAA Fisheries prohibited the importation of Atlantic bluefin tuna and its products from Equatorial Guinea.

In 2000, NOAA Fisheries prohibited the importation of bluefin tuna from Equatorial Guinea, prohibited the importation of swordfish from Belize and Honduras, and removed a prohibition on the importation of Atlantic bluefin tuna from Panama. These actions were consistent with 1999 recommendations from ICCAT.

Consistent with a 2000 ICCAT recommendation, in 2001, NMFS proposed a prohibition on the importation of Atlantic bigeye tuna and its products in any form from Belize, Honduras, Equatorial Guinea, Cambodia, and St. Vincent and the Grenadines. Honduras became a member of ICCAT on January 30, 2001. Based on this change in status and on Honduras' significant efforts to control its fleet and address ICCAT's concerns, ICCAT recommended at its 2001 meeting that its parties lift the bluefin tuna and swordfish trade embargoes in place against Honduras. At its 2002 meeting, ICCAT further decided that the bigeye tuna trade restrictions in effect against Honduras be lifted. The United States is developing regulations to remove the import prohibitions on Honduras consistent with the recommendations of ICCAT. In 2002, NMFS promulgated regulations prohibiting the importation of Atlantic bigeye tuna and its products in any form from Belize, Equatorial Guinea, Cambodia, and St. Vincent and the Grenadines consistent with ICCAT's decisions (November 20, 2002; 67 FR70023).

At the 2002 ICCAT meeting, recommendations were made to lift sanctions against Belize for bluefin tuna, swordfish, and bigeye tuna in January, 2004, pending a review of that nation's compliance with ICCAT conservation and management measures in 2003. Also, at the 2002 ICCAT meeting, recommendations were made to ban the importation of bigeye tuna from Bolivia as well as bluefin tuna, bigeye tuna, and swordfish from Sierra Leone. These recommendations are expected to enter into force in June 2003.

Data obtained by monitoring international trade in highly migratory species remains instrumental in making the decisions at ICCAT to impose trade restrictions. The role of trade data in assisting in the identification of problem fishing will likely increase in importance in the future.

7.3 Conclusions and Future Plans

NOAA Fisheries recognizes the limitations of using trade data to monitor conservation and management of HMS, particularly to identify IUU vessels operating in the ICCAT management areas. However, NOAA Fisheries has been successful at using these tools to collect more information about fisheries, harvesting practices, markets, and processors related to these species. Improved data collection depends on all harvesting nations and their ability and willingness to monitor fisheries and submit complete data sets to regional and global organizations such as FAO. These nations could potentially be assisted by the development of guidelines or standards for monitoring trade.

NOAA Fisheries monitors trends in trade for all federally managed species and will identify any need for additional harmonized tariff codes. While a request of the International Trade Commission for an additional tariff code is not always fulfilled, NOAA Fisheries has been successful in the past to solicit a code for shark fins, and specific product codes for swordfish (e.g., fillets and steaks). The use of more detailed bluefin and swordfish trade data has recently proved to be an effective tool for monitoring international activities. Combined with vessel sighting information, these data provide clues about illegal, unreported, and unregulated fishing

activities on the high seas. NOAA Fisheries expects that ICCAT will increase its use of trade data in its efforts to monitor, assess, and control fishing activities and to conserve the international resources under its authority.

Section 7 References

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8. BYCATCH

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. As a result, other species such as seabirds and marine mammals are considered "incidental catch." As bycatch tends to occur in fisheries that operate across jurisdictional boundaries, governing bodies, and legal statutes, bycatch reduction often becomes a complex issue. Bycatch reduction in HMS fisheries and bycatch reduction of HMS in other fisheries is no exception. Bycatch information relevant to each HMS gear type has already been discussed in previous sections of this document. This chapter describes the actions NOAA Fisheries has taken to reduce bycatch and incidental catch and any results of those actions.

8.1 Comprehensive Bycatch Reduction Strategy

The NOAA Fisheries HMS bycatch reduction program includes an evaluation of current data collection programs, implementation of bycatch reduction measures such as gear modifications and time/area closures, and continued support of data collection and research relating to bycatch. 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 (HMS FMP; NMFS, 1999), in Regulatory Amendment 1 to the HMS FMP (NMFS, 2000), and in Regulatory Adjustment 2 to the HMS FMP (NMFS, 2002).

Bycatch Reporting Methodology

NOAA Fisheries utilizes self-reported data (HMS logbook program and the new 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 geography (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 2,676 vessels with Federal permits in these fisheries in 2001, a total of 454 vessels were selected to report in 2001. Of the 2,319 vessels with Federal permits in the fisheries in 2002, 450 were selected to

report in 2002.

In addition to existing programs in some commercial HMS fisheries, NOAA Fisheries 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 NOAA Fisheries Northeast Region Vessel Trip Report (VTR) Program), in which they are required to report all fishing information, including that for HMS. NOAA Fisheries 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.

NOAA Fisheries 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.

NOAA Fisheries 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.

Marine Mammals

NOAA Fisheries relies on both fishery-dependent and fishery-independent data to produce stock assessments for marine mammals in the Atlantic Ocean, Gulf of Mexico, and Caribbean sea. The draft stock assessment reports are typically published around January and final reports are typically published in the Fall. Final 2001 stock assessment reports and draft 2002 reports are available and can be obtained from Emily Hanson Menashes at (301) 713-2322 or on the web at: http://www.nmfs.noaa.gov/prot_res/PR2/Stock_Assessment_Program/sars.html#Overview.

The final 2001 MMPA List of Fisheries published on August 15, 2001 (66 FR 42780). On January 17, 2002 (67 FR 2410), NOAA Fisheries published a notice that the 2001 List of Fisheries remained in effect for 2002. The proposed rule for the 2003 List of Fisheries was published on January 13, 2003 (68 FR 1414). 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 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, swordfish, and shark 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/PR2/Fisheries_Interactions/list_of_fisheries.html.

NOAA Fisheries continues to investigate serious injuries to marine mammals as they are released from fishing gear. In April 1999, NOAA Fisheries held a joint meeting of the three regional scientific review groups to further discuss the issue. NOAA Fisheries is continuing to develop marine mammal serious injury guidelines and until these are published, NOAA Fisheries will apply the criteria listed by the review groups to make determinations for specific fisheries.

Sea Turtles

NOAA Fisheries 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, NOAA Fisheries 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 new Biological Opinion (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 1012 leatherback sea turtles in 1999. The estimated take levels for 2000 are 1256 loggerhead and 769 leatherback sea turtles (Yeung 2001).

On July 13, 2001 (66 FR 36711), NOAA Fisheries 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), NOAA Fisheries extended the emergency rule for 180 days through July 8, 2002. On July 9, 2002, NOAA Fisheries published a final rule (67 FR 45393) that closed the Northeast Distant (NED) Area to pelagic longline fishing. As part of the Reasonable and Prudent Alternative, the BiOp required NOAA Fisheries to conduct an experiment with commercial fishing vessels to test fishery-specific gear modifications 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 is 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. Ideally, any successful measures will be transferable to other longline fleets to reduce sea turtle bycatch basin wide. The experimental fishery is scheduled to have a three year duration and utilizes 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. NOAA Fisheries is currently analyzing the results from 2002 and determining what measures to test in 2003.

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.

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. NOAA Fisheries, 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, NOAA Fisheries, and U.S. Fish and Wildlife Service, to advocate the development of National Plans of Action within relevant international fora. The HMS 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 longline fisheries, the adoption of immediate measures is unlikely. For additional information on the NPOA for Seabirds as well as the assessment of Atlantic HMS longline fisheries, see Appendix B.

8.2 Bycatch of Highly Migratory Species in Other Fisheries

NOAA Fisheries is concerned about bycatch mortality of Atlantic HMS in any federal or state-managed fishery which captures them. NOAA Fisheries plans to address bycatch of these species in the appropriate FMPs. For example, capture of swordfish and tunas incidental to squid trawl operations is to be 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. NOAA Fisheries continues to solicit bycatch data on HMS from all state, interjurisdictional, and federal data collection divisions. NOAA Fisheries supports development of an interstate plan for coastal sharks by the Atlantic States Marine Fisheries Commission which would support protection of sharks caught incidentally by state-managed fisheries.

Squid Mid-Water Trawl

U.S. squid trawl fishermen, using mid-water gear, landed 5.8 mt ww of yellowfin tuna, skipjack tuna, albacore tuna, bigeye tuna, and swordfish in 2001 (Table 8.1) incidental to the squid, mackerel, and butterfish trawl fishery (NMFS, 2001). Landings decreased from 2000 for bigeye tuna, albacore tuna and swordfish and increased slightly for yellowfin and skipjack tunas. Landings of bigeye tuna and swordfish had increased each year since 1998 before decreasing in 2001. Landed fish are counted through the dealer report program and by using information collected from tally sheets. In addition, squid trawl fishermen are required to report landings in the Large Pelagic Logbook or in the Multi-species Logbook. Bycatch of HMS in this fishery is not well-documented and observer funding for this fishery to document bycatch rates of HMS was provided in 2001 and 2002. 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. NOAA Fisheries continues to work with squid fishermen through the existing observer program to reduce bycatch.

Table 8.1 **Atlantic HMS Landed (mt ww) Incidental to Squid Trawl Fishing Operations in 1998-2001.** Data based on tally sheets submitted to NOAA Fisheries (NMFS, 2001).

Species	1998	1999	2000	
Yellowfin tuna	0.7	4.1	1.76	2.7
Skipjack Tuna	0.2	1.0	0.04	0.2
Bigeye Tuna	0.5	1.2	1.7	0.4
Albacore	2.4	0.4	0.03	0.0
Swordfish	5.9	7.5	10.9	2.5

Total	**9.7**	**14.2**	**14.43**	**5.8**

Menhaden Purse Seine

In the menhaden purse seine fishery, sharks were caught incidentally in approximately 30 percent of the purse seine sets (deSilva et al., 2001). Ten species of sharks were identified with blacktip sharks being the most common species. Approximately 20 percent of 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 8 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).

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 20-25,000 individuals (Cortes et al., 2002)

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 (Cortes et al. 2002). Cortes (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. From 1992 to 1997, annual estimates of bycatch ranged from zero to almost six million sharks (Table 8.2) (Cortes, 2002). The 2002 SCS assessment, included estimates of SCS bycatch because they are likely to exceed in importance the landings for those species (Cortes, 2002). In general, 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 8.2. 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: Cortes, 2002.

Year	Number of trips	Bonnethead	Atlantic sharpnose	
1992-1993	20,181	53,674	1,753,829	0

1993-1994	20,445	0	5,873,333	447,495
1995-1996	23,333	34,378	0	0
1996-1997	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 (Cortes, 2002). Estimates of the bycatch of SCS ranged from 3.2 to 1.3 million sharks per year from 1972-2000 (Table 8.3).

Table 8.3. 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 (Scott Nichols, NMFS Pascagoula Lab., pers. comm. as cited in Cortes, 2002).

Year	All SCS (numbers)	All SCS (lb dw)	Atlantic sharpnose (numbers)	Atlantic sharpnose (lb dw)	Bonnethead (numbers)	
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

Summary

Although bycatch of swordfish and tunas in the squid trawl fishery is substantial, Atlantic shark bycatch in non-HMS fisheries remains a greater concern. Approximately nine percent (approximately 25,100) of the LCS coastal sharks were bycatch in the menhaden fishery alone and bycatch of SCS in the shrimp trawl fishery alone is expected to exceed landings. NOAA Fisheries will consider options for minimizing bycatch of LCS and SCS in other fisheries in the amendment to the HMS FMP. The management measure that counts dead discards against the Atlantic shark quota went into effect for the first time on January 1, 2003.

8.3 Preliminary Analysis of the Effectiveness of the Time/Area Closures

8.3.1 Objectives

During the past several years, NOAA Fisheries has implemented several time/area closures in the Atlantic Ocean and the Gulf of Mexico to reduce discards and bycatch. During the formulation of the rules implementing these measures, NOAA Fisheries 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 very difficult to assess with any certainty what the impacts will be prior to the 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 the closure has been implemented.

The 2001 fishing year provided the first year of data following the implementation of most of the HMS area closures. This subsection evaluates the effectiveness of the closures in reducing discards and bycatch and in maintaining target catch. Because the following analyses are based only on one year's worth of data, any results should be considered preliminary. Additional years of data are needed before any accurate conclusions can be drawn.

8.3.2 Methods

Data used in these analyses were taken from the HMS Logbook database administered through the NOAA Fisheries 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 for each area by year. The monthly and annual Atlantic wide totals were calculated for each species as well. A reference period of 1999-2000 was chosen for the initial comparisons to examine the effect of closures implemented in 2001. The percent change in 2001 from 1999-2000 in numbers kept and discards was calculated for the

entire Atlantic and by each area separately (Table 8.4). These percentages should be considered as preliminary results given that some of the closures were implemented prior to 2001 (e.g. June closure in the Mid-Atlantic Bight was implemented in 1999). Further analyses will be conducted as more data become available. Future analyses will also include: 1) a comparison of 1999-2001 data to pre-1999 data; 2) a comparison of the location of fishing effort before and after the closures; and 3) an economic analysis to estimate the impact on individual fishermen, to evaluate changes in fishing behavior as a result of implementation of the closures.

8.3.3 Results

Total Atlantic Ocean

The cumulative effects of the individual area closures were examined by comparing the 2001 catch and discards to the average for 1999-2000 throughout the entire Atlantic fishery. Changes in the numbers of fish caught and discarded were compared to the predicted values from Amendment 1 to the HMS FMP (NMFS, 2000). Results are shown in Tables 8.4 and 8.5. Overall effort, expressed as the number of hooks set, declined by almost 5% in 2001. Declines of 9.3% to 48.1% were noted for both kept and discards of swordfish, bluefin tuna, yellowfin tuna, large coastal sharks, and wahoo. Discards of bigeye tuna, pelagic sharks, blue and white marlin, sailfish, turtles caught and dolphin kept decreased by 11.4 to 71.5%. The only increases were observed in bigeye tuna kept (<1%), other BAYS tunas kept and discarded (20.7 and 97.3% respectively), pelagic sharks kept (16.1%), spearfish discards (19.7%) and dolphin discards (6.2%).

The declines in swordfish kept and discarded, large coastal sharks kept and discarded, and dolphin kept were similar to the predicted values developed for Amendment 1. Discards of bluefin tuna, pelagic sharks, all billfish with the exception of spearfish, and turtles caught declined more than the predicted values. Other BAYS tunas kept and pelagic sharks kept increased more than the predicted values. Despite the almost 20% increase in spearfish discards, the actual numbers of spearfish discarded are relatively low. The percent increase represents an increase of 23 fish in 2001.

Table 8.4. **Summary of the effectiveness of the various time/area closures implemented since 1999 for swordfish (SWO), bluefin tuna (BFT, Yellowfin tuna (YFT), bigeye tuna (BET), other BAYS, pelagic sharks (PEL) and large coastal sharks (LCS) (numbers represent the percent change in 2001 from average of 1999-2000; K = Kept, D = Discards).** Source: Pelagic Longline Logbook data.

			SWO		BFT		YFT		BET		Other BAYS		PEL		LCS	
Area		**Hooks**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**
Total Atlantic	Percent change from 1999-2000	**-4.7**	**-26.9**	**-25.6**	**-28.9**	**-48.1**	**-32.9**	**-22.7**	**0.8**	**-11.4**	**20.7**	**97.3**	**16.1**	**-16.5**	**-9.3**	**-22.1**
	Predict w/out effort redist.[1]		-24.6	-41.5		-1.0					-5.2		-9.5	-2.0	-32.1	-42.5
	Predict with effort redist.[1]		-13.0	-31.4		10.7					10.0		4.1	8.4	-18.5	-33.3
De Soto Canyon	Percent change from 1999-2000	**-90.4**	**-89.2**	**-94.3**	**-100**	**-100**	**-82.4**	**-98.4**	**-100**	**-100**	**-100**	**-100**	**-98.7**	**-94.3**	**-99.4**	**-91.0**
Percent of Total Atlantic	1999-00	2.8	1.9	3.8	1.8	3.6	4.0	5.5	0.1	0.1	0.1	8.3	2.5	0.1	2.2	3.0
	2001	0.3	0.3	0.3	0.0	0.0	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
	(+/-)	-2.5	-1.6	-3.5	-1.8	-3.6	-3.0	-5.4	-0.1	-0.1	-0.1	-8.3	-2.5	-0.1	-2.2	-2.6
Charleston Bump	Percent change from 1999-2000	**-24.2**	**-33.7**	**-42.1**	**-100**	**-100**	**-15.1**	**-58.8**	**209.5**	**-33.3**	**-53.8**	**-91.3**	**-42.9**	**-24.5**	**-59.3**	**-22.7**
Percent of Total Atlantic	1999-00	8.6	17.9	18.6	2.0	0.7	4.4	9.1	0.1	0.5	0.3	1.6	5.6	2.7	22.4	38.2
	2001	6.9	16.3	14.5	0.0	0.0	5.6	4.8	0.4	0.4	0.1	0.1	2.8	2.5	0.1	37.9
	(+/-)	-1.7	-1.7	-4.1	-2.0	-0.7	1.2	-4.2	0.3	-0.1	-0.2	-1.5	-2.8	-0.2	-12.4	-0.3
Florida East Coast	Percent change from 1999-2000	**-86.7**	**-90.9**	**-93.7**	**-100**	**-100**	**-80.0**	**-100**	**-44.0**	**-9.5**	**-50.0**	**-100**	**-81.8**	**-92.2**	**-67.3**	**-96.8**
Percent of Total Atlantic	1999-00	4.6	10.2	13.2	1.2	1.8	1.1	1.6	1.8	3.4	0.1	0.0	2.2	0.9	7.2	19.6
	2001	0.6	1.3	1.1	0.0	0.0	0.3	0.0	1.0	3.4	0.0	0.0	0.3	0.1	2.6	0.8
	(+/-)	-4.0	-8.9	-12.1	-1.2	-1.8	-0.8	-1.6	-0.8	0.0	-0.1	0.0	-1.9	-0.8	-4.6	-18.8

Table 8.4 (cont.). **Summary of the effectiveness of the various time/area closures implemented since 1999 for swordfish (SWO), bluefin tuna (BFT, Yellowfin tuna (YFT), bigeye tuna (BET), other BAYS, pelagic sharks (PEL), and large coastal sharks (LCS) (numbers represent the percent change in 2001 from average of 1999-2000; K = Kept, D = Discards).** Source: Pelagic Longline Logbook data.

			SWO		BFT		YFT		BET		Other BAYS		PEL		LCS	
Area		**Hooks**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**
Northeast Distant	Percent change from 1999-2000	**-27.9**	**-48.2**	**-31.1**	**-33.3**	**-37.5**	**-84.6**	**0.0**	**35.2**	**-37.7**	**202.2**	**50.0**	**-9.7**	**-18.0**	**0.0**	**-100**
Percent of Total Atlantic	1999-00	5.6	20.8	10.5	6.6	4.8	0.0	0.0	7.2	11.0	1.6	2.8	6.1	36.9	0.0	0.0
	2001	4.2	14.7	9.7	6.2	5.7	0.0	0.1	9.6	7.8	4.1	2.1	4.7	36.2	0.0	0.0
	(+/-)	-1.4	-6.1	-0.8	-0.4	0.9	0.0	0.0	2.4	-3.2	2.5	-0.7	-1.4	-0.7	0.0	0.0
Mid-Atlantic Bight	Percent change from 1999-2000	**-9.9**	**-5.1**	**-7.1**	**-60.0**	**-81.5**	**-50.6**	**-88.7**	**-33.1**	**-46.6**	**11.1**	**330.4**	**79.4**	**-47.9**	**104.6**	**42.5**
Percent of Total Atlantic	1999-00	9.5	4.6	6.0	7.0	19.3	5.9	6.1	28.2	32.6	47.5	12.9	11.9	19.0	14.5	1.8
	2001	9.0	5.9	7.5	4.0	6.9	4.4	0.9	18.8	19.7	43.7	35.2	18.4	11.8	32.7	3.2
	(+/-)	-0.5	1.4	1.5	-3.1	-12.4	-1.6	-5.2	-9.5	-13.0	-3.8	22.3	6.5	-7.1	18.2	1.4

[1] Predicted values from Table 7.19, Regulatory Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks Fishery Management Plan (NMFS, 2000).

Table 8.5. **Summary of the effectiveness of the various time/area closures implemented since 1999 for blue marlin (BUM), white marlin (WHM), sailfish (SAIL), spearfish (SPEAR), dolphin, wahoo and turtles (numbers represent the percent change in 2001 from average of 1999-2000; K = Kept, D = Discards).** Source: Pelagic Longline Logbook data.

			BUM	WHM	SAIL	SPEAR	DOLPHIN		WAHOO		Turtles
Area		**Hooks**	**D**	**D**	**D**	**D**	**K**	**D**	**K**	**D**	**Caught**
Atlantic	Percent change from 1999-2000	**-4.7**	**-52.9**	**-47.5**	**-71.5**	**19.7**	**-9.1**	**6.2**	**-34.2**	**-28.7**	**-6.0**
	Predict. w/o effort redistribution [1]		-12.0	-6.4	-29.6		-29.3				-1.9
	Predict. w/ effort redistribution [1]		6.5	10.8	-14.0		-17.8				7.1
DeSoto	Percent change from 1999-2000	**-90.4**	**-90**	**-100**	**-100**	**-100**	**-74.3**	**0.0**	**-86.6**	**0.0**	**0.0**
Percent of Total Atlantic	1999-00	2.8	0.7	1.2	3.2	0.4	1.0	0.0	3.8	0.0	0.0
	2001	0.3	0.2	0.0	0.0	0.0	0.3	0.0	0.8	0.0	0.0
	(+/-)	-2.5	-0.6	-1.2	-3.2	-0.4	-0.7	0.0	-3.0	0.0	0.0
Charleston Bump	Percent change from 1999-2000	**-24.2**	**-53.1**	**-41.6**	**-58.6**	**45.5**	**-25.1**	**-34.8**	**32.9**	**-20.0**	**57.9**
Percent of Total Atlantic	1999-00	8.6	9.0	7.0	10.4	9.6	46.8	43.1	4.7	5.7	2.1
	2001	6.9	9.0	7.8	15.2	11.7	38.5	26.5	4.8	6.5	3.5
	(+/-)	-1.7	0.0	0.8	4.7	2.1	-8.3	-16.7	0.1	0.7	1.4
Florida East Coast	Percent change from 1999-2000	**-86.7**	**-96.3**	**-100**	**-99.0**	**-100**	**-92.0**	**-100**	**-92.0**	**-100**	**-100**
Percent of Total Atlantic	1999-00	4.6	8.0	3.6	16.5	4.4	6.6	5.6	1.9	2.3	0.6
	2001	0.6	0.6	0.0	0.6	0.0	0.6	0.0	0.2	0.0	0.0
	(+/-)	-4.0	-7.4	-3.6	-15.9	-4.4	-6.0	-5.6	-1.7	-2.3	-0.6
Northeast Distant	Percent change from 1999-2000	**-27.9**	**100**	**-100**	**0.0**	**-100**	**-91.3**	**0.0**	**-100**	**0.0**	**-16.3**
Percent of Total Atlantic	1999-00	5.6	0.1	0.6	0.0	0.9	0.5	0.0	0.0	0.0	63.3
	2001	4.2	0.5	0.0	0.0	0.0	0.0	3.7	0.0	0.0	56.4
	(+/-)	-1.4	0.4	-0.6	0.0	-0.9	-0.5	3.7	0.0	0.0	-6.9
Mid-Atlantic Bight	Percent change from 1999-2000	**-9.9**	**-25.5**	**-51.2**	**-100**	**100**	**-7.3**	**-59.1**	**26.5**	**100**	**-50.0**
Percent of Total Atlantic	1999-00	9.5	1.9	14.0	0.0	0.4	6.0	7.2	0.5	0.6	7.1
	2001	9.0	3.0	13.0	0.0	0.7	6.1	2.8	1.0	1.6	3.8
	(+/-)	-0.5	1.1	-1.0	0.0	0.3	0.1	-4.4	0.5	1.0	-3.3

[1] Predicted values from Table 7.19, Regulatory Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks Fishery Management Plan (NMFS, 2000).

De Soto Canyon

The De Soto Canyon closure went into effect on November 1, 2000, as a result of the implementation of Regulatory Amendment 1 to the HMS FMP (NMFS, 2000.). Based on the data presented in Tables 8.4 and 8.5, compliance with this closure was almost 100%. The number of hooks set in the two closure areas in 2001 decreased 90% from the 1999-2000 average. Almost all species categories decreased by 100% to zero kept or discarded. Exceptions to this were swordfish kept and discarded, yellowfin tuna kept and discarded, both pelagic and large coastal sharks kept and discarded, and dolphin/wahoo kept. However all of these decreased by approximately 90% from the 1999-2000 average, except for the number of dolphin kept (-74%). Prior to the closure, catches in this area ranged from 0.1 to 8.3% of the total Atlantic and decreased to 0 to 1.1% of the total after implementation.

Charleston Bump

The Charleston Bump Closure Area was implemented by Regulatory Amendment 1 to the HMS FMP, effective March 1, 2001 (66 FR 8903, February 5, 2001 and NMFS, 2000). This area is closed from February to April of each year. In comparing the percent change from 1999-2000 to 2001 (Tables 8.4 and 8.5), most of the species categories showed a decline, but to a lesser extent than the Florida East Coast and De Soto Canyon areas because it is not a year round closure. Seven of the nine species kept showed considerable decreases (25 to 100%), while twelve of the thirteen species discarded also showed considerable decreases (20 to 100%). The number of hooks set decreased by 24.2%. Other notable decreases were: swordfish kept (-33.7%) and discarded (-42.1%), bluefin tuna kept and discarded (both -100%), yellowfin tuna kept (-15.1%) and discarded (-58.8%), bigeye tuna discards (-33.3%), other BAYS kept (-53.8%) and discarded (-91.3%), pelagic sharks kept (-42.9%) and discarded (-24.5%), and large coastal sharks kept (-59.3%) discarded (-22.7%). Bigeye tuna increased by 209%. However, the numbers reveal that the average number of bigeye tuna kept from 1999 to 2000 was only 21 and the number kept in 2001 was 65.

Table 8.5 reveals declines in discards of blue marlin (-53.1%), white marlin (-41.6%), and sailfish (-58.6%). It also shows moderate declines in dolphin kept (-25.1%) and discarded (-34.8%), and wahoo discards (-20.0%). By contrast, spearfish discards and wahoo kept increased by 45.5% and 32.9%, respectively. The actual number of spearfish discarded increased from an average of 11 in 1999-2000, to 16 in 2001. Turtles caught also increased (57.9%) but there was only a small increase in the actual numbers caught, from 9.5 on average to 15 in 2001. The percent of the total Atlantic catch from this area prior to the closure ranged from 0.1 to 46.8%. Following implementation of the closure, these percentages decreased to 0 to 38.5% of the total Atlantic catch.

Florida East Coast

The Florida East Coast Closure was implemented by Regulatory Amendment 1 to the HMS FMP, effective March 1, 2001 (66 FR 8903, February 5, 2001 and NMFS, 2000). In comparing the percent change from 1999-2000 to 2001 (Tables 8.4 and 8.5), most of the species categories showed a considerable decline which was expected since this was intended to be a year round closure. The number of hooks set decreased by almost 87%. Five of the nine species kept showed considerable decreases, while ten of the thirteen species discarded also decreased. This area showed a 100% decrease in the reported number of turtles caught. Most notable were the decreases in swordfish kept (-90.9%) and discarded (-93.7%), bluefin tuna kept and discarded (both -100%), yellowfin tuna kept (-80%) and discarded (-100%), pelagic sharks kept (-81.8%) and discarded (-92.2%), and large coastal sharks discarded (-96.8%).

There were marked declines in blue marlin (-96.3%), white marlin (-100%), sailfish (-99%), and spearfish (-100%) discards (Table 8.5). There were also considerable declines in wahoo kept and discarded (-92% and -100%, respectively), as well as a decline in turtles caught (-100%). The number of bigeye tuna kept and discarded decreased somewhat (-44.0% and -9.5%, respectively). Dolphin kept and discarded decreased to almost zero (-92% and -100%, respectively). The percent of the total Atlantic catch from this area prior to the closure ranged from 0 to 19.6%. Following implementation of the closure, these percentages decreased to 0 to 3.4% of the total Atlantic catch.

Northeast Distant Area

The Northeast Distant Statistical Reporting (NED) Area was closed by an emergency rule on July 15, 2001 (July 13, 2001, 66 FR 36711), to reduce interactions with sea turtles in the pelagic longline fishery. The closure was implemented on a more permanent basis by a final rule published on July 9, 2002 (67 FR 45393). In an effort to test experimental fishing measures designed to reduce the incidental capture of sea turtles in pelagic longline gear, NOAA Fisheries sponsored an experimental fishery in the NED area. The experimental fishery began in August 2001 and is designed to have a three year duration. In 2001, there were 10 vessels that participated, making 185.5 sets. Because of the presence of the experimental fishery, it is difficult to assess the effectiveness of the closed area in reducing sea turtle bycatch. Tables 8.4 and 8.5 show the level of effort and catch in the NED area prior to the closure in 1999 and 2000 and then during the first year of the closure in 2001.

In examining the past three years of data, it is possible to assess the impact of the NED experimental fishery, but not of the area closure. In comparing the data in Tables 8.4 and 8.5 for 2001 versus 1999-2000, most of the categories demonstrate a decline. Most notable are the decreases in number of hooks set (-27.9%), swordfish kept (-48.2%) and discarded (-31.1%), bluefin tuna kept (-33.3%) and discarded (-37.5%), yellowfin tuna kept (-84.6%), spearfish and

white marlin discarded (both -100%), large coastal sharks discarded (-100%), dolphin kept (-91.3%), and wahoo kept -100%). Conversely, there were several increases noticeable during the 2001 NED experimental fishery. The amount of bigeye tuna kept (35.2%), other BAYS kept and discarded (202.2% and 50%, respectively), and blue marlin discards (100%) increased. However, the actual number of blue marlin caught and discarded in 2001 was only three fish. Because the vessels participating in the NED experimental fishery were not fishing in their usual manner, NOAA Fisheries can not attest to the relevance of these results in demonstrating the impact of the NED closure. The experimental fishing measures tested in 2001 (blue dyed bait, moving gangions away from floatlines, and increasing the length of gangions in sets where the floatline plus gangions depth was not more than 100 meters) may have contributed to the results seen in the logbook data. As these measures where not effective in reducing the catch of sea turtles, NOAA Fisheries examined new fishing methods in 2002. The results of this research will be available by mid-2003.

Mid-Atlantic Bight

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 pelagic longline fishery. Caution should be exercised in reviewing the results in Tables 8.4 and 8.5 for the effectiveness of this closure since it was already in effect in 1999 and 2000. The 2001 results in Tables 8.4 and 8.5 for the MAB should be on par with the 1999-2000 average. Further evaluation of this closure may be possible by examining pre-1999 data. Large decreases in the number of bluefin tuna kept (-60%) and discarded (-81.5%), yellowfin tuna kept (-50.6%) and discarded (-88.7%), bigeye tuna kept (-33.1%) and discarded (-46.6%) and pelagic sharks discarded (-47.9%) occurred in 2001 relative to the average for 1999-2000. The numbers of swordfish kept (-5.1%) and discarded (-7.1%) and dolphin kept (-7.3%) decreased slightly, while the numbers of other BAYS tunas discarded (330.4%), pelagic sharks kept (79.4%), and large coastal sharks kept (104.6%) increased. The apparent large increase in BAYS tunas discarded is due to an increase from an average of 115 fish from 1999-2000 to 495 in 2001. Although the number of spearfish discarded appeared to double, this represented an increase of only one fish caught in 2001 as opposed to the average of 0.5. White marlin discards decreased a little more than 50% in 2001. The percent of the total Atlantic catch from this area during 1999-2000 averaged from 0 to 47.5%. These percentages remained relatively stable, ranging from 0 to 43.7% of the total Atlantic catch.

The following tables (Tables 8.6 and 8.7) provide an enumeration of logbook submissions of the disposition of bluefin tuna catches (kept, discarded dead, discarded alive). These tables have been presented in previous SAFE reports. In Table 8.6, the rows designated as"closed" represent the area in the Northeast/Mid-Atlantic Bight (MAB) closed to pelagic longline fishing during the month of June. "Open" represents all other open areas in the Atlantic Ocean. Table 8.6 demonstrates that the June (MAB) closure was effective at reducing dead discards of bluefin tuna from that area. These data do not indicate that the closed area outside of June is problematic

because the higher estimates of dead discards in 1999 and 2000 seem to occur in the remaining open areas (i.e., expanding the closed area to include other months does not appear warranted at this time). Total numbers of both dead and live discards of bluefin tuna decreased in 2001. This decline may indicate that the other time/area closures may also have had an impact.

Table 8.6. Number of bluefin tuna (BFT) reported in the pelagic logbook program as kept, discarded dead, or discarded alive in and out of the MAB "closed area".

Month	Area	BFT kept					BFT discarded dead					BFT discarded alive				
		1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Jan	Closed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Open	18	9	22	23	7	5	15	3	2	2	5	35	8	1	6
Feb	Closed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Open	10	10	27	27	13	1	11	7	30	0	12	14	9	18	1
Mar	Closed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Open	23	17	38	37	14	4	14	13	106	7	9	51	27	37	3
Apr	Closed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Open	4	14	44	43	47	2	6	50	90	41	6	17	39	21	24
May	Closed	1	1	1	0	0	2	1	2	0	0	4	1	20	0	0
	Open	21	23	28	42	21	18	21	42	21	25	26	33	96	18	20
June	Closed	14	10	0	0	0	144	156	0	0	0	159	278	2	0	1
	Open	29	25	28	15	14	56	182	87	18	40	42	194	122	23	68
July	Closed	3	13	7	0	2	3	32	1	8	0	15	53	0	8	8
	Open	35	30	11	12	10	32	20	5	31	2	57	35	12	7	15
Aug	Closed	0	0	2	1	0	0	0	0	3	0	0	0	0	0	0
	Open	23	6	9	3	2	1	2	1	0	0	5	2	0	0	9

Sept	Closed	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1
	Open	12	4	0	8	10	0	1	1	1	21	0	4	0	2	27
Oct	Closed	0	7	6	7	3	0	9	0	20	5	1	30	2	154	7
	Open	9	25	12	5	4	0	0	0	3	6	0	1	0	45	3
Nov	Closed	7	10	2	5	2	7	14	1	0	0	6	20	0	15	1
	Open	5	11	9	3	28	0	11	1	9	2	7	33	1	9	0
Dec	Closed	10	1	2	1	0	22	3	1	5	0	39	0	0	16	1
	Open	10	16	15	2	0	14	4	6	7	1	11	6	45	9	1
Total		234	232	263	235	177	311	502	222	354	152	404	807	383	383	196

Catch patterns of other target species and bycatch by pelagic longline gear are also presented by combining the number of fish landed and discarded by month as reported in the pelagic logbook. The portion of Table 8.7 designated as "Closed" represents the area in the Northeast/Mid-Atlantic bight that is closed in June but the number represents those fish caught in that area for the entire year; "Open" represents all other open areas of the Atlantic Ocean fished by U.S.-flagged pelagic longline vessels. "Discarded" is both discarded dead and discarded alive.

Table 8.7. Number of bluefin tuna, swordfish, sharks, billfish, and turtles kept and discarded inside and outside of the June, Northeast/Mid-Atlantic Bight as reported in the pelagic logbook data (numbers in parentheses represent percent change from 2000 to 2001).

Species	Closed area					Open area				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
BFT kept	35	42	20	14	7 (-50%)	199	190	223	215	177 (-18%)
BFT discarded	402	597	30	122	24 (-80%)	313	712	573	612	348 (-43%)
Swordfish kept	2,075	3,315	1,656	4,300	2,826 (-34%)	67,000	66,000	63,000	56,138	47,560 (-15%)
Swordfish discarded	1,089	1,469	990	1,269	1,049 (-17%)	19,810	21,175	19,308	15,490	13,993 (-10%)
Pelagic sharks kept	401	368	276	432	635 (+47%)	4,834	3,388	2,543	2,552	3,460 (+36%)
Pelagic sharks discarded	16,672	12,486	5,378	5,430	2,816 (-48%)	66,108	32,126	24,082	21,492	23,813 (+11%)
LCS kept	1,734	816	1,030	1,040	2,118 (+104%)	25,500	11,492	12,024	7,108	6,478 (-9%)
LCS discarded	82	58	90	129	156 (+21%)	8,300	6,047	6,193	6,679	4,836 (-28%)
Billfish discarded	333	96	411	93	130 (+40%)	7,385	3,670	4,400	3,670	1,976 (-46%)
Turtle interactions	12	23	49	15	16 (+7%)	255	898	593	169	424 (+151%)

Based on reported data, Table 8.7 demonstrates that bluefin tuna discards in the MAB closure area have been reduced considerably due to the June closure from 1999 to 2001. Annual landings and discards of bluefin tuna from both the MAB closure area and remaining open areas were reduced in 2001, possibly due to the additional time/area closures elsewhere (Tables 8.6 and 8.7). These data also indicate that discards of swordfish and pelagic sharks from the MAB closure area were reduced in 2001, although discards of pelagic sharks from open areas increased slightly (11%). The number of pelagic sharks kept increased in both the open areas and the MAB closure area. Landings of large coastal sharks from the MAB closed area doubled in 2001. Although the discards of billfish increased in the MAB closure area, discards of billfish from the remaining open areas decreased by almost 50%.

8.3.4 Prohibition of Live Bait in the Gulf of Mexico

Regulatory Amendment 1 to the HMS 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% in 2000, to 1.7% in 2001. Overall, the number of hooks set in the Gulf of Mexico remained relatively steady from 1999-2001, averaging 3.3 million hooks. Further analysis of the effectiveness of the live bait prohibition in the Gulf of Mexico pelagic longline fishery may continue in 2003.

Table 8.8. Comparison of the number of hooks set in the Gulf of Mexico with dead or live bait, or a combination of both baits, 1999-2001 (numbers in parantheses are percent of the total number of hooks in the Gulf of Mexico). Source: Pelagic Longline Logbook data.

	Year		
Bait Type	**1999**	**2000**	**2001**
Dead	2,335,845 (70.9)	2,598,083 (77.3)	3,176,493 (98.3)
Live	372,162 (11.3)	259,256 (7.7)	5,500 (0.2)
Both	584,473 (17.8)	505,582 (15.0)	49,250 (1.5)
Total	3,292,480	3,362,921	3,231,243

8.3.5 Conclusions

Based on one year of self-reported data, 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. Billfish discards, except for spearfish, have all declined. The number of turtles caught, swordfish discarded, bluefin tuna discarded, and large coastal sharks have also declined. However, the number of target species kept such as swordfish and yellowfin tuna, also decreased. This is contrary to the other objective of these regulations of minimizing the reduction in target catch.

All of these results should be considered preliminary. Additional years of data are needed before the effect of these measures can be analyzed fully. As described in the methods section of this subsection, NOAA Fisheries plans to continue to analyze these measures as additional data becomes available.

8.4 Evaluation of Other Bycatch Reduction Measures

The following section provides a review of additional management measures or issues that may address bycatch reduction:

- Reduce length of longline to increase survival of marine mammals and turtles:

The effectiveness of this measure has not been analyzed. However, NOAA Fisheries intends to conduct an analysis of this measure in 2003.

- 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. NOAA Fisheries 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:
  NOAA Fisheries continues to update the MMPA List of Fisheries and the 2002 final list is available. The proposed 2003 List of Fisheries was published on January 13, 2003. Final 2001 marine mammal stock assessment reports and draft 2002 reports are also available. See section 8.1 for information on obtaining these reports.

- Atlantic Offshore Cetacean Take Reduction Team (AOCTRT):
  NOAA Fisheries 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. NOAA Fisheries intends to review the fishery and any marine mammal interactions in the future to determine if additional take reduction measures are necessary at that time.

- Observer coverage of shark drift gillnet fleet:
  On March 30, 2001, NOAA Fisheries 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 the amendment to the HMS FMP.

- Vessel monitoring systems in the pelagic longline fishery
  NOAA Fisheries 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 plaintiffs objections to the VMS regulations. Based on this ruling NOAA Fisheries is seeking to reinstate OMB approval for the information collection (67 FR 69506) and plans to implement the requirement in early 2003.

8.5 Recommendations to Reduce Bycatch

In 1998, NOAA Fisheries published a National Bycatch Plan (NOAA, 1998). The plan recommended numerous actions to address bycatch mortality. Table 8.9 lists the recommendations and actions taken by NOAA Fisheries thus far to address these issues.

Table 8.9. Recommendations for Addressing Bycatch Mortality in HMS Fisheries and Actions Planned or Taken to Address These Recommendations.

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Reduce bycatch and bycatch mortality of undersized swordfish and tunas.	Proposed closure of critical swordfish nursery areas. Closed critical swordfish nursery areas to pelagic longline fishing (Am. 1 to HMS FMP). Held educational workshop for recreational fishermen at Miami International Boat Show in Feb. 2001.	Rulemaking on Atlantic bluefin tuna incidental catch limits. Promoted use of circle hooks in swordfish recreational fisheries through an outreach program.	Analyses of time/area closures and other bycatch reduction methods.
Improve data on the character and magnitude of bycatch to allow quantitative estimates of discards in the fisheries for use in stock assessments and making management decisions.	Pursued submission of bycatch data by ICCAT countries for analyses to develop measures to reduce small swordfish bycatch stock-wide. Researched estimating discard rates and volumes based on direct observations by scientific fishery observers. Conducted independent review of methodology used to estimate bluefin tuna dead discards. Started collection of discard data in snapper-grouper/reef fish/shark logbook program. Conducted year one of Northeast Distant Area experiment.	Conducted year two of Northeast Distant Area experiment. Continued observer coverage in pelagic and bottom longline and shark drift gillnet fisheries. Changed bottom longline observer program from voluntary to mandatory.	Conduct year three of Northeast Distant Area experiment. Continue observer coverage in pelagic and bottom longline and shark drift gillnet fisheries.

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Improve gear-handling techniques to reduce mortality.	Held educational workshops for recreational and commercial fishermen. Distributed handling protocols for marine mammals and sea turtles Held pelagic longline gear workshop in January. Required line clippers and dipnets on pelagic longline vessels. Required posting of turtle handling/release guidelines in wheelhouse of all longline vessels.	Conducted year two of Northeast Distant Area experiment, including: evaluation of de-hooking devices; drift gillnet checks; and gangions and floatline lengths.	Conduct year three of Northeast Distant Area experiment.

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Conduct research on gear-deployment methods that will reduce interactions between and mortality of protected species that encounter fishing gear.	Transferred funding for gear development to NSIL. Funded a circle hook study in the Azores. Developed a dipnet and line cutter that would decrease injuries to turtles; these devices required as of Nov. 2000 on all pelagic longline vessels. Development of revised design of lightsticks that do not attract turtles, other gear modifications (NSIL, 2000). Held pelagic longline gear workshop in January. Conducted year one of Northeast Distant Area experiment.	Conducted year two of Northeast Distant Area experiment.	Conduct year three of Northeast Distant Area experiment.
Work cooperatively with the fishing industry to transfer new knowledge and techniques between fishermen and researchers.	Held educational workshops include research results on the agenda. Conducted cooperative research with pelagic longline industry members to explore lightstick color and design effects on turtle hooking rates. Held pelagic longline gear workshop in January. Conducted year one of Northeast Distant Area experiment.	Conducted year two of Northeast Distant Area experiment. Pursued other cooperative research funds and programs.	Conduct year three of Northeast Distant Area experiment.

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Improve knowledge of (1) basic biology and stock status of shark species in the Northwest Atlantic and (2) the effects of bycatch mortality on shark populations.	Funded the following research: - Center for shark research at Mote Marine Lab: shark biology - Univ of MI: shark nursery grounds - Gulf and South Atlantic Fishery Development Foundation/University of Florida: observer program and biology - COASTSPAN. Participated in pelagic shark assessment in February, 2000. ICCAT Bycatch sub-committee recommended that SCRS conduct shark assessments in 2002; ICCAT Bycatch sub-committee data preparatory meeting on pelagic sharks; ICCAT recommended blue and shortfin mako assessments be conducted in 2004. Developed draft National Plan of Action for Sharks; Final Shark NPOA published commensurate with the FAO International Plan of Action for Sharks to assess direct and indirect shark fisheries, stock status, and promote more effective and sustainable shark management. SCS data preparatory meeting for assessment.	Participated in LCS stock evaluation workshop and conducted LCS assessment. Funded peer review of LCS assessment. Conducted SCS assessment. Continued shark research programs. Funded the following research: - Center for shark research at Mote Marine Lab: shark biology - Gulf and South Atlantic Fishery Development Foundation/University of Florida: observer program and biology - COASTSPAN.	Continue shark research programs. Continue shark observer programs. Fund the following research: - Center for shark research at Mote Marine Lab: shark biology - COASTSPAN.

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Increase research on the role of apex predators in structuring marine ecosystems, and assess the effects of bycatch of these stocks.	Funded and continued COASTSPAN, a study to identify shark nursery areas. Resource partitioning study underway. Post-release mortality study on sharks.	Continued COASTSPAN program. Continued resource partitioning study. Included bycatch data in SCS and LCS assessments. Provided funding for blue and white marlin tagging studies.	Continue COASTSPAN program. Continue resource partitioning study.
Reduce mortality and bycatch mortality of billfish captured in the directed fisheries for Atlantic HMS.	Implemented time/area closures in the South Atlantic Bight and Gulf of Mexico; encouraged the voluntary use of circle hooks; live bait prohibition in Gulf of Mexico; funded circle hook research in longline fishery (Falterman and Graves, 2000); conducted recreational circle hook research by NOAA Fisheries scientists (Prince, Venizelos, and Ortiz, 2000). Post-release mortality study on marlin.		Promote voluntary use of circle hooks through the recreational monitoring rule.
Determine the status of sailfish populations.	Preliminary assessment of sailfish conducted by ICCAT SCRS.		

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Conduct research on post-release mortality of recreationally-caught billfish, tunas, and sharks.	Funded research on: - MA Div. Marine Fisheries: Effects of Hook Design - Bluefin tuna tagging Sponsored Catch and Release Conference in Nov. 1999 to share data, identify further research needs. Continued NOAA Fisheries-funded tagging programs. Post-release mortality study on sharks and marlin.	Continued NOAA Fisheries-funded tagging programs. Continued post-release mortality study on sharks and marlin. Provided funding for blue and white marlin tagging studies.	Continue NOAA Fisheries-funded tagging programs. Continue post-release mortality study on sharks and marlin.
Improve data collection and monitoring of the recreational tuna, shark, and billfish fisheries.	Implemented new voluntary Charter/Headboat observer program and logbook program. Increased tournament registration and reporting. Increased enforcement of tournament reporting and registration requirements. Proposed rule for new monitoring system for recreational billfish and swordfish landings.	Rulemaking on monitoring of recreational billfish and swordfish landings.	Rulemaking on charter/headboat and recreational vessel permit requirements, sale of fish, daily catch and retention limits, and timeframe for permit category changes. Rulemaking on non-tournament landings of swordfish and billfish (tournaments already required to report).

* Because stock assessments are conducted internationally by SCRS, NOAA Fisheries does not produce domestic stock assessments for ICCAT species. However, NOAA Fisheries has developed overfishing criteria based on the most recent assessment (1993) and has determined that West Atlantic sailfish are overfished and overfishing continues to occur.

8.6 Summary

It is difficult to compare fishing gears due to the differences in areas and seasons fished. Table 8.9 summarizes the total percentage of mortality attributed to bycatch for Atlantic HMS.

Table 8.9. Percent of Stock-Wide Mortality Attributed to U.S. Bycatch for HMS Stocks in 1998-2000 by weight (unless stated otherwise; Reported discards/total landings + discards).[1] Sources: SCRS, 2001.

Species/Stock	1998	1999	2000
North Atlantic Swordfish	4%	4.5%	10.1%
South Atlantic Swordfish	less than 0.1%	less than 0.1%	less than 0.1%
West Atlantic Bluefin Tuna[1]	4.5%	5.9%	4.7%
Large Coastal Sharks[2]	10.5% (by number)[3]	15% (by number)[3]	13.7% (by number)[3]
Pelagic Sharks[2]	30.5% (by number)[4]	16.2% (by number)[4]	36.8% (by number)[5]
Small Coastal Sharks[2]	Unknown	Unknown	In preparation[6]
North Atlantic Blue Marlin	3.5%	6.3%	7.2%
North Atlantic White Marlin	8.9%	14.8%	12.6%
West Atlantic Sailfish	4.6%	13.5%	8.9%
Spearfish	0%	0%	0%

[1] Based on the landings and discards reported to ICCAT for stocks fished on by U.S. fishermen. It should be noted that discards of BAYS tunas to ICCAT are generally not reported.
[2] There is no international estimate of total landings or discards of sharks, the percentages therefore reflect the U.S. mortality due to bycatch.
[3] Cortes, 2000; E. Cortes, pers. comm. 2001
[4] Recreational landings estimates from Cortes 2000; commercial estimates from Cortes 2000 and Cramer 1999 and Cramer and Adams 2000. For the commercial landings estimates, the commercial landings (in lbs dw) from Cortes 2000 were divided by the average sizes for pelagic and blue sharks for 1998 and 1999 from Cramer 1999 and 2000, respectively, to generate commercial landings by number. The number of dead discards for pelagic blue sharks for 1998 and 1999 were from Cramer 1999 and Cramer and Adams 2000, respectively.
[5] Cortes, 2001
[6] Stock assessments for LCS and SCS will be conducted in 2002, which will include bycatch estimates.

In Table 3.47 of the HMS FMP, NOAA Fisheries identified the significance of bycatch of certain species in various HMS fisheries. Table 8.10 below indicates action NOAA Fisheries has taken to address those issues and reduce bycatch.

Table 8.10. Addressing Significant Bycatch Concerns in HMS Fisheries

Gear	Significant Bycatch Species	
Pelagic Longline	• bluefin tuna • undersized target species • mammals • sea turtles	• Closed areas in Mid-Atlantic Bight in June; South Atlantic Bight area year-round, Charleston Bump Feb-April; DeSoto Canyon year-round; NED area year-round • Gear modifications (gangions length, line clippers and dipnets, handling and release guidelines for turtles) • Northeast Distant Area experiment • Educational workshops • Move after one entanglement • Proposed rule to modify target catch requirements for bluefin tuna retention in 2002
Bottom Longline	• undersized target species • prohibited shark species • target species after a closure	• Observer coverage to collect necessary data • Conducted LCS/SCS stock assessments • Proposed amendment to HMS FMP to address shark management issues **Note**: Minimum sizes are not in effect in the commercial fishery (December 27, 2002: 67 FR 78990).
Shark Gillnet	• undersized target species • protected species • prohibited shark species	• Observer coverage to collect necessary data • Consider VMS requirement during right whale season • Closed area to drift gillnets (strikenets only) • Temporary closure (30 days) due to leatherback interactions • Conducted LCS/SCS stock assessments • Proposed amendment to HMS FMP to address shark management issues

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9. HMS PERMITS

9.1 Capacity in HMS Fisheries

Summary

NOAA Fisheries' HMS Management Division continues to monitor capacity in HMS fisheries. Due to the large number of permits, overcapacity remains a concern in HMS fisheries. The overall number of limited access permits declined in 2002 from 1275 to 1262. The rate at which the number of issued permits is decreasing, however, leveled off in 2002. The tuna longline category was the only limited access permit category in which the number of permits increased in 2002. All other tuna permit categories increased in 2002 as well. The overall number of dealer permits declined slightly in 2002.

Overview

Resulting from a 1998 FAO initiative to develop definitions and metrics to measure fishing capacity and NOAA's goal of eliminating excess capacity in 20 percent of federally managed fisheries by 2005, NOAA Fisheries developed a project to define and measure domestic fishing capacity to assist in determining which U.S. fisheries have excess capacity and the magnitude of the problem. A task force was assembled to develop capacity definitions and to recommend metrics by which capacity could be measured. A report assessing capacity levels in commercial U.S. fisheries is still under development, but should be completed in 2003. Preliminary results in the Atlantic HMS fisheries indicate that the potential production of the commercial fleet is in excess of the actual level of production, suggesting that excess capacity exists. Once the final report is available, NOAA Fisheries will begin to discuss options for reducing or, if appropriate, maintaining capacity in Atlantic HMS fisheries with industry and the public.

To date, HMS has responded to overcapitalization issues through a variety of methods in addition to implementing limited access programs for swordfish, shark, and tuna longline permits. These additional mechanisms include overall harvest quotas, trip limits, size limits, and banning certain types of gear such as driftnets. Individual Vessel Quotas (IVQs) for bluefin tuna purse seiners were implemented in 1982 to exclude new entrants into the fishery. In 1991, NOAA Fisheries established a control date for the swordfish fishery (August 30, 1991). After this date, new vessels entering the Atlantic swordfish fishery were not guaranteed future access to the fishery. In 1994, NOAA Fisheries established a control date for the shark fishery (February 22, 1994) and for the Atlantic tunas fisheries (September 1, 1994). In 1995 and 1996, NOAA Fisheries held a number of workshops to discuss limited access in the Atlantic HMS fisheries. More recently, on July 1, 1999, NOAA Fisheries implemented a limited access program for the commercial Atlantic shark, swordfish, and Atlantic tunas longline category fisheries.

9.2 Limited Access Permits for Atlantic Swordfish, Atlantic Sharks, and Atlantic Tunas

Longline Category

9.2.1 History of the Program Established in the HMS FMP

The HMS FMP outlined several objectives of a program that would limit access to the swordfish, shark, and tuna longline fisheries. These objectives included:

- 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 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.

- 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.

- 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 with a longer range goal of reducing 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 meant to be the first step towards reducing capacity in the Atlantic swordfish, shark, and tuna longline fisheries.

The program implemented in the HMS 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. 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. Swordfish handgear and shark permits are valid without another limited access permit.

9.2.2 Status of the Program Established in the HMS FMP

Number of Permits

Between the permits issued in May, 1999, and successful applications/appeals, a total of 982 permit holders received limited access permits by October 2000. In the past year, the number of permit holders declined 5 percent from 752 to 713, and the number of dealer permits declined 1 percent from 1275 to 1262. However, in the past two years, the number of permit holders and limited access permits has declined by 27 percent (Table 9.1), with most of the decline occurring in 2001. The number of permit holders declined in all categories except the tuna longline category which increased from 213 to 226. The largest reduction in 2002 came in the incidental shark permit category which decreased 4 percent (390 to 376 permit holders). In the past two years, the largest reductions have been in the incidental swordfish (46 percent decrease) and incidental shark (36 percent) permit categories. These reductions occurred across all states and not just states adjacent to the time/area closures implemented in 2000 and 2001. There are a few possible explanations for the large decrease:

- A number of permit holders have not renewed their permits;
- A number of vessel owners did not renew their permits within a year and have lost their permits through attrition;
- Some permit holders chose to exit the fishery after the implementation of certain regulations (for example, the time/area closures for pelagic longlining);
- Permit holders tried to sell their permits when they left the fishery but could not find buyers due to the upgrading restrictions (although incidental permits are not subject to upgrading restrictions);
- Incidental permit holders wanted to change gear types or use a different gear in the tuna fishery (e.g. they would rather have a charter/headboat permit than a tuna longline permit) and let their permits lapse; or
- Some combination of the above.

In response to the large decline in permit numbers from 2000-2001, NOAA Fisheries and one constituent examined the database for potential problems. While several permit holders had let one or more of their permits lapse, no other reasons were found to explain the decrease. NOAA Fisheries will continue to monitor the permits in case a similar decline should occur in the future. The tuna longline permit category likely increased because a number of permit holders had not yet renewed their permits when the analysis of the database was conducted in 2001.

Transfers

In 2002, there were approximately 184 shark and swordfish permit transfers. The number represents a 42% increase over the 130 permits transferred in 2001. NOAA Fisheries examined a small number of 2002 permit transfers to obtain an estimate of the cost of buying a HMS limited access permit. Recording sale price on permit transfers is not required, thus many of the transfers did not include this information. Of the transfers examined, prices for swordfish directed, swordfish incidental, shark directed, and shark incidental ranged from $0 to $7,500. The average price was $750. Several permits were transferred at no cost.

Implementation problems and corrections

NOAA Fisheries has noted that a number of tuna longline permit holders do not hold valid swordfish and shark limited access permits and a number of swordfish directed or incidental permit holders do not hold valid tuna longline or shark permits. NOAA Fisheries is trying to determine the best method to handle these cases. In some instances, vessel owners who hold one permit but not the others may find that NOAA Fisheries has revoked their permit until the vessel owner provides information proving they hold the other required permits. In these cases, similar to the application and appeals format of the implementation of the limited access program, NOAA Fisheries has provided for two separate decision levels for permit holders: reconsideration and appeal. In cases where a tuna permit is revoked, NOAA Fisheries may consider changing the permit category if requested.

Table 9.1 **Distribution of Shark, Swordfish, and Tuna longline Limited Access Permits as of October, 2002.** The actual 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	1	2	5	2	7	1	14/18
NH	-	-	1	1	2	-	4/4
MA	12	3	17	3	15	6	34/56
RI	5	3	26	1	11	6	34/52
CT	-	-	1	-	1	-	2/2
NY	16	5	10	10	13	17	32/71
NJ	36	20	11	31	37	33	79/168
DE	1	-	-	1	1	1	2/4
MD	6	3	-	3	7	8	11/27
VA	1	7	-	5	5	3	10/21
NC	8	13	3	21	21	11	44/77
SC	5	1	-	8	14	5	22/33
GA	1	-	-	2	2	1	4/6
FL	72	33	20	150	165	74	330/514
AL	1	2	-	3	2	4	6/12
MS	-	-	-	1	8	1	9/10
LA	33	9	-	4	46	42	52/134
TX	4	9	-	5	16	10	21/44
CA	2	-	-	-	2	1	2/5
VI	1	-	-	-	1	2	1/4
Total October 2002	**205**	**110**	**94**	**251**	**376**	**226**	**713/1262**
Total October 2001	**208**	**112**	**100**	**252**	**390**	**213**	**752/1275**
Total: October 2000	**240**	**203**	**125**	**287**	**585**	**292**	**982/1732**
Total: December 1999	**243**	**208**	**114**	**279**	**599**	**451**	**976/1892**

9.2.3 Possible Next Steps

As noted in the HMS FMP, the current limited access system was designed to be the first step in addressing overcapitalization. Previous SAFE reports noted that possible future management measures could include:

- Attrition/Use or lose - reduce the number of permits based on lack of landings;
- Two-for-One entry - require entrants to the fishery to transfer two permits in order to obtain one limited access permit;
- Non-transferable Individual Fishing Quotas (IFQs);
- Individual Transferable Quota (ITQ) systems including landings based, auction, and/or lottery allocation;
- Permit buybacks; and,
- Changing the current species-based permits to a more gear-based permitting system.

At the April 2001 AP meeting and in Chapter 10 of the 2001 SAFE report, NOAA Fisheries presented a number of options to reduce the confusion of having multiple permits. These options included:

- allowing for conversion from swordfish directed permits to swordfish handgear permits;
- allowing any tuna permit category to be acceptable with a swordfish directed or incidental permit, not just the tuna longline category;
- eliminating the need for squid trawlers who occasionally catch swordfish to hold a tuna longline category permit; and,
- changing the permit structure to issue permits by gear type, not species.

At this same meeting, NOAA Fisheries heard that a number of AP members would prefer the permitting system to be streamlined. Some suggestions included:

- NOAA Fisheries should have only two types of permits, commercial and recreational;
- a single limited access permit type is preferable to the three permits currently needed to use pelagic longline gear; and,
- gear-based permits are acceptable as long as vessels can be issued more than one type of permit.

Additionally, some AP members expressed concern about the one year renewal time period.

At the April 2002 AP meeting, NOAA Fisheries and AP members continued to hear from Caribbean fishery representatives who stated that fishermen in Puerto Rico and the U.S. Virgin Islands continue to fish for HMS without the necessary permits and that NOAA Fisheries needs to ensure that their catches are accurately reported. Generally, AP members expressed concern and sympathy for these fishermen but felt that opening the limited access permitting process for those fishermen could create problems. The Caribbean representative has written to NOAA Fisheries with some suggestions on how to address this issue including:

- allow the incidental take of swordfish and shark on the Atlantic tunas handline permit in the Caribbean EEZ only;
- require vessels to be registered in Puerto Rico or the U.S. Virgin Islands for commercial fishing;
- restrict vessels to two swordfish and two sharks per trip;
- restrict vessels to 30 feet in length; and,
- restructure data collection contracts with Puerto Rico and Virgin Island Governments to include an HMS component with swordfish, sharks, tunas, wahoo, and dolphin.

Not all of the above suggestions are possible given the National Standards, particularly National Standard 4 that states management measures should not discriminate against residents of different states, some of them are not enforceable, and some of them are already in effect (e.g. vessels must have either state registration or Coast Guard documentation in order to fish commercially for HMS). Additionally, all states, including Puerto Rico and the Virgin Islands, are asked to provide representatives for the HMS and Billfish APs in order to ensure our regulations are consistent with and consider state regulations and fishermen. However, NOAA Fisheries would appreciate comments on this issue, particularly from fishermen in Puerto Rico and the U.S. Virgin Islands, and may consider different options to address this issue in future rulemaking on limited access permitting issues.

9.2.4 Upgrading and Safety Issues

When the limited access program was implemented, NOAA Fisheries 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. NOAA Fisheries 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 substantial safety at sea concerns. In the past year, NOAA Fisheries has received comments that the current upgrading restrictions are too restrictive for smaller vessels (e.g. less than 35 ft LOA). 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. NOAA Fisheries 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. In Chapter 10 of the 2001 SAFE report, NOAA Fisheries mentioned 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. NOAA Fisheries heard similar comments as those above from the AP in April 2001 and in 2002. NOAA Fisheries 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.

9.3 Atlantic Tuna Permits

In 2000, NOAA Fisheries contracted Aquilent, formerly known as Commerce One, to issue Atlantic Tunas permits. These permits, made available December 1, 1999, allow vessels to fish for, take, retain, or possess Atlantic bluefin, yellowfin, skipjack, albacore, and bigeye tunas. The HMS FMP established a fishing year for Atlantic tunas (June 1 through May 31 of the following year) in order to facilitate timely implementation of international management recommendations. Therefore, Atlantic Tunas permits issued for the fishing year 2002 are valid from the date of issuance through May 31, 2003. The Atlantic Tunas permit are renewable on an annual (fishing year) basis.

The Atlantic tunas permits are the only HMS permits at this time that have categories based on gear type. The number of Atlantic Tunas permit holders in each category is listed in Table 9.2. The number of permits in the longline, angling, trap, and general categories decreased from 2000 to 2001, but increased from 2001 to 2002. The number of permits in the harpoon category has continued to increased slightly since 2000 (Table 9.2). In previous years, charter/headboat vessels fishing for HMS only needed a charter/headboat permit if they were fishing for Atlantic tunas. However, in July 2001, HMS implemented a charter/headboat permit for all charter/headboat vessels fishing for Atlantic HMS. For more information on this permit, please see section 9.4 below.

In December 2002, NOAA Fisheries 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. This permit will replace the Atlantic Tunas Angling category permit. The HMS Angling permits will be required as of March 1, 2003. Current Atlantic Tunas Angling permits will meet HMS Angling category requirements through May 31, 2003.

9.4 HMS Charter/Headboat Permits

The HMS FMP established a new 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 Highly Migratory Species Charter/Headboat permit. This new permit replaced the Atlantic Tunas Charter/Headboat permit. A vessel issued a HMS Charter/Headboat 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. A final rule to expand the HMS recreational permit from tuna to include all HMS and define charter/headboat operations was published in December 2002 (67 FR 77434, Dec. 18, 2002).

Table 9.2 The number of Atlantic tunas permit holders in each category. The actual number of permit

holders in each category is subject to change.

Category	As of October 2000	As of October 2001	As of October 2002
Longline	292	213	226
Angling	14,908	12,685	13,263
Harpoon	44	53	56
Trap	4	1	6
General	6,705	6,072	6,431
Purse Seine	5	5	5
Charter/headboat	2,728	No longer a tuna-only permit, now a HMS charter/headboat (3,260)	No longer a tuna-only permit, now a HMS charter/headboat (3,659)
Total	**24,686**	**19,029 Does not include HMS charter/ headboat**	**19,987 Does not include HMS charter/ headboat**

As of October 2002, there were 3,659 Atlantic HMS charter/headboat permit holders. This is a 12% increase over the number of charter/headboat category permits issued in 2001 and a 34% increase over the tuna charter/headboat category permits issued in 2000 (Table 9.2). This increase could be due to the requirement for all charter/headboats to hold an HMS charter/ headboat permit in case they catch any highly migratory species.

9.5 Dealer Permits

Dealer permits are required for commercial receipt of Atlantic tuna, swordfish, and sharks, and are detailed in Section 2.6.1 of the HMS FMP. Additionally, the appropriate dealer permit is necessary for those importing bluefin tuna and/or swordfish from any ocean, the specifics of which are discussed in Section 7 of this report. 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 a U.S. fishermen. Dealers must also submit bi-weekly reports that include additional information on tunas they purchase. To facilitate quota monitoring "negative reports" for shark and swordfish are required from dealers when no purchases are made (i.e., NOAA Fisheries can determine who has not purchased fish versus who has neglected to report). NOAA Fisheries 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. For instance, NOAA Fisheries is considering mandatory negative reporting for BAYS tunas dealers.

The number of dealer permits issued by state and species is listed in Table 9.3. Unlike the number of limited access vessel permits, the number of dealer permits has not changed substantially from the numbers in 2000. In fact, there was an increase in the number of dealer permits for Atlantic swordfish and sharks in 2002, whereas the number of Atlantic tunas dealer permits declined.

Table 9.3 **Number of dealer permits issued in each state as of October, 2002.** The actual number of permits per state may change as permit holders move or sell their businesses.

State	Atlantic tunas	Atlantic swordfish	Atlantic sharks	# of permits
AL	1	3	5	9
CA	34	36	12	82
CT	6	-	-	6
DE	4	1	1	6
FL	19	102	100	221
GA	-	1	1	2
GU	1	-	-	1
HI	8	11	4	23
IL	1	1	1	3
KY	-	-	-	0
LA	15	18	19	52
MA	114	27	19	160
MD	6	4	0	10
ME	35	3	3	41
MO	-	-	1	1
MS	-	-	2	2
NC	32	15	21	68
NH	7	-	-	7
NJ	48	14	12	74

State	Atlantic tunas	Atlantic swordfish	Atlantic sharks	# of permits
NY	62	21	11	94
OR	1	-	-	1
OH	-	1	1	2
PA	-	3	1	4
PR	3	-	-	3
RI	33	14	11	58
SC	9	8	13	30
TX	3	7	10	20
VA	22	4	5	31
VI	14	4	1	19
WA	1	7	7	15
Canada	-	13	5	18
Chile	-	1	-	1
New Zealand	-	-	-	0
Uruguay	-	1	-	1
Ecuador		1	1	2
TOTAL OCTOBER 2002	**479**	**321**	**267**	**1067**
TOTAL OCTOBER 2001	**522**	**302**	**249**	**1073**
TOTAL OCTOBER 2000	**544**	**312**	**251**	**1107**

9.6 Exempted Fishing Permits (EFPs) and Scientific Research Permits (SRPs)

EFPs and SRPs are requested and issued under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.) and/or the Atlantic Tunas Convention Act (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 highly migratory species.

Issuance of EFPs and/or SRPs may be necessary because possession of certain shark

species is 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 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, NOAA Fisheries regulations at 50 CFR 635.32 regarding implantation or attachment of archival tags in Atlantic highly migratory species require prior authorization and a report on implantation activities.

The number of EFPs and SRPs issued from 2000-2002 are listed in Table 9.4. Year-end reports for permits issued for 2002 are required, and are expected to be submitted to NOAA Fisheries in early 2003. During 2002 there were 8 public display EFPs issued, which authorized 695 sharks, 68 tuna, and 2 swordfish to be taken. To date, 42 sharks, no tuna, and no swordfish are reported to have been taken.

During 2002 there were 11 EFPs issued to non-scientific research vessels. These EFPs authorized 313 sharks, 300 swordfish, 30 billfish, and over 450 BFT, 100 YFT, and 50 ABT. To date, 92 sharks no sharks, and no tunas have been reported to have been taken.

During 2002 there were 4 EFPs issued to scientific research vessels. These EFPs authorized 108 BFT, 100 YFT, 100 sailfish, 100 blue marlin, 100 white marlin, and 100 swordfish.

Table 9.4 Number of EFPs and SRPs issued.

Permit type		2000	2001	2002
Exempted Fishing Permit	Sharks for display	14	9	7
	HMS for display	-	-	1
	Tunas for display	1	1	No longer a Tunas for display, now HMS for display
	Tuna fishing	0	4	7
	Observers for sharks	0	1	1
	Observers for HMS (multi-species)	0	1	1
	Shark research on a non-scientific vessel	2	4	4
	Tuna research on a non-scientific vessel	1	4	4
	HMS research on a non-scientific vessel	1	4	4
	TOTAL	**19**	**28**	**29**
Scientific Research Permit	Shark research	0	2	2
	Tuna research	4	1	1
	Billfish research	2	1	0
	HMS (multi-species) research	0	1	1
	TOTAL	**6**	**5**	**4**

10. ISSUES FOR CONSIDERATION AND OUTLOOK

The HMS Management Division strives to create economically and biologically healthy fisheries that can serve as an exemplary model of fisheries management. By identifying and addressing emerging issues in a timely manner, NOAA Fisheries can achieve and maintain the balance of biological and economic imperatives necessary to realize stable, prosperous, and sustainable HMS fisheries.

The information provided in this section serves as a means of introducing important unresolved and novel HMS management issues. This section is included for discussion purposes and is based on input from the general public, federal advisory panels, staff concerns, and other forums. The issues discussed in it are intentionally broad in scope. The order of discussion within each time-delineated subsection does not reflect any order of importance. It is also important to note that the information presented below is not meant to be an exhaustive list of management issues facing the HMS Management Division, and NOAA Fisheries welcomes input on issues pertaining to HMS fisheries. This section can also be used as a starting point for discussions by the joint HMS and Billfish Advisory Panels.

10.1 Issues In Process

The following issues are active in the federal rule making process.

10.1.1 Incidental Catch of Atlantic Bluefin Tuna

Since the early 1980s, NOAA fisheries has implemented and evaluated target catch requirements in an effort to minimize bycatch and discards of BFT, while implementing the prohibition on the use of longline gear in a directed BFT fishery. In 1981, NOAA Fisheries prohibited the use of longlines for a directed BFT fishery and implemented incidental catch limits (46 FR 8012, January 26, 1981). Longline fishermen were restricted to two BFT per vessel per trip in a southern region and two percent by weight of all other fish on board in a northern region. In 1982, ICCAT recommended a ban on directed fishing for BFT in the Gulf of Mexico. Over the following decade, the value of BFT increased dramatically and fishing practices evolved with respect to incidental catch of BFT. In response, NOAA Fisheries established various strategies to discourage pelagic longline vessels from developing a target fishery for this valuable species while allowing for the retention of incidentally caught BFT.

The current target catch requirements have not changed since 1994, and currently restrict longline vessels to one fish per vessel per trip in the southern region (south of 34^{o} N. Latitude) with a minimum of 1,500 lbs. of other fish landings from January through April, and 3,500 lbs. of other fish landings from May through December. North of 34^{o} N. Latitude, BFT landings by longline vessels are restricted to two percent by weight of all other landed catch. Despite efforts to alter target catch requirements and adjust geographic management areas, bycatch and discards

of BFT by U.S. pelagic longline vessels have continued, and NOAA Fisheries has continued to evaluate management alternatives to address this issue. Over time, NOAA Fisheries has adjusted the regulations to try to achieve a balance between allowing the retention of truly incidentally caught BFT while preventing a directed fishery and reducing discards.

NOAA Fisheries published a proposed rule on December 24, 2002 (67 FR 78404) evaluating several options, weighing the ability of each option to meet objectives and analyzing the economic and policy implications. The proposed rule, if adopted, would adjust the coastwide target catch requirements to 2,000 lbs. of other fish landings to retain one BFT, and 6,000 lbs. of other fish landings to retain two BFT, in all areas. The preferred alternative would maintain a boundary line between the northern and southern areas to prevent one area from consuming all the incidental longline quota, but would move the boundary line to an area with little longline fishing activity nearby, and would adjust the longline quota subdivision to reflect the change in areas. The North/South boundary line is proposed to be moved to 31°00' N. Latitude, near Jekyll Island, Georgia, and the North/South quota subdivision within the Longline category would be adjusted to allocate 30 percent to the northern area and 70 percent to the southern area (the current subquota allocation is 21.1 percent to the northern area and 78.9 percent to the southern area). The proposed action would also provide NOAA Fisheries with in-season authority to adjust the BFT retention limits for pelagic longline vessels (within a range of zero to three BFT per trip by number and/or within a 25 percent range of the target catch requirements by weight).

10.1.2 Bigeye Tuna/Swordfish Statistical Document and Re-export Certificate

To comply with recommendations from ICCAT's 2001 annual meeting, NOAA Fisheries must implement a trade monitoring program for the import, export, and re-export of swordfish and bigeye tuna. The underlying purpose of this program is to prohibit international trade in illegal, unregulated and unreported landings as well as to further understanding of catches and trade for these species. Under the Atlantic Tunas Convention Act, the United States is obligated to implement ICCAT recommendations.

The overall program will be similar to ICCAT's existing bluefin tuna statistical document program. A statistical document is generated for each shipment by the exporting country and accompanies the shipment to its final destination. If an imported shipment is then exported, a re-export certificate must be employed. The most significant issue associated with this action is the evident need to develop a comprehensive, agency-wide approach to trade monitoring programs. An interim approach of adding to current programs is supported, with future re-evaluation of NOAA Fisheries trade programs slated for the near future.

NOAA Fisheries will be developing an economic analysis of the impact of this program, and formulating the best method for implementation during early 2003. As part of the analysis, impacts on dealers must be ascertained, particularly in regards to the number of U.S. dealers (importers/exporters) affected on the Pacific, Gulf of Mexico, and Atlantic coasts as well as in the

Pacific Islands. Impacts to the nature of trade are also of interest, taking into account product form and the most frequently used ports of entry and/or export. Finally, any additional administrative burdens on dealers associated with completion of forms will be considered.

10.2 HMS Issues Under Short-term Consideration

The following is an anticipatory look at some of the issues NOAA Fisheries HMS Management Division expects to consider for rule making in the next three to 18 months.

10.2.1 Atlantic Bluefin Tuna Purse Seine Fishery Start Date

An objective of the HMS FMP is to manage Atlantic HMS fisheries for continuing optimum yield, which includes consideration of economic and market concerns. A related objective is to coordinate domestic management of fishery sectors, including minimizing gear conflict, and coordinating overlapping regional and individual participation. Historically, scheduling of the purse seine bluefin tuna fishery has taken into account both of these objectives, and attempted to avoid over-supply of bluefin on domestic and international markets by coordinating activity patterns between purse seiners and other sectors of the commercial fishery. In the early to mid 1980's, the purse seine season was postponed for about a month to avoid a market-glut of landings from both purse seine and general category fisheries. Delaying the purse seine season until August staggered the purse seine start date from the June 1st general category opening, and improved earnings for both fishery sectors. This strategy was an effective approach for many years.

Recently, however, the bulk of landings from the general category fishery has shifted to later in the season, again overlapping the purse seine season. By shifting the purse seine start date back to earlier in the year, this category may be able to provide the market with product during time when other fisheries are less active. In order to investigate this approach and provide the purse seine sector with access to a better market, NOAA Fisheries issued exempted fishing permits in 2002, which allowed purse seine vessels to fish earlier in the season. One of the five vessels comprising this category took advantage of this opportunity.

A number of factors must be investigated as this issue is further considered. Would an earlier start date in fact decrease market glut and improve earnings? Would this type of action be an overall benefit to the fishery and the nation? Would it adversely affect any other fishery sector? If a change in start date is warranted based on the answers to these questions and other information, it could be enacted either through the current exempted fishing permit approach, or through a change to the HMS regulations.

10.2.2 Atlantic Bluefin Tuna Allocation

The FMP for Atlantic tunas, swordfish, and sharks established quota allocation among the bluefin tuna fishery sectors based on historical patterns in the bluefin fishery. A suballocation in many sectors has also been made to maximize fishing opportunities and provide equitable access to the fishery. In addition, NOAA Fisheries has the ability to make in-season transfers among sectors to address changes in fish behavior, distribution, and fishing patterns.

During the Fall of 2002, NOAA Fisheries received a petition from the North Carolina Division of Marine Fisheries (NCDMF) requesting that a rulemaking to amend the HMS regulations be initiated in order to modify the current bluefin allocation criteria and create a General category winter time-period sub-quota. Specifically, NCDMF requested that 23% of the General category quota (an amount equal to 153 mt for 2002) be allocated to a new December 1 through January 31 time-period subquota. The petition states that the quota allocated to the late season General category fishery does not provide reasonable opportunity to harvest bluefin when they appear off the South Atlantic coast during the winter months. In the past, the HMS Advisory Panel has discussed this issue extensively without reaching consensus and NOAA Fisheries has maintained the status quo in the annual fishery specifications.

NOAA Fisheries issued a Federal Register notice announcing receipt of the petition and requesting comments by the December 18, 2002 deadline. These comments will be summarized and made available to the petitioner and HMS Advisory Panel for further consideration and discussion.

10.2.3 On-line Atlantic HMS Tournament Registration, Reporting, & Calendar

NOAA Fisheries' HMS Management Division is constantly searching for new ways to improve constituent services and streamline constituent requirements while improving the agency's ability to manage Atlantic HMS. To that end, the HMS Management Division is interested in creating a public access on-line system for tournament operators to register tournaments, fulfill tournament reporting requirements, and possibly view a calendar displaying the dates and venues of other registered tournaments. After March 2, 2003, this site could also potentially serve as the central location for anglers to report their recreational landings of sailfish, Atlantic blue and white marlin, and swordfish. A similar system exists and has been successful for reporting Atlantic bluefin tuna at www.nmfspermits.com.

NOAA Fisheries collects information on fishing tournaments involving the catch and/or landing of Atlantic highly migratory species. This information is necessary to estimate tournament fishing effort and landings of HMS for stock assessments and national statistical reports. The HMS regulations require that tournament operators notify NOAA Fisheries of the purpose, dates, and location of all tournaments targeting HMS conducted from ports in Atlantic coastal states, including the U.S. Virgin Islands and Puerto Rico, at least 4 weeks prior to commencement of the tournament.

Presently, tournament registration is accomplished using a fax/mail-in system where tournament operators submit hard copies of the tournament registration form and NOAA Fisheries employees enter it into the existing HMS Fish Tournament Registry. NOAA Fisheries notifies tournament operators in writing, when their tournament has been selected for reporting. Tournament operators that are selected must maintain and submit to NOAA Fisheries records of catches and effort on forms available from NOAA Fisheries. Tournament operators must submit completed forms to NOAA Fisheries postmarked no later than the 7th day after the conclusion of the tournament and must attach a copy of the tournament rules. These results are then faxed to the NOAA Fisheries Southeast Fisheries Science Center for inclusion in stock assessments and national statistical reports.

The HMS Management Division believes that the creation of a publically accessible on-line registration database could improve constituent service by streamlining registration and reporting procedures, improve compliance with the mandatory HMS tournament registration and reporting requirements by easing access, and provide a proven system for recreational anglers to report their landings, all while minimizing NOAA Fisheries internal workload.

10.2.4 Shark Regulations and an Amendment to the HMS FMP

NOAA Fisheries intends to amend the Fishery Management Plan for Atlantic tunas, swordfish, and sharks (HMS FMP) to revise the management measures for Atlantic sharks based on the results of the 2002 large and small coastal shark stock assessments and the subsequent peer review of the 2002 large coastal shark stock assessment (see the Notice of Intent to do an Environmental Impact Statement 67 FR 69180, November 15, 2002). The amendment will examine management alternatives available to rebuild or prevent overfishing of Atlantic sharks, consistent with the results of the 2002 stock assessments for large and small coastal sharks, the Magnuson-Steven Act, and other relevant federal laws. The ensuing management decisions will affect the well-being of shark fishery communities and their economic condition as well as the status of the resource.

The first step in the development of an amendment to the HMS FMP is to collect comments and ideas from the interested public. In order to provide a means for the public to consider different management options, NOAA Fisheries has prepared an Issues and Options (IO) paper. The IO paper describes the major issues, current management and legal requirements, and identifies potential management measures (including measures already in effect) to address these issues in the fisheries for Atlantic sharks. While the IO paper lists many different issues and options, NOAA Fisheries anticipates that additional issues and options will be identified by the public during the public comment period. All comments received on the IO paper and during the public comment period will assist NOAA Fisheries in determining the options for rulemaking to conserve and manage shark resources and shark fisheries.

For details regarding the issues and options for shark management, please see the IO

paper. Below is a list of a few of the topics contained in the IO paper.

1. Commercial quotas (e.g., Group, Species-specific, Spatial-specific, Temporal-specific, Gear-specific, Combination of above options, Individual fishing quota)
2. Commercial fishery closures (e.g., Fishing season notification 30 days prior to opening, Five day advanced notice of closure, 14 day advanced notice of closure)
3. Commercial minimum size and other limits (e.g., Group-specific, Species-specific, Sex-specific, Time/Area Closures)
4. Commercial trip limits for directed permit holders (e.g., Limits on all species groups, Limits on some species groups such as the, 4,000 lb dw for LCS, Limits based upon average catch, Allow incidental landings during a directed closure, None)
5. Commercial trip limits for incidental permit holders
6. Recreational retention limits (e.g., Group-specific, Sex-specific, Charter/Headboat-specific, Tournament-specific, Male harvest only)
7. Recreational minimum sizes and other limits (e.g., Group-specific, Species-specific, Sex-specific, Charter/Headboat-specific, Tournament-specific, Time/Area closures)
8. Reduction of shark bycatch (e.g., Close nursery and pupping grounds, Close overwintering grounds, Issue non-transferable permits allowing access to selected areas, Close EFH or areas of particular concern)
9. Prohibited species (e.g., Status quo, Remove dusky shark or other species from list, Return to the 5 species in 1997, Allow limited numbers of display species to be collected with a separate collection permit, None)

In the course of amending the HMS FMP, NOAA Fisheries is also going to examine its designations of EFH for sharks. Under the Magnuson-Stevens Act, EFH designations must be periodically reviewed and revised or amended as warranted, based on new information.

This amendment to the HMS FMP will also examine the regulations that allow the issuance of exempted fishing permits (EFPs) for all HMS. Issuance of EFPs or scientific research permits (SRP) may be necessary because possession of certain shark species is 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. NOAA Fisheries has been made aware of growing concerns about the EFP/SRP issuance process. Specifically, current concerns relate to lenient accountability requirements in the live capture of HMS. Concerns have also been noted that EFPs should not allow access to closed areas for the purposes of research (i.e., bycatch reduction experiments), that commercial sale of fish caught during exempted fishing activities should not be allowed to offset the costs of conducting scientific research, and that EFPs should not allow the capture of prohibited sharks for the purpose of public display. Some of the options listed in the IO paper

include, but are not limited to:

10. Issue EFPs for all species groups within the management unit
11. Issue EFPs for some species groups within the management unit (e.g., LCS, SCS, and pelagic sharks for public display and scientific research only; prohibited species for public display and scientific research only
12. Issue EFPs for none of the species groups within the management unit
13. Improve overall accountability in the EFP/SRP issuance process (i.e., call in and out 72 hours in advance of activity, passive integrated transponder tags required for implantation in live collections, application must include gear deployment, monitoring, and soak time in order to minimize mortality of live captures, mandatory observer placement, VMS employed on directed swordfish vessels will negate necessity for EFP to allow delayed offloading)
14. Limit or prohibit commercial sale of fish caught during exempted fishing activities

10.3 HMS Issues Under Long-term Consideration

The following is an overview of some of the issues the HMS Management Division expects to examine in more detail in the future.

10.3.1 Commercial Atlantic Bluefin Tuna Minimum Size Limits

Over the last few years NOAA Fisheries has received comments from several organizations and individuals in support of adjusting the minimum size for commercial BFT and liberalizing the Large medium bluefin tuna (BFT measuring between 73 and less than 81 inches) allowance for Purse Seine and Harpoon category vessels. Until July of 1992, commercial BFT vessels had the ability to land and sell Large school/Small medium BFT (BFT measuring between 47 and less than 73 inches). On July 24, 1992, NOAA Fisheries published a final rule that prohibited the sale of BFT less than the Large medium size class (57 FR 32905). Effective June 1, 1998, NOAA Fisheries also prohibited persons aboard vessels permitted in the General category from retaining BFT less than the Large medium size class. These actions effectively separated the commercial and recreational fisheries and quotas, with the exception of HMS CHB permitted vessels.

Since 1998, landings of the Large school/Small medium size class BFT have been minimal. This has led to large amounts of quota transfer of this size class from one fishing year to the next. Also, over the last several years NOAA Fisheries has implemented a number of in-season quota transfers of the Large school/Small medium size class to provide U.S. fishing vessels with a reasonable opportunity to harvest the U.S. BFT quota.

Since 2001, public comments have been received requesting HMS to reconsider the minimum size for commercially harvested BFT. A number of reasons have been articulated to

justify these requests including reducing discards, access to a broader range of fishing opportunities, and reducing the amount of quota that is transferred from year to year. Reducing the commercial BFT minimum size limit and/or liberalizing the large medium bluefin tuna allowance for Purse Seine and Harpoon category vessels may have a number of impacts to the BFT stock rebuilding and fishing sectors. Further discussion of these potential impacts is encouraged by the Advisory Panel members.

10.3.2 Review of EFH for HMS

Regulations implementing Magnuson-Stevens Act essential fish habitat (EFH) provisions (67 FR 2343, January 17, 2002) specify that EFH designations periodically be reviewed and subsequently revised or amended as warranted, based on new information. The review of new information should be reported in the annual SAFE report. The regulations also specify that a complete review of all EFH information be conducted at least once every 5 years. In addition, shark EFH designations are about to undergo a complete review and be amended or revised as new information warrants, for incorporation into Amendment 1 of the HMS FMP, which is scheduled for publication in 2003. Following publication of the FMP amendment pertaining to sharks, the HMS Division intends to review EFH designations for other HMS, as well, although at this time the exact time-frame has not been determined.

10.3.3 Extension of NED Experimental Measures to Minimize Sea Turtle Interactions

The June 14, 2001, Biological Opinion included a recommendation that NOAA Fisheries conduct a three-year experimental fishery in the northeast distant statistical reporting (NED) area to attempt to reduce the interactions between pelagic longline gear and sea turtles. In the fall of 2001, NOAA Fisheries conducted the first year of the experimental fishery. The measures that were examined included the use of blue-dyed squid and spacing the gangions lines farther away from the float lines. Following an examination of the data, NOAA Fisheries discovered that the measures had no significant effect upon the catch of sea turtles. In the summer and fall of 2002, NOAA Fisheries conducted the second year of the experimental fishery. The use of circle hooks, mackerel bait, and shortened daylight soak time were tested to examine their usefulness in reducing the capture of sea turtles. NOAA Fisheries is currently waiting for statistical analyses to be performed to assess the effectiveness of the experimental fishing measures, results are expected by early February.

Based on the success of the measures examined in 2002, NOAA Fisheries will discuss what should be examined in 2003. If the target of a 55% reduction in the incidental catch of sea turtles can be reached following the conclusion of the NED experimental fishery, then the NED area can be reopened to pelagic longline fishing with the adoption of the successful fishing methods. In addition, NOAA Fisheries will assess the appropriateness of adopting the successful sea turtle reduction measures for the pelagic longline vessels fishing outside the NED area to

further comply with the Endangered Species Act.

10.3.4 Authorized Fishing 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, NOAA Fisheries needs be cognizant of these advances to gauge their potential impacts on the resource and resource use. New or modified fishing gears and techniques may have significant positive or negative 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 NOAA fisheries for qualification as an authorized gear type.

NOAA Fisheries has become aware that one unclassified gear type, referred to as the "green stick rig", may be being used by fishermen to target Atlantic HMS with increasing frequency and success. Green stick fishing gear has been used in other parts of the world for many years. The green stick technology made its U.S. debut in Hawaii during the 1980's but was originally developed in Japan. The term green stick refers to a certain brand of gear developed in Japan that used an olive green pole. Other brands have marketed gears with poles in orange, black, and blue, but regardless of the brand or color, the generic "green stick" nickname is still used. The green stick fishing rig is a gear that is used primarily to target tunas (Wescott, 1996).

The configuration of the gear may vary, but generally consists of a 35 - 45 foot fiberglass pole mounted to the deck of a vessel or on top of the wheelhouse. A mainline housed in a spool at the stern of the vessel 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. At the end of the mainline a floating decoy is attached. This decoy, also called a "shava" or bird, provides drag as the vessel moves forward and puts tension on the mainline. Several leaders of specific lengths 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 bird jumps, bobs, and splashes, creating commotion and tugs at the green stick. As the lures attached to the mainline skip across the water's surface, 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 reeled in 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 bird 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 sportfishing, allowing multiple anglers to fish individually tended lines hoisted by the green stick's one mainline

(Wescott, 1996).

NOAA Fisheries intends to work with the fishing community to obtain a more complete understanding of green stick gear impacts on catches of target and non-target species, bycatch post-release mortality, seabird interactions, interactions with protected resources, the potential for conflicts with other gear types, changes in patterns of fishing effort, as well as the frequency and scope of its use in targeting HMS fisheries. Absent an understanding of these and other factors, it is difficult for NOAA fisheries to make a determination on whether or not this or any novel gear should qualify as an authorized gear type.

10.3.5 HMS Observer Programs

The regulations for HMS allow NOAA Fisheries 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 Atlantic Angling categories can be requested to take observers on a voluntary basis. Among other things, observer programs allow NOAA Fisheries to collect biological information on individual fish (e.g., species, sex, and length), to verify self-reported logbook data–including bycatch data, to observe how the fishery operates, and to collect information regarding protected species. The June 14, 2001, Biological Opinion also requires NOAA Fisheries to collect observer information specific to sea turtles and marine mammals, such as genetic samples, and for trained observers to tag sea turtles.

Currently, the only HMS fishermen that have been selected for observer coverage are: fishermen with directed swordfish limited access permits that use pelagic longline gear and fishermen with directed shark limited access permits that use bottom longline gear or gillnet gear. While there are issues that need to be addressed (e.g., budget, insurance, safety, and observer forms and data entry), NOAA Fisheries would like to move forward with observer programs in other HMS fisheries and believes that working with affected constituents to determine the best method of doing so is essential to establishing a successful program.

10.3.6 HMS Vessel Logbook and Cost-Earnings Reporting

The HMS FMP requires permitted shark, tuna and swordfish vessels, and Atlantic HMS Charter/Headboat vessels to submit logbooks for all HMS trips, if selected by NOAA Fisheries. Vessel logbook programs provide critical fishery dependent information to the Agency on fishing behavior, including vessel characteristics, effort, and amounts of fish caught (landed as well as discarded). The data is used by the agency for a variety of purposes including quota monitoring, stock assessments and monitoring the impacts of management measures on the industry and the stocks.

In the 2001 SAFE Report, NOAA Fisheries included a discussion regarding reporting in logbooks, possible options regarding the selection of people to report in logbooks (e.g., 10

percent of General category permit holders, 10 percent of charter/headboat permit holders, etc.), and possible options for logbook formats (e.g., electronic logbooks, a whole new HMS only logbook, etc.). Since that time, NOAA Fisheries has received approval from the Office of Management and Budget to expand the vessel logbook collection requirement to include the collection of information regarding the cost of fishing equipment for trips and payments to crew (cost-earning information). This cost-earnings information is needed to help NOAA Fisheries evaluate the economic impact of different management options as required under the Regulatory Flexibility Act, Executive Order 12866, and NEPA and to minimize any potential impacts of fishermen and communities.

Since 1996, this type of cost-earnings information had been collected voluntarily from vessels reporting swordfish and shark catches in the HMS pelagic logbook form. However, the voluntary program failed to provide information for all sectors of these HMS fisheries and did not provide information on HMS fishermen using gear types other than longline. In order to improve the type and scope of data collected, NOAA Fisheries decided to make the reporting of this information mandatory if selected. The mandatory cost-earnings reporting for selected vessels was formally implemented in the commercial swordfish and shark fisheries on January 1, 2003. NOAA Fisheries plans to expand the selection process to include tuna and charter/headboat permit holders within the next year or two. Before this expansion occurs, NOAA Fisheries will need to examine other logbooks that permit holders currently use to minimize the chance of duplication in other logbook programs.

Additionally, in October 2002, NOAA Fisheries received approval from the court to implement a vessel monitoring system (VMS) in the HMS pelagic longline fishery. NOAA Fisheries expects to implement VMS this year. While VMS will help NOAA Fisheries enforce a number of regulations, including the time/area closures, it can also be expanded to allow for the use of electronic logbooks. NOAA Fisheries plans to examine this issue and looks forward to working with fishermen to streamline the reporting system and possibly developing a working electronic logbook system.

Section 10 References

Wescott, W. 1996. The Wanchese Green Stick Tuna Rig. North Carolina Sea Grant. UNC-SG-96-04.

APPENDIX A: FINAL NATIONAL PLAN OF ACTION (NPOA) FOR THE CONSERVATION AND MANAGEMENT OF SHARKS

Summary

Sharks, skates, rays (elasmobranchs) and the chimaeras together comprise the class Chondrichthyes, or cartilaginous fishes.[1] As a group, elasmobranchs present an array of problems for fisheries management and conservation. Elasmobranchs are primarily at the top of the food web, often top-level carnivores (Cortés, 1999), and their abundance is relatively small compared to groups situated in lower trophic levels. Thus, fishing elasmobranchs down to unsustainable levels may occur rapidly, and successful management of elasmobranch fisheries requires a stronger commitment to fishery monitoring, biological research, and proactive management than many teleost fisheries (Walker, 1998).

Few countries (including Canada, New Zealand, Australia, South Africa, and the United States) have specific fishery management plans for certain shark fisheries and there are no international management mechanisms effectively addressing the capture of sharks at present. However, a number of international bodies, e.g., the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Northwest Atlantic Fisheries Organization, and the Inter-American Tropical Tuna Commission, have initiated efforts to encourage member countries to collect information about shark catches and, in some cases, develop regional databases for the purpose of stock assessments. In addition, some countries already have laws that facilitate international management. For instance, U.S. participation in international management initiatives is guided by the Atlantic Tunas Convention Act and the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks.

In recognition of the need for improved international coordination, in 1994, the Ninth Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) adopted a Resolution on the Biological and Trade Status of Sharks, requesting that: (1) The United Nations Food and Agriculture Organization (FAO) and other international fisheries management organizations establish programs to collect and assemble the necessary biological and trade data on shark species; and (2) all nations utilizing and trading specimens of shark species cooperate with FAO and other international fisheries management organizations. In February 1999, the FAO Committee on Fisheries (COFI) endorsed the *International Plan of Action for the Conservation and Management of Sharks* (IPOA). This plan was commended by the March 1999 FAO Fisheries Ministerial, endorsed by the June 1999 FAO Council, and adopted by the November 1999 FAO Conference. The IPOA builds upon the FAO

[1] The International Plan of Action for the Conservation and Management of Sharks considers the term "shark" to include all species of sharks, skates, rays, and chimaeras.

Code of Conduct for Responsible Fisheries, encompasses all elasmobranch fisheries (commercial and recreational), and calls on all member nations to implement, voluntarily, the IPOA through the development of a national plan of action.

The objective of the IPOA is to ensure the conservation and management of sharks and their long-term sustainable use. In the IPOA, member nations have agreed voluntarily to develop, implement, and monitor a national plan of action if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries. As stated in paragraph 22 of the IPOA, shark plans should aim to:

1. Ensure that shark catches from directed and non-directed fisheries are sustainable;
2. Assess threats to shark populations, determine and protect critical habitats, and implement harvesting strategies consistent with the principles of biological sustainability and rational long term economic use;
3. Identify and provide special attention in particular to vulnerable or threatened shark stocks;
4. Improve and develop frameworks for establishing and coordinating effective consultation involving stakeholders in research, management, and educational initiatives within and between member Nations;
5. Minimize unutilized incidental catches of sharks;
6. Contribute to the protection of biodiversity and ecosystem structure and function;
7. Minimize waste and discards from shark catches in accordance with article 7.2.2. (g) of the *Code of Conduct for Responsible Fisheries* (for example, requiring the retention of sharks from which fins are removed);
8. Encourage full use of dead sharks;
9. Facilitate improved species-specific catch and landings data and monitoring of shark catches;
10. Facilitate the identification and reporting of species-specific biological and trade data.

Additionally, national plans of action are to be implemented by United Nations Food and Agriculture Organization (FAO) members in a manner consistent with the FAO (1995) *Code of Conduct for Responsible Fisheries* and any applicable rules of international law, and in conjunction with relevant international organizations.

Consistent with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and the IPOA, the United States finalized its National Plan of Action (NOA) on February 15, 2001 (66 FR 10484). In addition to the objectives of the IPOA, the NPOA identifies the following management principles:

Adopt the Precautionary Approach: Management entities should initiate, continue, or improve research on elasmobranch catches in their fisheries, address the uniqueness of

each fishery, identify key habitats and their impacts on populations, and implement necessary elasmobranch management measures before stock declines are evident.

Protect Vulnerable Life History Stages: Management entities should consider protecting juvenile, subadult, and early adult life history stages and habitat in order to rebuild overfished shark stocks and to prevent overfishing on other shark stocks. Potential measures to increase protection of sensitive life history stages include minimum sizes for retention, enhanced conservation of essential fish habitat, and time/area closures of nursery areas.

Protect Vulnerable Species: Management entities should consider additional, separate measures to protect species particularly vulnerable to overfishing. Potential measures to increase protection of vulnerable species may include prohibiting possession of that species (e.g., white sharks in California, numerous species in Atlantic Federal waters), time/area closures or marine reserves to protect important habitats or essential fish habitat, gear modifications, and precautionary limits on harvest levels.

Minimize Waste: Management entities should consider measures to minimize waste, discards, and unutilized incidental catches in shark fisheries, consistent with the Shark Finning Act and the IPOA.

Prioritize Limited Resources: Management entities should determine whether a particular species is overfished, which fisheries should be regulated in regard to shark catches, and determine which shark species have higher conservation needs and act appropriately.

Implementation of the NPOA in Atlantic Highly Migratory Species (HMS) Fisheries

The authority for implementing the U.S. NPOA in Atlantic HMS Fisheries comes from the U.S. participation and endorsement of the IPOA as well as through the Magnuson-Stevens Act. The Magnuson-Stevens Act defines Atlantic HMS as Atlantic tunas (bluefin, bigeye, albacore, yellowfin, and skipjack), Atlantic swordfish, Atlantic billfish (blue and white marlin, longbill spearfish, and sailfish), and oceanic sharks. The Magnuson-Stevens Act further designates the Secretary of Commerce with the authority to manage these species directly. Thus, NOAA Fisheries, as the designee for the Secretary of Commerce, has jurisdiction of shark fisheries in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea in Federal waters.

The NPOA calls for data collection, population assessments, evaluation of the need for management measures, research and development of mitigation measures and methods, limitations on fishing capacity, outreach and education, and reporting and monitoring. In addition to the existing programs summarized in the Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks as well as the NPOA, NOAA Fisheries has taken several actions to implement the NPOA in Atlantic HMS fisheries.

1. *Data Collection: Data collection programs should collect reliable data to determine the directed and incidental catch, bycatch, and disposition of elasmobranchs by the various fisheries; the effectiveness of existing management measures; the locations and characteristics of nursery and wintering grounds; information on EFH or key habitat for all life stages; and the status of the stocks.*

Implementation in Atlantic HMS fisheries:

In January 2002, NOAA Fisheries converted the voluntary shark bottom longline observer program to a mandatory program. This observer program, started in 1994, attempts to observe four percent of the effort by the commercial shark fleet and is currently managed by the University of Florida. The program has observed, on average, just over two percent of the large coastal sharks landed by the commercial fleet, and in 2001, observed over four percent. The data collected by this program enhances the reliability of management strategies for the shark fishery and has been used in stock assessments. Observers provide baseline characterization information, by region, on the species composition, relative abundance, and size composition within species for the large coastal and small coastal bottom longline shark fisheries. During the 2002 sampling season, a total of 60 shark trips were observed, representing 133 sets yielding 648,103 observed hook hours. Catches, catch rates, and disposition were documented for total of 4057 LCS and 1560 SCS(A. Morgan, pers. communication).

NOAA Fisheries continues to conduct an observer program in the southeast shark drift gillnet fishery. During right whale calving season (November 15 through March 31), 100 percent observer coverage of all shark trips is required. Outside of right whale calving season, a statistically significant level of observer coverage is required (currently approximately 53 percent of all shark trips). During the 2002 right whale calving season, a total of 41 drift gillnet sets and 24 strikenet sets were observed (Carlson and Baremore, 2002a). Catches, catch rates, and disposition were documented for total of 10,162 sharks (ten species). Outside the right whale calving season (April 1 through November 14), a total of 28 drift gillnet sets and 14 strikenet sets were observed (Carlson and Baremore, 2002b). Catches, catch rates, and disposition were documented for total of 11,803 sharks (11 species). These data have also been used in stock assessments.

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 geography (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). In 2001, of the 2,676 vessels with Federal permits in these fisheries, a total of 454 vessels were selected to report.

In order to continue to delineate shark distributions and migratory patterns, the Cooperative Shark Tagging Program (CSTP) and Mote Marine Laboratory (MML) Center for Shark Research (CSR) continue to tag sharks. In 2001, nearly 5,300 sharks were tagged by the CSTP and 547 were recaptured.. Between 1962 and 2001, more than 171,000 sharks of 40 species have been tagged and 10,032 sharks of 32 species have been recaptured, as a result of the CSTP. Eighty-seven percent of the tags are represented by eight species: blue shark, sandbar shark, tiger shark, dusky shark, shortfin mako, blacktip shark, Atlantic sharpnose shark, and scalloped hammerhead. Eighty-eight percent of the recaptures are made up of seven species: blue shark, sandbar shark, shortfin mako, tiger shark, lemon shark, blacktip shark, and dusky shark. By the end of 2001, the CSR has tagged 9,741 sharks of 16 species and has received data on 355 recaptures (Hueter, 12/29/02).

NOAA Fisheries occasionally conducts fishery independent bottom longline surveys along the Atlantic coast and in the Gulf of Mexico to monitor the distribution, abundance, and species composition of sharks, tag sharks for migration studies, collect biological samples for age and growth, feeding ecology, and reproductive studies, and collect morphometric data. The last such surveys were done in 2001. The next Atlantic coast survey is planned for spring 2003.

The Northeast Fisheries Science Center continued the Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey which is an ongoing investigation of known and putative shark nursery grounds along the East Coast of the United States. The following cooperative institutions participated by investigating shark nursery areas in their state waters in 2001: North Carolina Division of Marine Fisheries, South Carolina Department of Natural Resources, and University of Georgia's Marine Extension Service. Researchers from the NOAA Fisheries and the University of Rhode Island conducted the study in Delaware Bay. COASTSPAN cooperators sampled a total of 2706 sharks in 2001. Seven hundred and eight of the sharks sampled were tagged with fin tags and released. Juvenile sharks caught by these states in 2001 were: Atlantic sharpnose (Rhizoprionodon terraenovae), blacknose (Carcharhinus acronotus), blacktip (C. limbatus), bonnethead (Sphyrna tiburo), finetooth (C. isodon), lemon (Negaprion brevirostris), nurse (Ginglymostoma cirratum), sandbar (C. plumbeus), sandtiger (Carcharias taurus) scalloped hammerhead (S. lewini), smooth dogfish (Mustelus canis), spinner (C. brevipinna) and tiger (Galeocerdo cuvier) sharks.

The MML CSR has also conducted tagging studies with the cooperation of the Instituto Nacional de la Pesca in Mexico. In the six field trips to date (1995, 1996, 1997, 1998, 2000, 2001), a total of 390 gillnet sets have been made resulting in the capture and tagging of 1,160 juvenile blacktip sharks with Spanish/English dart tags (asked Hueter 12/29/02).

2. <u>Assessment:</u> *Assessments of elasmobranchs subject to directed, incidental, or bycatch fishing mortality to determine the sustainable level of fishing mortality should be conducted following the completion of this NPOA by NOAA Fisheries, the Councils, the Commissions, and appropriate States (management entities). The purpose of the*

assessment is to determine whether the level of total fishing mortality of shark, skate, and ray species is sustainable. To continue to improve upon existing elasmobranch assessments and help make future assessments more effective, the following items should be included for collection and analysis: Fishery-dependent data on catches, landings, bycatch, effort, and gears and areas fished; fishery-independent data on distribution and abundance; fishing fleet data; habitat data; market (utilization, price) and trade data (imports and exports); and monitoring of fisheries with directed and incidental catches and bycatch of elasmobranchs (e.g., observer programs).

Implementation in Atlantic HMS fisheries:

NOAA Fisheries conducted two new shark stock assessments, one on large coastal sharks and one on small coastal sharks, in 2002. Both assessments used a variety of models and catch data to estimate the status of these two complexes. The large coastal shark stock assessment was also peer reviewed, per a court-approved settlement agreement. This peer review was completed in mid-December and is currently being reviewed by NOAA Fisheries staff. Also in 2002, NOAA Fisheries received a small coastal shark stock assessment conducted by MML and the Florida Museum of Natural History. NOAA Fisheries has begun work on an amendment to the Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks based on the results of these stock assessments (67 FR 69180, November 15, 2002).

The ICCAT's Standing Committee on Research and Statistics (SCRS) Subcommittee on Bycatch has recommended that ICCAT take the lead in conducting stock assessments for Atlantic blue, porbeagle and mako sharks. The subcommittee held a data preparatory meeting to review all available shark statistics in September, 2001. Numerous papers on catches and catch rates as well as two papers on assessment methodologies were presented. The Commission is considering adoption of a resolution that the SCRS should conduct assessments for Atlantic shortfin mako and blue sharks in 2004, and hold an interim meeting in 2003, as SCRS considers necessary, to determine improvements in data collection.

NOAA Fisheries solicited a status review for dusky sharks from the fishery-independent shark monitoring program at the Virginia Institute of Marine Science (VIMS) and Florida State Museum Commercial Shark Fishery Observer Program, which was completed in 2001. The dusky shark was listed on the Endangered Species Act Candidate Species List in 1997 due to its depleted stock status and concern for further stock declines. Observer program analyses indicate a distinct shift in catch composition from a widely scattered size distribution in 1994 to catches comprised primarily of sharks less than 110 cm FL (0-2 age classes) in 1999 (Romine et al. 2001). VIMS data show a decrease in relative abundance from 1980 to 1992, however recent years (1997-2000), have shown an increase in relative abundance. Observer catch rate data show an increase from 1974-1999, particularly for dusky sharks less than 110 cm FL, although catch rates of sharks greater than 170 cm FL declined over the period (Romine et al. 2001).

The NOAA Fisheries Southeast Fisheries Science Center (SEFSC) conducted a study on demographic modeling of sharks that included estimation of natural mortality rates of sharks through indirect life history methods, and incorporated uncertainty in vital rates on demographic analyses of sharks (Cortés, 2002). Monte Carlo simulation was used to reflect uncertainty in estimates of demographic traits and to calculate populations statistics and elasticities. Results indicate that research, conservation, and management efforts should focus on juvenile survival, age at maturity, and reproduction.

The SEFSC also studied the life history and population dynamics of the finetooth shark by determining age, growth, size-at-maturity, natural mortality, productivity, and elasticity of vital rates of the population (Carlson et al., in press). Results suggest the finetooth shark exhibits life-history traits and population parameters that fall between some large coastal sharks such as the blacktip shark and those of other small coastal species.

In January 2003, NOAA Fisheries began to collect mandatory cost-earning information from a random selection of 20 percent of fishermen with a directed shark limited access permit. Collection of this information will help NOAA Fisheries chose management measures that are sustainable and that minimize economic impacts on fishermen.

3. <u>Need for Management Measures:</u> *If the assessment concludes the stock is overfished, that overfishing is occurring, or that the stock is approaching an overfished state, appropriate management measures (e.g., reduce harvest levels or effort, use of alternative gears, reduce adverse effects on EFH or other habitats, implement minimum sizes, establish time-area closures) should be prescribed to end and/or prevent overfishing, to conserve necessary habitats, and to minimize waste, discards, and unutilized incidental catches of all elasmobranchs harvested.*

<u>Implementation in Atlantic HMS fisheries</u>:

NOAA Fisheries published an emergency rule on December 27, 2002 (67 FR 78990), that established new commercial large and small coastal shark quotas and suspended the regulation on ridgeback large coastal shark minimum size. Additionally, this emergency rule announced that several management measures implemented in 1999, such as counting dead discards against the quota, would go into effect. The measures in this emergency rule are based on the results of the 2002 large and small coastal shark stock assessments and should maintain shark status pending an amendment to the Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks. The comment period on the emergency rule ends on February 14, 2003, and NOAA Fisheries will hold at least one public hearing on the regulations in this emergency rule. Comments on the rule and the results of the large coastal shark stock assessment peer review will be considered, as necessary, before any amendments or extension to the rule.

NOAA Fisheries has also announced its intent to conduct an environmental impact

statement and fishery management plan amendment regarding shark measures (67 FR 69180, November 15, 2002). NOAA Fisheries is asking for comments on a number of management option, including, but not limited to: commercial quota levels, regional and seasonal quotas, commercial and recreational trip limits, minimum sizes, authorized gear, prohibited species, and the issuance of exempted fishing permits. NOAA Fisheries is currently in the scoping phase of this amendment, will release an issues and options paper soon, and will accept comments until March 17, 2003.

NOAA Fisheries is continuing to work with Atlantic States Marine Fisheries Commission in the issuance of exempted fishing permits for collection of sharks for public display. Issuance of exempted fishing permits may be necessary because possession of certain shark species is prohibited and because the commercial fisheries for large coastal sharks may be closed for extended periods during which collection of live animals and/or biological samples would otherwise be prohibited. NOAA Fisheries is working with the Commission to improve tracking of sharks collected and enforcement of permit requirements.

4. *Research and Development of Mitigation Measures and Methods:* *Regardless of the determination of the assessment, management entities should invest in elasmobranch research, fishery monitoring, reduction of bycatch and bycatch mortality, minimization of waste, and enforcement.*

Implementation in Atlantic HMS fisheries:

For information on fishery monitoring, observer programs, and collection of bycatch information, see the discussion under data collection. For information on research on EFH and tagging programs, see the discussion under data collection.

To investigate post-release survivorship in support of bycatch mortality reduction, a two-phase study was undertaken on the relationship between exhaustive exercise and recovery rates in neonatal and juvenile sandbar sharks in 1999 utilizing sharks made available by the COASTSPAN Delaware Bay sampling program (Spargo et. al. 2001). Most metabolites returned to normal within 6-10 hours, indicating that sandbar sharks are able to physiologically recover after the exhaustive exercise associated with rod and reel angling. Therefore, catch and release fishing may not severely impact neonatal and juvenile sandbar sharks in important nursery areas (Spargo et. al. 2001).

In the past several years, NOAA Fisheries has taken steps in 2001 to reduce sea turtle bycatch and bycatch mortality in domestic HMS fisheries. Management measures include, but are not limited to, a closure of the northeast distant statistical reporting area (NED) to pelagic longline fishing, a modification on how pelagic longline gear may be deployed, a requirement that all longline vessels (pelagic and bottom) post safe handling guidelines for sea turtles in the wheelhouse, and a requirement on net checks every two hours in the gillnet fishery. Additionally,

NOAA Fisheries has been conducting an experiment in the NED using commercial fishing vessels to determine methods to reduce sea turtle bycatch.

5. *Limitation of Fishing Capacity: Limitation of capacity should be investigated as a method for increasing the sustainability of elasmobranch fisheries. The greater the number of fishing vessels participating, the more likely it is that individual fishing enterprises will become unprofitable or marginal. Combined with limited quotas, the resulting "race for the fish" or derby fishery produces market gluts, poor product quality, safety concerns, and high administrative costs.*

Implementation in Atlantic HMS fisheries:

Commercial fisheries for sharks are already regulated under a limited entry permit system implemented in 1999. NOAA Fisheries continues to review the limited entry permit system and may consider additional limitations on fishing capacity in the future. Possible future management measures could include attrition/use or lose that would reduce the number of permits based on lack of landings; two-for-one entry that would require entrants to the fishery to transfer two permits in order to obtain one limited access permit; non-transferable individual fishing quotas; individual transferable quota based on landings, auction, and/or lottery allocation; permit buybacks; and, changing the current species-based permits to a more gear-based permitting system.

6. Outreach and Education: Each management entity should cooperatively or individually to develop and implement training tools and programs in elasmobranch identification, reduce bycatch mortality, and raise awareness about the ecological benefits from elasmobranch populations, detrimental effects of habitat destruction (e.g., coastal development, coastal pollution), and appropriate conservation measures to avoid, minimize or mitigate adverse effects on necessary habitats.

Implementation in Atlantic HMS fisheries:

NOAA Fisheries is developing an identification guide for Atlantic HMS, including sharks, that is scheduled for production in 2003. The guide is intended to facilitate species identification of fish by commercial and recreational fishermen. NOAA Fisheries has also produced a brochure of regulations governing recreational shark fishing which is available on the internet at http://www.nmfs.noaa.gov/sfa/hmspg.html. NOAA Fisheries intends to produce a similar brochure for commercial shark fishing.

7. *Reporting and Monitoring: Each management entity should prepare a biennial report on the status of sharks and shark fisheries under its jurisdiction so that NOAA Fisheries can incorporate that information into biennial reports to COFI. For any fisheries that are under the authority of the Magnuson-Stevens Act and that are identified as*

overfished, the development of rebuilding programs must be consistent with Section 304(f) of the Magnuson-Stevens Act.

Implementation in Atlantic HMS fisheries:

For information on fishery monitoring, observer programs, and collection of bycatch information, see the discussion under data collection. NOAA Fisheries also produces an annual Stock Assessment and Fishery Evaluation report which discusses the status of sharks and shark fisheries.

Atlantic HMS Research and Management Needs

The NPOA identified several high priority research and management needs in commercial and recreational fisheries for Atlantic shark fisheries. The following table lists those research and management needs as well as the actions taken to address them.

Research and Management Need	
Commercia	
Improve species-specific identification of catches, landings, discards, and trade data	Production of HMS Identification Guide
Conduct stock assessments on small coastal and pelagic sharks and species-specific assessments on dusky and sand tiger sharks	Dusky shark status review, NOAA Fisheries and MML/University of FL small coastal shark assessments in 2002, ICCAT blue and shortfin mako assessments in 2004
Continue participation in international research and management initiatives, particularly for pelagic sharks	NEFSC Apex Predator Investigation cooperative studies with Canada, MML studies in Mexico, participation in ICCAT
Determine and minimize bycatch mortality rates of sharks, particularly prohibited species and juvenile sharks	Bottom longline, drift gillnet, and pelagic longline observer programs
Continue research to determine nursery areas and spatial and temporal use of nursery areas for sharks by size/stage and species	COASTSPAN, MML studies in Mexico
Recreationc	
Improve species-specific identification of catches and landings data	Production of HMS Identification Guide, Recreational fishing brochure
Determine post-release mortality rates and ways to minimize that mortality	Post-release survivorship study on sandbar sharks

Research and Management Need	Action Taken or Planned
Commercial Fisheries	
Conduct stock assessment on small coastal sharks and species-specific assessments on dusky and sand tiger sharks	Dusky shark status review, NOAA Fisheries and MML/University of FL small coastal shark assessments in 2002
Continue participation in international research and management initiatives, particularly for pelagic sharks	NEFSC Apex Predator Investigation cooperative studies with Canada, MML studies in Mexico, participation in ICCAT

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APPENDIX B: FINAL NATIONAL PLAN OF ACTION FOR REDUCING THE INCIDENTAL CATCH OF SEABIRDS IN ATLANTIC TUNA, SWORDFISH, AND SHARK LONGLINE FISHERIES

NPOA-Seabird Executive Summary

Increased concerns have arisen about the incidental capture of non-target species in various fisheries throughout the world. Incidental capture can be economically wasteful, it impacts living marine resources, and the accidental killing of non-harvested animals may be aesthetically aversive. Incidental catch of non-target marine species such as marine mammals, sea turtles, and seabirds has generated growing concern over the long-term ecological effects of such bycatch in longline and other fisheries conducted in many areas of the world's oceans.

The United States has voluntarily developed the U.S. *National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries* (NPOA-S) to fulfill a national responsibility to address seabird bycatch in longline fisheries, as requested in the *International Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries* (IPOA-S). The IPOA-S applies to "States" (hereafter Countries) in whose waters longline fishing is being conducted by their own or foreign vessels, and to Countries that conduct longline fishing on the high seas and in the exclusive economic zones (EEZs) of other Countries. The IPOA-S is a voluntary measure that calls on Countries to: (1) assess the degree of seabird bycatch in their longline fisheries; (2) develop individual national plans of action to reduce seabird bycatch in longline fisheries that have a seabird bycatch problem; and (3) develop a course of future research and action to reduce seabird bycatch. The NPOA-S is to be implemented consistent with the FAO *Code of Conduct for Responsible Fisheries* and all applicable rules of international law, and in conjunction with relevant international organizations.

Development of the NPOA-S was a collaborative effort between the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (FWS) and the Department of State (DOS), carried out in large part by the Interagency Seabird Working Group (ISWG) consisting of representatives from those three agencies. This partnership approach recognizes the individual agency management authorities covering seabird interactions with longline fisheries. NMFS manages U.S. fisheries under the authority of the Magnuson-Stevens Fishery Conservation and Management Act and the High Seas Fishing Compliance Act. FWS manages birds predominately under the authority of the Endangered Species Act and the Migratory Bird Treaty Act. In addition, DOS has the lead role in international negotiations on fisheries conservation and

management issues that should help promote IPOA implementation by encouraging other nations to develop NPOAs. Given each agency's responsibilities, the NPOA-S was developed collaboratively by NMFS and FWS. This collaborative effort has increased communication between seabird specialists and fishery managers in FWS and NMFS. Maintaining this cooperation is a high priority for both agencies.

The NPOA-S contains the following themes:

1. Action Items: NMFS, with the assistance of the Regional Fishery Management Councils (Councils), the NMFS Regional Science Centers, and FWS, as appropriate, should conduct the following activities:

- Detailed assessments of its longline fisheries for seabird bycatch within 2 years of the adoption of the NPOA-S;
- If a problem is found to exist within a longline fishery, measures to reduce this seabird bycatch should be implemented within 2 years. These measures should include data collection, prescription of mitigation measures, research and development of mitigation measures and methods, and outreach, education, and training about seabird bycatch; and
- NMFS, in collaboration with the appropriate Councils and in consultation with FWS, will prepare an annual report on the status of seabird mortality for each longline fi shery, including assessment information, mitigation measures, and research efforts. FWS will also provide regionally-based seabird population status information that will be included in the annual reports.

2.) Interagency Cooperation: The continuation, wherever possible, of the ongoing cooperative efforts between NMFS and FWS on seabird bycatch issues and research.

3.) International Cooperation: The United States' commitment, through the DOS, NMFS and FWS, to advocate the development of National Plans of Action within relevant international fora. The development of the NPOA-S has emphasized that all U.S. longline fisheries have unique characteristics, and that the solution to seabird bycatch issues will likely require a multi-faceted approach requiring different fishing techniques, the use of mitigating equipment, and education within the affected fisheries. Therefore, the NPOA-S does not prescribe specific mitigation measures for each longline fishery. Rather, this NPOA-S provides a framework of actions that NMFS, FWS, and the Councils, as appropriate, should undertake for each longline fishery. By working cooperatively, fishermen, managers, scientists, and the public may use this national framework to achieve a balanced solution to the seabird bycatch problem and thereby promote sustainable use of our nation's marine resources.

Detailed assessments should address the following:

- Criteria used to evaluate the need for seabird bycatch mitigation and management measures

• Longline fishing fleet data (numbers and characteristics of vessels)
• Fishing techniques data (demersal, pelagic, and other pertinent technical information)
• Fishing areas (by season and geographic location)
• Fishing effort data (seasons, species, catch, number of sets, and number of hooks/year/fishery)
• Status of seabird populations in the fishing areas, if known
• Estimated total annual seabird species-specific catch and catch-per-unit-effort (number/1,000 hooks set/species/fishery)
• Existing area and species-specific seabird bycatch mitigation measures and their effectiveness in reducing seabird bycatch
• Efforts to monitor seabird bycatch (e.g., observer program and logbooks), and
• Statement of conclusions and decision to develop and implement mitigation measures as needed.

Bycatch of Seabirds in Atlantic Tuna, Swordfish, and Shark Longline Fisheries

Introduction

The Secretary of Commerce manages Atlantic tunas, swordfish, and sharks - collectively known as highly migratory species or HMS - under the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks. The HMS FMP includes five species of Atlantic tunas (bluefin, yellowfin, albacore, bigeye, skipjack), swordfish, and 39 species of sharks in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. Longline fisheries for these species include the pelagic longline fishery for Atlantic tunas and swordfish and the bottom longline fishery for sharks. The HMS Management Division assesses seabird bycatch annually in the Stock Assessment and Fishery Evaluation Report.

Seabird Bycatch Assessment.

Atlantic pelagic longline fishery

Observer data from 1992 through 2002 indicate that bycatch is relatively low (Table 1). Since 1992, a total of 113 seabird interactions have been observed, with 77 seabirds observed killed in the Atlantic pelagic longline fishery. No expanded estimates of seabird bycatch or catch rates are available for the pelagic longline fishery.

Observed bycatch has ranged from 1 to 18 seabirds observed dead per year and 0 to 15 seabirds observed released alive per year from 1992 through 2002. Approximately half of the seabirds observed have not been identified to species (n = 55). Of those seabirds identified, gulls represent the largest group (n = 29), followed by greater shearwaters (n = 19), and northern gannets (n = 8). Greater shearwaters experienced the highest mortality (100 percent), followed by unidentified seabirds (67 percent), and gulls (66 percent). Northern gannets had the lowest

mortality rate (12 percent).

The Mid Atlantic Bight experienced the highest number of seabirds observed caught and killed (n = 49, 80 percent). The Northeast Coastal area had the second highest number observed (n = 35) but third highest bycatch mortality (48 percent) compared to the South Atlantic Bight, which had a lower number of seabirds observed caught (n = 15) but higher mortality (80 percent).

Table 1. **Seabird Bycatch in the Atlantic Pelagic Longline Fishery from 1992 to 2002.** Source: NMFS Pelagic longline fishery observer program.

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	SEABIRD	5	dead
1995	8	GOM	SEABIRD	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	SEABIRD	11	dead
1997	7	MAB	SEABIRD	1	dead
1997	7	NEC	SEABIRD	15	alive
1997	7	NEC	SEABIRD	6	dead
1998	2	MAB	SEABIRD	7	dead
1998	7	NEC	SEABIRD	1	dead
1999	6	SAB	SEABIRD	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	alive

GOM - Gulf of Mexico, MAB - Mid Atlantic Bight, NEC - Northeast Coastal, NED - Northeast Distant, SAB - South Atlantic Bight

Atlantic bottom longline shark fishery

One pelican has been observed killed from 1994 through 2002. The pelican was caught in January 1995 off the Florida Gulf Coast (between 25 18.68 N, 81 35.47 W and 25 19.11 N, 81 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.

Description of Fisheries

Atlantic pelagic longline fishery

There are approximately 80 to 100 active pelagic longline vessels currently operating in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. Fishermen target either swordfish (at night) or yellowfin and bigeye tuna (during the day). The nighttime fishery utilizes frozen bait (mackerel or squid, predominantly) and lightsticks. The daytime fishery uses frozen bait predominantly along the east coast and live bait in the Gulf of Mexico. In 2000, NMFS prohibited the use of live bait on pelagic longline vessels in the Gulf of Mexico to minimize bycatch mortality of billfish. Additionally, NMFS prohibited pelagic longline fishing in the Florida East Coast, Charleston Bump, DeSoto Canyon, and Northeast Distant areas beginning in 2000 and 2001 to reduce bycatch of swordfish, billfish, and sea turtles. An experimental fishery has been conducted in the Northeast Distant area since 2001.

NMFS attempts to achieve five percent observer coverage (by number of sets) and has achieved approximately three to five percent annually between 1992 and 2001. Increased sampling in 2001, particularly in the Northeast Distant area, increased the sampling fraction to over six percent. Observers collect information about seabird bycatch by species and also take photographs of the birds. In addition, fishermen are required to submit logbooks for every trip made. Logbooks do not collect specific information about seabird bycatch at this time. Commercial pelagic longline fishing occurs throughout the North and South Atlantic, and the Gulf of Mexico. NMFS expects to estimate seabird bycatch from the pelagic longline observer program in the coming year (extrapolating reported effort with observed catch rates).

Atlantic bottom longline shark fishery

There are approximately 250 bottom longline shark vessels currently operating in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. The Atlantic bottom longline fishery targets large coastal sharks, with landings dominated by sandbar and blacktip sharks. Gear characteristics

vary by region, but in general, a ten-mile long monofilament bottom longline, containing about 750 hooks is fished overnight. Skates, sharks, or various finfishes are used as bait. This fishery operates subject to a limited large coastal shark quota, with a typical two to three-month long season starting in January and July. Commercial shark bottom longline fishing is concentrated in the southeastern United States and Gulf of Mexico. Vessel owners must submit logbooks for each shark fishing trip and are subject to observer coverage.

NMFS attempts to achieve five percent observer coverage and has achieved approximately three percent annually between 1995 and 2001 by weight of sharks landed. Increased sampling in 2001 increased the sampling fraction to a little more than four percent. Observers collect information about seabird bycatch. Starting in 2001, 20 percent of shark fishermen have been selected to submit a supplemental discard form, which includes information on seabird bycatch, as part of their standard logbook submissions.

Current Seabird Mitigation Efforts

No management measures are currently in place for seabird protection in either of these fisheries. Time/area closures for the pelagic longline fishery are in place in the Gulf of Mexico, along the east coast of Florida, in the Charleston Bump, in the Northeast Distant area, and in the Mid-Atlantic Bight (Figure 2). Such closures may positively affect seabirds. Evidence has been presented at international workshops that has indicated that, if necessary, streamer lines and line shooters are effective in reducing the bycatch of seabirds in longline fisheries.

Conclusion

Bycatch of seabirds in Atlantic HMS pelagic and bottom longline fisheries is minimal and there does not appear to be a problem with seabird bycatch in these fisheries. Accordingly, no mitigation measures are necessary at this time. NMFS intends to continue to collect data on seabird bycatch through observer programs and supplemental logbooks programs and to increase the species-specific identification of seabirds observed. NMFS will reassess seabird bycatch in these fisheries as expanded bycatch estimates are generated and/or new information becomes available.

Figure 1. Geographic areas used in the Atlantic pelagic longline fishery observer prgram.

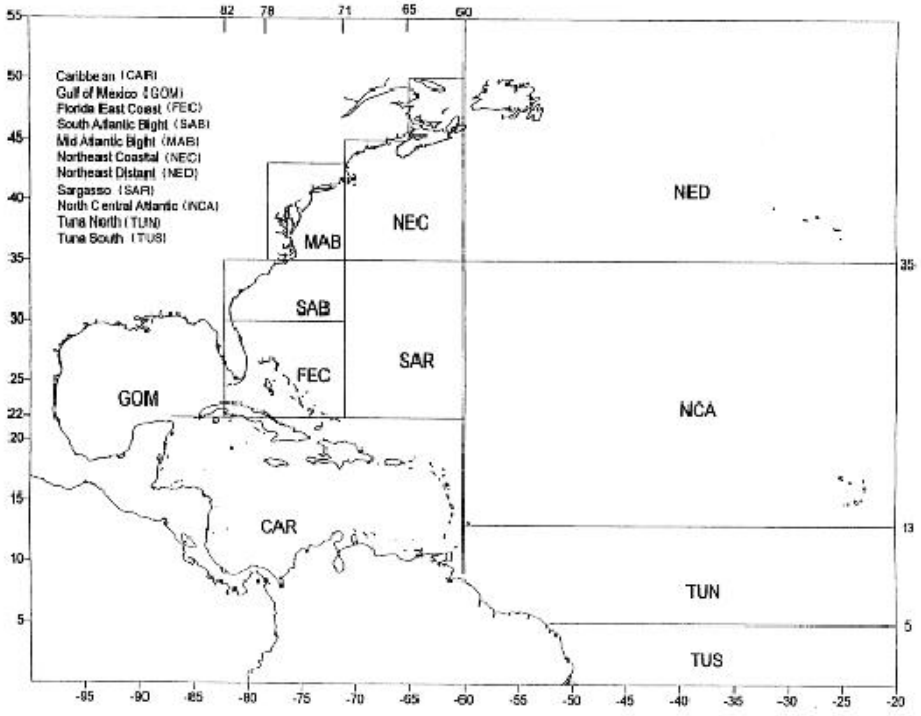

Figure 2. Map of closed areas for Atlantic pelagic longline fishermen.