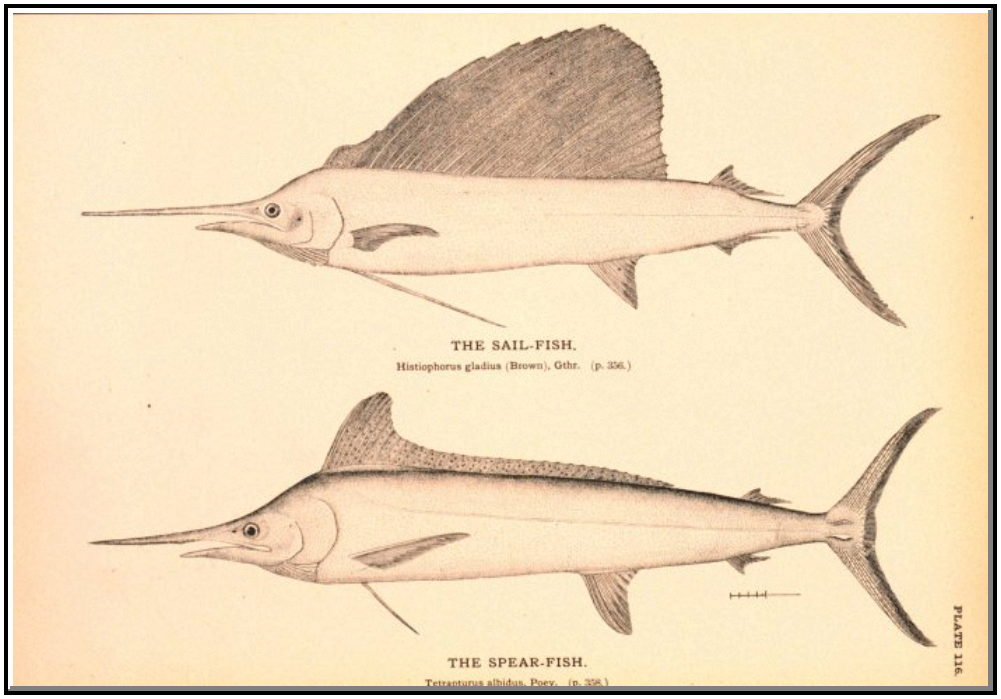
2001 Stock Assessment and Fishery Evaluation for Atlantic Highly Migratory Species



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

2001 Stock Assessment and Fishery Evaluation for Atlantic Highly Migratory Species

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Sustainable Fisheries
Highly Migratory Species Management Division
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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 NMFS (978-281-9370), shark and swordfish dealer permits are issued out of the NMFS Southeast Regional Office (727-570-5326).

Atlantic Tuna Permits:

Questions regarding the Atlantic tunas permit process should be directed to Commerce One 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 NMFS Southeast Regional Office (727-570-5326).

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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 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 (NMFS) can ensure use of the best available scientific data in its decision making process.

The 2001 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 2000. The report is divided into the following nine sections: 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

The SCRS conducted several stock assessments in 2000, including: West Atlantic bluefin tuna, Atlantic yellowfin tuna, North and South Atlantic albacore tuna, and Atlantic blue and white marlin. The bluefin tuna, North Atlantic albacore, and marlin stocks remain overfished. Yellowfin tuna and South Atlantic albacore stocks are fully fished. A stock assessment for Atlantic blue marlin and Atlantic white marlin was completed in July 2000. A two-phase rebuilding plan for Atlantic blue and white marlin was recommended by ICCAT in November 2000. No stock assessments for Atlantic sharks were conducted in 2000.

Essential Fish Habitat

Several investigations continued surveying shark nursery grounds and pupping areas along the Atlantic and Gulf of Mexico coasts during 2000. Early life history studies on billfish are providing important essential fish habitat information. A comprehensive program examining the importance of the Charleston Bump area to a suite of fishery resources, including HMS, was conducted this year. This program is taking a multi-disciplinary approach to describing biological and oceanographic features of this important nursery and fishing area.

Fishery Data Update

There are several sources of new information concerning HMS fisheries. These include updated catch and landings data, logbook and observer data, and recently conducted social surveys. In this document, data are analyzed by gear type to more easily assess the implications for each of our multi-species fisheries. Some of the more important developments from 2000 are:

- implementation of time/area closures, gear modifications, and gear requirements to reduce bycatch (including HMS species and sea turtles) in the pelagic longline fishery;

- implementation of vessel monitoring systems on pelagic longline (which was delayed indefinitely by a Federal court ruling);

- Advanced Notices of Proposed Rulemakings to implement a recreational monitoring program for billfish and swordfish, as well as to reduce bycatch of bluefin tuna;

- ICCAT's adoption of a two-phase rebuilding for Atlantic blue and white marlin, and the implementation of the 10-year international rebuilding program for North Atlantic swordfish adopted by ICCAT in 1999;

- updated estimates of shark catches by U.S. fishermen from the 2000 Shark Evaluation Annual report; and

- settlement agreements were reached in two shark lawsuits.

Economic Status of HMS Fisheries

The 2001 SAFE report includes a section on the economic status of commercial and recreational HMS fisheries. In the previous SAFE report, this information was presented in association with various gear types, but this year's report combines 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 rules that had or will 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 Fishery Conservation and Management Act rely heavily on the availability of community studies and profiles. As HMS by definition are highly migratory resources, 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 several agency actions completed during 2000.

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. Data indicate that roughly 84 percent of Atlantic bluefin tuna landed in the United States in 1999 were exported. 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. The use of trade data is an important tool in the monitoring and management of HMS and an effective supplement to existing information sources. In 2000, ICCAT also recommended an enhancement of trade monitoring efforts for swordfish and bigeye tuna in the coming years.

Bycatch

Bycatch of finfish and sea turtles and incidental catches of marine mammals and sea birds continue to be areas of concern in HMS management, with major steps taken during 2000 to reduce bycatch in the pelagic longline fishery through implementation of several time/area closures, gear modifications and gear restrictions. These actions were taken in compliance with the HMS FMP and a Biological Opinion (BO) on HMS fisheries received on June 30, 2000. Bycatch in the squid mid-water trawl and menhaden purse seine fisheries is also discussed in this section. A summary of agency actions taken during 2000, as part of the National Bycatch Plan, is also provided. A challenging aspect in dealing with bycatch is the international component of HMS fisheries, particularly considering that the United States often represents only a small percentage of the overall catch of these species on an Atlantic-wide basis.

HMS Permits

NMFS continues to explore effective and equitable means to reduce overcapitalization problems. As of October 2000, there were 982 total permit holders in the limited access commercial shark, swordfish and tuna (pelagic longline only) fisheries. 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.

NMFS has made significant improvements to its Atlantic tunas permitting system, including a website where constituents can purchase initial and renewal 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. NMFS hopes to build upon this success and consider automating other HMS permitting processes in the future.

Issues for Consideration and Outlook

In 2001, NMFS plans to continue implementing and evaluating the FMP measures in an attempt to address overfishing and overcapitalization problems that affect many HMS fisheries. It is anticipated that as a result of the HMS FMP, Amendment 1 of the Atlantic Billfish FMP and the 2000 ICCAT recommendations that more focus will be placed on implementing and/or enhancing monitoring of HMS recreational fisheries through charter/headboat permits and logbooks, observer programs, and landings of billfish and swordfish by recreational anglers. New SCRS information, new ICCAT recommendations, and other recently released studies need to be incorporated, consistent with National Standard 2. Improvements in data coordination and management within NMFS and with other agencies should contribute to increasingly effective monitoring and management. Further actions related to the June 30, 2000, BO on HMS fisheries, as well as the anticipated BO early in 2001 resulting from a re-initiation of consultation are expected to address loggerhead and leatherback sea turtle bycatch in Atlantic pelagic longline fisheries. The April 2 - 4, 2001 HMS Advisory Panel meeting provides an excellent opportunity to identify and discuss those issues raised in the SAFE report which require further action. Through continuous public and constituent interaction, increased monitoring, ongoing life history work, and additional socio-economic assessment, NMFS strives to continue building sustainable fisheries for all Atlantic Highly Migratory Species.

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1. INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a long-range management process to manage sustainably the nation's fisheries beginning with the creation of a Fishery Management Plan (FMP). A component of 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. Consistent with the guidelines for National Standard 2 (NS 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, NMFS can ensure use of the best available scientific data in its decision making process.

The 2001 SAFE report for Atlantic Highly Migratory Species is a vehicle to introduce information made available after completion of the final HMS FMP and Billfish Amendment One of the Atlantic Billfish FMP, 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). In adherence with NS 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 nine sections: 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, Advisory Panel members, and the public.

1.7 Update on HMS Activities During 2000

The year 2000 was very active for the HMS Division, with several significant actions completed during this year. On February 9-11, 2000, an Advisory Panel meeting was held in

Silver Spring, Maryland. The HMS and Billfish panels provided valuable comments on a suite of management actions to be considered during calendar year 2000, including the following issues:

- ICCAT overview
  - Swordfish assessment and rebuilding
  - Trade issues
  - Northern albacore tuna rebuilding options

- Time/Area Closure Proposed Rule

- Bluefin tuna issues
  - Restricted fishing days
  - Bag limits
  - General category effort control
  - Angling category allocation

- Current HMS Activities
  - Essential fish habitat
  - Upcoming proposed rules:
    - Permitting
    - Authorized gears in HMS fisheries
    - Billfish commercial prohibition clarification

- Long Term Activities and Planning
  - Budget
  - Permitting/reporting
  - Economic data collection
  - Communities
  - Research

One of the major accomplishments of 2000 was completion of Regulatory Amendment One to the Atlantic Tunas, Swordfish and Sharks FMP to reduce bycatch, bycatch mortality, and incidental catch in the Atlantic pelagic longline fishery. On June 14, 2000, the Final Supplementary Environmental Impact Statement (FSEIS), Regulatory Impact Review (RIR) and Final Regulatory Flexibility Analysis (FRFA) were published and made available for public review, with the implementing regulations establishing time/area closures and gear restrictions published on August 1, 2000 (65 FR 47214). Several Congressional Bills with alternative time/area closure scenarios and vessel buy-back options to reduce bycatch in the pelagic longline fishery were also developed during 2000. The HMS Division provided numerous comments and analyses on the potential impacts of proposed Congressional closures; however, none of the bills were passed by Congress during 2000. Another important bycatch action taken during this year was the preparation and publication of an emergency rule on October 13, 2000 (65 FR 60889), closing

areas of the Grand Banks and requiring the use of line cutters and dip nets by the pelagic longline fishery. More information is provided on the specifics of these rules in Chapter 9 (Bycatch) of this document.

The international Atlantic swordfish rebuilding program developed as a result of a 1999 ICCAT recommendation was implemented this year, with the United States establishing a reduced North Atlantic swordfish quota over the next three years (December 12, 2000; 65 FR 77523). Further, a 320 mt dead discard allowance was implemented for the 2001 fishing season; the dead discard allowance will be incrementally reduced to 0 mt by 2003. Finally, the December 12, 2000, final rule also prohibited imports of bluefin tuna from Equatorial Guinea, as well as swordfish from Belize and Honduras.

Numerous Atlantic tuna actions were completed during 2000, with several relating to bluefin tuna (BFT), including annual quota specifications, closures, proposed changes to the Angling Category north/south line, in-season transfers in quota distribution, adjustments to Angling and General category retention limits, determination of state jurisdiction, and trade restrictions. An Advanced Notice for Proposed Rulemaking (ANPR) was also completed relating to developing a requirement for mandatory dealer reporting for Atlantic bigeye, albacore, yellowfin and skipjack tunas. An ANPR was published on November 17, 2000 (65 FR 69492), requesting comments on reducing BFT bycatch by pelagic longline gear.

The draft National Plan of Action (NPOA) for Conservation and Management of Sharks was made available for comment during 2000, as was the draft NPOA for Seabird Bycatch in Longline Fisheries. The final shark NPOA was published in early 2001 and made available to the public. NMFS also reached a settlement agreement during 2000 with the plaintiffs in two shark-related lawsuits. Other Atlantic shark-related actions during this year included publication of large coastal shark, small coastal shark and pelagic shark quotas, and fishing season notifications. Several applications for Exempted Fishing Permits for sharks collections for the aquarium trade were received during the year (see Section 3 of this document for further information). The appeals process for directed and incidental shark and swordfish permits was also completed during calendar year 2000.

Other significant HMS issues that came to light during 2000 include the continued growth of a swordfish recreational fishery, particularly off the east Florida coast and mid-Atlantic regions. An ANPR requesting comments on potential methods to monitor this fishery, as well as to improve estimates of Atlantic billfish landings was also completed this year (August 9, 2000; 65 FR 48671). The vessel monitoring requirement established in the HMS FMP for all Atlantic pelagic longline vessels was delayed by several agency actions, and subsequently delayed indefinitely by a federal court ruling.

1.2 2000 ICCAT Accomplishments

The following summarizes the major accomplishments achieved at the 2000 ICCAT meetings held November 13 to 20, 2000, in Marrakech, Morocco. Several management measures, such as quotas, were only established for a single year due in part to the unfinished work of ICCAT's Working Group on Allocation Criteria. The commission decided that this working group, created to address concerns of developing countries that quota allocation practices were unfair, would meet for a third time in Brussels, Belgium, from May 21-23, 2001, in an effort to finalize criteria that should be taken into account when making quota allocations.

Atlantic Marlin Rebuilding

The United States successfully negotiated a two-phase rebuilding plan for Atlantic blue and white marlin. Phase One of the Atlantic marlin rebuilding plan requires that countries capturing marlins commercially reduce white marlin landings by 67 percent and blue marlin landings by 50 percent from 1999 levels. To accomplish these reductions, the plan requires the release of all live marlins taken as bycatch in commercial fisheries, but allows landing of fish unavoidably killed provided that they are not sold. The United States agreed to limit annual landings by recreational fishermen to 250 marlin, combined, to provided scientific monitoring of at least 5 percent of the Atlantic billfish tournaments, and to maintain regulations that prohibit retention of marlins on U.S. longline vessels. Phase One of the plan also encourages countries to set minimum sizes for marlins taken in recreational fisheries that are consistent with the requirements for conservation, but they may take into account the specific circumstances of local fisheries.

In Phase Two of the program, ICCAT will reassess the status of the billfish stocks and develop specific time tables to rebuild the stocks to levels that will support maximum sustainable yield. At such time, additional landings restrictions or alternative management measures such as fishing gear modifications or time and area closures may be recommended.

Atlantic Tunas

ICCAT's science body advised that the total allowable catch for the western stock of bluefin tuna "should not be changed significantly from the current level..." Given this advice and noting the 20-year rebuilding program agreed by ICCAT in 1998 was only in its second year, ICCAT members that fish for western Atlantic bluefin tuna (the United States, Canada, and Japan) agreed to maintain the current 2,500 mt quota.

In stark contrast and despite scientific advice that the total catch for the eastern Atlantic bluefin tuna fishery must be reduced to 25,000 mt in order to begin rebuilding, the commission adopted an overall catch level of 29,500 mt for 2001. This catch level represents the status quo and does not take into account other factors that may lead to actual harvest levels that exceed this target. The United States expressed extreme disappointment with this recommendation as it will allow continued overfishing of the eastern Atlantic bluefin tuna stock and could threaten recovery

measures in the western Atlantic. An intersessional scientific meeting in 2001 will examine stock boundary issues and possible new spawning areas in the central Atlantic Ocean. ICCAT also recommended a total allowable catch levels for bigeye tuna and northern albacore as the first step toward rebuilding overfished stocks in the Atlantic.

Swordfish

The United States was concerned about the overall 2001 total allowable catch for South Atlantic swordfish. While this stock is significantly healthier than eastern bluefin tuna, the target total allowable catch of 14,620 mt could allow overfishing to occur. Moreover, unlike past years, no member-specific quotas were agreed to for this fishery. Additionally, during compliance discussions, Japan reported that it had seriously exceeded its North Atlantic swordfish quota. Swordfish are a non-target species taken in Japan's bigeye tuna fishery. Although Japan had taken some actions to address this compliance problem, Japan sought help from ICCAT to rectify the situation fully. Because of concerns for the integrity of the 10-year swordfish rebuilding program adopted by ICCAT in 1999 and given the recent underharvest 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 overharvest. Specifically, a measure was adopted that, among other things, will allow Japan access to 400 mt of unused U.S. quota for 2001 only. NMFS will publish proposed and final rules to address this allocation of quota.

1.3 Summary of HMS Actions Published in the Federal Register during 2000

In summary, during calendar year 2000, the HMS Division completed a total of 3 ANPRs, 12 proposed rules, 6 final rules, 12 in-season actions (mainly related to the bluefin tuna fishery), 8 notices, 1 Emergency Rule, and 2 Notices of Availability (NOA). Table 1.1 provides a summary of all the Federal Register Notices filed during 2000 relating to specific actions taken by the HMS Division. All required analytical documents accompanied these actions (e.g., Environmental Assessments, Environmental Impact Statements, RIR, Regulatory Flexibility Analyses, etc.).

Table 1.1 Summary of 2000 NMFS HMS actions

Action Type NMFS ID#	CFR Part*	Action Description	
Final Rule Inseason Action ID 010600A	635	Atl. HMS Fisheries; Atl. BFT Closure of the Angling Category Large Medium/Giant BFT Fishery in the So. Area	01/13/2000; 65 FR 2075
Proposed Rule ID 121799E	635	Atl. HMS Fisheries; Additional Public Hearings; Extension Comment Period on Proposed Regs to Reduce Bycatch in Atl. Pelagic Longline Fishery	01/20/2000; 65 FR 3199
Notice ID 011100E	600*	M-S Act Provisions; Atl. HMS; Applications for Exempted Fishing and Scientific Research Permits; Req. Comments	01/21/2000; 65 FR 3419
Notice ID 021100D	635*	BFT Recr. Landings Reports; Proposed Information Collection; Req. Comments	02/16/2000; 65 FR 7853
Notice ID 022500A	635*	Atl. Tuna Vessel Permits; Proposed Information; Req. Comments	03/01/2000; 65 FR 11039
Final Rule Inseason Action ID 102299B	635	Atl. HMS Fisheries; Swordfish Adjustment of Annual Catch Quotas	03/24/2000; 65 FR 15873
Notice ID 032100A	635*	National Plan of Action for Conservation and Management of Sharks; Revised Time Frame	03/27/2000; 65 FR 16186
Advance Notice of Proposed Rulemaking ID 031500A; RIN 0648-AN97	635	Atl. HMS; Atl. BFT Angling Category No/So Division Line and Associated Quota Adjustment	04/10/2000; 65 FR 18960
Notice of Availability ID 040400A	635*	Atl. HMS Fishery Mgmt Plan (FMP) Second Errata Sheet	04/11/2000; 65 FR 19361
Final Rule Inseason Action ID 033100D	635	Atl. HMS; Atl. BFT; Retention Limit Adjustment Angling Category	04/13/2000; 65 FR 19860
Final Rule ID 012800H; RIN 0648-AN56	635	Atl. HMS; BFT Rec. Landings Reporting; Determination of State Jurisdiction	04/14/2000; 65 FR 19860

Action Type NMFS ID#	CFR Part*	Action Description	
Final Rule ID 040500B; RIN 0648-AJ67	635	Atlantic HMS; Vessel Monitoring Systems Delay of Effectiveness until 09/01/2000	04/19/2000; 65 FR 20918
Proposed Rule ID 110499B; RIN 0648-AM79	635	Atl. HMS; Pelagic Longline Mgmt; Time/Area Closures; Addl. Area; Notice of Availability of DSEIS/RIR/IRFA; Req. Comments	04/26/2000; 65 FR 24440
Correction to Proposed Rule ID 110499B; RIN 0648-AM79	635	OFR Correction to OFR printing error in table (appeared incomplete in 04/26/2000 issue)	05/09/2000; 65 FR 26877
Notice ID 042500A	635*	Atl. HMS; Issuance of EFPs for Qualifying Holders of Swo/Shark Ltd Access Permits; Request for Comments	05/16/2000; 65 FR 31149
Proposed Rule ID 120999B; RIN 0648-AN52	635	Atl. HMS; Atl. Swordfish Quotas; No. Albacore Tuna Rebuilding	05/24/2000; 65 FR 33519
Proposed Rule ID 051600B; RIN 0648-AN52	635	Atl. HMS; Trade Restrictions for BFT and Swordfish	05/24/2000; 65 FR 33517
Proposed Rule ID 041200D; RIN 0648-AO03	635	Atlantic HMS; Atlantic BFT Annual Specifications and HMS Regulatory Amdt. Re. Authorized Gear in No. Atl. Swo Fishery	05/24/2000; 65 FR 33513
Proposed Rule ID 120999B	635	Atl. HMS; Change in Public Hearing Date for ID 120999B above	06/06/2000; 65 FR 35881
Final Rule Inseason Action ID 052500B	635	Atl. HMS; Large Coastal, Small Coastal and Pelagic Sharks Quota Adjustment and Fishing Season Notification	06/06/2000; 65 FR 35855
Final Rule Inseason Action ID 052500B	635	Atl. HMS; Implementation of Prohibited Species Provisions (per Court Order); Large Coastal Sharks Commercial Fishery Closure Change	65 FR 38440; 06/21/2000
Final Rule Inseason Action ID 061500D	635	Atl. HMS; Atl. BFT Harpoon Category Closure	65 FR 40538; 06/30/2000

Action Type NMFS ID#	CFR Part*	Action Description	
Final Rule ID 041200D; RIN 0648-AO03	635	Atlantic HMS; Atlantic BFT Annual Specifications and HMS Regulatory Amdt. Re. Authorized Gear in No. Atl. Swo Fishery	65 FR 42883; 07/12/2000
Proposed Rule ID 070500C	635	Atl. HMS; Bycatch Reduction. Notice of Intent to Prepare an SEIS. NOA of Biological Opinion. Scoping Meetings Announcement	65 FR 44753; 07/19/2000
Final Rule Inseason Action ID 072100C	635	Atl. HMS; Atl. BFT; Adjustment of General Category Daily Retention Limit on Previously Restricted Fishing Days	65 FR 46654; 07/31/2000
Final Rule ID 110499B; RIN 0648-AM79	635	Atl. HMS; Pelagic Longline Mgmt; Time/Area Closures and Gear Restrictions (Live Bait Prohibition)	65 FR 47214; 08/01/2000
Proposed Rule ID 070500C	635	Atl. HMS; Bycatch Reduction; Additional Scoping Meetings	65 FR 46885; 08/01/2000
Notice 062300A	635*	Notice of Availability; Draft National Plan of Action for Conservation and Management of Sharks	65 FR 47968; 08/04/2000
Proposed Rule 032900A	635	Advance Notice of Proposed Rulemaking; Atl. HMS; Billfish Size Limits; Monitoring Rec. Landings; Post-Release Mortality	65 FR 48671; 08/09/2000
Final Rule ID 040500B; RIN 0648-AJ67	635	Atlantic HMS; Vessel Monitoring Systems Delay of Effectiveness until 10/01/2000	08/16/2000; 65 FR 49941
Final Rule Inseason Action ID 080300A	635	Atl. HMS; Atl. BFT; Retention Limit Adjustment Angling Category	08/17/2000; 65 FR 50162
Proposed Rule ID 090600B	600	M-S Act Provisions; Notification of a Proposal for Exempted Fishing Permits to Conduct Experimental Fishing for Giant BFT by Purse Seine Vessels in NE Multispecies Closed Area 1	09/11/2000; 65 FR 54833
Final Rule Inseason Action ID 081600A	635	Atl. HMS; Atl. BFT; Adjustment of General Category Daily Retention Limit on Previously Restricted Fishing Days	09/12/2000; 65 FR 54970

Action Type NMFS ID#	CFR Part*	Action Description	Action Pub Info
(Final) Emergency Rule ID 091100A	635	Atl. HMS; Pelagic Longline Fishery; Sea Turtle Protection Measures Time/Area Closure and Gear Deployment Restrictions.	10/13/2000; 65 FR 60889
Final Rule Inseason Action ID 101300B	635	Atl. HMS; Atl. BFT. Inseason Transfer to General Category	10/20/2000; 65 FR 63021
Final Rule Inseason Action ID 101700B	635	Atl. HMS; Atl. BFT; Retention Limit Adjustment Angling Category	10/25/2000; 65 FR 63807
Advance Notice of Proposed Rulemaking ID 110200D; RIN 0648-AO75	635	Atl. HMS; Atl. BFT; Incidental Catch of BFT in Pelagic Longline Fishery (Target Catch Requirements)	11/17/2000; 65 FR 69492
Proposed Rule section ID 110800C	635	Atl. HMS; Technical Gear Workshops (Pelagic Longline Fishery) aimed at reducing takes mortality of sea turtles	11/21/2000; 65 FR 69898
Proposed Rule section ID 110800C	635	Atl. HMS; Technical Gear Workshops (Pelagic Longline Fishery) aimed at reducing takes mortality of sea turtles - Postponement	11/29/2000; 65 FR 71085
Proposed Rule section ID 110800C	635	Fishing Season Notification for Atlantic large coastal sharks, small coastal sharks, and pelagic sharks	12/5/2000; 65 FR 75867
Proposed Rule section ID 031500A; RIN 0648-AN97	635	Atlantic Tunas Reporting, Fishery Allocations, and Regulatory Adjustments	12/7/2000; 65 FR 76601
Final Rule section ID120999B, RIN0648-AN52	635	Implementation of ICCAT Recommendations, annual swordfish landings quotas, dead discard allowance, importation prohibitions	12/12/2000; 65 FR 77523

* Part 600/635 not listed in FR publication, but M-S Provisions are codified under part 600 and all HMS regulations are consolidated under Part 635.

2. STOCK ASSESSMENT UPDATES

With the exception of Atlantic sharks, stock assessments for Atlantic HMS are conducted by ICCAT and the SCRS. Stock assessments were conducted during 2000 for North and South Atlantic albacore tuna, West Atlantic bluefin tuna, Atlantic yellowfin tuna, Atlantic blue marlin and Atlantic white marlin. 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.

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Fishing Mortality Rate	Maximum Fishing Mortality Threshold	
North Atlantic Swordfish	B_{99}/B_{MSY} = 0.65 (0.51 -1.05)	$0.8B_{MSY}$	F_{98}/F_{MSY} = 1.34 (0.84-2.05)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring
South Atlantic Swordfish	B_{99}/B_{MSY} = 1.10 (0.84-1.40)	$0.8B_{MSY}$	F_{98}/F_{MSY} = 0.81 (0.47-2.54)	F_{year}/F_{MSY} = 1.00	Fully fished*; Overfishing may be occurring
West Atlantic Bluefin Tuna	SSB_{99}/SSB_{MSY}= 0.36 (low recruitment); 0.10 (high recruitment) SSB_{99}/SSB_{75} = 0.19 (low recruitment); 0.21 (high recruitment)	$0.86SSB_{MSY}$	F_{99}/F_{MSY} = 1.37 (low recruitment scenario) F_{99}/F_{MSY} = 2.22 (high recruitment scenario)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring
East Atlantic Bluefin Tuna	SSB_{97}/SSB_{1970} = 0.19		Not estimated		Overfished; overfishing is occurring
Atlantic Bigeye Tuna	B_{98}/B_{MSY}=0.57-0.63	$0.6B_{MSY}$ *(age 2+)*	F_{98}/F_{MSY} = 1.50-1.82	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Fishing Mortality Rate	Maximum Fishing Mortality Threshold	
Atlantic Yellowfin Tuna	B_{99}/B_{MSY} = 1.03	*0.5B_{MSY} (age 2+)*	F_{99}/F_{MSY}= 0.88-1.16	F_{year}/F_{MSY} = 1.00	Stock 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)		F_{99}/F_{MSY} = 0.57 (0.34-5.56)		Not overfished; overfishing not occurring *
West Atlantic Skipjack Tuna	unknown		unknown	F_{year}/F_{MSY} = 1.00	unknown
Atlantic Blue Marlin	B_{2000}/B_{MSY} = 0.4 (0.25 - 0.6)	*0.9B_{MSY}*	F_{99}/F_{MSY} = 4 (2.5 - 6)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
Atlantic White Marlin	B_{2000}/B_{MSY} = 0.15	*0.85B_{MSY}*	F_{99}/F_{MSY} > 7	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
West Atlantic Sailfish	B_{92-96}/B_{MSY} = 0.62	*0.75B_{MSY}*	F_{91-95}/F_{MSY} = 1.4	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
Blacktip Shark	N_{98}/N_{MSY}=0.50 (baseline) N_{98}/N_{MSY}=0.48 (alternative)	*0.9B_{MSY}*	F_{97}/F_{MSY} = 3.52 (baseline) F_{97}/F_{MSY} = 3.74 (alternative)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
Sandbar Shark	N_{98}/N_{MSY}=0.58 (baseline) N_{98}/N_{MSY}=0.70 (alternative)	*0.9B_{MSY}*	F_{97}/F_{MSY} = 2.70 (baseline) F_{97}/F_{MSY} = 1.62 (alternative)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring
Large Coastal Sharks (all species)	N_{98}/N_{MSY}=0.30 (baseline) N_{98}/N_{MSY}=0.36 (alternative)	*0.9B_{MSY}*	F_{97}/F_{MSY} = 6.34 (baseline) F_{97}/F_{MSY} = 6.03 (alternative)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring
Small Coastal Sharks	B_{91}/B_{MSY} = 1.12	*0.9B_{MSY}*	F_{86-91}/F_{MSY} = 0.89	F_{year}/F_{MSY} = 1.00	Stock not overfished; overfishing is not occurring

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Fishing Mortality Rate	Maximum Fishing Mortality Threshold	Outlook
Pelagic Sharks	unknown	unknown	unknown	unknown	unknown

*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

In support of monitoring the swordfish stock status in a way that explicitly accounts for the sexually dimorphic growth of swordfish, analyses of catch rate patterns which make use of the sex-specific age slicing algorithms used in the 1999 stock assessment were conducted (SCRS/00/144). Swordfish catch, size and catch rate patterns through 1999, based on fishermen logbook reports and observer data, were examined in support of monitoring the recovery of North Atlantic swordfish. U.S. catch rates from the pelagic longline fleet indicate a somewhat improved condition in 1999 compared to earlier years.

Atlantic swordfish are currently managed as two separate stocks, as divided by a line designated for management purposes at 5 degrees North latitude. In 1999, ICCAT adopted a resolution to support research programs to reduce the current uncertainties about the structure, mixing, and boundaries of stocks.

Research on the genetics of swordfish in the Atlantic was continued although no manuscript on the topic was presented to the 2000 SCRS. The analysis conducted by investigators from the FISHTEC consortium has provided genetic evidence in support of the hypothesis that swordfish from the Northwest Atlantic are genetically distinct from those found in the South Atlantic. Genetic variation in introns of the nuclear genes aldolase B (aldB) and the lactate dehydrogenase A (ldhA) was examined and the distribution of alleles was found to be significantly different in samples from the two regions. These results are consistent with those obtained from earlier studies of mitochondrial DNA. Taken together these results provide support for the current practice of dividing the North and South Atlantic into separate management units for swordfish.

2.1.2 Recent Stock Assessment Results

In 1999, assessments for the north Atlantic stock indicated that the decline in biomass has been slowed or arrested (1999a). In addition, the SCRS concluded that estimated high recruitment in 1997 and 1998 could promote improvement in future spawning stock biomass, if these year classes are not heavily harvested. Updated indices examined in 2000 confirmed that a positive effect from this strong recruitment has already been manifested in younger ages and in the biomass indices. The replacement yield for the year 2000 was estimated to be about 11,700 mt. Catches in 1999 slightly exceeded this level, although only catches below replacement yield are likely to allow the stock to recover.

The SCRS also conducted an assessment of the South Atlantic swordfish stock in 1999. Constant catch in the South Atlantic is expected to result in a continued gradual reduction in biomass; the expected levels of decline and the associated timing vary between models. Fishing

mortality is likely to continue to increase gradually and reach F_{MSY} in 2006. There is a good deal of uncertainty surrounding the projection results due to ambiguity in the catch-per-unit-effort (CPUE) trend for the non-target fisheries.

In preparation for future swordfish assessments, the SCRS has suggested a number of initiatives to improve CPUE indices. Methodological problems for the bycatch series must be addressed. The selectivities of deep and shallow longline sets should be investigated and compared. Finally, scientists should explore ways to more directly take into account the environment and habitat.

2.1.3 SCRS Advice and Current Management Measures

The SCRS cautioned that the north Atlantic recovery plan is very sensitive to any overharvests. If recent overharvests of 10% continue, the stock would likely not have a greater than 50% probability of reaching biomass levels that will support MSY. In 2000, Japan reported that it had seriously 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 underharvest 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 overharvest. Specifically, a measure was adopted that, among other things, will allow Japan access to 400 mt of unused U.S. quota for 2001 only. ICCAT also continued its efforts to control illegal, unregulated and unreported (IUU) fishing activities, with an agreement to develop a statistical document program for swordfish. This new program will monitor harvest and trade, and assist in the collection of data. Together, these steps are designed to ensure that total catches do not exceed the total allowable catch (TAC) established by the 1999 rebuilding program.

Relative to the South Atlantic, the SCRS expressed concern with a pattern of high catches and declining CPUE trends in some of the bycatch fisheries used in 1999 as indicators of swordfish abundance. With the total allowable catch of 14,620 mt that was adopted for 2001, there is a greater than 50% chance of biomass declining to levels slightly below the level that would support MSY. Moreover, unlike past years, no member specific quotas were agreed for this fishery. The SCRS recommended that future catch levels should remain at the 1998 level (i.e., 13,500 mt) in order to keep the stock at about the biomass level that would support MSY.

Table 2.1.1 **Summary Table for the Status of Atlantic Swordfish Stocks**. Source: SCRS, 2000, unless otherwise indicated.

Stock (2 stocks; divided at 5°N. Lat.)	**North Atlantic**	**South Atlantic**
Age/size at Maturity	Females: 50% are mature ~ 179 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_{1999}/B_{MSY})	0.65 (0.51-1.05)	1.10 (0.84-1.40)
Minimum Stock Size Threshold	$0.8B_{MSY}$	$0.8B_{MSY}$
Current Fishing Mortality Rate F_{1998}/F_{MSY}	1.34 (0.84-2.05)	0.81 (0.47-2.54)
Maximum Fishing Mortality Threshold	F_{1998}/F_{MSY} = 1.00	F_{1998}/F_{MSY} = 1.00
Maximum Sustainable Yield	13,370mt (7,625 - 15,900mt)	13,650 mt (5,028 - 19,580 mt)
Current (1999) Yield	11,914 mt	15,463 mt
Current (2000) Replacement Yield	11,720 mt (6,456 - 15,040 mt)	14,800 mt (5,328 - 16,240 mt)
Outlook	Overfished; overfishing continues to occur	Fully fished*; Overfishing probably continues to occur

*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.

2.2 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.

As part of its commitment to ICCAT's Bluefin Year Program, 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 1999 and 2000. 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.

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, S. C., is acting as a sample archive center and has tissues from all bluefin collected for stock structure research by NMFS 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, Texas A&M University, and the Massachusetts Department of Marine Fisheries (SCRS/00/145). Progress was reported on a study of the genetic composition of 127-190 and 197-277 cm bluefin captured in the west Atlantic and bluefin from multiple year classes caught in the Mediterranean (SCRS/00/147). Results from that work generally indicated that differences in genetic frequencies were primarily within regions rather than between regions; it also indicated that there could be differences between year class within the Mediterranean.

Scientists from NMFS, Texas A&M University and University of Maryland continued research on the feasibility of using otolith microconstituents to distinguish bluefin stocks. Interlaboratory comparison of Atlantic bluefin tuna otoliths were conducted between U.S. and Canadian laboratories. Results were well within acceptable levels; apart from one element (Mn), differences between labs were relatively minor (generally <6% for four elements and for the two elements for which differences exceeded 5% the abundances of the elements were low and the relative abundances were similar between the labs). Preliminary analyses comparing age 1 bluefin from the west Atlantic and the Mediterranean collected in 1998 indicated good separation (67-89% correctly classified depending on the approach used). Only two age zero fish were collected in the west in 1998, so a statistical comparison of age-0 western Atlantic vs. Mediterranean was not attempted.

Otolith chemistry of age-0 ABT was determined for individuals from several locations (Alboran Sea, Tyrrhenian Sea, Ionian Sea, Ligurian Sea) within the Mediterranean; samples from both 1998 and 1999 were assayed to examine spatial and temporal stability. Otolith signatures from different regions were relatively similar while signatures from similar regions did vary among years suggesting that shifts in ambient water chemistry may be important. Otolith chemistry of juvenile bluefin tuna was measured to assess differences in composition among nursery areas in the western Pacific: East China Sea, Sea of Japan, and Pacific Ocean. Various analyses of bluefin tuna collected in 1994 and 1995 indicated concentrations of four elements (Na, Mg, Mn, Sr) differed among nurseries. Temporal stability of the elemental fingerprint was examined over a three-year period (1995-1997) in the East China Sea. Significant interannual trends were observed for Na, Mg, and Ba; however, differences in elemental fingerprints among nurseries were greater than temporal variability within a nursery. Efforts to obtain samples both in the west Atlantic and the Mediterranean regions continue.

Research on bluefin tuna movement patterns using tags was continued in 1999 and 2000. For bluefin tuna, the longest movement during 1999 (4,247 NM) was from a fish released off Hatteras, N.C. (35° 13' N, 75° 42' W) and recovered off Madeira Islands (Portugal) (14° 8' N, 34° 58' W) 857 days later. Electronic tagging activities also continued off North Carolina (scientists from Stanford University, the Monterey Bay Aquarium and NMFS) and off northeast North America (by scientists from (1) the New England Aquarium, Massachusetts Division of Marine Fisheries and DFO from Canada and (2) Stanford University and the Monterey Bay Aquarium). Additionally researchers from Stanford University and the Monterey Bay Aquarium continued studying the feasibility of tagging bluefin tuna in the Gulf of Mexico in 1999 and 2000 successfully releasing four bluefin with electronic tags in 1999 and about ten fish in 2000.

A summary of pop-up satellite tagging of giant bluefin tuna in the joint US-Canadian program in the Gulf of Maine and Canadian Atlantic was reported by Lutcavage et al. (SCRS/00/95). Since 1997, 58 singlepoint and 21 light-sensing pop-up archival satellite tags (Microwave Telemetry, Inc., Columbia, MD) have been deployed on giant bluefin tuna (178-266 cm SFL) in the western North Atlantic. The goals of the initial deployments were to test external tag attachments and the tags themselves, which evolved to include greater data logging capacity, additional sensors, and increased power. All of the tags were deployed on fish from New England and Canadian commercial or charter fishing vessels (harpoon, rod and reel, trap, and purse seine gear) using tag attachment techniques developed by the U.S. fishermen (authors Murray, Chaprales, Mendillo, and Genovese). Attachment periods ranged from 5 - 365 days, although the majority of tags detached from the fish over the presumed spawning period (April-July). Tag reporting success rates were 59% for single point tags and 79% for the archival tags.

Data successfully returned from the archival tags will generate geolocation estimates and errors associated with light-derived data. Plans are now in place to deploy pop-up archival tags for 365-500 day attachments. The success of the long-term attachment of the tags enables such questions as spawning site fidelity to be addressed. Some of the discussion focused on the

importance of understanding the methods of calculating geolocation, a topic that has recently been addressed at international tagging meetings (see SCRS/00/123).

A workshop on the biology of bluefin in the central Atlantic was held in May 2000 under the sponsorship of the East Coast Tuna Association and the Bermudian government. Electronic tagging results indicated the presence of large, presumably adult bluefin in the north Sargasso Sea during periods when spawning occurs in the Gulf of Mexico and the Mediterranean Sea raising questions about what they are doing there. A multi-faceted research expedition was recommended (SCRS/00/125).

Research to support assessments and on assessment methods continued. U.S. scientists participated in the SCRS Assessment Methods Meeting in May 2000 and submitted three papers on assessment methods. U.S. scientists also participated in the Meeting of the Ad Hoc GFCM/ICCAT Working Group held in Malta and the west Atlantic bluefin working group meeting held in Madrid in September 2000. U.S. scientists presented fourteen papers at that meeting on genetic analyses and tagging results, on basic statistics and indices of abundance and on assessment methods.

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. The 2000 assessment of the west Atlantic stock 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 the 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) indicated that a constant catch of 3,000 mt per year has about a 75% probability of allowing rebuilding to the associated B_{MSY} level by 2018. A constant catch of 2,500 mt per year has about a 56% probability of allowing rebuilding to the 1975 stock size by 2018. Under the high recruitment scenario, a constant catch of about 3,000 mt has about a 62% probability of allowing rebuilding to the 1975 stock size, and with a constant annual catch of 2,500 mt there is about a 47% chance of rebuilding to the associated B_{MSY} by 2018. 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 has noted that significant improvements to the biological knowledge of bluefin tuna are required before an improved assessment of west Atlantic bluefin can be achieved. Accumulating evidence, including recent tagging results, shows that the populations of fish in the western and eastern management units are somewhat related. There is a need to study the best proxy for MSY, and to increase the accuracy on estimation of recruitment levels. The SCRS has suggested a workshop to address the effects and relationship between environment and recruitment, and how these relationships could best be reflected in stock assessments.

The SCRS was unable to update the assessment for the east Atlantic and Mediterranean stock in 2000, 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. A catch of 25,000 mt would halt the decline in spawning stock biomass in the medium term, but reported catches in 1999 totaled over 34,000 mt. In addition, the SCRS expressed continued concern about the intensity of fishing pressure on small fish. This contributes substantially to growth over-fishing, and it seriously reduces the long-term potential yield from the resource.

2.2.3 SCRS Advice and Current Management Measures

Relative to the west Atlantic stock, the SCRS concluded that in light of uncertainty in the assessment (particularly with regard to estimates of recent high recruitment), the total allowable catch should not be changed significantly from the level established by the 1998 rebuilding program (i.e., 2500 mt). Based on this advice, ICCAT did not adopt any changes to the 20 year rebuilding program at its 2000 meeting.

Despite SCRS advice that current catch levels in the east Atlantic and Mediterranean are unsustainable, the total allowable catch was not reduced at the 2000 ICCAT meeting. Unless significant management actions are taken to reverse these trends, the poor condition of the east Atlantic stock and fishery may adversely affect recovery of the bluefin tuna stock in the west Atlantic. At its 2000 meeting, ICCAT adopted a recommendation to support bluefin tuna research in the central north Atlantic. A separate resolution calls for the SCRS to hold an intersessional meeting to examine the effects of mixing for stock assessments and management. This resolution requests the SCRS to consider the appropriateness of the current boundary between the western and eastern management units for Atlantic bluefin tuna and to develop recommendations regarding future management strategies that take mixing into account.

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_{99}/SSB_{75} (low recruitment) = .19 (.12-.31) SSB_{99}/SSB_{75} (high recruitment) = .21 (.12-.33) SSB_{99}/SSB_{msy} (low recruitment) = .36 (.28-.49) SSB_{99}/SSB_{msy} (high recruitment) = .10 (.06-.14) $0.86B_{MSY}$
Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	F_{99}/F_{MSY} (low recruitment) = 1.37 (0.96-1.87) F_{99}/F_{MSY} (high recruitment) = 2.22 (1.51-3.32) F/F_{MSY} = 1.00
Maximum Sustainable Yield	Low recruitment scenario: 3,500 mt (3,200-3,800) High recruitment scenario: 7,700 mt (6,100-9,600)
Current (1999) Yield	2,771
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, 2000.

Catch (mt)	Low Recruitment Scenario B/B_{MSY}	High Recruitment Scenario B/B_{MSY}
500	100%	86%
1000	100%	79%
1500	100%	71%
2000	100%	62%
2300	99%	53%
2500	94%	47%
2700	86%	43%
3000	75%	36%

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_{97}/SSB_{1970} = 0.19
Current Relative Fishing Mortality Rate	Not estimated
Maximum Sustainable Yield	Not estimated
Current (1999) Yield	31,487 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 2000, ICCAT's Bigeye Tuna Year Program facilitated a number of research activities, including conventional tagging in the Azores and Canary Islands. A tagging manual was prepared and distributed to the National Laboratories. Contacts were also maintained to pursue genetic studies and archival tag deployment. These activities will continue in 2001.

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, 1999b). The SCRS completed a stock assessment of Atlantic bigeye tuna in October 1999. The assessment utilized catch and effort information submitted by ICCAT member and non-member nations. One important component of the 1999 bigeye tuna assessment was the incorporation of revised data from previous years. This resulted in the addition of some 20,000 mt of previously unreported catch.

Work is being carried out on an integrated statistical model appropriate to the assessment of tropical tuna species. In the meantime, the SCRS has recommended that the assessment of the bigeye stock planned for 2001 should not be carried out. Instead, a tropical tuna statistics group will meet during the week prior to the 2001 SCRS to revise the databases for three species of tropical tunas (bigeye, yellowfin and skipjack) in depth, and develop criteria for the validation of statistics. These criteria could then be incorporated into the new ICCAT data base to support future assessments of tropical tunas, including bigeye.

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 approximately 55 percent, by number, of all bigeye tuna harvested. This number has stabilized since with the time/area closure for purse seining in the eastern tropical Atlantic area, but still remains a concern (SCRS, 1999b). SCRS has recommended a reduction of catch to approximately 80,000 mt to prevent further decline of the stock, although an additional reduction of catch would be required to rebuild the stock to MSY levels. At its 2000 meeting, ICCAT adopted a recommendation that establishes the first-ever total allowable catch for bigeye tuna. While the measures adopted will not be sufficient to rebuild the stock, catches should be reduced significantly from the 1999 level of 120,883 mt, as a first step toward rebuilding.

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_{98}/B_{MSY} = 0.57 - 0.63 $0.6B_{MSY}$ (age 2+)
Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	F_{98}/F_{MSY} = 1.50 - 1.82 F_{year}/F_{MSY} = 1.00
Maximum Sustainable Yield	79,000 - 94,000 mt
Current (1999) Yield	121,000 mt
Current (1999) Replacement Yield	72,000 - 85,000 mt
Outlook	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 2000, scientists from the United States and Venezuela continued their cooperative research on the spawning status and maturity of yellowfin tuna in the western central Atlantic (SCRS/00/46). Cooperative research with Mexico was continued, with joint analyses of longline observer program data from the Gulf of Mexico and the calculation of abundance indices (SCRS/00/67). Tagging and recapture research continued for yellowfin tuna. There was a trans-Atlantic yellowfin tuna recapture, released off Cape Hatteras, N.C. (38° 10' N, 74° 10' W) and recaptured off the Bay of Biscay, near Spain (34° N, 4° W), a distance of about 3,106 NM, in 779 days.

U.S. scientists also calculated yellowfin tuna abundance indices using data from the U.S. rod and reel fishery off the U.S. coast from Virginia through Massachusetts (SCRS/00/64) as well as from logbook data reported by the U.S. longline fleet (SCRS/00/65). Yellowfin tuna tag-releases and recaptures from the U.S. Cooperative Tagging Center Program are reviewed in SCRS/00/66.

A study analyzing the genetic variability in bigeye and yellowfin larvae taken in the Gulf of Guinea, of the west coast of Africa, began in September 2000. This Texas A&M project, funded by the Saltonstall-Kennedy grant program (NA97FD0553), will examine mitochondrial and nuclear DNA loci to determine whether the genetic variation observed in a single sample is

representative of that found in the adult population. Also, samples obtained at different seasons or in successive years will be compared to determine seasonal and temporal variations. The results will be used to develop a monitoring scheme for the assessment of tuna reproduction in the Gulf of Guinea.

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 ground), ICCAT currently manages Atlantic yellowfin tuna based on an Atlantic-wide single stock hypothesis. The SCRS conducted a new stock assessment for Atlantic yellowfin tuna in 2000 using various age-structured and production models (SCRS 2000). 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 although catches could be slightly lower than MSY levels, 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 (1999) could either be above, or about at, levels that could produce MSY. In summary, reported yellowfin 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 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, NMFS 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 higher 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 *Minimum Stock Size Threshold*	B_{97}/B_{MSY} = 1.03 $0.5B_{MSY}$ (age 2+)
Current Relative Fishing Mortality Rate F_{1999}/F_{MSY} *Maximum Fishing Mortality Threshold*	F_{97}/F_{MSY} = 0.88 - 1.16 F_{year}/F_{MSY} = 1.00
Maximum Sustainable Yield	144,600 - 152,200 mt
Current (1999) Yield	140,000
Current (1999) Replacement Yield	May be close to 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

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

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 amount of albacore from theNorth Atlantic stock/management unit, as well as minor catches of South Atlantic albacore.

The SCRS conducted new stock assessments for North and South Atlantic albacore tuna in 2000. Results of the North Atlantic assessment were consistent with previous findings. Equilibrium yield analyses indicate 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.

In the south Atlantic, the spawning stock biomass of the albacore stock 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.

2.3.3.3 SCRS Advice and Management Actions

Relative to the north Atlantic, the SCRS concluded that to maintain a stable spawning stock biomass in the near future, catch should not exceed the current catch level (34,500 mt) in the period 2001-02. In order to begin increasing 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. The SCRS has since noted that effort limitations are likely to be ineffective for this stock, and recommended that a catch limit be established. In 2000, ICCAT adopted a recommendation that sets a total allowable catch at 34,500 mt for the year 2001.

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]
Current (1999) Yield	34,557 mt
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 - 5.56)
Maximum Sustainable Yield	30,200 mt (50 - 31,400)
Current (1999) Yield	27,293 mt

Current Replacement Yield	29,200 mt (12,10 - 31,400)
Outlook	Not overfished; overfishing is not occurring

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 more 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, SCRS did not conduct a stock assessment for Atlantic (west or east) skipjack tuna in 1999, although some estimates of current yield were made (SCRS, 1999b).

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 (1999) Yield	27,043 mt

Current (1999) Replacement Yield	not estimated
Outlook	unknown

2.4 Stock Assessment Update: ATLANTIC BILLFISH

2.4.1 Life History/Species Biology Information

A summary of life history information is provided in the Billfish Amendment in Section 3.1.1 and Chapter 4. U.S. scientists prepared a number of scientific documents for the Fourth ICCAT Billfish Workshop, held in Miami, USA in July 2000. Document SCRS/00/54 discussed the analyses of blue marlin and white marlin stock structure using mitochondrial DNA, single copy nuclear DNA, and microsatellite DNA to survey variation across large samples of both species. The levels of variation revealed by the different molecular methodologies varied between species and molecular markers, and were quite high for both mtDNA and the microsatellite loci. Analysis of samples from the same location taken in different years did not reveal significant spatial heterogeneity and allowed researchers to pool temporal samples to increase the power of spatial analyses. No significant spatial heterogeneity in the distribution of allelic variants were found for any of the molecular markers. The genetic results are consistent with the natural history of both species--their continuous distribution across the tropics, broad spawning times and areas, and high vagility as adults--and support the hypothesis that blue marlin and white marlin comprise a single stock within the Atlantic Ocean.

Document SCRS/00/61 reviewed attempts to improve the accuracy of stock assessments of blue marlin (*Makaira nigricans*) and white marlin (*Tetrapturus albidus*) using habitat-based standardization of CPUEs derived from the longline fishery in the Atlantic Ocean. This paper examined the approach of estimating CPUEs under the assumption that blue marlin are restricted to a narrow depth and temperature range.

Sampling of recreational billfish tournaments continued in 1999 along the U.S. east coast, Gulf of Mexico, Bahamas, and U.S. Caribbean. A total of 161 billfish tournaments were sampled in 1999 (compared to 120 tournaments in 1998). This represented 118,488 hours of fishing effort, an increase of about 29,445 hours from the 1998 level. In 1999, sampling accounted for 244 billfish boated (177 blue marlin, 36 white marlin, 30 sailfish, and 0 spearfish); 2,683 released; and 2,341 tagged-and-released. In comparison, in 1998, there were 245 billfish boated (168 blue marlin, 31 white marlin, 46 sailfish, and 0 spearfish); 2,629 released; and 1332 tagged-and-released). Morphometric measurements of billfish landings were also taken in conjunction with the ICCAT Enhanced Research Program for Billfish (ERPB).

The NMFS SEFSC again played a substantial role in the ICCAT Enhanced Research

Program for Billfish in 2000, with SEFSC scientists acting as general coordinator and coordinator for the western Atlantic Ocean. Major accomplishments related to the Billfish Program activities include the following: (1) completion of about 24 at-sea observer trips on Venezuelan longline vessels by October 1999; (2) three of the at-sea observer trips completed were on the larger Korean type vessels that stay out about one month; (3) continuation of the swordfish observer program and biological sampling in Venezuela; (4) continuation of work on shore-based sampling, including billfish tournament sampling in Barbados, St. Maarten, Grenada, Jamaica, Senegal, Cote d'Ivoire, Trinidad and Tobago, and Venezuela; (5) continued efforts to retrieve tag-recaptured billfish (particularly successful in the southeast Caribbean where more than 165 recaptures were reported in 1999); (6) age and growth sampling of billfish continued in 1999; (7) the western Atlantic coordinator acted as chairman of the newly formed ICCAT tag recovery network in 1999; and (8) SEFSC staff made several extended trips to numerous Caribbean locations in 1999 to assist in coordination of the program and collect data; (9) the Western Atlantic coordinator collaborated with VIMS and Bermuda Department of Fisheries on a popup satellite tagging project of blue marlin to evaluate this technology of estimating post-release survival.

Historical tag release and recapture files for Atlantic istiophoridae (*i.e.*, marlins and sailfish) are updated in document SCRS/00/56. The sources of data in this update were limited to the Southeast Fisheries Science Center's Cooperative Tagging Center (CTC), The Billfish Foundation (TBF), and South Carolina's Department of Marine Resources (SCDMR). Data for Istiophoridae are available from 1954 to 2000 for the CTC, from 1990 to 2000 for TBF, and from 1980 to 2000 for SCDMR. The data were presented by agency, gear type, and days at large for Atlantic blue marlin (*Makaira nigricans*), white marlin (*Tetrapturus albidus*), and sailfish (*Istiophorus platypterus*).

Participants in the Southeast Fisheries Science Center's Cooperative Tagging Center (CTC) tagged and released 2,555 billfishes (including swordfish) in 1999. This represents a decrease of 2% from 1998 levels for the CTC. The Billfish Foundation reported tagging 5,929 billfish for 1999. Among the CTC 1998 billfish releases, there were 963 blue marlin, 451 white marlin, and 938 sailfish.

There were 90 billfish recaptures from the CTC reported in 1999, representing a decrease of 1% from 1998. Among the 1999 CTC billfish recaptures there were 30 blue marlin, 14 white marlin, and 36 sailfish. The ICCAT Enhanced Research Program for Billfish in the western Atlantic Ocean has continued to assist in reporting tag recaptures to improve the quantity and quality of tag recapture reports, particularly from Venezuela, Barbados and Grenada. The Billfish Foundation recovered a total of 204 tagged billfishes in 1999, including 111 blue marlin, 38 white marlin, and 51 sailfish.

There were several noteworthy CTC billfish recaptures during 1999. The longest reported sailfish movement (i.e., minimum straight distance traveled) was 1,160 nautical miles (NM) from a fish released off South Florida (25° 50' N, 80° 0' W) and recaptured off La Guaira, Venezuela

(11° N, 66° 50' West) after 2,289 days at large (6.2 years). The longest straight line distance traveled for a blue marlin recaptured in 1999 was 1,699 NM from a fish released off Louisiana coast (28° N, 91° W) and recaptured off La Guaira, Venezuela (11° N, 66° 50' W). Another blue marlin recaptured in 1999 was at large 9.5 years (3473 days), this fish was released and recaptured off La Guaira, Venezuela. The longest straight line distance traveled by a white marlin in 1999 was 1,603 NM from a fish released off Hatteras, North Carolina (37° N, 74° W) and recaptured off La Guaira, Venezuela, after 1,740 days at large.

A successful pilot study assessing popup satellite tag technology for estimating post-release survival of blue marlin from recreational vessels off Bermuda was reported to the 1999 SCRS (SCRS/99/97). This collaborative research effort, between the Virginia Institute of Marine Science (Dr. John Graves and Dave Kerstetter), the Bermuda Division of Fisheries (Dr. Brian Luckhurst), and the National Marine Fisheries Service (Dr. Eric Prince) was continued in 2000 on longline vessels. Preliminary results from blue marlin tagged from longline vessels are encouraging, with data from 5 out of 7 tagged blue marlin indicating the fish survived the catching and tagging events.

Several researchers are working cooperatively on early life history studies on Atlantic billfishes off Lee Stocking Island in the Bahamas. The original goal of this research was to address some fundamental questions surrounding the biology and ecology of the Atlantic billfishes, with particular emphasis on the earliest life stages inhabiting the surface waters off Lee Stocking Island (LSI). This research program is discussed in more detail in Chapter 3 - Essential Fish Habitat.

2.4.2 Recent Stock Assessment Results

Stock assessments for Atlantic blue marlin and Atlantic white marlin were conducted in 2000. The SCRS suggested that substantial investments in research into the habitat requirements of marlins, as well as the verification of historical catch data, are needed to reduce uncertainties in these assessments.

The new 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} and the current fishing mortality is approximately four times higher than F_{MSY}. Although blue marlin landings in 1999 were reduced by 29% from 1996 levels, these reductions are not sufficient to rebuild the stock. The SCRS recommended that ICCAT take additional steps to reduce the catch of blue marlin as much as possible.

The 2000 assessment for white marlin was more pessimistic. The total Atlantic stock is estimated at less than 15% of B_{MSY}, and current fishing mortality is estimated to be seven times higher than F_{MSY}. 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.

The objective of ICCAT resource management is to achieve stock sizes and fishing mortality rates that produce maximum sustainable yield in biomass (MSY). Generally, the model of choice for estimating the condition of the stock relative to MSY has been a surplus-production model. For recent billfish assessments, the surplus-production model has been fitted with the computer program ASPIC. An underlying assumption in such estimation of MSY is that indices of population abundance used in fitting are measured in units of biomass. Because of available data, ICCAT billfish assessments have been conducted using indices of abundance (CPUE) in numbers rather than in biomass. This discrepancy is expected to bias estimates of MSY and related benchmarks. Using simulated fisheries data; the impact of this substitution on estimates of management benchmarks was evaluated. The simulation model was constructed around the life history characteristics of Atlantic blue marlin, and explicitly included sex, size, and age structure on a monthly basis. Growth was sexually dimorphic, with females attaining larger asymptotic mean sizes, and size varied about mean size at age. Annual recruitment was determined from spawning biomass with a Beverton-Holt stock-recruitment function, modified by density-independent stochastic survival. For this evaluation, natural mortality M was assumed to decline from 0.5/yr at first recruitment to 0.1/yr by the age of three, and the slope of the unfished stock-recruitment curve was assumed to be 10. A logistic surplus-production model was fitted to the simulated data sets using ASPIC. Simulations and analyses were performed over the range of estimates of the von Bertalanffy growth parameter k for blue marlin found in the literature. Estimates of management benchmarks differed when numbers- and biomass-based measures of abundance were used in fitting. In summary, biomass-based measures provided generally better fits and perhaps more reliable estimates of benchmarks. However, those summary results are strongly influenced by cases using the lowest published values of k. For other values of k, estimates from numbers-based CPUE tended to be more accurate than those in from biomass-based CPUE; this result presumably stems from offsetting biases. In the absence of conclusive data on billfish growth rates, the importance of this source of error cannot be quantified precisely. Better understanding of growth in these species would allow more precise quantification of likely biases arising from the use of numbers-based abundance indices.

Longbill spearfish and sailfish landings have historically been reported together in annual ICCAT landings statistics. The majority of these landings were most likely sailfish; for 1998 the SCRS reported a 2182 mt catch of sailfish/spearfish, only 17 mt of which was identified as spearfish. The last assessment for West Atlantic sailfish/spearfish was submitted to the SCRS in 1993 and was based on data collected through 1991.

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_{2000}/B_{MSY} = 0.15 $0.85B_{MSY}$	$B_{92\text{-}96}/B_{MSY}$ = 0.62 $0.75B_{MSY}$
Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	F_{99}/F_{MSY} = 4 (2.6 - 6) F_{1995}/F_{MSY} = 1.00	F_{99}/F_{MSY} = 7 F_{1995}/F_{MSY} = 1.00	$F_{91\text{-}95}/F_{MSY}$ = 1.4 $F_{91\text{-}95}/F_{MSY}$ = 1.00
Maximum Sustainable Yield	2,000 mt (2000-3000 mt)	1,300 mt (900-2000mt)	700 mt
Current (1999) Yield	3,316 mt	908 mt	546 mt (incomplete)
Current Replacement Yield	1,200 mt (840 - 1600 mt)	< 1999 yield	600 mt
Outlook	Overfished; overfishing is occurring	Overfished; overfishing is occurring	Overfished; overfishing is occurring

*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.

2.4.3 SCRS Advice and Management Actions

In 1997, ICCAT made several recommendations to recover billfish resources throughout the Atlantic Ocean, including reduction of Atlantic blue marlin and white marlin landings by at least 25 percent from 1996 levels, starting in 1998, to be accomplished by 1999; promote the voluntary release of live Atlantic blue marlin and white marlin; and work to improve current monitoring, data collection and reporting in all Atlantic billfish fisheries. A 1998 ICCAT recommendation continued the requirement for a reduced level of marlin landings through 2000. Because commercial landings of Atlantic billfish by U.S.-flagged vessels were prohibited by the 1988 Atlantic Billfish FMP, the 25 percent reduction in blue and white marlin landings affects only

recreational anglers in the United States.

In November, 2000, ICCAT made a third recommendation for Atlantic blue marlin and white marlin by developing a two-phase rebuilding program. Phase One measures are to commence in 2001 and apply through 2002, with re-evaluation and adjustment in 2002 for the beginning of Phase Two. During Phase One, the annual amount of blue marlin that can be harvested in years 2001 and 2002 by pelagic longline and purse seine vessels and retained for landing must be no more than 50% of the 1999 landing levels. During Phase One, 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 1999 landing levels. All blue and white marlin brought to 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 along side of the vessel and that are not sold or entered into commerce. The United States is to monitor the landings of billfish tournaments through scientific observer coverage of at least 5% that includes collection of data on marlin landings from each observed billfish tournament, and endeavor to attain 10% scientific observer coverage on billfish tournament landings by the end of 2002. The United States will also limit its landings to 250 recreationally-caught Atlantic blue and white marlin combined on an annual basis for the period 2001 through 2002.

In the second phase of the rebuilding program, the SCRS will conduct stock assessments of Atlantic blue and white marlins in 2002, and present its evaluation of specific stock recovery scenarios that take into account the new stock assessments, any new information and any re-evaluation of the historical catch and effort time series. Based on SCRS advice, at its 2002 meeting, the Commission will, if necessary, develop and adopt programs to rebuild blue and white marlins to levels that would support MSY. Such rebuilding programs will include a timetable for recovery to a scientifically derived goal, with associated milestones and biological reference points. This objective could be reached through general plans of monitoring of effort and/or time-area closures and/or other measures practical to apply by the various Contracting Parties, Non-Contracting Parties, Entities, and Fishing Entities, taking the specific characteristics of their fisheries into account.

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). Previously released life history information concerning the thirty-three shark species recently added to the shark management unit can be found in the Essential Fish Habitat section of this report (3.1).

Cooperative research with coastal states to delineate Atlantic and Gulf of Mexico shark nursery grounds is underway through the COASTSPAN program (see also Section 3.1 of the SAFE report). Results identify crucial parturition and nursery grounds for over a dozen species of coastal sharks. Over 1600 sandbar sharks have been tagged in Delaware Bay alone; newborns leave the estuaries in the fall to overwinter in southern nursery grounds. Many surviving juvenile sandbar sharks return to Delaware Bay in the spring. A field study is also underway to explore the reproductive biology of the nurse shark. This shallow water species can serve as a template for understanding elasmobranch breeding and parturition (also see Section 3.1).

A cooperative study with Canadian biologist on the life history of the porbeagle shark continued in 2000 and has elucidated aspects of their reproduction, age and growth, and migration patterns. Results have shown that male porbeagles mature about 174 cm (8 years) and females at 218 cm (13 years). Mating is in the fall and birth of about four oophagous young occurs between March and June after 8 to 9 months gestation.

Tagging studies designed to map nursery areas and migratory patterns of cross-boundary species of sharks are being carried out in Yucatan, Mexico in cooperation with the Institute Nacional de Pesca and Mote Marine Laboratory. A total of 700 juvenile blacktip sharks have been tagged and released in Mexican nurseries, with a recapture rate of 18.2%. Tagging efforts in 1999-2000 focused on areas near the U.S./Mexican border. A workshop of collaborators will be held to assess the last five years of data.

In order to continue to delineate shark distributions and migratory patterns, the Northeast Fisheries Science Center's (NEFSC) Cooperative Shark Tagging Program (CSTP) tagged approximately 5,200 sharks in 2000. Recaptures in the CSTP totaled 562 sharks. The data from this program are maintained on the NEFSC network for analysis.

2.5.2 Most Recent Stock Assessment Data

No new stock assessments were conducted for Atlantic sharks this year, although two assessments - large coastal and small coastal sharks - are scheduled for 2001. The stock assessment information used in the HMS FMP came primarily from the 1998 Shark Evaluation Workshop. Detailed information can be found in Section 2.4 of the FMP. In general, there

remains a good deal of uncertainty regarding shark stocks and mortality. Due to most shark species inability to withstand intense exploitation, precautionary approaches were used in adherence with Magnuson-Stevens guidelines.

The University of Florida is continuing an observer program of the directed commercial shark fishery in the Gulf of Mexico under funding from the MARFIN program (Grant Number NA97FF0041). This program is designed to enhance the reliability of management strategies for the shark fishery in the Atlantic. Observers will 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 2000 sampling season at total of 13 shark trips were observed, representing 64 sets (36 large coastal shark sets and 28 small coastal shark sets) yielding 232,470 observed hook hours. The biological data is being processed to identify catch patterns by species and region.

The SCRS Subcommittee on Bycatch has recommended that ICCAT take the lead in conducting stock assessments for Atlantic blue, porbeagle and mako sharks. In anticipation of a pelagic shark assessment taking place in 2002, the subcommittee recommended holding a data preparatory meeting to review all available shark statistics in 2001. Only 25 of the more than 80 countries, entities and fishing entities have provided ICCAT with any information on shark catches. The SCRS has requested that all parties establish adequate data collection systems for collecting catch data, size frequency, and discard information for sharks, and provide this information to ICCAT on an annual basis.

NMFS has recently reached a settlement agreement with Southern Offshore Fishing Association (SOFA) plaintiffs. The terms of the agreement include independent reviews of stock assessments, new stock assessments for large coastal and small coastal sharks, and establishing interim commercial quotas for the large coastal and small coastal shark fisheries at the levels previously established for 1997. In the settlement agreement, NMFS agreed to take action to maintain the 1997 commercial quota levels for large coastal sharks pending an independent review of the 1998 stock assessment, which should be completed in early 2001. NMFS also agreed to take action to maintain the 1997 commercial catch accounting/monitoring procedures and to suspend the commercial minimum size, pending completion of this review. Furthermore, NMFS agreed to take action to maintain the 1997 commercial quota levels for small coastal sharks pending a new stock assessment. New stock assessments for both species groups are expected in 2001.

Table 2.5.1 Summary Table for the Status of Atlantic Sharks

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Fishing Mortality Rate	Maximum Fishing Mortality Threshold	
Blacktip Shark	N_{98}/N_{MSY}=0.50 (baseline) N_{98}/N_{MSY}=0.48 (alternative)	$0.9B_{MSY}$	F_{97}/F_{MSY} = 3.52 (baseline) F_{97}/F_{MSY} = 3.74 (alternative)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.
Sandbar Shark	N_{98}/N_{MSY}=0.58 (baseline) N_{98}/N_{MSY}=0.70 (alternative)	$0.9B_{MSY}$	F_{97}/F_{MSY} = 2.70 (baseline) F_{97}/F_{MSY} = 1.62 (alternative)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring
Large Coastal Sharks (all species)	N_{98}/N_{MSY}=0.30 (baseline) N_{98}/N_{MSY}=0.36 (alternative)	$0.9B_{MSY}$	F_{97}/F_{MSY} = 6.34 (baseline) F_{97}/F_{MSY} = 6.03 (alternative)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring
Small Coastal Sharks	B_{91}/B_{MSY} = 1.12	$0.9B_{MSY}$	$F_{86\text{-}91}/F_{MSY}$ = 0.89	F_{year}/F_{MSY} = 1.00	Stock not overfished; overfishing is not occurring
Pelagic Sharks	unknown	unknown	unknown	unknown	unknown

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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

3.1.1 Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey

*The material presented below is excerpted from the following reports: McCandless, C. and H. L. Pratt. 2000. *1998-1999 Summary Report of the Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey*. Apex Predators Program. US DOC, NOAA, NMFS, NEFSC, Narragansett Laboratory, Narragansett, RI.; Pratt, H. L. and J. C, Carrier. 2000. *COASTSPAN Nurse Shark Mating and Nursery Grounds Project*. *Draft Report of the 1999 Apex Predators Program / Albion College*. Apex Predators Program. US DOC, NOAA, NMFS, NEFSC, Narragansett Laboratory, Narragansett, RI, Department of Biology, Albion College, Albion, MI.

Introduction

Sharks are especially vulnerable to overfishing because they grow slowly, mature late and have few young. These reproductive characteristics contribute to a long stock rebuilding time. 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 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.

Little is known about the extent and ecology of shark nursery habitat along the East Coast of the United States. The HMS FMP identifies several research and information needs concerning essential fish habitat (EFH) of shark species, focusing on shark nurseries. Shark nursery areas are frequently located in highly productive coastal or estuarine waters within state boundaries. Specifically, further delineation of summer and winter nursery areas is needed to determine if

sharks return to their natal nurseries, determine habitat relationships such as temperature and salinity, determine significance of areas of aggregation, and determine the role of coastal/inshore habitats in supporting neonate and juvenile sharks. Such information is vital to understanding and managing sharks at this vulnerable stage where many sharks come closest to man's influence.

In 1998, the NMFS Apex Predators Program (APP) formed the Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey. This is an alliance of NMFS and state cooperators conducting ongoing investigations of shark nursery grounds along the East Coast of the United States. State cooperators include the following: the North Carolina Division of Marine Fisheries, South Carolina Department of Natural Resources, Savanna State University with cooperation from the Georgia Department of Natural Resources, and Florida Department of Environmental Protection (DEP). NMFS APP staff conducts the COASTSPAN study in Delaware Bay. COASTSPAN is funded by NMFS NEFSC and NMFS Highly Migratory Species Management Division.

Results presented here are a summary of the first two years of this five-year study. In subsequent years the program will 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.

Summary of Preliminary 1998-1999 COASTSPAN Findings

COASTSPAN cooperators sampled a total of 2,488 sharks in 1998 and 1999. Twelve hundred and eighty-three (52%) of the sharks sampled were tagged with fin tags and released. Florida DEP also contributed their sampling data from the Indian River Lagoon from April 1991 to March 1997. Juvenile sharks caught by the cooperators included the following: Atlantic sharpnose (*Rhizoprionodon terraenovae*), blacknose (*Carcharinus acronotus*), blacktip (*C. limbatus*), bonnethead (*Sphyrna tiburo*), bull (*C. leucas*), dusky (*C. obscurus*), finetooth (*C. isodon*), sandbar (*C. plumbeus*), sand tiger (*Odontaspis taurus*), scalloped hammerhead (*S. lewini*), smooth hammerhead (*S. zygaena*), tiger (*Galeocerdo cuvieri*), and spinner sharks (*C. brevipinna*).

Atlantic sharpnose sharks were the predominant species caught in North Carolina, South Carolina, and Georgia waters. Juvenile sharpnose sharks (including neonates) were caught in coastal waters in North Carolina, South Carolina, and Georgia and also offshore in South Carolina. Preliminary COASTSPAN findings provide supporting evidence that sharpnose sharks utilize coastal waters in these states as pupping and nursery grounds based on umbilical scar condition and size of sharks captured.

Juvenile blacknose sharks (including neonates) were caught in North and South Carolina waters. Preliminary COASTSPAN findings provide supporting evidence that blacknose sharks

use North Carolina waters off Cape Lookout as at least a secondary nursery ground. Blacknose sharks also appear to use waters offshore of South Carolina (south east of Charleston Harbor) as pupping and nursery grounds based on umbilical scar condition and size of sharks sampled.

COASTSPAN data indicate that North and South Carolina waters also support nursery habitat for juvenile blacktip sharks. Juvenile and neonate blacktip sharks were caught off Cape Hatteras and Core Sound in North Carolina, providing evidence that these areas may be utilized as pupping and nursery grounds. In South Carolina juvenile and neonate blacktip sharks were caught in St. Helena Sound, indicating these waters as possible pupping and nursery grounds for this species.

Juvenile bonnethead sharks were captured in South Carolina and Georgia coastal waters. The presence of juveniles (age 1+) in Bulls Bay and St. Helena Sound, SC lend supporting evidence that these waters contain secondary nursery grounds for bonnethead sharks. Georgia waters in St. Andrews, Cumberland, and Wassaw Sounds may support pupping and nursery grounds for bonnethead sharks based on the presence of neonate and juvenile sharks in these areas.

One juvenile bull shark was caught in St. Helena Sound, SC in 1999, and several were captured in Indian River Lagoon, FL from 1991-1997. The presence of juvenile sharks (age 1+) in these areas supports the preliminary COASTSPAN finding that these areas provide secondary nursery habitat for bull sharks.

Two juvenile dusky sharks were caught during the 1998-1999 COASTSPAN sampling seasons. One neonate was captured in coastal waters off Saltier Path, NC and one age 1+ juvenile was captured in offshore waters southeast of Charleston Harbor, SC. These preliminary findings suggest that North and South Carolina contain nursery habitat for dusky sharks based on umbilical scar condition and size of the sharks.

Juvenile finetooth sharks were found in coastal waters in North Carolina, South Carolina, and Georgia. Only age 1+ juveniles were found in North Carolina and Georgia waters, indicating that secondary nursery habitats may be located in these areas. Preliminary COASTSPAN findings show that finetooth utilize South Carolina waters to some degree as pupping and nursery grounds based on the presence of neonates and juveniles. One juvenile nurse shark was captured offshore in South Carolina waters.

COASTSPAN results show the importance of Delaware Bay as a pupping and nursery ground for sandbar sharks. Tag/recapture data and the presence of juvenile sandbar sharks during early spring, late fall, and the winter months in North and South Carolina waters gives supporting evidence that sandbar sharks use these waters as important overwintering nursery grounds. The presence of juveniles in low numbers during the summer months in South Carolina waters suggests that sandbar sharks may utilize these waters as secondary nursery habitat.

The presence of juvenile sand tiger sharks indicates that Delaware Bay may be a secondary nursery ground for this species. There were no juvenile sandtigers caught in North Carolina, South Carolina and Georgia waters during the COASTSPAN survey in 1998 and 1999.

Juvenile scalloped hammerhead sharks (including neonates) were found in the coastal waters of North Carolina, South Carolina, and Georgia. The presence of neonate and juvenile scalloped hammerhead sharks in South Carolina suggests the use of these waters as pupping and nursery grounds by this species. In North Carolina and Georgia, only one juvenile scalloped hammerhead was caught in each state, indicating that this species may utilize these waters to some degree as a secondary nursery ground.

One juvenile smooth hammerhead was caught in North Carolina in 1998. This COASTSPAN result suggests that smooth hammerhead sharks may utilize coastal waters in North Carolina to some degree as secondary nursery habitat.

Juvenile spinner sharks were found in the coastal waters of North and South Carolina. Preliminary COASTSPAN findings based on the presence of fresh umbilical scars suggest that spinner sharks utilize these waters as pupping and nursery grounds.

Juvenile tiger sharks were captured offshore in South Carolina waters. One tiger shark had a faint umbilical scar. This finding and other observations indicate that tiger sharks may utilize South Carolina's offshore waters as at least secondary nursery habitat.

Preliminary COASTSPAN findings are based on data collected by the COASTSPAN survey and data contributed by cooperating agencies. More cooperative work is needed to confirm all of these preliminary results.

COASTSPAN Nurse Shark Mating and Nursery Grounds Project

Studies of the nurse shark *Ginglymostoma cirratum* in the Dry Tortugas, FL are a critical key to understanding the reproductive dynamics of sharks. This is an ideal natural laboratory where all stages of the shark reproductive process, mating, gestation, pupping and nursery grounds are in evidence and may be observed. Studies of sharks in this remote, protected archipelago, provide a rare window on processes that are essential to the perpetuation of all shark populations. Results of this research can serve as a template for the management of shark EFH. Since 1991, NMFS and several other institutions have been engaged in ongoing cooperative studies on nurse shark reproduction, mating and nursery grounds. Work conducted in FY 2000 was largely a cooperative effort between NMFS APP and Albion College, and was partially funded by NMFS HMS Management Division.

In June of 2000, 30 identifiable adults in 164 mating events were recorded, and 19% of the total (109) juveniles tagged were recaptured. Progress this year included recording two gravid females in October, a result of the June mating and two fresh nurse sharks egg cases on the

sea floor not far from these females, all in the identified mating/nursery grounds and study area. The passing of large open egg cases is a sign that parturition is a few weeks away. These observations, with the presence in June of neonates, confirm that the shallow study lagoon is indeed a pupping and nursery area as well as a mating ground.

In addition to surveys of neonates and larger juveniles, behavioral documentation, and environmental data are collected, as well. Environmental parameters including time of day, temperature, tide, moon phase, substrate type and associated biotic community are routinely monitored and recorded on videotape and data boards. Temperature information is down-loaded from a local NOAA data buoy over the Internet. An analysis to look at effects on this nursery ground from El Nino and the North Atlantic Oscillation showed no significant correlation with the mating activities data set thus far.

The life history stages, behaviors and potential habitat affiliations that have been revealed to date are intriguing and require more investigation. Understanding this essential fish habitat 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.

3.1.2 Movement Patterns and Habitat Associations of Juvenile Sandbar Sharks in Delaware Bay

* The following is excerpted from Wetherbee, B. M., E. L. Rechisky and H. L. Pratt. 2000. *Movement Patterns of Juvenile Sandbar Sharks on Their Delaware Bay Nursery Grounds*. Apex Predators Program. US DOC, NOAA, NMFS, NEFSC, Narragansett Laboratory, Narragansett, RI.

Introduction

For optimal recovery of sandbar shark stocks, which have been subject to fishing pressure over the last several decades and have been depressed, the nursery grounds for this species must be maintained as suitable habitat, which is dependent upon understanding the utilization of the nurseries by the sharks. Thus, the necessity for research including delineation of shark nurseries, patterns of habitat use and environmental tolerances of sharks in nurseries, and the overall role of coastal/inshore habitats in supporting juvenile sharks has recently received much emphasis.

Acoustic telemetry studies yield information on fine-scale movements of individual animals, which is useful for inferring habitat preferences and activity patterns. Such data are crucial for thorough evaluation of the effects of fishing and habitat degradation on populations, and in turn for assessment of the potential success of management techniques such as area/time closures. Delaware Bay, one of the principal nursery grounds for sandbar sharks on the US East Coast, was chosen as the site for a telemetry study to investigate movement patterns and spatial and habitat requirements of these sharks. The study was funded by NMFS NEFSC, NMFS HMS Management Division and the National Research Council.

Summary of Findings

Ultrasonic telemetry was used to document the movement patterns and habitat use of juvenile sandbar sharks in Delaware Bay. A total of 25 sharks was tracked during June-September, 1998 and 1999; 19 tracks on the Delaware side of the bay and six on the New Jersey side. Findings show that young sandbar sharks are common near-shore on both sides of Delaware Bay, and are not abundant in the deeper, middle section of the bay, presumably as a means of avoiding predation by large sharks that occur in the central bay. Based on nearly 850 h of tracking data, movement patterns exhibited by juvenile sandbar sharks in this study were generally heavily influenced by tidal currents, restricted to a limited portion of the bay, and dependent upon the side of the bay where tracking was initiated.

Behavior patterns of young sandbar sharks in Delaware Bay appear to include repetitive movements on several scales, and are indicative of site fidelity for these sharks. Firstly, movements of sharks were strongly associated with tidal currents and were generally repeated several times a day with each tidal cycle. Secondly, repeatable behavior on a daily basis within individual sharks was demonstrated by the high degree of overlap between activity spaces of consecutive days for sharks in areas of high shark activity. Thirdly, repeatability of behavior among individual sharks was observed in the study as demonstrated by a high degree of overlap of activity spaces among different individuals.

Juvenile sandbar sharks restrict the majority of their movements to a relatively small portion of Delaware Bay. There are clearly areas in the bay where activity of sharks is concentrated, such as Broadkill and Bigstone beaches, DE. Multiple sharks spend considerable time in common areas, and catch data also suggests that large numbers of sharks inhabit these areas. The tracking studies were conducted over the course of the entire summer, indicating that there is a degree of site fidelity in sandbar sharks during the entire time they are residents in Delaware Bay.

There are a number of factors that may influence the behaviors observed. The more restricted movements in shallow, near-shore water on the Delaware side may be a reflection of the presence of a more extensive, shallow shelf on that side of the bay in comparison to the New Jersey side. Differences in substrate may also explain the behavioral patterns observed in sharks; the New Jersey side of the bay is characterized by large oyster beds, whereas the Delaware side is predominately fine sediment with very few oysters. Since the diet of young sandbar sharks is dominated by a few prey types, the movements of the sharks may also be related to prey distribution.

3.1.3 Other Shark Nursery Area Research

The University of Mississippi is completing a MARFIN research project (Grant Number

NA77FF0548) to identify and characterize shark nursery grounds in the northern Gulf of Mexico. The project collected sharks from coastal Mississippi and Alabama waters to describe the temporal and spatial components of shark nursery areas. Sharks were also tagged and released to examine growth and movement patterns in northern Gulf waters.

3.2 Atlantic Billfish

Joseph E. Serafy, Thomas R. Capo, Claire B. Paris and Robert K. Cowen are working cooperatively on early life history studies on Atlantic Billfishes off Lee Stocking Island in the Bahamas. The original goal of this research was to address some fundamental questions surrounding the biology and ecology of the Atlantic billfishes, with particular emphasis on the earliest life stages inhabiting the surface waters off Lee Stocking Island (LSI). It is important to note that this project changed in scope and emphasis by expanding the spatial extent of this study well beyond the pelagic waters adjacent to LSI, thereby gaining a comprehensive view of larval billfish density-distribution throughout Exuma Sound.

Each istiophorid larva collected was separated from other biota, examined under a dissecting microscope and tentatively placed into one of three taxonomic categories. Based on snout morphometry and pigment patterns the three taxonomic categories were: (1) blue marlin;(2) white marlin or sailfish; and (3) undetermined istiophorid. The latter category was composed primarily of partially larvae less than 5 mm in length. The Exuma Sound efforts yielded a total of 100 individual billfish larvae. Of these, 82 have been tentatively identified as blue marlin, two are identified as either white marlin or sailfish and the remainder (16) are as yet identified as "undetermined istiophorids". Researchers are currently in the process of removing the eye tissue of all 100 specimens for genetic determination of species identity. Also in progress are measurements of the total length of each specimen. In the case of confirmed blue marlin, these lengths can then be converted in to an estimated age using empirically-derived equations.. Knowledge of larval blue marlin age, coupled with details of the flow environment, is important for hindcasting the probable spawning locations and times. Further, measurements of size-at-age may provide proxy of condition of the young that may relate to habitat quality (e.g. fish from high food habitats experience high growth rates). Once individuals have been identified genetically, species-specific density-distribution maps can be generated and an estimate of probable spawning times and locations determined.

3.3 Swordfish

The South Carolina Department of Natural Resources, Marine Resources Research Institute is currently working on a research program designed to determine the importance of the Charleston Bump and associated oceanographic features (currents, circulation, sources, productivity) in the life history of large oceanic pelagic fishes, including swordfish, sailfish, tunas and marlins. A Charleston Bump Colloquium was held in Charleston, SC, with a total of 16 papers presented covering the geology, physical oceanography, and fisheries of this area. Studies of the Charleston Bump include hydrographic surveys and bottom mapping, logbook data

analyses, satellite pop-off tagging. During 2000, swordfish and sailfish were tagged and released from the Charleston Bump area using pop-off satellite tags. Three pop-off periods were used in this study, 30-day (10 swordfish), 60-day (10 swordfish), and 90-day (9 swordfish, 1 sailfish) tags. Two 5-day tags (1 swordfish, 1 sailfish) were also used as a system test. Of the 10 swordfish tagged with 30-day tags, information from 7 tags was recovered, with fish moving an average of 529 km, mainly moving to the east toward Bermuda. Information from six, 60-day tags was received, with swordfish moving an average of 1,120 km to the north and northeast from the release location. A total of 8 of the 9, 90-day tagged swordfish were recovered, with these fish moving an average of 1,104 km, with movement in generally a north to northeast direction near submarine canyons or along the Gulf Stream. Four of the swordfish did not move away from the Charleston Bump area, even after 90 days. The two sailfish moved 98 km in 5 days, while the sailfish tagged with a 90-day tag moved 1,581 km.

The temperature profiles provided from the satellite tags indicate active diel movement patterns, migrating from warm surface waters to cooler waters at depth. Swordfish appear to be attracted to complex, high-relief bottom structure and complex thermal structure consisting of fronts where warm Gulf Stream waters meet cooler shelf, slope and Labrador Current waters. The Charleston Bump appears to be an important habitat for swordfish, and also functions as a "stepping stone" along the path of seasonal migration of the swordfish.

3.4 Bluefin Tuna

Results of archival and pop-up tagging of bluefin in the western North Atlantic by the Stanford-NMFS group was reported by Block et al. (SCRS/00/148). A total of 380 Atlantic bluefin have been equipped with implantable archival tags or pop-up satellite tags since 1996. Of the 279 implantable archival tags deployed, 30 have been recovered and 21 of these instruments have been returned. Seventy pop-up satellite tags have provided positions, ambient temperature and/or depth movements. This represents 90% of the expected returns from deployed pop-up satellite tags. Data on seasonal movements, trans-Atlantic movement patterns, depth preferences and breeding behaviors have been obtained for fish assumed to be in the age 6-13 range. The authors suggest that bluefin tagged in the west display at least three distinct types of behaviors: (1) western residency with no visitation to spawning areas, (2) western residency with Gulf of Mexico breeding, and (3) trans-Atlantic migrations to the east Atlantic or Mediterranean Sea. Again the high success of the pop-up tags was noted compared to the eastern study. The Group recommended that there be additional releases in the Gulf of Mexico in order to better understand spawning site fidelity.

Section 3 References

McCandless, C. and H. L. Pratt. 2000. *1998-1999 Summary Report of the Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey*. Apex Predators Program. US DOC, NOAA, NMFS, NEFSC, Narragansett Laboratory, Narragansett, RI.

Pratt, H. L. and J. C, Carrier. 2000. *COASTSPAN Nurse Shark Mating and Nursery Grounds Project*. *Draft Report of the 1999 Apex Predators Program / Albion College*. Apex Predators Program. US DOC, NOAA, NMFS, NEFSC, Narragansett Laboratory, Narragansett, RI, Department of Biology, Albion College, Albion, MI.

SCRS/00/148. 2000. A report to ICCAT on archival and pop-up satellite tagging of bluefin tuna in the western North Atlantic - Block, B.A., H. Dewar, S. Blackwell, T. Williams, A. Boustany, E.D. Prince, C. Farwell.

Wetherbee, B. M., E. L. Rechisky and H. L. Pratt. 2000. *Movement Patterns of Juvenile Sandbar Sharks on Their Delaware Bay Nursery Grounds*. Apex Predators Program. US DOC, NOAA, NMFS, NEFSC, Narragansett Laboratory, Narragansett, RI.

4. FISHERY DATA UPDATE

In this section of the 2001 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 most HMS fishermen target particular species, the non-selective nature of most fishing gear promotes 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 by species can be found in the National Report of the United States:2000 (NMFS, 2000a), as well as 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 the U.S. portion of HMS catch and landings by species rather than gear type. International catch levels as well as U.S. reported catches, other than sharks, are taken from the 2000 SCRS Report which reflects catch data on a calendar year basis through 1999. The U.S. percentages of regional and total catch for HMS species are presented (Table 4.1) to provide a basis for comparison of 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 1999 U.S. vs International Catch of HMS (mt ww) other than sharks.** Source: NMFS, 2000a).

Species	Total International Reported Catch	Region of U.S. Involvement	Total Regional Catch	U.S. Catch	U.S. Percentage of Regional Catch	
Atlantic Swordfish	40,003 (Atlantic and Mediterranean)	North Atlantic (NA) and South Atlantic (SA)	27,377 (11,914 NA, 15,463 SA)	3,087 (500 mt discards) (2,908 + 494 mt discards NA, 179 +6 mt discards SA)	13.1% (28.55% NA, 1.20% SA)	8.97% (includes Med catches)
Atlantic Bluefin Tuna	34,258	West Atlantic	2,771	1,363 (151 mt discards)	49.19%	3.98%
Atlantic Bigeye Tuna	120,883	Total Atlantic	120,883	1,261	1.04%	1.04%
Atlantic Yellowfin Tuna	139,967	West Atlantic	27,632	7,734	30.17%	5.52%
Atlantic Albacore Tuna	64,189	North Atlantic	34,557	314	0.91%	0.49%
Atlantic Skipjack Tuna	163,435	West Atlantic	27,043	148	0.55%	0.09%
Atlantic Blue Marlin	3,316	North Atlantic	1,201	120 (83 mt discards)	9.82%	3.56%
Atlantic White Marlin	908.5	North Atlantic	315	57 (56 mt discards)	8.09%	6.27%
Atlantic Sailfish	827	West Atlantic	546	72 (71 mt discards)	13.19%	8.71%

4.1 Fishery Data: PELAGIC LONGLINE

4.1.1 Overview of History and Current Management

U.S. pelagic longline fishermen began targeting highly migratory species in the Atlantic Ocean in the early 1960s. However, U.S. landings of swordfish did not exceed 1500 mt until the mid-1970s. Since that time, the gear deployed has evolved several times. The majority of fishermen use monofilament mainline that is rigged depending on whether the line is "targeting" tunas or "targeting" 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, yellowfin tuna fishing tends to occur during the day while most swordfish fishing takes place at night. However, use of pelagic longline gear also results in incidental catch of other pelagic species. The incidental catch includes species which are discarded for economic and regulatory reasons. A complete discussion of the pelagic longline fishery can be found in Regulatory Amendment One to the HMS FMP (NMFS, 2000b)

Bycatch in this fishery is discussed in Section 4.1.4 and Section 8. Like fishermen using other fishing gears, pelagic longline fishermen are subject to minimum sizes for yellowfin, bigeye, and bluefin tuna, and swordfish in order to reduce the mortality of small fish. Pelagic longline fishermen are also subject to target catch limits 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, NMFS 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 is also currently in place a time/area closure for pelagic longline fishermen designed to reduce the incidental catch of bluefin tuna and sea turtles. In order to enforce time/area closures, NMFS would like to require all pelagic longline vessels to report positions on an approved vessel monitoring system (VMS). Time/area closures and VMS considerations are discussed below in Section 4.1.6.

In addition to regulations designed to reduce bycatch, pelagic longline fishermen are subject to quota management for swordfish, sharks and bluefin tuna. Quota monitoring requires seasonal regulations, closures, and 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, NMFS 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. NMFS is re-evaluating the limited access program and may consider gear-specific permits in the future. Refer to Section 9 for a discussion of limited access options. This gear type is possibly the most regulated of all HMS gear types due to the nature of the gear and its catch/bycatch.

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 1995-1999 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 1996-1999 (mt ww)*. Source: U.S. National Report (NMFS, 1999and 2000a).

	1996	1997	1998	1999
Swordfish *landings*	3625.1	3361.9	3169.2	3051.9
Swordfish *dead discards***	563.7	455.2	432.7	495.7
Yellowfin Tuna	3285	3773.6	2447.9	3374.9
Bigeye Tuna	660.5	794.8	695.3	929.1
Bluefin Tuna *landings*	67.9	49.9	48.8	73.5
Bluefin Tuna *dead discards****	73.5-168	37.1-148	64-102	30-151
Albacore Tuna	109.4	189.1	180.1	194.5
Skipjack Tuna	0.3	3.5	1.3	2.0
Blue Marlin*****	196.5	138.1	52.4	82.1
White Marlin*****	67.6	70.8	32.8	56.7
Sailfish*****	71.6	57.7	27.1	71.6
Total	**5767.3-5861.8**	**8931.7-9042.6**	**7194.3-7232.3**	**8362-8483**

*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 NMFS at this time.
***Estimates of bluefin tuna discards vary depending on method used to calculate discards.
*****Indicates longline *dead discards* of these species.

4.1.3 U.S. vs. International Catch

For 1999, the provisional estimate of U.S. vessel landings and dead discards of swordfish (North and South Atlantic) was 3,585 mt (99 percent of these are longline landings and discards). This estimate is somewhat lower than the estimate of 3,660 mt for 1998. Decline in U.S. landings of swordfish from the 1990 level (5,519 mt, North Atlantic only) was at least in part due to U.S. implementation of quotas. The 1999 stock assessment shows a potential reward for these

fishermen who have been subject to increasingly restrictive management measures. With a rebuilding plan in place, it is hoped that the strong year classes of young swordfish will be protected throughout their lives and stock size will begin to increase. Anecdotal evidence indicates more small swordfish are being encountered by pelagic longline fishermen throughout the Atlantic Ocean. The following table indicates the proportion of the harvest that is allocated to the United States.

Table 4.1.2 Estimated International Longline Landings of HMS, Other than Sharks, for All Countries in the Atlantic: 1995-1998 (mt ww)*. Source: NMFS, 1999and 2000a.

	1996	1997	1998	1999
Swordfish (N.Atl + S. Atl)	31438	30375	24203	25695
Yellowfin Tuna (W. Atl)**	8569	8505	8181	10943
Bigeye Tuna	74880	68198	70302	77356
Bluefin Tuna (W. Atl.)**	528	382	764	914
Albacore Tuna (N. Atl + S. Atl)	23044	22324	20936	24936
Skipjack Tuna***	26	60	89	13
Blue Marlin (N. Atl. + S. Atl.)****	3577	3626	2390	2522
White Marlin (N. Atl. + S. Atl.)****	1171	942	831	833
Sailfish (W. Atl.)****	341	209	830	405
Total	**143,574**	**134,621**	**128,526**	**143,617**
U.S. Longline Landings (from U.S. Natl. Report, 2000)#	**5767.3**	**8931.7**	**7194.3**	**8362-8483**
U.S. Longline as Percentage of Longline Total	**4.0**	**6.6**	**5.6**	**5.9**

* landings include those classified by the SCRS as longline landings for all areas
**Note that the U.S. has not reported participation in the E. Atlantic yellowfin tuna fishery since 1983 and has not participated in the E. Atl bluefin tuna fishery since 1982.
***includes longline and trawl catches for all countries throughout the Atlantic Ocean
****includes U.S. *dead discards*
includes swordfish longline discards and bluefin tuna discards

The U.S. longline fleet has historically accounted for a small percentage 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 right around 5 percent of all longline landings reported to ICCAT. In contrast, U.S. fishermen have been severely restricted in order to

minimize bycatch in this fishery. 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 from the pelagic longline fishery 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 some other finfish species, are discarded as a result of a limited market (resulting in low prices) and perishability of the product. Large coastal sharks are discarded from this gear during times when the shark season is closed. Bluefin tuna may be discarded because target catch requirements have not been met. All billfish and protected species including mammals, sea turtles, and birds are required to be discarded. In the past, swordfish have been discarded during times 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 remains an important management issue. NMFS is also concerned about serious injuries to 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, NMFS published regulations to close areas to longline fishing (Figure 4.1.1) and banned the use of live bait by long line vessels in the Gulf of Mexico.

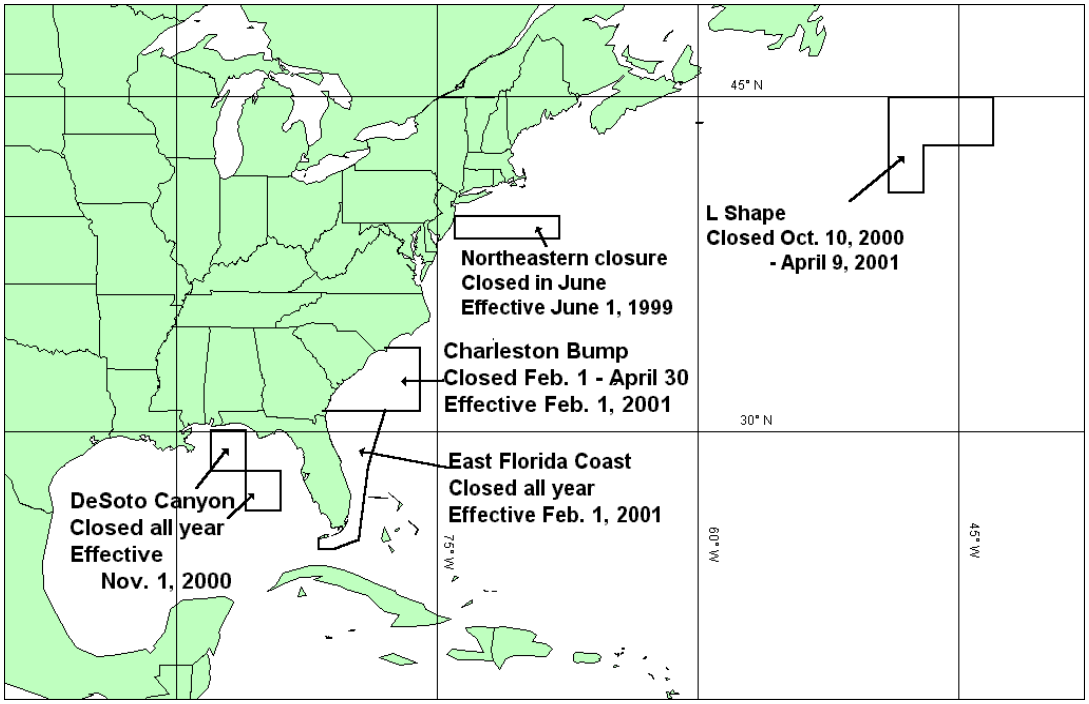

Figure 4.1.1 Areas closed to pelagic longline fishing by U.S.-flagged vessels.

Vessel Monitoring Systems

Vessel monitoring systems are essential to the effective implementation and enforcement of time/area closures and they provide increased communication and safety benefits to pelagic longline fishermen. Further, they facilitate monitoring of this diverse fleet that ranges throughout the Atlantic Ocean. NMFS delayed the effective date of the VMS requirement until October 1, 2000, in order to allow pelagic longline fishermen sufficient time to comply with the regulation. On September 26, 2000, the Washington, D.C. District Court requested additional information from NMFS regarding the fleet-wide application of VMS. NMFS seeks additional comments from the public on this issue before responding to the Court. Comments were accepted through February 8, 2001.

Observer Program

Four hundred and thirty longline sets were observed and recorded by NMFS observers in 1999 (4% coverage of a total of 11,045 sets reported). Table 4.1.4 compares observer coverage in past years for this fleet. The HMS Biological Opinion requires that 5 percent of the pelagic longline trips be selected for observer coverage for trips taken during 1999. In addition, ICCAT requires 5 percent observer coverage for all trips targeting yellowfin tuna and/or bigeye tuna. Unfortunately, due to logistical problems, it was not possible to place observers on all selected trips. NMFS is working towards improving compliance with observer requirements and facilitating communication between vessel operators and observer program coordinators. In addition, fishermen will be reminded of safety requirements for placement of observers, including the need to have all safety equipment on board that is required by the U.S. Coast Guard.

Table 4.1.4 Observer Coverage of the Pelagic Longline Fishery

Year	Number of Sets Recorded	Percentage of Total Number of Sets
1995	696	5.2
1996	361	2.5
1997	448	3.1
1998	287	2.9
1999	430	3.9

Marine Mammals

In accordance with the Marine Mammal Protection Act, NMFS published draft stock assessment reports for Atlantic and Gulf of Mexico marine mammals. These species are sometimes hooked on pelagic longline gear and fishermen report takes of mammals to NMFS in a marine mammal logbook. The Atlantic pelagic longline fishery is considered a Category I fishery under the Marine Mammal Protection Act (MMPA). In 1999 there were six observed takes of marine mammals by pelagic longlines. This number has been extrapolated out to an estimated 205 mammals fleet-wide. In addition to mammals released *dead* from fishing gear, which is uncommon in the pelagic longline fishery, NMFS must consider post-release mortality of mammals released *alive*.

The Atlantic Stock Recovery Group (SRG) recognized the need to immediately apply serious injury "guidelines" to the Atlantic pelagic longline fishery. At the April 1999 meeting, NMFS presented a preliminary analysis of the serious injuries in this fishery and gave a rough estimate of the number of injuries. Based on these levels of takes, the SRG recommended maintaining the Category I listing for the Atlantic pelagic longline fishery in the proposed List of Fisheries for 2000. NMFS will summarize the serious injury determinations for the pelagic longline fishery in the upcoming proposed List of Fisheries for 2001.

Sea Turtles

The Atlantic pelagic longline fishery exceeded the authorized level of takes of loggerhead sea turtles in 1999. As a result, NMFS re-initiated consultation under Section 7 of the Endangered Species Act. NMFS subsequently re-initiated consultation under the ESA to consider new information and analyses concerning turtle interactions with Atlantic pelagic longline gear. Nevertheless, an emergency rule to reduce bycatch was published October 13, 2000, (65 FR 60889) to avoid fishing in an area on the Grand Banks to minimize the number of turtle takes. In addition, all U.S.-flagged vessel with pelagic longline fishing gear onboard are required to have line clippers and a dip net that meet standards set forth in the emergency rule. A new Biological Opinion is expected in the Spring of 2001.

Sea Birds

Gannetts, gulls, and storm petrels are occasionally hooked by Atlantic pelagic longlines. These species and all other sea birds are protected under the Migratory Bird Treaty Act; endangered sea birds receive further protection under the Endangered Species Act. Sea bird populations are often slow to recover from excess mortality as a consequence of their low reproductive potential (one egg per year and late sexual maturation). According to NMFS observer data from 1999, 1 seabird was hooked in June 1999 in the South Atlantic Bight. The species was not identified. The majority of longline interactions with sea birds 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 incidental sea bird takes (www.nmfs.gov.gov/NPOA-S.html). Although Atlantic pelagic longline interactions will be considered in the plan, NMFS has not identified a need to implement gear modifications aimed at reducing sea bird takes by Atlantic pelagic longlines. Takes of sea birds have been minimal in this 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 the stock assessment. Direct use of observer data has been used for a number of years to estimate dead discards of a variety of species in longline fisheries, including billfish, sharks, undersized swordfish, and turtles, and it has been applied in both Atlantic and Pacific fisheries. Further, it has been used for scientific analyses by both ICCAT and the Inter-American Tropical Tuna Commission for a number of years.

NMFS is committed to seeking a review of the dead discard estimation methodology from an independent scientific panel. This panel would recommend the most appropriate fashion to evaluate the precision and accuracy of methods and assumptions needed to estimate dead discarded catches given current sampling levels for the range of species taken as bycatch and for determining compliance given the terms of the rebuilding program agreement. The results of this study will be reported to the ICCAT Advisory Committee and the U.S. Commissioners prior to their submission to ICCAT in 2001. NMFS will determine appropriate next steps at that time.

The total estimated metric tons of dead discards of swordfish, sailfish, blue marlin, and white marlin increased in 1999 over 1998 levels. The weight of pelagic, blue, dusky and hammerhead sharks discarded dead decreased while the weight of coastal and silky sharks increased (Cramer, pers. comm.). The most recent longline bycatch data are available from the 2000 U.S. National Report to ICCAT (NMFS, 2000a). Longline dead discards of swordfish in 1999 were estimated to be 449 mt ww, an increase of 57 mt from the 1998 level (U.S. National

Report, 2000).

Longline bycatch of billfish in 1999 in many geographic areas increased from 1998 levels. Estimated billfish dead discards from commercial longlines were 82.1 mt for blue marlin, 56.7 mt for white marlin, and 71.6 mt for sailfish in 1999. In 1998, 51.8 mt blue marlin, 32.1 mt white marlin, and 27.1 mt sailfish were reported as dead discards. Approximately three times as many blue marlin were discarded by longlines in the Gulf of Mexico in 1999 as in 1998. Bycatch of this species decreased from 1998 to 1999 in most other areas. White marlin bycatch increased substantially from 1998 to 1999 in the Gulf of Mexico and Caribbean Sea. Sailfish bycatch likewise increased substantially in the Gulf of Mexico in 1999.

Bluefin tuna dead discards from the pelagic longline fishery were 30-151 mt in 1999, depending on the methodology used for estimation, and 64 mt in 1998. A June closure of an area off the New Jersey coast was implemented in 1999 to reduce discards of bluefin tuna in the pelagic longline fishery (54.8 mt coastwide in 1998 and 30.7 mt in 1997). This closure was expected to reduce discards by approximately 55 percent in the northwest Atlantic.

4.1.5 Safety Issues Associated with the Fishery

Like all offshore fisheries, pelagic longlining can be dangerous. Trips can be of long duration, the work can be arduous, and the nature of setting and hauling the line may cause injuries due to hooking. Like all other HMS fisheries, longline fishermen are exposed to unpredictable weather. NMFS does not wish to exacerbate unsafe conditions through implementation of regulations. Therefore, NMFS considers safety factors when implementing management measures on pelagic longline fishermen. For example, all time/area closures are expected to be closed to fishing, not transiting, in order to allow fishermen to make a direct route to and from fishing grounds. VMS is also likely to improve safety concerns not only because of the Emergency Position Indicating Radiobeacon (EPIRB) abilities of the system, but because regulations can now be adjusted given the enforcement backup of the vessel monitoring system. NMFS seeks comments from fishermen on any safety concerns they may have. Fishermen have pointed out that due to decreasing profit margins, they may fish with less crew or less experienced crew or may not have the time or money to complete necessary maintenance tasks. NMFS encourages fishermen to be responsible in fishing and maintenance activities.

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 did target and land bluefin tuna off the coast of Gloucester, MA as early as the 1930s. The limited entry system with non-transferable individual vessel quotas (IVQs) for purse seining was established in 1982, effectively excluding any new entrants to this category. Equal quotas are assigned to individual vessels by regulation; the IVQ system is possible given the small pool of ownership in this sector of the fishery. Currently, only five vessels comprise the bluefin tuna Purse Seine fleet and the quotas were made transferable among the five vessels in 1996.

The HMS FMP and its final implementing regulations established percentage quota shares for bluefin tuna for each of the domestic fishing categories. For the Purse Seine category, NMFS adopted a cap on the amount of quota the category could be allocated. The HMS AP met in Silver Spring, MD on June 10 and June 11, 1999, and discussed, among other issues, the Purse Seine category cap. The AP provided information and advice to NMFS on the issue of fairness in the context of allocation to the Purse Seine category.

On August 18, 1999 (64 FR 44885), NMFS published a proposed rule to remove the 250 mt cap on the Purse Seine category bluefin tuna allocation. NMFS held two public hearings on the proposed rule and the comment period closed on September 27, 1999. Numerous comments were received, both in favor of the proposed rule and against it. On October 27, 1999, NMFS filed a final rule with the Federal Register (64 FR 58793, November 1, 1999) removing the cap on the Purse Seine category.

4.2.2 Most Recent Catch and Landings Data

Table 4.2.1 shows purse seine landings of Atlantic tunas from 1995 through 1999. Purse Seine landings make up about 20% of the total annual U.S. landings of bluefin tuna (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: 1995-1999 (mt ww). NW Atlantic Fishing Area. Sources: NMFS, 1999 and 2000a.

Species	1995	1996	1997	1998	1999
Bluefin Tuna	249.0	245.0	249.7	248.6	247.9
Yellowfin Tuna	0	6.8	0	0	0
Skipjack Tuna	0	0.7	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 4.1.2 Estimated International Purse Seine Atlantic Tuna Landings in the Atlantic and Mediterranean: 1995-1999 (mt ww). Source: NMFS, 1999and 2000a **.**

Species	1995	1996	1997	1998	1999
Bluefin Tuna	24,295	26,589	25,256	20,957	15,030
Yellowfin Tuna	94,621	104,847	93,448	100,449	83,080
Skipjack Tuna	110,212	98,773	78,722	81,816	97,254
Bigeye Tuna	25,583	27,030	18,124	18,446	20,512
Total	**254,711**	**257,239**	**215,550**	**211,668**	**215,876**
US Total	**249**	**252.5**	**249.7**	**248.6**	**247.9**
US Percentage	**0.10%**	**0.10%**	**0.12%**	**0.11%**	**0.11%**

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 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.

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 NMFS' 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 NMFS 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, NMFS issued Experimental Fishing Permits 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 NMFS with additional data on purse seine operations and gear interactions. The data collected by the observers in 2000 will be analyzed and available in 2001.

4.2.5 Safety Issues Associated with the Fishery

There are no new safety issues associated with the U.S. Atlantic tunas purse seine fishery. Section 3.9 of the HMS FMP describes safety of human life at sea as it pertains to the fisheries for Atlantic HMS.

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[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 and hook and line, midwater trawls and recently scallop dredge gear on a limited basis, have been allowed in the closed areas.

4.3 Fishery Data: COMMERCIAL HANDGEAR

Handgear are used for Atlantic HMS by fishermen on private vessels, charter vessels, and headboat vessels. Operations, frequency and duration of trips, and distance ventured offshore vary widely. An overview of the history of the HMS handgear fishery (commercial and recreational) can be found in Section 2.5.8 of the HMS FMP.

The proportion of domestic HMS landings harvested with handgear varies by species, with Atlantic tunas comprising the majority of commercial landings. Commercial handgear landings of all Atlantic HMS (other than sharks) in the United States are shown in Table 4.3.1. The fishery is most active during the summer and fall, although in the South Atlantic and Gulf of Mexico fishing occurs during the winter months. For bluefin tuna, commercial handgear landings accounted for approximately 60% of total U.S. bluefin tuna landings, and over 71% of commercial bluefin landings. The commercial handgear fishery for bluefin tuna occurs mainly in New England, with vessels targeting large medium and giant bluefin using rod and reel, handline, harpoon, and bandit gear. Beyond these general patterns, the availability of bluefin tuna at a specific location and time is highly dependent on environmental variables that fluctuate from year to year. Fishing usually takes place between eight and 200 km from shore using bait including mackerel, whiting, mullet, ballyhoo, herring, and squid.

The majority of U.S. commercial handgear (rod and reel, handline, and bandit gear) fishing activities for bigeye, albacore, yellowfin, and skipjack tunas take place in the northwest Atlantic. Rod and reel gear is also used by recreational fishermen, which is addressed in Section 4.4. In 1998, 4.3 percent of the total yellowfin catch, or 9.0 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 less than one percent of total skipjack landings, or about 2.1 percent of commercial skipjack landings. The percentages of albacore are similar to those for skipjack, and handgear landings of bigeye tuna accounted for less than one percent of total and 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. Handgear landings of swordfish are shown in Table 4.3.1 and account for a very small percentage of total U.S. swordfish catch (less than 0.1%).

The HMS FMP established a limited access program for the commercial swordfish and shark fisheries (all gears), as well as for tunas (longline only). Fishermen who submitted an application by December 1, 1999, with documentation of a swordfish permit for use with harpoon gear or landings of swordfish with handgear as evidenced by logbook records, verifiable sales slips or receipts from registered dealers, or state landings records were eligible for a swordfish handgear permit. NMFS also issued handgear permits to those applicants who met the earned

income requirement, i.e., those who had derived more than 50% of their earned income from commercial fishing through the harvest and first sale of fish or from charter/headboat fishing, or those who had gross sales of fish greater than $20,000 harvested from their vessel, during one of the three calendar years preceding the application. Chapter 4 of the HMS FMP includes a complete description of the handgear permit for swordfish under the limited access system. See Chapter Nine of this document for further information on permitting, including limited access permits.

There are a significant number of sharks 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 4.3.5) indicate that 65% of party boat operators targeted sharks at least once during the study period. Further information on Atlantic sharks catch and landings data 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. Section 2.2.4.2 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 handgear fisheries are described in Section 2.3.4, and later in this document.

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 discussed in Section 4.5 of this report. Social and economic aspects of the domestic handgear fisheries are described in Section 2.4.4 of the FMP, as well as in Section 5 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 1995-1998 are presented in Tables 4.3.1 and 4.3.2. As commercial shark landings are not recorded/disaggregated by gear type, no commercial handgear data is provided in this section. A complete discussion of Atlantic sharks is found in Section 4.5. 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 catches (landings and discards) are presented in Section 2.3.3. As the majority of U.S. landings of yellowfin tuna are by rod and reel, a summary of the recently published total domestic recreational and commercial yellowfin landings (1981-1998) is presented in this section.

Table 4.3.1 Domestic Landings for the Commercial Handgear Fishery, by Species and Gear, for 1996-1999 (mt ww). Sources: NMFS, 1999 and 2000a.

Species	Gear	1996	1997	1998	
Bluefin Tuna	Rod and Reel	504.1	617.8	603.4	643.6
	Handline	32.5	17.4	29.2	16.4
	Harpoon	95.7	97.5	133.4	114.4
	TOTAL	**632.3**	**732.7**	**766.0**	**774.4**
Bigeye Tuna	Troll	4.1	3.9	4.0	0
	Handline	17.3	2.7	0.1	12.3
	TOTAL	**21.4**	**6.6**	**4.1**	**12.3**
Albacore Tuna	Troll	2.7	5.2	5.8	0
	Handline	3.8	4.8	0	4.4
	TOTAL	**6.5**	**10.0**	**5.8**	**4.4**
Yellowfin Tuna	Troll	371.0	237.6	177.5	0
	Handline	84.2	90.6	64.7	219.2
	TOTAL	**455.2**	**328.2**	**242.2**	**219.2**
Skipjack Tuna	Troll	0.9	7.9	0.4	0
	Handline	0.4	0.1	0	6.6
	TOTAL	**1.3**	**8.0**	**0.4**	**6.6**
Swordfish	Troll	7.3	0.4	0.7	0
	Handline	0.1	1.3	0	5.0
	Harpoon	0.5	0.7	1.5	0
	TOTAL	**7.9**	**2.4**	**2.2**	**5.0**

Table 4.3.2 Domestic Landings for the Commercial Handgear Fishery by Species and Region for 1996-1999 (mt ww). Sources: NMFS, 1999 and 2000a.

Species	Region	1996	1997	1998	1999
Bluefin Tuna	NW Atl	632.3	732.7	766.0	774.4
Bigeye Tuna	NW Atl	20.5	6.6	4.0	11.9
	GOM	0.9	0	0.1	0.2
	Carib	0	0	0	0.2
Albacore Tuna	NW Atl	6.4	6.4	5.8	0.6
	GOM	0.1	0	0	$\leq$ .05
	Carib	0	3.6	0	3.8
Yellowfin Tuna	NW Atl	408.2	252.3	177.5	192.0
	GOM	47.0	55.6	60.8	12.7
	Carib	0	20.3	3.9	14.5
Skipjack Tuna	NW Atl	1.2	0.7	0.4	0.2
	GOM	0.1	0	0	0.4
	Carib	0	7.3	0	5.8
Swordfish	NW Atl	7.9	2.4	2.2	5.0
	GOM	0	0	0	$\leq$ .05

Handgear Trip Estimates

Tables 4.3.3a and 4.3.3.b displays the estimated number of rod and reel and handline trips targeting large pelagic species in 1999 and 2000. The trips include commercial and recreational trips, and are not specific to any particular species. One can assume that most trips in MA, NH, and ME were targeting bluefin tuna, and that most of these trips were commercial, as over 90 percent of Atlantic tunas vessel permit holders in these states have commercial General category tuna permits. For the other states, the majority of the trips are recreational (in that fish are not sold), with the predominant targeted species consisting of yellowfin tuna and sharks. The drop in the number of trips from 1999 to 2000 may be a result of less availability of tuna in near-shore fishing grounds. It should be noted that the 2000 estimates are still preliminary and subject to change.

Table 4.3.3a **Estimated total trips targeting large pelagic species from June 7 through November 7, 1999.** Source: LPS telephone and dockside interviews. Estimates are from 1999 Large Pelagics Survey Program Documentation (December 1999).

State/Area	Private Vessel Trips	Charter Trips	
VA	2,522	885	3,407
MD/DE	4,517	1,376	5,893
NJ	4,849	1,286	6,135
NY	3,037	838	3,875
CT/RI	2,804	414	3,218
MA	7,562	832	8,394
NH/ME	3,452	366	3,818
Total	**28,742**	**5,998**	**34,740**

Table 4.3.3b **Estimated total trips targeting large pelagic species from June 5 through November 5, 2000** Source: LPS telephone and dockside interviews. Estimates are preliminary (November 2000).

State/Area	Private Vessel Trips	Charter Trips	Total
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**

4.3.3 U.S. vs. International Catch

SCRS data do not lend themselves to organize international landings into a commercial handgear category. While some countries report rod and reel landings, these numbers may include both commercial and recreational landings. International catches of all Atlantic HMS for 1999 are summarized in Table 4.1.

4.3.4 Bycatch Issues and Data Associated with the Fishery

As compared with other commercial gear types, commercial handgear produces relatively

lower levels of bycatch. However, bycatch in the yellowfin tuna commercial handgear fishery is unmonitored in those areas where commercial activities occur after the Large Pelagic Survey (LPS) sampling season. Rod and reel discards of HMS as assessed from LPS data are discussed in the Recreational Section (4.4.4) as are new efforts in documenting catch and release survival rates. At this time, however, there is little information regarding important interactions and new data relating to commercial handgear bycatch. Anecdotal reports suggest that there may be an issue of small bluefin, yellowfin, and bigeye tuna discards, but there is no supporting documentation at this point. Some regulatory discards occur because fishermen must comply with minimum size restrictions.

4.3.5 Safety Issues Associated with the Fishery

Section 3.9 of the HMS FMP describes safety of human life at sea as it pertains to the fisheries for Atlantic HMS. Additional safety information regarding the commercial handgear fisheries for Atlantic HMS is presented below.

The United States Coast Guard (USCG) conducts routine vessel safety inspections at sea on a variety of vessels throughout the year, and during the busy fall General category bluefin tuna season the USCG concentrated patrol activities on General category bluefin tuna boats and followed 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. In the fall of 1999, three vessels participating in the Atlantic bluefin tuna General category capsized off Chatham, Massachusetts. Two of the vessels capsized due to weight while attempting to boat commercial-sized bluefin tuna (measuring 73 inches or greater and weighing several hundred pounds). The third vessel capsized while under tow by another vessel. Through November of 2000, there have not been any similar incidents in 2000 involving participants in the General category fishery.

Currently, NMFS does not require proof of proper safety equipment as a condition to obtain an Atlantic tunas permit. Instead, NMFS 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 NMFS regulations do not require USCG inspection or safety equipment in order to obtain a General category permit, NMFS cannot be certain that all participants in the commercial bluefin fishery are adequately prepared for the conditions they may encounter. NMFS 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 tunas vessels to engage in fishing unless the vessel travels to and from the area where it will be fishing under its own power and the person operating that vessel brings any bluefin tuna under control (secured to the catching vessel or on board) with no assistance from another vessel, except when shown by the operator that the safety of the vessel or its crew was jeopardized or other circumstances existed that were beyond the control of the operator. NMFS Enforcement and USCG boarding officers have recently encountered vessels participating in the bluefin tuna fishery that are unable to transit to and from the fishing grounds due to their limited fuel capacity. Occasionally these smaller vessels will work in cooperation with a larger documented vessel to catch a bluefin; others have been observed to leave lifesaving equipment at the dock to make room for extra fuel, bait, and staples. NMFS is concerned that use of such inadequately-equipped vessels jeopardizes crew in that the vessel may not be able to safely return to shore without assistance of the larger vessel due to insufficient fuel or to adverse weather conditions.

In 1999 and 2000, the USCG focused boardings on small vessels, especially those owned by "part-time" commercial bluefin fishermen, and terminated several dozen trips due to the lack of safety equipment on board. If a vessel is boarded at sea and found to be lacking major survival equipment, the USCG will terminate the trip and escort the vessels back to the dock.

NMFS 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, and therefore improve safety. There is a perception by many General category participants that every open day must be fished. The issue of effort controls alleviating fatigue problems was discussed in the FMP, but vessel repairs were not. NMFS also continues to receive comments, as discussed in the FMP, that indicate that RFDs may encourage fishermen to fish in conditions which they generally would avoid on open days, and that a season without RFDs would allow fishermen to choose their own schedule of fishing days, thus alleviating derby conditions and safety concerns.

NMFS will consider all safety comments and information, including those from the USCG and NMFS Enforcement, when planning future General category effort control schedules and will discuss these issues in future meetings with the AP.

4.4 Fishery Data: RECREATIONAL HANDGEAR

The HMS Handgear (rod and reel, handline, and harpoon) fishery includes both commercial and recreational fishermen and is described in Section 2.5.8 of the HMS FMP. The recreational billfish fishery is described in section 2.1.3 the Billfish Amendment; commercial sale, barter or trade of Atlantic billfish by U.S. commercial interests is prohibited. This section of the SAFE report describes the recreational portion of the handgear fishery, primarily as related to rod and reel fishing. Commercial handgear fisheries for HMS are discussed separately in Section 4.3 of this report.

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 Amendment. The history of Atlantic billfish management is reviewed in Section 1.1.1 of the Billfish Amendment. 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.

Atlantic tunas, sharks, and billfish are all targeted by recreational fishermen using rod and reel gear. Atlantic swordfish are also targeted and, although this fishery had declined dramatically over the past twenty years, recent anecdotal reports suggest that a recreational swordfish fishery may be growing in the Mid-Atlantic Bight and off the East Coast of Florida. Recreational fishing for Atlantic HMS is managed primarily through the use of minimum sizes and bag limits. Recreational tuna fishing regulations are the most complex and include a combination of minimum sizes, bag limits, limited seasons based quota allotment for bluefin tuna, and reporting requirements depending on the particular species and vessel type. Atlantic tunas are the only HMS species group that require a permit for recreational fishing at this time. Bluefin tuna are the only HMS species managed under a recreational quota for which the fishing season closes after the quota has been met. While Atlantic marlin have associated landing caps (a maximum amount of fish that can be landed), the overall strategy for management of recreational billfish fisheries is based on use of minimum size limits. The recreational fishery for swordfish is also managed through a minimum size requirement. The recreational shark fishery is managed through 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.

In 1997, ICCAT made several recommendations to recover billfish resources throughout the Atlantic Ocean, including reduction of Atlantic BUM and WHM landings by at least 25 percent from 1996 levels, starting in 1998, to be accomplished by 1999; promote the voluntary release of live Atlantic BUM and WHM; and work to improve current monitoring, data collection and reporting in all Atlantic billfish fisheries. A 1998 ICCAT recommendation continued the requirement for a reduced level of marlin landings through 2000. Because commercial landings of Atlantic billfish by U.S.-flagged vessels were prohibited by the 1988 Atlantic Billfish FMP, the 25

percent reduction in blue and white marlin landings affects only recreational anglers in the United States. In November, 2000, ICCAT made a third recommendation for BUM and WHM by developing a two-phase rebuilding program. See Section 2.4.3 for more information related to the rebuilding program.

4.4.2 Most Recent Catch and Landings Data

The recreational landings databases for HMS consists of data obtained through surveys including the Marine Recreational Fishery Statistics Survey (MRFSS), Large Pelagic Survey (LPS), Southeast Headboat survey (HBS), Texas Headboat survey, and the 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 1996-1999 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 1996-1999 (mt ww)*. Sources: NMFS, 1999 and 2000a, 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	
Bluefin tuna**	NW Atlantic	362	299	184	99.9
	GOM	0	0	0	0.4
	Total	362	299	184	100.3
Bigeye tuna	NW Atlantic	108.2	333.5	228.0	316.1
	GOM	0	0	0	1.8
	Total	108.2	333.5	228.0	317.9
Albacore	NW Atlantic	277.8	269.5	601.1	90.1
	GOM	61.7	65.2	0	0
	Total	339.5	334.7	601.1	90.1

Yellowfin tuna	NW Atlantic	4,484.8	3,560.9	2,845.7	3,818.2
Species	**Region**	**1996**	**1997**	**1998**	**1999**
	GOM	13.2	7.7	80.9	149.4
	Total	4,498	3,569	2,927	3,967.6
Skipjack tuna	NW Atlantic	48.1	42.0	49.5	63.6
	GOM	36.4	21.7	37.0	34.8
	Total	84.5	63.7	86.5	98.4
Blue marlin***	NW Atlantic	17.0	25.0	34.1	24.8
	GOM	8.3	11.5	4.5	7.5
	Caribbean	9.6	8.6	10.6	4.6
	Total	34.9	45.1	49.2	36.9
White marlin***	NW Atlantic	2.7	0.9	2.4	1.5
	GOM	0.6	0.9	0.2	0.1
	Caribbean	0.0	0.0	0.02	0
	Total	3.3	1.8	2.6	1.6
Sailfish***	NW Atlantic	0.2	0	0.1	0.07
	GOM	0.8	0.4	1.0	0.6
	Caribbean	0.2	0.2	0.05	0
	Total	1.2	0.6	1.15	0.67
Swordfish	Total	5.9	10.9	4.7	21.32

* 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 estimated based on the SEFSC Recreational Billfish Survey and the Large Pelagic Survey.

Atlantic Billfish Recreational Fishing

As part of the 2000 SCRS assessment of Atlantic blue marlin and Atlantic white marlin stocks (see Section 2 of this report), several scientific papers were presented by the SEFSC

relating to recreational landings of billfish by U.S. anglers. Document SCRS/00/055 reviewed the 1997 ICCAT Commission recommendation that, beginning in 1998, all parties reduce "blue marlin and white marlin landings by at least 25% for each species from 1996 landings, such reduction be accomplished by the end of 1999." This Commission recommendation was based on the SCRS recommendation "that reductions in fishing mortality are necessary to avoid further declines in the stocks and to begin rebuilding these stocks." An evaluation is presented comparing the U.S. blue marlin rod and reel catches in 1999 with 1996, updating the 1998 versus 1996 preliminary comparison (SCRS/99/99). The results of the evaluation presented indicate that in order to achieve a 25% reduction by weight in blue marlin rod and reel landings in year 2000, relative to 1996 landings using minimum size, the minimum size for this species would likely have to be increased to above the current 99 inch lower jaw fork length limit. Higher minima would have greater chances of achieving this implementation for the entire fishing year, and some buffer against further increases in the average size of available blue marlin in 2000 and beyond relative to those available in 1996.

Document SCRS/00/57 noted that some components of the U.S. recreational marlin landings are not precisely measured and have not been routinely included in the landings reported to ICCAT. This is reflected by the caveat that these reported landings are "minimum estimates." This paper explores the possible integration of the U.S. Marine Recreational fishery Statistics Survey (MRFSS) catch estimates and the U.S. Atlantic Recreational Billfish Survey (RBS). The resulting model attempts to estimate total U.S. recreational marlin landings by adjusting for the bias in the relatively precise annual RBS estimates. The bias correction was based on regressions of relatively unbiased, but highly imprecise, MRFSS estimates on the RBS estimates. The resulting models were used to predict the U.S. recreational landings of Atlantic blue marlin and white marlin for 1981-1999.

Document SCRS/00/58 developed indices of abundance of blue marlin and white marlins from the U.S. recreational tournament and non-tournament fisheries for the period 1973-1999. The indices of abundance in numbers of fish and weight were estimated from numbers of billfish caught and reported to the Recreational Billfish Survey (RBS) program. The standardized indices were estimated using Generalized Linear Mixed Models under a delta lognormal model approach. Factors in the analysis included year, area, season and first-level interactions. The model analyzed the fishing success and effort of each day-location, weighted by the number of boat trips. Model selection, diagnostics and comparison with prior standardized series were presented.

Document SCRS/00/60 indicated that size frequencies of catches represent a useful adjunct to catch, effort and abundance information for stock assessment. Size frequencies of blue and white marlin (*Makaira nigricans*, and *Tetrapturus albidus*, respectively) have been collected at U.S. recreational tournaments since 1972. The U.S. Marine Recreational Fishing Statistics Survey (MRFSS), and Large Pelagic Survey have made limited additional observations of the U.S. recreational marlin catch during dockside interviews of fishermen since 1982 and 1984, respectively. Other size data for marlin are available for U.S. and Venezuelan longline fisheries.

These include measurements taken by observers on Venezuelan longline vessels since 1987, and on U.S. vessels since 1989. These data are supplemented with dockside samples of billfish landed in Venezuela beginning in 1987. Length frequencies constructed from these data showed increasing mean sizes in the recreational fisheries in recent years. This trend is the result of the implementation of minimum size regulations that truncated the size distribution of landed fish. This trend is not reflected in the samples from longline fisheries. Sex ratios for both species change from predominately male, or unknown sex at smaller sizes to predominantly female at larger sizes.

Swordfish Recreational Fishery

The recreational swordfish fishery in the North Atlantic Ocean has been expanding in recent years probably due to increased availability of small swordfish and increased interest in this sport. Fishermen typically fish off the east coast of Florida and off the coasts of New Jersey and New York. In the past, the New York fishery for swordfish has 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 directed fishery off Florida year-round and New Jersey in the summer months. The Florida fishery occurs at night when fishermen target swordfish using live bait, circle hooks, and lightsticks.

Existing survey strategies do not pick up landings of these fish which anecdotally appear to be frequent. Some hand gear swordfish fishermen have commercial permits[2], others land swordfish for personal consumption. NMFS is developing a strategy for sampling this fishery in order to accurately report recreational handgear-caught swordfish to ICCAT. These landings are counted against the Incidental quota.

Shark Recreational Fishery

Recreational landings of sharks are an important component of HMS fisheries. The following tables provides a summary of landing for each of the three species groups.

Table 4.4.2 Final Estimates of Total Recreational Harvest of Atlantic Sharks: 1995-1999 (numbers of fish in thousands). 1999 estimates are preliminary. Source: Cortes 2000.

Species Group	1995	1996	1997	1998	1999
LCS	176.3	188.5	165.1	169.8	83.9
Pelagic	32.5	21.6	8.7	11.8	11.1

[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.

SCS	170.7	113.5	98.5	169.8	82.9

Table 4.4.3 Recreational Harvest of Atlantic LCS by Species, in number of fish: 1997-1999. 1999 estimates are preliminary. Source: Cortes 2000.

LCS Species	1997	1998	
Basking**	none reported	none reported	none reported
Bignose*	none reported	none reported	none reported
Bigeye sand tiger**	none reported	none reported	none reported
Blacktip	70,963	82,310	30,961
Bull	857	1,745	2,832
Caribbean Reef*	none reported	none reported	none reported
Dusky*	13,426	4,499	5,186
Gallapagos*	none reported	none reported	none reported
Hammerhead, Great	381	494	346
Hammerhead, Scalloped	3,313	2,575	1,329
Hammerhead, Smooth	2,227	375	none reported
Hammerhead, Unclassified	473	389	75
Lemon	2,354	2,303	131
Night*	90	133	none reported
Nurse	7,937	2,455	1,489
Sandbar	41,618	35,766	18,882
Sand tiger**	1,474	none reported	none reported
Silky	122	5,376	3,834
Spinner	2,990	10,836	5,738
Tiger	69	1,380	146
Whale**	none reported	none reported	none reported
White**	none reported	none reported	none reported

LCS Species	1997	1998	1999
Large Coastal Unclassified	16,790	19,139	12,953
Total:	165,094	169,776	83,901

*indicates species that were prohibited in the recreational fishery as of July 1, 1999.
** indicates species that were prohibited as of April 1997.

Table 4.4.4 Recreational Harvest of Atlantic Pelagic sharks by Species, in number of fish: 1997-1999. 1999 estimates are preliminary. Source: Cortes 2000. Note: * indicates species that were prohibited in the recreational fishery as of July 1, 1999.

Pelagic Shark Species	1997	1998	1999
Bigeye thresher*	none reported	none reported	none reported
Bigeye sixgill*	none reported	none reported	none reported
Blue	4,236	6,085	5,218
Mako, Longfin*	none reported	none reported	none reported
Mako, Shortfin	3,025	5,633	1,383
Mako, Unclassified	10	8	none reported
Oceanic whitetip	none reported	none reported	none reported
Porbeagle	none reported	none reported	none reported
Sevengill*	none reported	none reported	none reported
Sixgill*	none reported	none reported	none reported
Thresher	1,472	36	4,512
Total:	8,743	11,762	11,113

Table 4.4.5 Recreational Harvest of Atlantic SCS by Species, in number of fish: 1997-1999. 1999 estimates are preliminary. Source: Cortes 2000. Note: * indicates species that were prohibited in the recreational fishery as of July 1, 1999.

SCS Species	1997	1998	
Atlantic Angel*	107	109	none reported
Blacknose	10,705	10,523	5,957
Bonnethead	15,307	29,692	36,664
Finetooth	4,763	139	69
Sharpnose, Atlantic	67,726	129,315	40,291
Sharpnose, Caribbean*	none reported	none reported	none reported
Smalltail*	none reported	none reported	none reported
Total:	98,501	169,779	82,891

4.4.3 U.S. vs. International Catch

Important fisheries including directed recreational fisheries of the United States, Venezuela, Bahamas, Brazil, and many other countries and entities in the Caribbean Sea and off of the west coast of Africa are responsible for significant HMS landings. Directed recreational fisheries for sailfish occur in the west Atlantic from the United States, Venezuela, Bahamas, Brazil, Dominican Republic, Mexico, and other countries in the Caribbean Sea. However, of these countries, the United States is the only country that reports recreational landings to ICCAT. Therefore, a comparison of the percentage of U.S. landings relative to recreational fisheries in other countries is not feasible. 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. 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 catch across nations and species does warrant further exploration of potential data sources and the feasibility of increased 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 are 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 report was prepared, no further information was available on 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 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. NMFS believes that establishing a

catch and release fishery in this situation will further solidify the existing catch-and-release ethic of recreational billfish fishermen, thereby increasing 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 and bycatch mortality should be incorporated into fish stock assessments and evaluation of management measures. Rod and reel estimates from Virginia to Maine during June through October can be monitored through expanding survey data derived from the Large Pelagic Survey (dockside and telephone surveys). Actual numbers of fish discarded for many species are so low that presenting these data by area may be misleading, particularly if 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. This table is updated below to included preliminary 1999 data.

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

Species	Number of Fish Kept					
	1997	1998	1999	1997	1998	
White Marlin**	7	11	6	203	465	156
Blue Marlin**	2	3	3	30	27	28
Sailfish**	0	1	0	2	2	3
Swordfish	5	1	3	6	5	1
Bluefin Tuna	749	653	396	1,181	1,105	327
Bigeye Tuna	17	17	27	6	9	0
Yellowfin Tuna	1,632	2646	2,501	224	645	682
Skipjack Tuna	285	261	146	468	267	88
Albacore Tuna	189	558	133	43	92	52
Thresher Shark	3	7	3	2	2	2
Mako Shark	51	78	49	86	92	49
Sandbar Shark	5	2	2	30	56	6
Dusky Shark	16	6	1	50	54	7
Tiger Shark	0	2	0	5	5	0

Blue Shark	68	26	11	1,897	780	572
Hammerhead Shark	1	1	1	4	4	5
Wahoo	6	71	45	1	2	0
Species	**Number of Fish Kept**			**Number of Fish Discarded Alive**		
	1997	**1998**	**1999**	**1997**	**1998**	**1999**
Dolphinfish	920	7263	2,139	61	194	73
King Mackerel	174	198	141	1	10	8
Atlantic Bonito	336	328	254	203	300	166
Little Tunny	587	1231	97	1,015	1507	133
Amberjack	3	6	9	18	40	24

*NMFS 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, NMFS 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

Outreach programs were included as final actions in the HMS FMP and the Billfish Amendment as part of the management measures to address bycatch. These programs have not yet been implemented, but preparation of program designs are currently in progress. One of the key elements of the outreach program will be to provide information that leads to an improvement in post-release survival from both commercial and recreational gear.
Section 3.5.2.2 in the Billfish Amendment includes a review of available information on post-release mortality. Table 3.5.3 of the Billfish Amendment and Table 3.40 of the HMS FMP list the existing studies, their methods, and conclusions. Approximately 90%, or greater, of blue and white marlin taken by U.S. recreational fishermen are released after capture, therefore, studies on post-release mortality are critical.

A study on the impact of circle and straight hooks was completed this year by G. B. Skomal and B.C. Chase of the Massachusetts Division of Marine Fisheries together with Dr. E. Prince of the SEFSC of NMFS. The objectives of their research were to compare the performance of circle hooks to straight hooks relative to hooking location, damage, and success in bait fisheries for bluefin tuna. Based on the capture of 101 school-sized bluefin tuna, they determined that 94% caught with circle hooks were hooked in the jaw, while 52% caught with straight hooks were hooks in the jaw and 34% hooked in the pharynx or esophagus. The estimated release mortality was 4% from circle hooks and 28% from straight hook captures. They also noted that while the ability of each hook type to hook and hold tuna was not the same, the overall catching success was similar. The straight hooks tend to hold fish more readily, but

the circle hooks do not pull out once the fish is hooked. Therefore, they concluded that circle hooks can be an effective conservation tool in bait fisheries for juvenile bluefin tuna.

In a study conducted in Iztapa, Guatemala by Dr. E. Prince, M. Ortiz and A. Venizelos of the SEFSC in Miami, FL, a total of 360 Pacific sailfish were caught to assess terminal gear performance: 235 sailfish were caught on circle hooks and 125 on "J" hooks. Circle hooks used on sailfish hooked 1.14 times more fish compared to "J" hooks; no difference was noted in the catch percentage (fish caught/fish hooked) between hook types. Significantly more sailfish were hooked in the corner of the mouth using circle hooks (85% vs. 27%), while fish were more likely to be hooked in the stomach or throat using "J" hooks (46% vs. 2%). Sailfish caught on "J" hooks were approximately 21 times more likely to suffer hook-related bleeding than those caught on circle hooks. Further research was conducted on 75 Atlantic sailfish caught in the south Florida live bait recreational fishery, comparing the hooking performance of circle hooks with and without an offset point. The results of this work indicated that use of circle hooks with hook offsets of 15 degrees resulted in approximately 45% of the sailfish being hooked in the throat or stomach, while sailfish caught on circle hooks with little or no offset (less than 4 degrees) tended to be hooked in the jaw or corner of the mouth. There was no observed difference in the catch percentage between the circle hooks with or without offset hook points. In summary, use of circle hooks resulted in measures of fishing success that were comparable to, or higher than, the traditional "J" hook. Circle hooks also minimized deep hooking, foul hooking and bleeding. Prince *et al.* conclude that use of circle hooks has considerable potential for promoting the live release of billfish in recreational fisheries.

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. Coast Guard Safety Officer and Recreational Boats Safety Specialist, Lieutenant Keirsten Current cited two common situations that place recreational boaters in potential danger. Individuals in small vessels often venture out farther than the vessels are designed without the proper navigational equipment and may encounter rougher water than their boats can handle. 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. The other situation that the Lieutenant noted as a 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 1997, approximately 70% of all boating casualties were due to drowning and in approximately 90% of all the drowning deaths, the victim was not wearing a personal floatation device (PFD).

Table 4.4.7 1997 Reported Boating Casualties. Source: USCG Lt. Current, personal communication.

Age Groups	# of Drowning Fatalities (victim was wearing a PFD)	# of Drowning Fatalities (victim was not wearing a PFD)	Total Number of Drowning Fatalities	
0-12	0	14	14	11
13-19	4	36	40	15
20-29	15	91	106	36
30-39	13	98	11	58
40-49	12	97	109	41
50-59	7	76	83	19
60-69	9	40	49	14
70-79	4	24	28	5
80-97	1	5	6	7
0-97	65	521	586	233

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). While the new measures for the recreational fishery were effective on July 1, 1999, many of the measures for the commercial fishery were not effective due to a June 30, 1999, 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 1760 mt dw, respectively). Additionally, the prohibited species provisions did not go into effect for the commercial fishery until June 2000, and the minimum size on ridgeback LCS are not in effect for the commercial fishery.

In 1999, the annual LCS quota (1,285 mt dw per court order) was exceeded by 493 mt dw or 38 percent. The impact of this quota overharvest on the LCS rebuilding program is unknown at this time. Only 31 percent and 17 percent of the pelagic (580 mt dw) and SCS (1760 mt dw) annual quotas, respectively, were taken. On November 24, 1999 (64 FR 66114), NMFS announced that the LCS fishery would remain open until March 31, 2000; the pelagic and SCS fisheries remained open for the entire semiannual season (Cortes, 2000). Dealer reports and state landing reports indicate that approximately 792 mt dw of LCS, 54 mt dw of pelagic, and 119 mt dw of SCS were taken in the first semiannual period of 2000. This exceeded the LCS semiannual quota of 642.5 mt dw by 149.5 mt dw or 23 percent.

On June 6, 2000 (65 FR 36855), NMFS announced that the second semiannual season for LCS would close on August 7, 2000 and, due to an overage in the first semiannual season, the quota was reduced to 542 mt dw. At the time this announcement was made, available landings data indicated that 180 mt dw had been landed over the first semi-annual quota (the actual overage was 149.5 mt dw). On June 12, 2000, the Court issued another order permitting NMFS to implement and enforce the 1999 prohibited species provisions. Based on the catch rates and the prohibited species provisions, NMFS announced on June 21, 2000 (65 FR 38440), that the prohibited species list in the HMS FMP would be enforced, the LCS season would be extended, and the new closure date would be August 15, 2000. As of September 6, 2000, dealer reports and state landing reports indicate that approximately 752 mt dw of LCS had been landed in the

second semiannual season. This was 210 mt dw (39 percent) over the available quota. Thus, as of September 6, 2000, the annual LCS quota for 2000 had already been exceeded by 259 mt dw or 20 percent. Only a total of 204 mt dw and 76 mt dw of pelagic and SCS, respectively, had been reported at that time.

On December 5, 2000 (65 FR 75867), NMFS announced that the LCS first semiannual season would close on March 24, 2000. Closure dates for the pelagic and SCS fisheries will be announced as necessary. On December 7, 2000, the Court approved a settlement agreement that was signed by NMFS and the plaintiffs in the two Southern Offshore Fishing Association et al. lawsuits. This settlement agreement dissolves the injunction and requires an independent review of the 1998 LCS stock assessment among other things. On January 2, 2001 (66 FR 55), NMFS announced that the pelagic shark quotas adopted in the HMS FMP would be enforced. These annual quotas are: 92 mt dw for porbeagle sharks; 273 mt dw for blue sharks; and 488 mt dw for pelagic sharks other than porbeagle or blue sharks. NMFS is developing an emergency rule that will implement management measures for the LCS and SCS fisheries consistent with the settlement agreement. NMFS will continue to monitor the fisheries and will close the fisheries if harvest data indicate that the quotas will be reached earlier than projected.

Also in 2000, NMFS released a draft National Plan of Action (NPOA) for the Conservation and Management of Sharks (65 FR 47968). 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 was released in early 2001, and, consistent with the Magnuson-Stevens Act, requires NMFS 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.

4.5.2 Most Recent Catch and Landings Data

Landings estimates for 1999 indicate that, compared to landings in 1998, commercial landings for LCS decreased by 302 mt dw (-14 percent; Tables 4.5.1 and 4.5.2), commercial landings for pelagic sharks decreased by 47 mt dw (-20 percent; Table 4.5.3), and commercial landings for SCS increased by 18 mt dw (+6 percent; Table 4.5.4). Similarly, harvest estimates in 1999 indicate that, compared to 1998, the number of LCS harvested in the recreational fishery decreased by 85,875 fish (-51 percent; Tables 4.4.2 and 4.4.3), the number of pelagic sharks harvested decreased by 649 fish (-6 percent; Tables 4.4.2 and 4.4.4), and the number of SCS decreased by 86,888 fish (-51 percent; Tables 4.4.2 and 4.4.5).

Table 4.5.1 Estimates of Total Landings and Dead Discards for Large Coastal Sharks: 1981-1999 (numbers of fish in thousands). 1999 data are preliminary. Source: Cortes 2000

Year	Commercial Landings	Longline Discards	Recreational Catches	Unreported	Coastal Discards	Menhaden Fishery bycatch
1981	16.2	0.9	265.0	N/A	N/A	N/A
1982	16.2	0.9	413.9	N/A	N/A	N/A
1983	17.5	0.9	746.6	N/A	N/A	N/A
1984	23.9	1.3	254.6	N/A	N/A	N/A
1985	22.2	1.2	365.6	N/A	N/A	N/A
1986	54.0	2.9	426.1	24.9	N/A	N/A
1987	104.7	9.7	314.4	70.3	N/A	N/A
1988	274.6	11.4	300.6	113.3	N/A	N/A
1989	351.0	10.5	221.1	96.3	N/A	N/A
1990	267.5	8.0	213.2	52.1	N/A	N/A
1991	200.2	7.5	293.4	11.3	N/A	N/A
1992	215.2	20.9	304.9	N/A	N/A	N/A
1993	169.4	7.3	249.0	N/A	17.6	N/A
1994	228.0	8.8	160.9	N/A	22.8	26.2
1995	222.4	6.1	176.3	N/A	22.2	24.0
1996	160.6	5.7	188.5	N/A	16.1	25.1
1997	130.6	5.9	165.1	N/A	13.2	25.1
1998	174.9	4.3	169.8	N/A	11.2	25.1

Table 4.5.2 **Commercial landings of Large Coastal Sharks in lb dw: 1997-1999**. 1999 data are preliminary. Source: Cortes, 2000.

Large Coastal Sharks	1997	1998	1999
Basking**	none reported	none reported	none reported
Bignose*	2,132	50	9,035
Bigeye sand tiger**	none reported	none reported	none reported
Blacktip	1,506,182	1,893,805	1,286,979
Bull	40,247	27,389	25,426
Caribbean Reef*	3,548	100	none reported
Dusky*	80,930	81,124	110,950
Galapagos*	none reported	none reported	none reported
Hammerhead, Great	none reported	none reported	none reported
Hammerhead, Scalloped	none reported	none reported	none reported
Hammerhead, Smooth	none reported	none reported	none reported
Hammerhead, Unclassified	79,685	59,802	53,394
Lemon	20,595	23,232	23,604
Narrowtooth*	none reported	none reported	none reported
Night*	33	3,289	4,287
Nurse	8,864	2,846	1,168
Sandbar	890,881	1,077,161	1,299,987
Sand tiger**	8,425	38,791	6,401
Silky	13,920	13,615	8,649
Spinner	6,039	16,900	629
Tiger	6,603	12,174	30,274
Whale**	none reported	none reported	none reported
White**	1,315	none reported	82
Large Coastal Unclassified	1,177,539	1,258,027	978,312
Unclassified fins	140,638	76,588	80,393
Total	3,987,576 (1,809 mt dw)	4,584,893 (2,080 mt dw)	3,919,570 (1,778 mt dw)

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

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

Table 4.5.3 Commercial landings of Pelagic Sharks in lb dw: 1997-1999. 1999 data are preliminary. Source: Cortes, 2000.

Pelagic Sharks	1997	1998	1999
Bigeye thresher*	5,308	1,403	17,759
Bigeye sixgill*	none reported	none reported	none reported
Blue	904	706	1,111
Mako, Longfin*	7,867	4,971	4,619
Mako, Shortfin	224,362	224,421	170,860
Mako, Unclassified	71,371	79,773	58,344
Oceanic whitetip	2,764	22,049	698
Porbeagle	4,222	19,795	5,362
Sevengill*	none reported	none reported	none reported
Sixgill*	none reported	none reported	none reported
Thresher	145,253	102,531	96,012
Unclassified pelagic	75,543	49,626	46,056
Total:	537,594 (244 mt dw)	505,275 (229 mt dw)	400,821 (182 mt dw)

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

Table 4.5.4 Commercial Landings of Small Coastal Sharks in lb dw: 1997-1999. 1999 data are preliminary. Source: Cortes, 2000.

Small coastal sharks	1997	1998	
Atlantic Angel*	none reported	none reported	none reported
Blacknose	202,781	119,689	130,317
Bonnethead	75,787	13,949	53,702
Finetooth	169,733	267,224	246,404
Sharpnose, Atlantic	256,562	230,920	239,647
Sharpnose, Caribbean*	none reported	none reported	2,039
Unclassified Small Coastal	51	82	136

Total:	704,914 (320 mt dw)	631,864 (287 mt dw)	672,245 (305 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 and those that do use varying reporting methods.

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). Observer data collected from the directed bottom longline shark fishery indicate that LCS discarded dead represent approximately 2.7 percent of the total mortality of these species in 1999 (Cortes, 2000). 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).

Shark Drift Gillnet and Strikenet Fisheries

Current regulations require that the southeast shark gillnet fishery have 100 percent observer coverage during the right whale season (November 15 through April 1) from approximately West Palm Beach, FL to Sebastian Inlet, FL. In 1999, shark fishermen began to strikenet for sharks (Carlson, 2000). Unlike drift gillnets which are set in a straight line and left to fish passively, strikenets are rapidly set in a circle around a school of sharks and require more than one vessel. Observer data from the 2000 Right Whale season indicate that drift gillnets caught 14 species of sharks (90.2% of 6,479 animals caught), 33 species of teleosts and rays (5.3% percent were teleosts, 4.5% were rays), 1 species of sea turtle (0.02% of the 6,479 animals caught), and 2 species of marine mammals (0.03% of the 6,479 animals caught; Tables 5.5.9 and 5.5.10) (Carlson, 2000). Blacktip, finetooth, and bonnethead sharks made up 93.1% of the number of sharks caught (Carlson, 2000). Observer data also indicate that strikenets caught 2 species of sharks (99.3% of the 910 animals caught) and 2 species of teleosts and rays (0.7% of the 910 animals caught) (Carlson, 2000). No protected resources were caught while strikenetting. Blacktip sharks made up 99.9% of the shark catch when strikenetting.

While no shark species were discarded dead in the strikenet fishery, some scalloped hammerhead, common threshers, Atlantic sharpnose, and great hammerheads were discarded dead in the drift gillnet fishery. The total catch for the drift gillnet fishery can be found in Tables 4.5.9 and 4.5.10.

Table 4.5.5 Total Shark Catch in NMFS Observed Driftnet Sets During 2000 Critical Right Whale Season: Source: Carlson, 2000.

Species	Total Number Caught	Percentage Kept	Discarded Alive (%)	
Blacktip	3,013	99.8	0.1	0.1
Finetooth	1,230	99.6	0.0	0.4
Bonnethead	1,199	98.7	0.3	1.0
Scalloped hammerhead	110	59.1	0.0	40.9
Blacknose	92	100.0	0.0	0.0
Common thresher	45	26.7	11.1	62.2
Atlantic sharpnose	32	34.3	30.3	34.4
Sandbar	29	96.5	0.0	3.5
Large hammerhead	26	100.0	0.0	0.0
Bull	24	100.0	0.0	0.0
Spinner	18	100.0	0.0	0.0
Silky	7	100.0	0.0	0.0
Great hammerhead	7	42.8	0.0	57.2
Tiger	6	66.7	33.3	0.0
Lemon	5	100.0	0.0	0.0

Table 4.5.6 Total Bycatch in NMFS Observed Driftnet Sets During 2000 Critical Right Whale Season: Source: Carlson 2000

Species	Total Number Caught	Percentage Kept	Discarded Alive (%)	
Cownose Ray	169	0.6	86.4	13.0
Spotted Eagle ray	113	13.3	75.2	11.5
Drums	39	0.0	0.0	100.0
Cobia	37	100.0	0.0	0.0
King Mackerel	36	97.2	0.0	2.8
Spanish Mackerel	36	77.8	0.0	22.2
Tarpon	35	0.0	2.9	97.1
Tripletail	24	91.7	8.3	0.0
Bluefish	21	61.9	0.0	38.1
Great Barracuda	19	100.0	0.0	0.0
Herring	18	0.0	0.0	100.0
Permit	15	66.7	0.0	33.3
Menhaden	9	0.0	0.0	100.0
Sea trout	9	0.0	0.0	100.0
Unknown teleost	8	0.0	0.0	100.0
Red Drum	6	33.3	66.7	0.0
Atlantic Stingray	5	80.0	20.0	0.0
Blue runner	3	66.7	0.0	33.3
Little tunny	3	33.3	0.0	66.7
Atlantic sailfish	3	0.0	0.0	100.0
Atlantic manta ray	3	0.0	100.0	0.0
Pigfish	3	0.0	0.0	100.0
Spadefish	2	0.0	0.0	100.0
Banded croaker	2	0.0	0.0	100.0
Pompano	2	100.0	0.0	0.0

Species	Total Number Caught	Percentage Kept	Discarded Alive (%)	
Wahoo	1	100.0	0.0	0.0
Jacks	1	0.0	0.0	100.0
Crevalle jack	1	100.0	0.0	0.0
Atlantic bumper	1	0.0	0.0	100.0
Southern stingray	1	0.0	0.0	100.0
Black grouper	1	100.0	0.0	0.0
Gag grouper	1	100.0	0.0	0.0
Flounder	1	100.0	0.0	0.0
Harvestfish	1	0.0	0.0	100.0
Black drum	1	100.0	0.0	0.0
Atlantic bonito	1	100.0	0.0	0.0
Lookdown	1	0.0	0.0	100.0
Spotted dolphin	1	0.0	100.0	0.0
Bottlenose dolphin	1	100.0	0.0	0.0
Loggerhead turtle	1	100.0	0.0	0.0
Skate	1	100.0	0.0	0.0

4.6 Fishery Data: LANDINGS BY SPECIES

The following tables are taken from the 2000 National Report of the United States to ICCAT (SCRS/00/142). 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)

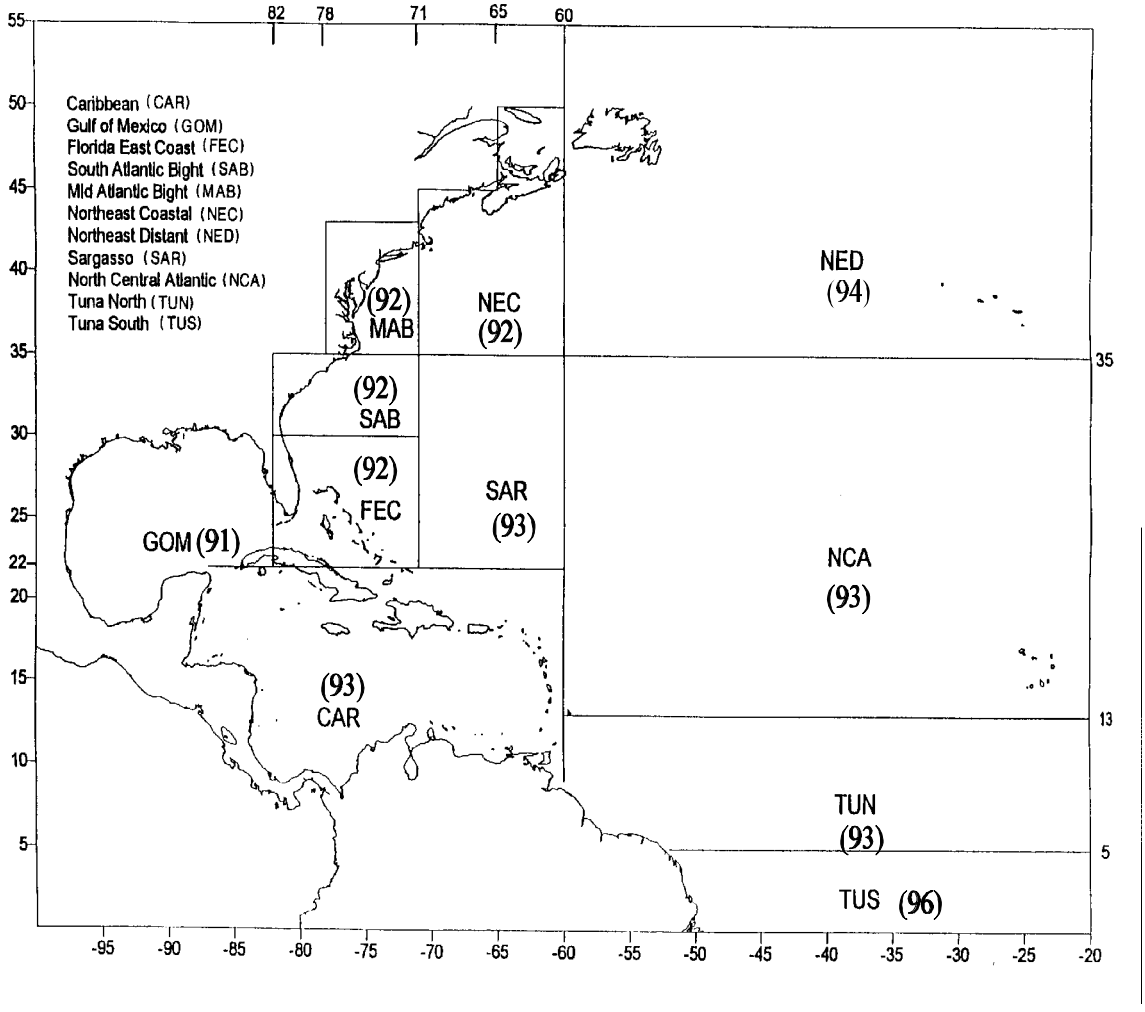

Table 4.6.1. U.S. Landings (Mt) of Bluefin Tuna by Gear and Area for 1996 to 1999.

Area	Gear	1996	1997	1998	1999
NW Atlantic	Longline	31.7	26.0	30.5	25.1
	Handline	32.5	17.4	29.2	15.5
	Purse Seine	245.0	249.7	248.6	247.9
	Harpoon	95.7	97.5	133.1	115.8
	*Rod and reel (>145 cm LJFL)	588.5	752.6	610.4	657.5
	*Rod and reel (<145 cm LJFL)	251.7	178.9	166.3	103.0
	Unclassified	2.8	2.2	0.6	0.1
Gulf of Mexico	Longline	36.2	23.8	18.3	48.4
	*Rod and reel	0.0	0.0	0.0	0.4
	All Gears	1284.1	1348.1	1237	1213.7

* 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 1996 to 1999 .

Area	Gear	1996	1997	1998	1999
NW Atlantic	Longline	728.3	838.9	464.9	581.3
	Rod and reel*	4484.8	3560.9	2845.7	3818.2
	Troll	371.0	218	177.5	0
	Purse seine	6.8	0	0	0
	Gillnet	13.2	1.3	1.7	0.2
	Trawl	7.3	1.9	0.7	4.1
	Harpoon	0	0	0	0
	Handline	37.2	34.3	0	192
	Trap	0	**	0.1	0.8
	Unclassified	0.4	0	0	2.1
Gulf of Mexico	Longline	2164.8	2571.3	1864.5	2736.6
	Rod and reel*	13.2	7.7	80.9	149.4
	Handline	47.0	55.6	60.8	12.7
	Gillnet	0	0	0	**
	Uncl	19.6	0	0	0
Caribbean	Longline	34.2	135.4	58.6	24.4
	Troll	0	19.6	0	0
	Handline	0	.7	3.9	14.5
	Gillnet	0	**	0	0
	Trap	0	.1	0	0.1
NC Area 94a	Longline	319.3	6.1	4.6	0.2
SW Atlantic	Longline	38.4	221.9	55.3	32.4
All Gears		8285.5	7673.7	5619.2	7569

** $\underline{<}$= 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 1996 to 1999.

Area	Gear	1996	1997	1998	1999
NW Atlantic	Longline	.1	1.0	0.7	0.3
	Rod and reel*	48.1	42.0	49.5	63.6
	Troll	.9	.6	0.4	0
	Purse seine	.7	0	0	0
	Gillnet	18.5	8.9	16.9	26.5
	Trawl	0	0	0.2	1.0
	Handline	0.3	.1	0	0.2
	Trap	15.2	0	0	17.5
	Pound	0	0	0	0
	uncl	**	0	0	0
Gulf of Mexico	Longline	.2	1.3	0.6	0.4
	Rod and reel*	36.4	21.7	37.0	34.8
	Handline	0.1	0	0	0.4
	Trap	0	0	0	0
Caribbean	Longline	0	1.2	0	1.3
	Gillnet	0	.2	0	0.4
	Harpoon	0	0	0	0
	Handline	0	0	0	5.8
	Trap	0	**	0	0.1
	Troll	**	7.3	0	0
	uncl	0	0	0	0
SW Atlantic	Longline	0	**	0	0
All Gears		120.5	84.3	105.3	152.3

** $\leq$= 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 1996-1999.

Area	Gear	1996	1997	1998	1999
NW Atlantic	Longline	333.0	476.3	544.3	737.8
	Rod and reel*	108.2	333.5	228.0	316.1
	Troll	4.1	3.9	4.0	0
	Gillnet	4.2	**	0.4	0.2
	Handline	16.4	2.7	0	11.9
	Pairtrawl	0	0	0	0
	Trawl	1.4	1.0	0.5	1.2
	Harpoon	0	0	0	0
	Haul Seine	0	0	0	0
	Uncl	0.1	.5	0	0.9
Gulf of Mexico	Longline	30.9	33.9	25.6	54.6
	Rod and reel*	0	0	0	1.8
	Handline	0.9	**	0.1	0.2
Caribbean	Longline	32.8	50.0	48.5	23.2
	Handline	0	0	0	0.2
NC Area 94a	Longline	228.9	91.8	48.4	35.3
SW Atlantic	Longline	34.9	142.8	28.5	78.2
All Gears		795.8	1136.4	928.3	1261.6

** $\leq$= 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 1996 to 1999.

Area	Gear	1996	1997	1998	1999
NW Atlantic	Longline	63.6	140.0	155.4	179.5
	Gillnet	30.7	42.8	40.1	27.0
	Handline	3.7	4.8	0	0.6
	Trawl	1.7	2.6	2.4	0.4
	Troll	2.7	1.6	5.8	0
	Rod and reel*	277.8	220.2	601.1	90.1
	Pair Trawl	0	0	0	0
	Pound	3.5	1.3	0.9	0.4
	Uncl	21.1	0.2	0	0
Gulf of Mexico	Longline	5.7	16.9	3.9	3.8
	Rod and reel*	61.7	49.3	0	0
	Handline	0.1	0	0	**
Caribbean	Longline	6.6	16.1	17.8	8.3
	Troll	0	3.6	0	0
	Gillnet	0	**	0	0.2
	Trap	0	**	0	**
	Handline	0	0	0	3.8
NC Area 94a	Longline	32.4	11.4	1.6	1.5
SW Atlantic	Longline	1.1	4.7	1.4	1.4
	All Gears	512.4	515.5	830.4	317

** $\leq$= 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 1996 to 1999.

Area	Gear	1996	1997	1998	1999
NW Atlantic	* Longline	1310.4	1262.2	1624.1	1872.3
	Gillnet	77.8	.4	36.3	0
	Pair Trawl	0	0	0	0
	Handline	.1	1.3	0	5.0
	Trawl	19.8	8.0	5.9	7.5
	Troll	7.3	0.4	0.7	0
	* unclassified	25.8	11.9	9.1	3.8
	Harpoon	.5	.7	1.5	0
	** Rod and Reel	5.92	10.91	4.71	21.32
	Trap	0	0	0.1	**
Gulf of Mexico	* Longline	896.3	759.9	633.1	579.6
	Handline	0	0	0	**
Caribbean	* Longline	1180.0	688.9	516.0	260.5
NC Atlantic	* Longline	629.4	688.2	658.6	650.0
SW Atlantic	* Longline	172.6	417.9	170.1	185.2
	All Gears	4325.92	3850.71	3660.21	3585.22

* 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 1997-1999.

		Blue Marlin			White Marlin			Sailfish		
Area	**Gear**	**1997**	**1998**	**1999**	**1997**	**1998**	**1999**	**1997**	**1998**	**1999**
NW Atlantic	Longline*	18.7	23.3	22.0	11.2	15.3	18.6	9.2	6.4	13.7
	Unclassified*		0.62			0.7	0.06		0.06	
	Rod and reel**	25.0	34.1	24.8	0.9	2.4	1.5	0.0	0.1	0.07
Gulf of Mexico	Longline*	51.0	18.5	55.2	15.4	11.8	31.5	13.3	17.0	57.4
	Rod and reel**	11.5	4.5	7.5	0.9	0.2	0.1	0.4	1.0	0.6
Caribbean	Longline*	24.6	2.3	1.6	6.6	1.3	5.04	3.3	0.2	0.46
	Rod and reel**	8.6	10.6	4.6	0.0	0.02	0.0	0.2	0.05	0.0
	Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown & NC Area 94a	Longline*	2.3	6.1	1.6	0.5	2.8	1.08	0.0	0.8	0.02
SW Atlantic	Longline*	41.5	1.6	1.7	37.1	0.9	0.45	31.9	2.7	0.02
	All Gears	183.2	101.6	119.0	72.6	35.4	58.3	58.3	28.3	72.3

* 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

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 NMFS 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. NMFS has 10 years after the adoption of each rule in which to review the impact of the rule.

Additionally, under the Magnuson-Stevens Act, NMFS must prepare an annual SAFE report in order to account for the best scientific information available. Each SAFE report should, among other things, provide information on the economic condition of the recreational and commercial fishing interests, communities, and industries.

Thus, both the SAFE report and Section 610 to the RFA require similar information. For this reason, NMFS believes that the following section of the 2001 SAFE Report should fulfill NMFS' 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.

5.1 Commercial Fisheries

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

In 1999, the total commercial landings at ports in the 50 states by U.S. fishermen were 9.3 billion pounds and were valued at $3.5 billion. This is an increase of $338.6 million compared with the estimated 1998 value and a decrease of $19.6 million from the estimated 1996 value. The average ex-vessel price for all fishery products increased from 36 cents in 1996 to 37 cents in 1999. However, no consumer price index conversions were made for these comparisons. The 1999 ex-vessel index indicated that only 19 species of the 33 species tracked had increasing ex-vessel prices compared to the 1998 index.

The estimated value of the 1999 domestic production of all fishery products was $7.3

[1] All the information and data presented in this section was obtained from NMFS 1997a and NMFS 2000a.

billion. This is $27.3 million less than the estimated value in 1998. The estimated value of domestic production in 1996 was $7.4 billion. The total import value of fishery products was $17.0 billion in 1999. This is an increase of 1.4 billion from 1998. The total import value in 1996 was $13.1 billion. The total export value of fishery products was $10.0 billion in 1999. This is an increase of $1.3 billion from 1998. The total export value in 1996 was $8.7 billion.

Consumers spent an estimated $52.3 billion for fishery products in 1999 including $35.6 billion at food service establishments, $16.4 billion for home consumption, and $326.6 million for industrial fish products. The commercial marine fishing industry contributed $27.2 billion to the U.S. Gross National Product in 1999. 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 1999, 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 1999. The value of all HMS species (both Atlantic and Pacific) constituted 9.5 percent and 8.5 percent in 1996 and 1999, respectively, of the total U.S. finfish value. The ex-vessel values of HMS landings are listed in Table 5.2. 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.** Source: NMFS, 1997a; NMFS, 2000a.

Rank in value of commercial landings	1996		1999	
	State	Value	State	Value
1	Alaska	$1.2 billion	Alaska	$1.1 billion
2	Louisiana	$267.3 million	Louisiana	$302.7 million
3	Massachusetts	$231.4 million	Maine	$265.2 million
4	Florida	$205.2 million	Massachusetts	$260.2 million
5	Maine	$200.9 million	Texas	$209.2 million

Table 5.2 **U.S. domestic commercial landings in thousand dollars of HMS, by Species. Note: Value includes Atlantic and Pacific landings.** Source: NMFS, 1997a; NMFS, 2000a.

Species		1996	
Sharks	Dogfish	11,804	5,951

Species		1996	1999
	Other	10,824	6,625
	Total	22,628	12,576
Swordfish		36,494	33,436
Tunas	Albacore	30,157	21,932
	Bigeye	23,673	25,428
	Bluefin	21,857	15,573
	Little (Tunny)	--	626
	Skipjack	7,084	5,221
	Yellowfin	27,060	17,076
	Unknown	425	398
	Total	110,256	86,254
Total value all HMS		169,378	132,266
Total value all finfish species		1,790,966	1,558,292

Table 5.3 **U.S. production in thousand dollars of HMS, by Species.** Note: Value includes Atlantic and Pacific caught fish. Source: NMFS, 1997a; NMFS, 2000a.

Product	Species		1996	
Fresh and Frozen Fillets	Shark		5,992	2,486
	Swordfish		34,277	48,062
	Tuna		62,456	79,932
	Total HMS		102,725	130,480
Fresh and Frozen Steaks	Shark		27	168
	Swordfish		12,725	13,233
	Tuna		14,669	17,307
	Total HMS		27,421	30,708
Total Fillets and Steaks, all finfish			885,665	834,531
Canned products	Tuna	Albacore	362,690	411,622
		Lightmeat	594,234	534,159

Product	Species		1996	
		Total	956,924	945,781
	Total, all finfish		1,298,489	1,390,637

5.1.2 Ex-Vessel Prices of Atlantic HMS

The average ex-vessel prices per lb dw for 1996 and 1999 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 1999 by species and area are summarized in Table 5.5. For both of these tables, 1999 dollars are converted to 1996 dollars using the consumer price index conversion factor of 0.94. This conversion allows for easy comparisons in price. The ex-vessel price indices for some HMS for all 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 the Gulf of Mexico and South Atlantic regions and have generally decreased in the Mid-Atlantic and North Atlantic regions. The gears used also influenced the average price of bigeye tuna with longline-caught fish bringing the highest average value in 1999 in the Gulf of Mexico and South Atlantic while net-caught bigeye tuna received the highest average value in the mid-Atlantic and North Atlantic. The mid-Atlantic region is the only region that had consistent uses of gear types in both 1996 and 1999. This region also showed a switch from high average values for handgear- and trawl-caught bigeye tuna to high average values for bottom longline- and net-caught bigeye tuna.

Average ex-vessel prices for bluefin tuna have generally declined in all regions (Table 5.5), except for bluefin tuna caught by pelagic longline gear (Table 5.4). This is contrary to the ex-vessel value of bluefin tuna across the United States (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 Mid-Atlantic, bluefin tuna caught with pelagic longline gear had the highest average ex-vessel price in 1999. In the North Atlantic, handgear-caught fish received the highest average price per pound in 1999. 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 1999. Ex-vessel prices in 1999 were higher than in 1998, and preliminary information for 2000 indicate that ex-vessel prices improved further. This could be because the pace of landings in the General category in 1999 and 2000 was slower than in recent years and may have reduced market gluts.

As with bigeye tuna, the average ex-vessel prices for yellowfin tuna have generally increased in the South Atlantic and decreased in the mid-Atlantic and North Atlantic (Table 5.5). No data was available from 1996 in the Gulf of Mexico region. In the United States, the ex-

vessel price of all yellowfin tuna has generally decreased since 1995 (Table 5.6), with a small deviation in this trend during 1997. Gears influenced the average prices, but changed between regions (Table 5.4). In 1999, the highest average prices for yellowfin tuna caught by pelagic longline gear. In the North Atlantic regions handgear produced the highest priced fish on average in 1996 and pelagic longline produced the highest priced fish on average in 1999.

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 the lowest in the Gulf of Mexico compared to the other regions. The ex-vessel prices for all tunas in the United States has generally declined from 1996 to 1999 (Table 5.6). In both the South Atlantic and mid-Atlantic regions, the highest average price was obtained using longline gear, either bottom or pelagic (Table 5.4). In the North Atlantic, the highest average price was obtained using handgear.

In the South Atlantic region, the average ex-vessel price for swordfish has generally increased while the average ex-vessel price has decreased in the mid-Atlantic and North Atlantic regions (Table 5.5). Overall in the United States the ex-vessel price has decreased from 1996 to 1999 (Table 5.6). The highest average ex-vessel prices changed by area, region, and year and did not have a pattern (Table 5.4).

The average ex-vessel price for large coastal sharks (LCS) increased in the Gulf of Mexico region, remained the same in the South and mid-Atlantic regions, and decreased in the North Atlantic region (Table 5.5). The highest average prices were generally obtained with pelagic or bottom longline gear except in the mid-Atlantic where the highest average values were obtained using handgear (Table 5.4).

The average ex-vessel price for pelagic sharks increased in the South Atlantic and decreased in the 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-vessel price of all shark species but this price generally increased in all regions (Table 5.5). No data was available in the North Atlantic region for this species because these species are generally not found near the states in that region. In the Gulf of Mexico region, the highest average price was obtained for net gears while in the South Atlantic the highest average price was obtained for pelagic and bottom longline gears (Table 5.4).

The average ex-vessel price for shark fins has decreased in all regions, except the Gulf of Mexico which had no data available for 1996 (Table 5.5). The highest average values are generally found in the Gulf of Mexico and South Atlantic regions and were generally obtained using bottom longline (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 reported in the United States National Report (NMFS 2000b), the 1997 and 2000 Shark Evaluation Reports (NMFS, 1997b; Cortes, 2000), as well as prices and weights reported to the Northeast Regional Office by Atlantic bluefin tuna dealers. These values indicate that the estimated total value of Atlantic HMS fisheries in 1996 dollars has declined 17.9 percent from approximately $68.1 million in 1996 to approximately $55.9 million in 1999. The bigeye tuna, other tunas, and small coastal shark fisheries were the only Atlantic HMS fisheries that increased in value (by 75 percent, 6 percent, and 178 percent respectively). The value of the pelagic shark fishery decreased the most (45 percent) followed by the fisheries for swordfish (30 percent) and large coastal shark (21 percent).

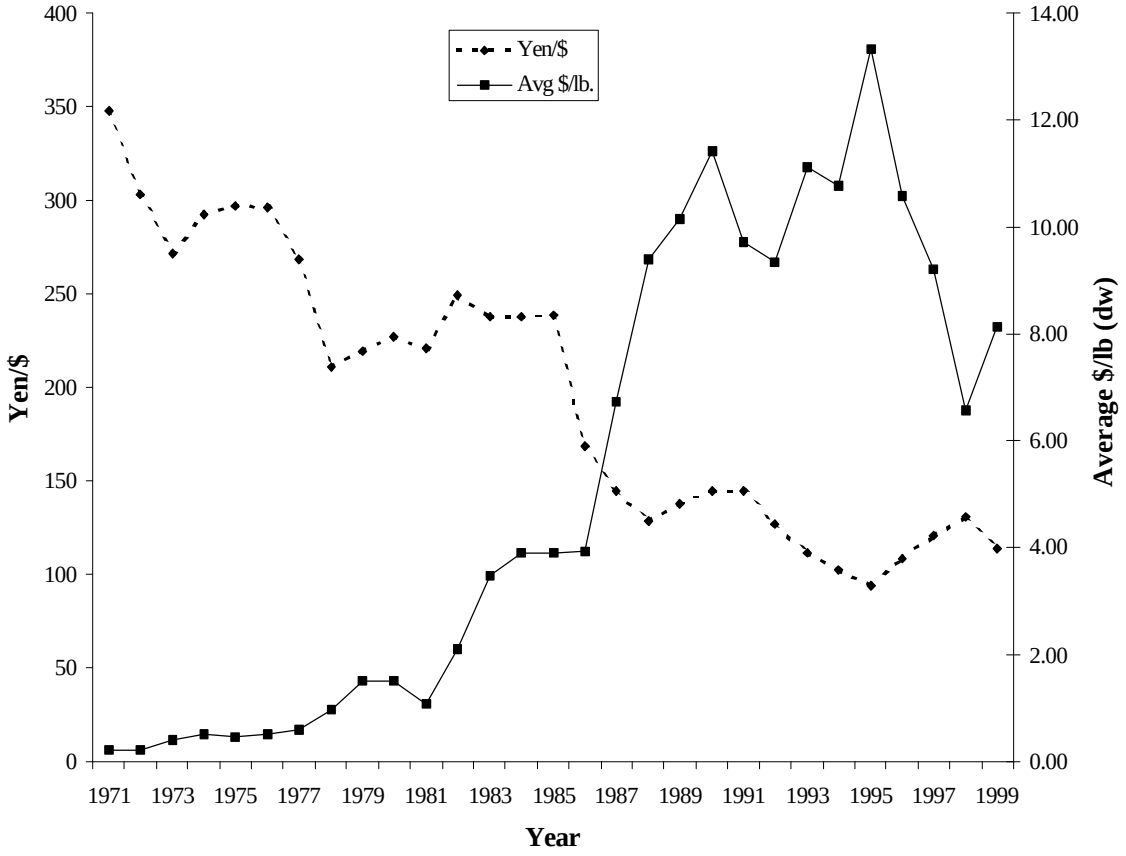

Figure 5.1 **Average Annual Yen/$ Exchange Rate and Average U.S. BFT Ex-vessel $/lb (dw) for all gears: 1971-1999**. Source: Federal Reserve Bank (www.stls.frb.org)

Table 5.4 **Average ex-vessel prices per lb. dw for Atlantic HMS by gear and area. 1999 dollars are converted to 1996 dollars using the consumer price index conversion factor of 0.94.** 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. 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	1999	1996	1999	1996	1999	1996	
Bigeye tuna	HND	$0.68	$2.00	$1.30	$1.90	$5.74	$3.40	$3.69	$3.21
	PLL	-	$3.80	$1.33	$2.70	$3.51	$3.00	$3.36	$3.06
	BLL	-	$4.15	$1.30	$2.82	$2.61	$4.07	$2.15	-
	NET	-	-	$1.30	-	$3.87	$4.35	$3.31	-
	TWL	-	-	-	-	$4.68	$2.97	$8.00	$3.09
Bluefin tuna	HND	-	-	-	-	$14.70	$3.30	$10.73	$7.93
	PLL	5.83	$5.94	$4.62	$4.43	$6.12	$6.90	$5.56	$6.64
	NET	-	-	-	-	$15.71	-	-	-
	P. Seine	-	-	-	-	-	-	$11.05	$7.36
Yellowfin tuna	HND	-	$2.24	$1.55	$1.33	$2.49	$1.50	$2.50	$1.09
	PLL	-	$2.99	$1.63	$2.04	$2.51	$2.02	$2.14	$2.29
	BLL	-	$2.88	$1.41	$2.30	$3.28	$1.42	$2.03	$0.48
	NET	-	-	$1.07	$0.82	$2.03	$1.01	$2.43	$0.47
	TWL	-	-	-	-	$2.40	$1.49	$2.67	$2.08
Other tunas	HND	$0.28	$0.85	$0.75	$0.63	$1.34	$0.84	$1.90	$1.33
	PLL	-	$0.73	$0.79	$1.38	$1.84	$1.49	$0.98	$0.56
	BLL	-	$0.63	$0.87	$1.33	-	$0.78	$1.50	-
	NET	$0.38	$0.31	$0.35	$0.18	$0.45	$0.51	$0.73	$0.19
	TWL	-	$0.66	$0.31	$0.53	$0.45	$0.62	$1.08	$0.35
	P. Seine	-	$0.49	-	$0.10	-	-	-	-
Swordfish	HND	-	$3.02	$2.48	$2.86	$3.61	$2.94	$5.20	-
	PLL	-	$3.19	$2.88	$3.07	$4.31	$3.32	$4.01	$3.10
	BLL	-	$3.09	$2.46	$3.19	$4.88	$3.54	$3.07	-

Species	Gear	Gulf of Mexico		S. Atlantic		Mid-Atlantic			
		1996	1999	1996	1999	1996	1999	1996	
	NET	-	-	-	-	$4.63	$3.58	$5.62	-
	TWL	-	-	-	-	$4.56	$3.09	$3.08	$3.54
Large Coastal Sharks	HND	$0.23	$0.60	$0.72	$0.62	$0.74	$0.90	-	$0.70
	PLL	-	$0.74	$1.54	$1.24	$0.58	$0.74	$1.03	-
	BLL	$0.60	$0.52	$0.73	$1.06	$0.54	$0.53	$0.99	$0.97
	NET	$0.38	$0.39	$1.30	$1.60	$0.45	$0.43	$0.83	$0.60
	TWL	$0.15	$0.46	$0.86	$0.63	$0.47	$0.46	$0.80	$0.94
Pelagic sharks	HND	-	$1.27	$0.82	$0.89	$1.47	$1.61	$1.60	-
	PLL	-	$1.19	$0.68	$0.98	$1.25	$1.31	$1.26	$3.10
	BLL	-	$1.34	$0.59	$0.84	$1.47	$0.98	$1.85	$0.84
	NET	-	-	$0.33	$0.26	$0.99	$0.93	$1.12	$0.66
	TWL	-	-	-	$0.20	$1.00	$1.03	$0.96	$0.72
Small Coastal sharks	HND	-	$0.55	$0.25	$0.37	-	$0.43	-	-
	PLL	-	$0.47	-	$0.54	$0.25	-	-	-
	BLL	-	$0.49	-	$0.54	-	-	-	-
	NET	-	$0.63	$0.25	$0.49	-	$0.42	-	-
	TWL	-	-	-	$0.49	-	$0.50	-	-
Shark fins	HND	-	$8.00	$14.00	$5.31	$2.74	$3.38	-	-
	PLL	-	$13.18	-	$10.51	$7.79	$3.15	$4.25	-
	BLL	-	$13.48	$14.00	$14.81	$8.00	-	$3.00	$0.31
	NET	-	$7.31	-	$4.88	$4.77	$3.72	$1.96	$2.62
	TWL	-	-	$9.11	$6.21	$1.99	$2.60	$2.32	$0.46

Table 5.5 **Average ex-vessel prices per lb. for Atlantic HMS by area. 1999 dollars are converted to 1996 dollars using the consumer price index conversion factor of 0.94.**

Species	Gulf of Mexico		S. Atlantic		Mid-Atlantic		N. Atlantic	
	1996	1999	1996	1999	1996	1999	1996	1999
Bigeye tuna	$0.68	$3.18	$1.32	$2.60	$3.99	$3.31	$3.59	$3.10
Bluefin tuna	$5.83	$5.94	$4.62	$4.42	$9.48	$5.55	$10.78	$7.76
Yellowfin tuna	-	$2.76	$1.56	$1.66	$2.43	$1.51	$2.35	$1.43
Other tunas	$0.29	$0.81	$0.62	$0.57	$1.10	$0.75	$1.31	$0.48
Swordfish	-	$3.15	$2.79	$3.07	$4.43	$3.26	$4.09	$3.24
Large coastal sharks	$0.21	$0.53	$1.02	$1.03	$0.55	$0.55	$0.88	$0.72
Pelagic sharks	-	$1.28	$0.62	$0.78	$1.21	$1.16	$1.31	$0.76
Small coastal sharks	-	$0.52	$0.25	$0.47	$0.25	$0.44	-	-
Shark fins	-	$13.17	$10.74	$10.43	$4.60	$3.21	$2.69	$1.12

Table 5.6 **Indices of ex-vessel prices for HMS, except sharks, by years 1993-1999.** 1982 is the base year and has a value of 100. 1996 and 1999 are in bold for easier referencing. Note: Indices based on Atlantic and Pacific ex-vessel prices. Source: NMFS, 2000a.

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
1999	**76**	**125**	**736**	**63**	**88**	**94**

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. Sources: NMFS, 1997b; NMFS, 2000b; Cortes, 2000, and bluefin tuna dealer reports from the Northeast Regional Office.

Species	1996			1999		
	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	$3.05	1,664,385	$5,072,213
Bluefin tuna	$10.58	1,652,989	$17,488,624	$7.65	1,926,442	$14,737,281
Yellowfin tuna	$2.11	6,679,938	$14,116,936	$1.84	6,351,717	$11,687,160
Other tunas	$0.83	368,433	$305,799	$0.65	495,241	$323,145
Total tuna	--	--	$34,815,791	--	--	$31,819,798
Swordfish	$3.77	7,170,619	$27,033,234	$3.18	5,942,839	$18,898,228
Large coastal sharks	$0.67	5,262,314	$3,499,439	$0.71	3,919,570	$2,773,096
Pelagic sharks	$1.05	695,531	$727,989	$1.00	400,821	$398,817
Small coastal sharks	$0.25	460,667	$115,167	$0.48	672,245	$320,437
Shark fins (weight = 5% of all sharks landed)	$6.01	320,926	$1,928,763	$6.98	249,632	$1,743,054
Total sharks	--	--	$6,271,358	--	--	$5,235,403
Total HMS	--	--	$68,120,382	--	--	$55,953,430

5.1.3 Wholesale Prices of Atlantic HMS

Currently, NMFS 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 (e.g., freshness, fat content, method of storage), the weight of the fish, the supply of fish, and consumer demand.

Tables 5.8 through 5.11 indicate that the average wholesale price of all HMS sold in Atlantic and Gulf of Mexico states decreased by approximately 19 percent from 1996 to 1999.

The wholesale price of swordfish weighing between 26 and 49 lbs decreased the most (42.5 percent), followed by the wholesale price of swordfish weighing between 50 and 99 lbs (29.1 percent) and the wholesale price of swordfish weighing over 100 lbs (21.3 percent). The wholesale price of blacktip and mako sharks decreased the least (6.7 and 6.9 percent, respectively). These tables also indicate that of all HMS, sharks appear to be worth the least in terms of wholesale prices while yellowfin tuna is worth the most. 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: 1999 dollars are converted to 1996 dollars using the conversion factor 0.94.

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
		99	1.18	0.00	1.41	0.00	0.00	0.73	0.88	0.00	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
		99	3.29	0.00	1.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
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
		99	0.98	0.81	1.16	0.92	0.00	1.18	0.81	0.00	0.94	0.80	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	Thresher	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.53	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
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
		99	1.18	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	0.00

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: 1999 dollars are converted to 1996 dollars using the conversion factor 0.94.

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
		99	4.35	4.51	5.64	4.88	4.23	4.70	4.23	4.23	0.00	0.00	4.54	4.59
	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
		99	3.81	3.95	4.94	4.41	4.00	4.23	0.00	0.00	0.00	0.00	4.00	3.95
	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
		99	2.35	2.88	3.60	4.23	0.00	0.00	0.00	0.00	0.00	0.00	3.29	2.59
	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
		99	5.35	6.34	7.05	5.93	5.64	5.64	5.64	5.40	0.00	0.00	5.95	5.48
LA	100# Up	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	5.17	0.00	0.00	0.00	4.70	0.00	0.00	0.00	0.00	4.70
	50-99#	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.29
	26-49#	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	-	-	-	-	-	-	-	-	-	-	-	-
	Cuts	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	6.58	0.00	0.00	0.00	6.11	0.00	0.00	0.00	0.00	5.64
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
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.41	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
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.82	0.00	0.00	0.00
	26-49#	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.88	0.00	0.00	0.00
	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
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.64	0.00	0.00	0.00
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
		99	0.00	5.17	4.70	4.94	0.00	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
		99	0.00	4.23	0.00	4.23	0.00	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

State	Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	0.00	0.00	5.88	6.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NJ	100# Up	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	0.00	0.00	0.00	6.11	5.64	0.00	0.00	0.00	0.00	6.00
	50-99#	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	0.00	0.00	0.00	5.64	5.29	0.00	0.00	0.00	0.00	4.35
	26-49#	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	0.00	0.00	0.00	0.00	4.23	0.00	0.00	0.00	0.00	0.00
	Cuts	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	0.00	0.00	0.00	7.05	6.34	0.00	0.00	0.00	0.00	7.28
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
		99	0.00	0.00	0.00	0.00	0.00	5.17	5.06	4.23	6.34	5.17	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
		99	0.00	0.00	0.00	0.00	0.00	4.70	4.59	3.29	5.17	4.70	4.00	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
		99	0.00	0.00	0.00	0.00	0.00	3.29	0.00	3.29	3.29	3.29	2.82	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
		99	0.00	0.00	0.00	0.00	0.00	6.11	6.34	0.00	7.99	6.11	0.00	0.00

Table 5.10 **Average fresh wholesale price per lb of bigeye tuna (B) and yellowfin tuna (Y) 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. #'s indicate quality (1 is highest, 3 is lowest). BTF is 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
		99	4.37	4.07	0.00	3.76	4.23	0.00	0.00	0.00	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
		99	6.58	5.56	0.00	5.88	6.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Y#3BTF	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	2.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Y#3cut	96	-	-	-	-	-	-	-	-	-	-	-	-

State	Species and Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
		99	0.00	4.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LA	Y#1BTF	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	6.11	7.05	0.00	0.00	0.00	4.46	0.00	5.40	0.00	6.58	0.00
	Y#1cut	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	8.46	0.00	0.00	0.00	0.00	6.27	0.00	7.52	0.00	9.40	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
		99	0.00	0.00	0.00	4.46	3.18	3.72	3.16	4.46	3.65	4.70	4.23	0.00
	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
		99	0.00	0.00	0.00	6.58	5.17	5.56	4.83	6.11	5.40	6.58	6.11	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
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
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.88	0.00	0.00	0.00	0.00
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
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
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.76	0.00
	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
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.05	0.00

State	Species and Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
	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
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	3.88	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
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.64	5.76	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	B#1BTF	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.76	0.00
	B#1cut	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.17	0.00
	B#2BTF	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.76	4.23	0.00
	B#2cut	96	-	-	-	-	-	-	-	-	-	-	-	-
		99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.17	6.11	0.00
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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-
	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
		99	-	-	-	-	-	-	-	-	-	-	-	-

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. #'s indicate quality (1 is highest, 3 is lowest); BTF is by the fish.

Species	Description	1996 Price/lb	1999 Price/lb	Percent Change
Blacktip	--	$1.05	$0.98	-6.7%
Mako	--	$2.77	$2.58	-6.9%
Thresher	--	$1.00	$0.86	-14%
Swordfish	100# and up	$6.28	$4.94	-21.3%
	50-99#	$6.02	$4.27	-29.1%
	26-49#	$5.50	$3.16	-42.5%
	Cuts	$7.74	$6.16	-20.4%
Yellowfin tuna	#1: BTF	$7.00	$5.61	-19.9%
	#1: Cuts	$9.38	$7.74	-17.5%
	#2: BTF	$5.00	$3.99	-20.2%
	#2: Cuts	$6.52	$5.85	-10.3%
	#3: BTF	--	$2.82	--
	#3: Cuts	--	$4.23	--
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

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 the SAFE report for 2000 and the HMS FMP.

In general, a vessel owner will need to pay for a number of supplies for each fishing trip (e.g. hooks, bait, lightsticks, ice, fuel, groceries, etc.), for vessel and gear repairs as needed, for 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 prohibitively 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

Although this is the main gear type of commercial HMS fisheries, the only economic information currently collected for this gear type is done 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 are collected (Table 5.12). NMFS may require this information in the future (64 FR 55900, October 15, 1999) in order to improve the economic data available for all HMS fisheries.

There are two studies that have examined this voluntary data, Larkin *et al*. (1998) and Ward and Hanson (1999). Both find that the characteristics of fishing trips vary widely and that distinct fleet sectors must be taken into account when managing this fishery. This is consistent with NMFS' view to manage fisheries holistically, not solely by species. Both reports also find that the cost of fuel and bait is 40 to 51 percent of the cost of the entire trip (Table 5.13). Hanson and Ward (1999) found that summing the total inputs into the trip arrived at an average variable cost per trip of $2,966 but that the total cost of the trip as reported on the trip summary form had an average of $5,284. This is closer to the average variable cost per trip ($7,331) estimated in Larkin *et al*. (1998).

Generally, fishermen in HMS fisheries do not have large profits. Larkin *et al*. (1998) found that the average vessel earns approximately $35,907 per year in net revenues and that the captain of the vessel earns an average of $1,521 per trip, the vessel owner earns an average of $4,422 per trip, and the crew members each earn an average of $978 per trip. Ward and Hanson's results indicate that fifty percent of the fleet earns $10,000 or less annually and 20 percent of this part of the fleet actually has a negative profit each year. Ward and Hanson (1999) also found that almost 19 percent of the vessels in the fleet earned more than $50,000 annually and 7 percent earned more than $100,000 annually.

Table 5.12 Total Number of Logbook and Weigh-Out Observations. Source: Ward and Hanson, 1999.

	1996	**1997**	
Set Form	17,996	15,867	N/A
Weigh-Out Form	21,976	21,792	N/A
Trip Summary	1,310	624	383 (incomplete)

Table 5.13 The average variable cost per pelagic longline trip.

Cost Category	Average cost for 1996: Larkin *et al.* (1998)	Percent of total costs	Average cost for 1996-1997: Ward and Hanson (1999)	Percent of total costs
Light sticks	$801	10.9%	$302	10.2%
Fuel	$1,400	19.1%	$876	29.5%
Bait	$1,506	20.5%	$646	21.8%
Ice	$384	5.2%	$350	11.8%
Groceries	$617	8.4%	$441	14.9%
Miscellaneous	$2,623	35.8%	--	--
Freight/handling	--	--	$350	11.8%
Total	$7,331		$2,965	

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. According to Larkin *et al*. (1998), pelagic longline vessels that were between 30 and 49 feet had total returns for a trip (payments to owner and captain) between $2,271 and $3,462 for an average annual net revenue of $34,000 to $51,000.

Purse Seine

In June 2000, NMFS sent out a voluntary economic survey to the owners of the five Atlantic tuna purse seine vessels. The purpose of the survey is to collect up-to-date information regarding the seasonal and/or yearly costs incurred by the purse seine fleet. Accurate cost information will be 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. NMFS is still in the process of collecting and compiling the information from the purse seine fleet, and hopes to have preliminary results available during 2001.

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, and are in the process of publishing an additional peer-reviewed paper with three 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. Only a few vessels are known to fish with this type of gear. NMFS currently has very little economic information on the fishing costs related to this gear type. However, it is expected that the fishing costs per trip would be less than those of a pelagic or bottom longline fishing trip because the trips are usually shorter (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 lightsticks. Other costs may be incurred as the holes in the gear will need to be repaired regularly.

5.1.5 Costs and Revenues for Atlantic Dealers

NMFS does not currently have information regarding the costs to HMS dealers. In general, dealer costs include: paying the vessel owner/captain for 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, fishing costs and revenues of dealers are not as variable or unpredictable as those of a vessel owner; however, dealer costs may fluctuate depending upon supply of fish, labor costs and equipment repair.

Although NMFS does not have specifics regarding HMS dealers, there is some

information on the number of employees for processors and wholesalers in the United States provided in the HMS FMP (Section 2.2.4). Table 5.14 provides a summary of available information. Recent trends indicate that while the number of plants have decreased, the number of employees have increased. Florida and Massachusetts appear to have the largest number of plants and employees on the Atlantic coast.

NMFS also has information regarding the percent mark-up 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 5.15. In both 1996 and 1999, the mark up was over 90 percent and the mark-up decreased slightly (3.2 percent) in 1999 compared to 1996.

Table 5.14 The number of plants and employees for Atlantic processors and wholesalers , by State, in 1996 and 1998. Source: NMFS, 1998; NMFS, 2000a. 1999 data is not yet available.

State	1996		1998	
	Number of plants	Number of employees	Number of plants	Number of employees
Maine	267	3,353	278	3,328
New Hampshire	37	455	36	561
Massachusetts	374	4,964	391	5,117
Rhode Island	82	793	78	758
Connecticut	44	339	41	372
New York	339	2,622	358	2,617
New Jersey	150	2,090	153	2,098
Pennsylvania	68	2,017	70	2,680
Delaware	-	-	-	-
District of Columbia	7	73	6	101
Maryland	126	1,889	119	1,699
Virginia	129	2,115	122	2,240
N. Carolina	145	2,064	144	2,222
S. Carolina	37	337	33	276
Georgia	66	1,649	66	1,845
Florida	504	5,794	482	6,126

State	1996		1998	
	Number of plants	Number of employees	Number of plants	Number of employees
Alabama	144	2,425	137	2,147
Mississippi	64	1,142	71	2,799
Louisiana	311	4,280	288	3,939
Texas	136	2,384	141	2,854
Total	3,030	40,785	3,014	43,779

Table 5.15 **Summary of the mark-up and consumer expenditure for the primary wholesale and processing of domestic commercial marine fishery products: 1996 and 1999.** Source: NMFS, 1997a and NMFS, 2000a.

	1996	
Purchase of Fishery inputs	$5,377,442	$6,238,465
Percent mark-up of fishery inputs	96.6%	93.5%
Total mark-up	$5,192,619	$5,834,232
Total value of fishery inputs	$10,570,061	$12,072,698

5.2 Recreational Fisheries

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

Although NMFS believes that recreational fisheries have a large influence on the economies of coastal communities, NMFS does not have a lot of 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 1996 found that 9.4 million saltwater anglers went on approximately 87 million fishing trips and spent approximately $8.1 billion (USFWS ,1997). 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, 1997). Saltwater anglers spent $4.6 billion on trip related costs and $3.4 billion on equipment (USFWS, 1997). Approximately 76 percent of the saltwater anglers surveyed fished in their home state (USFWS, 1997). The next USFWS survey will be conducted in 2001.

The American Sportfish Association (ASA) also has a report listing the 1996 economic impact of sportfishing on specific states. This report states that all sportfishing has an overall economic importance of $108.4 billion dollars (ASA, 1997). Texas, Florida, New York, North Carolina, and Georgia are among the top ten states in terms of overall economic impact for both saltwater and freshwater fishing (ASA, 1997). Florida is also one of the top states in terms of economic impact of saltwater fishing with $2.2 billion in angler expenditures, $4.4 billion in overall economic impact, $1.2 billion in salaries and wages related to fishing, and 56,278 fishing related jobs (ASA, 1997). Texas followed Florida with $0.9 billion in angler expenditures, $2.0 billion in overall economic impact, $0.5 billion in salaries and wages, and 24,802 jobs (ASA, 1997). New Jersey and North Carolina were the next highest states in terms of economic impact (ASA, 1997).

In general, most anglers did not target HMS in 1996 or 1999. 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 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 EEZ. The most common caught species caught in federal managed waters were black sea bass, Atlantic mackerel, dolphin, red snapper, and bluefish.

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[2] Unless stated otherwise, all the information and data presented in this section is from NMFS 1997a and NMFS 2000a.

[3] This survey interviewed 22,578 anglers

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In 1999, over 7.8 million people made recreational fishing trips in the United States and caught over 328.8 million fish (over 59 percent were released alive). Along the Atlantic and Gulf of Mexico, 6.1 million participants took 50.9 million trips and caught a total of 308.4 million fish. Of the trips that occurred in the Atlantic, 23 percent were made in east Florida, 14 percent in New Jersey, and 13 percent in North Carolina. The most commonly caught species in the Atlantic were Atlantic croaker, summer flounder, striped bass, bluefish, and black sea bass. The most commonly caught species in federally managed waters were black sea bass, Atlantic croaker, summer flounder, dolphin, and Atlantic mackerel. Of the trips that occurred in the Gulf of Mexico, 71 percent were made in west Florida and 17 percent in Louisiana. The most commonly caught species were spotted and sand seatrouts, red drum, white grunt, Atlantic croaker, and red and gray snappers. The most commonly caught species in federally managed waters were red snapper, white grunt, dolphin, black sea bass, and spotted seatrout.

5.2.2 Willingness to Pay to Fish for Atlantic HMS

The most recent data NMFS 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 thousand 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. NMFS will continue to pursue options for funding economic surveys of the recreational HMS fisheries.

5.2.3 Atlantic HMS Tournaments

The most recent economic information associated with HMS tournaments can be found in the HMS FMP and the Billfish Amendment. In general, HMS such as billfish and sharks are often targets of big game tournaments. These tournaments can charge large fees ($20 to $8,000) and award large prizes ($20 to more than $100,000; fishing equipment can also be awarded). In August 1997, the Pirate Cove Billfish Tournament awarded $217,000 to the participant who landed a 670 lb blue marlin. Tournaments can bring in a lot of money for the surrounding communities and local businesses. 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.

5.2.4 Atlantic HMS Charter and Party boat Operations

Currently, specific information on the economic impact of HMS charter/headboat operations is sparse. 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. 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 fee 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 5.16. 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 5.17.

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 known number of charter boats) and 52 head boat operators (35 percent of the known number of headboats). The average fees for charter and headboats are listed in Table 5.18. Charterboats and headboat operators are not targeting HMS as much as other species such as mackerel, grouper, snapper, dolphin, red drum. The percent charter and headboat operators report targeting HMS can be found in Table 5.19. Table 5.20 shows the economic information regarding these businesses. Unlike similar businesses in the Gulf of Mexico, 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. 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 5.16 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 5.17. 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 5.18 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 5.19 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 5.20. 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			
		Florida	**Other states**	**Florida**	
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)

5.3 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 NMFS 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. NMFS has 10 years after the adoption of each rule in which to review the impact of the rule. Section 610 states that NMFS 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

The review of each rule is facilitated when there is a baseline against which the rule may be evaluated. In this case, NMFS has decided to use 1996 as a baseline. NMFS believes that this baseline is appropriate because RFA was amended in 1996, the Magnuson-Stevens Act was amended in 1996, and regarding HMS specifically, no rules were implemented in 1996 that were classified as significant under RFA. A list of final regulations that were found significant under RFA or E.O. 12866[4] and were implemented since 1996 can be found in Table 5.21.

[4] NMFS 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 5.21. HMS regulations that were implemented after 1996 and were classified as significant under either RFA or E. O. 12866.

Rule	Date	FR cite	Action	Classification
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, NMFS 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 1 in Table 5.21 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 shark. 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 NMFS regarding the commercial quota in this regulation. In February 1998, the Court remanded the economic analyses to the agency. In May 1998, NMFS 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, NMFS 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.

Rule 2 in Table 5.21 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 5.21 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, and consolidate the HMS regulations into one part of the Code of Federal Regulations. 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 fishing groups

and environmental sued NMFS on different aspects of the regulations and stated that the regulations were not consistent with RFA. Some of these lawsuits are still ongoing. Generally, the most recent economic data available only includes data for 1999. Thus, any impacts of the actual regulations, as opposed to the anticipation of the regulations, cannot be analyzed at this time, therefore the quanitifiable economic impacts of this rulemaking will not be discussed in this document.

Rule 4 in Table 5.21 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. NMFS has also been sued on this regulation by three different organizations. Because this rule will not be fully implemented until February 2001 and because a full year's worth of data will not be available for any subsequent analyses until 2002, the actual economic impacts of this regulation are unknown and will not be discussed in this document.

Rule 5 in Table 5.21 implemented a time/area closure for pelagic longline gear in the Northeast Distant Statistical Area (NED) from October 10, 2000, until April 9, 2001 and requires all pelagic longline vessels to carry and use line clippers and dipnets. The intent of this regulation is 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. Because a full year's worth of data will not be available for any subsequent analyses until 2002, the actual economic impacts of this regulation are unknown and will not be discussed in this document.

5.3.3 The Economic Impact of the Regulations

The actual economic impact of any specific regulation is difficult to quantify in any fishery 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 5.21 reduced the LCS commercial quota by 50 percent and reduced the recreational bag limit by 50 percent. Tables 5.5 and 5.7 indicate that in general from 1996 to 1999, the ex-vessel price of LCS and pelagic sharks stayed approximately the same, the SCS prices increased, and the fin prices decreased. This indicates that the commercial quota reduction may not have impacted the price of LCS meat, may have negatively impacted the price of shark fins, and may have positively impacted the price of SCS meat. This could be due, in part, to the reduction in a constant supply of shark fins available (after the quota reduction, the LCS fishery has generally closed within 2-3 months of the season opening) and the substitution of SCS meat during an LCS closure (the SCS fishery has not closed to date and landings in 1998 were higher than in 1997 although 1999 landings were lower). Wholesale prices of shark meat in general, have declined. While this reduction could be due to the reduction in LCS shark meat available, the wholesale price of pelagic sharks has also decreased indicating that factors other than the LCS quota reduction may be influencing the price. 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 in relation to HMS. However, given the fact that most anglers do not target HMS in general, or sharks specifically, relative to the total salt water angler population, NMFS does not feel that the 1997 bag limit reduction had a significant impact on the recreational fishery.

Rule 2 in Table 5.21 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. Instead other factors, such as anticipation of the 1999 HMS FMP, the general decline in swordfish stocks between 1996 and 1999, overcapacity in the swordfish fishery, and the "Give swordfish a break" campaign may have influenced this price reduction.

Rules 3, 4, and 5 of Table 5.21 are too recent for NMFS to examine any economic impacts at this time.

5.3.4 Continued Need for the Regulations

In 1998, the results of the shark evaluation workshop (SEW) indicated that the quota and bag limit reduction for LCS in 1997 (Rule 1 in Table 5.21) did not reduce fishing mortality enough to rebuild LCS stocks. Based on these results, in 1999, NMFS implemented new regulations that would further reduce the commercial quotas and the recreational bag limits and add additional species to the prohibited species list. The new recreational bag limits and recreational prohibited species went into effect on July 1, 1999. Due to a court injunction, many of the 1999 commercial regulations, including the quotas, did not go into effect and the 1997 regulations remained in effect. A settlement agreement was approved by the Court on December 7, 2000. Emergency regulations, consistent with the settlement agreement, are currently being drafted. Thus, in 1999, NMFS felt that the regulations in this 1997 rule did not achieve its overall goal of sustaining the LCS shark stocks and that more restrictive measures were necessary, despite the potential for large economic costs in the short-term.

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

Rules 3 through 5 in Table 5.21 are all regulations implemented within the last two years. At this time, NMFS believes these regulations are still necessary, although, in some cases it has not been long enough to assess the efficacy of the specific regulations in terms of achieving the objectives of the FMPs.

5.3.5 Comments Received on Each Rule

NMFS always invites comments on current and proposed regulations. Currently, most comments on existing regulations occur in the form of litigation. For instance, a number of different commercial shark fishermen and dealers sued NMFS regarding Rule 1 in Table 5.21. A commercial driftnet fisherman sued NMFS on a takings claim for Rule 2 in Table 5.21, seven different groups of plaintiffs composed of recreational, commercial, and environmental interest groups sued NMFS on different aspects of Rule 3 in Table 5.21[5], three different groups sued NMFS on Rule 4, and one group sued NMFS on Rule 5. Almost all of these lawsuits include claims that NMFS did not comply with RFA and on various National Standards. NMFS is working with lawyers, plaintiffs, and constituents to ensure that all concerns are considered.

In 2000, NMFS 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 5.21 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 NMFS had not done enough for the fishery, or that NMFS had done too much and did not consider all aspects of the fishery. In all cases, NMFS gave Congress comments on the proposed bills and continues to work with constituents to ensure all concerns are considered.

Outside of litigation and legislation, NMFS continues to receive comments on certain regulations and restrictions. NMFS is currently considering many of them; these are discussed in Section 10 of this document.

[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.

5.3.6 Complexity of Each Rule

Neither Rule 1 nor Rule 2 on Table 5.21 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 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 comments include the BFT catch limits for pelagic longline fishermen and effort controls in the BFT fishery. Rules 4 and 5 on Table 5.21 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 require the use of line clippers and dipnets. These regulations do not include any additional reporting requirements.

Overall, the complexity of the regulations have increased over time as loopholes in the regulations are fixed and new restrictions are added. NMFS 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), NMFS efforts include faxing notices of rulemakings, season closures, 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.

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

NMFS believes that all its regulations are consistent with and do not overlap with other Federal rules, except where necessary. In some cases, NMFS' regulations may overlap or be inconsistent with State regulations. In all cases, NMFS 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 5.21 were evaluated in 1999 or after. 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.

5.3.9 Conclusion

If ex-vessel and wholesale prices are a good indicator, the economic health of Atlantic HMS commercial fisheries has declined since 1996 (Tables 5.7 and 5.12). At this point, it is unknown to what degree the economic health of the recreational fisheries has changed since 1996. However, given the status of HMS stocks, NMFS feels that all its current regulations are necessary and will benefit the fisheries economically in the long-term. NMFS 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 fishery management plans (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 §102(2)(a)). Federal agencies should address the aesthetic, historic, cultural, economic, social, or health effects of regulations which may be direct, indirect, or cumulative. Consideration of the social impacts associated with fishery management measures is a growing concern of managers as fisheries experience variable participation and are affected by declines in stocks.

Social impacts are defined as the consequences to human populations that follow from some type of public or private action. These consequences may include changes in "the ways in which people live, work or play, relate to one another, organize to meet their needs and generally cope as members of a society ... " (NMFS, 1994). In addition, cultural impacts may involve changes in the values and beliefs that affect the way people identify themselves within their occupation, their communities, and society in general. Social impact analyses help determine the consequences of policy action in advance by comparing the status quo with the projected impacts. Public hearings, scoping meetings, and Advisory Panel meetings provide input from those concerned with the impacts of a proposed management action.

While geographic location is an important component of a fishing community, management measures often have the most identifiable impacts on fishing fleets that use specific gear types. In addition, since the species managed by the HMS FMP are by definition highly migratory, fishermen tend to shift locations in an attempt to follow the fish. The geographic concentrations of HMS fisheries may also vary from year to year as the behavior of these

migratory fish is somewhat unpredictable. The relationship between these fleets and geographic fishing communities is not always a direct one. As a result, the inclusion of typical community profiles in HMS management decisions is difficult.

NMFS (1994) guidelines for social impact assessments specify that the following elements are utilized in the development of FMPs and FMP amendments:

- Information on distributional impacts, non-quantifiable considerations such as expectations and perceptions of the alternative actions, and the potential impacts of the alternatives on both small economic entities and broader communities;

- Descriptions of the ethnic character, family structure, and community organization of affected communities;

- Descriptions of the demographic characteristics of the fisheries;

- Descriptions of important organizations and businesses associated with the fisheries;

- Identification of possible mitigating measures to reduce negative impacts of management actions on communities.

To help develop this information for the HMS FMP and the Billfish Amendment, NMFS contracted with Dr. Doug Wilson, from the Ecopolicy Center for Agriculture, Environmental and Resource Issues at Rutgers, the State University of New Jersey. Dr. Wilson and his colleagues completed their field work in July 1998. This study covered four species groups (tunas, swordfish, sharks, and billfish) that have important commercial and recreational fisheries extending along the Atlantic and Gulf coasts 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 coasts 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, and the existence of other community studies. Finally, the Advisory Panels for HMS and Billfish provided extensive input on which fishing communities should be included in this analysis. Complete descriptions of the study results can be found in Chapter 9 of the HMS FMP and Chapter 7 of the Billfish Amendment.

6.2 Summary of Current Social Data by Gear Type

Bottom Longline

There have been no recent social studies or data available on the U.S. bottom longline fishery. During the winter, the directed shark fishery is concentrated in the southeastern United States. During the summer, shark species are more dispersed, allowing vessels in the mid-Atlantic and Northeast to participate. Most of the permit holders are located in the state of Florida, but similar to most HMS fisheries, some shark fishery participants more from their home ports to active fishing areas as the seasons change. In some cases, this can have a disruptive effect on the social structure of the effected community.

Commercial Handgear

A study conducted in 1999, details key social and economic characteristics of the for-hire fishery in the offshore waters of Alabama, Mississippi, Louisiana, and Texas (Sutton *et al.*, 1999). The results of the study apply primarily to fishermen harvesting species governed by the Gulf of Mexico Fishery Management Council, but there is interaction with several stocks classified as highly migratory species. In addition, the general conclusions made about the charter and party boat fisheries can be applied to HMS management, notably the importance of industry participation in any further fishery management in the Gulf. Assessing the social and economic dynamics of the for-hire fisheries has been difficult since they tend to operate on a multi-species basis. NMFS will continue to monitor the charter and party boat fisheries to assess the social impact of regulatory actions.

Drift Gillnet

In 1999, twelve vessels in this fishery took 216 trips targeting shark species, with approximately three or four vessels accounting for the majority of these trips. The fishermen are located on the east coast of Florida and their trips are usually less than 18 hours long with harvesting occurring in areas within 30 nautical miles from port. Many of the fishermen utilizing this gear type participate in other commercial fisheries or outside of commercial fishing to supplement their income. If fishermen exit this fishery, it is unlikely there would be significant social impacts on the social structure of fishing communities due to its small size. Also, it is possible that participants could sell their shark permits to other interested fishermen to mitigate the costs of exiting the fishery.

Pelagic Longline

A survey completed in 1996 (Hoey, 1996) examined the quality of life as perceived by members of this fishery. While the information is from several years ago, it demonstrates some of the predominant sentiments expressed by longline fishermen. In a comparison of current life as a

commercial fisherman with that of five years ago, fifty-two percent of the respondents claimed they were better off five years ago. To assess attitudes about future well-being, the respondents were asked to estimate their quality of life five years ahead and fifty-two percent answered that it would be worse than the present. The majority of the respondents indicated that federal regulations had an overall negative effect on the quality of personal life and the ability to fish commercially. Generally, any regulatory framework dampens the independent nature of fishing by

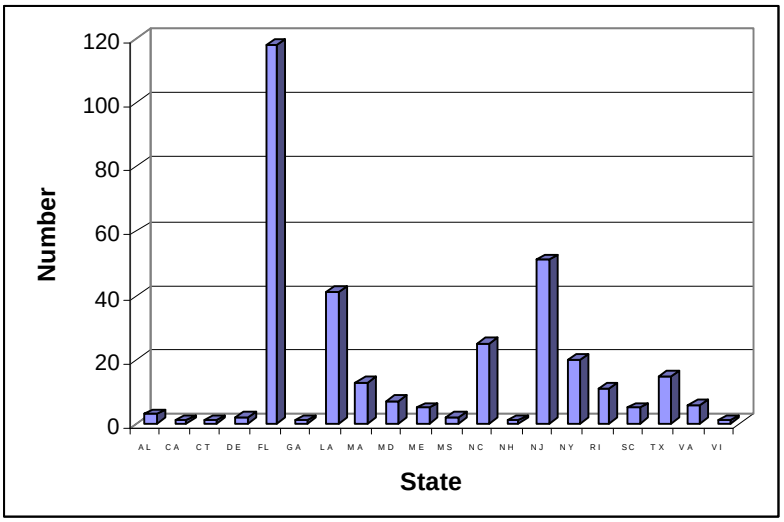

Figure 6.1 **Frequency distribution, by address, of pelagic longline vessels with directed or incidental swordfish limited access HMS permits.** Source: NMFS permit database, November 2000.

dictating how, where, and when longlines can be set.

To assess the impacts of proposed regulations on pelagic longline fishermen, it is necessary to determine the geographic concentrations of permit holders. To do so, NMFS used the mailing addresses of permit holders on file. It is important to note that the addresses used to determine the permit distributions are not necessarily the home ports or communities in which the fishermen spend most of their time. The mailing addresses were selected to identify concentrations of family residences that may be impacted socially from additional management measures. Figure 6.1 depicts geographic distribution of the permit holders on file for 2000. Although a large fleet of longline vessels fish out of New England states, the greatest number of qualifying permit holders are found south of New York.

Purse Seine

There have been no recent social studies or data available on the United States Atlantic tunas purse seine fishery. As a result of the limited entry system for purse seine vessels, NMFS can easily characterize the small number of participants (5 vessels and 3 owners) in the fishery.

Recreational Handgear

In August 1999, a thesis was submitted to the College of Agriculture and Life Sciences of Texas A&M University that analyzed the management preferences of members of The Billfish Foundation (TBF) who responded to a mail survey (Gillis, 1999). The survey was sent to a random sample of 435 TBF members (approximately 11% of membership residing in the United States). A total of 229 surveys were completed and returned at a 57% response rate (excluding 24 surveys that were undeliverable). The study focused on billfish angler preferences for potential management measures necessary to achieve a 25% reduction in landings of Atlantic blue and white marlin. The management measures were those considered by NMFS in the Draft Billfish Amendment. Respondents evaluated sixteen potential management regimes defined by two levels of the six different management measures NMFS was considering as options.

The results of this study concern the preferences of TBF members only and therefore it cannot be concluded that the results represent the preferences of billfish anglers overall. As active members of one or more conservation groups, it would be expected that their preferences for management measures would differ from other billfish anglers who may not be involved in related conservation efforts. However, the study concludes that survey analysis can be a useful tool to define management regimes that achieve biological objectives while maximizing constituent satisfaction.

6.3 Summary of New Social and Economic Data Available

Fishing Ports of the Mid-Atlantic by Bonnie McCay and Marie Cieri. Report to the Mid-Atlantic Fishery Management Council. April, 2000.

This report provides a social and economic examination of the fishing ports and coastal counties of six of the states that are represented on the Mid-Atlantic Fishery Management Council (New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina). The goal was to profile the recreational and commercial fisheries associated with ports in these areas. The impetus for this work is National Standard 8 of the Magnuson-Stevens Fishery and Conservation and Management Act, which stresses that conservation and management measures must consider the importance of fishery resources to fishing communities.

The report utilized information gathered from three primary sources: federal census and employment data for counties associated with commercial fishing; NMFS weigh-out data by port from 1998 and county data from North Carolina; and field visits and interviews or other published studies. The investigators implemented a "rapid rural appraisal" approach to the research. They conducted a little background research and then visited the places identified as fishing ports to question relevant respondents. The report provides insight into the social and economic status of the fishing communities along the mid-Atlantic seaboard.

The examination of the economic and social aspects of a community involved assessing the level of local support, such as zoning restrictions, proximity of service industries, and available dock space for commercial and recreational fishing businesses. The level of support for individuals employed in these sectors was evaluated through the types of cultural events available and the level of industry support present in the community. The researchers also considered the vulnerability of the fishing community by examining membership associations and the presence of community meeting places. Finally, the community was analyzed to characterize the ethnicity and gender composition as well as the presence of any migrant workers and overall skill of available laborers. The economic attributes were expressed by describing the different gears used per port, the species landed in each location and their value, the number of people involved, and the relevant census data. When coupled with the social assessment, an accurate depiction of the fishing community is provided.

The report has limited application for the social and economic assessments conducted by the HMS Management Division due to its geographic focus. The McCay and Cieri report does cover some of the communities in New Jersey (Cape May, Sea Isle City, Point Pleasant, and Barnegat Light) and North Carolina (Morehead City, Beaufort, Hatteras, and Wanchese) that harbor high numbers of HMS permit holders. The pertinent information about these communities can serve to improve the social data utilized in the 1999 FMP for those locations.

Table 6.1 **Percent value of HMS related gear types. Note: specific target species is not known.** Source: McCay and Cieri, 2000.

State	City	Gill Net, Drift	Gill Net, Sink	Handline	Longline, Bottom (or shark)	Longline, Pelagic	Otter Trawl, Fish	Troll Line	Other	
New Jersey	Barnegat Light	34.9	9.8	0.1	6.1	19.9	0.3	0.0	28.8	10,194,400
	Cape May	0.1	0.5	0.0	0.0	0.3	61.9	0.0	37.3	25,757,200
	Point Pleasant	0.7	13.5	0.1	0.0	0.2	17.7	0.0	67.8	16,715,400
North Carolina	Carteret County (Beaufort, Morehead City)	0.1	5.4	0.0	0.1	0.9	0.0	0.4	92.9	21,332,100
	Dare County (Hatteras, Wnachese)	0.0	22.5	0.0	0.8	5.8	0.0	6.1	64.6	23,511,500

6.4 Social Impacts of Prominent 2000 Regulatory Actions

Emergency Rule to Reduce Sea Turtle Bycatch and Bycatch Mortality in the Atlantic Pelagic Longline Fishery

On October 13, 2000, NMFS issued an emergency rule lasting 180 days that closes a 55,970 square mile L-shaped area of the Grand Banks to pelagic longline fishing. The possession and use of a dipnet and line clipper on every pelagic longline vessel to assist in the removal of gear from incidentally caught sea turtles was also required by this regulatory action. From a socio-economic perspective, the time/area closure had a greater impact upon the relevant fishing communities than the gear requirements.

Seven vessels fished in the closed area in 1999. Gross revenues for these vessels from October 1 to March 31 are estimated to be $548,439 in total and average $78,348 per vessel in 1999. Closing this L-shape area from October 8 to March 31 could cause these vessels to lose approximately 70 to 79 percent in average gross revenues per vessel (based on earnings in 1998 and 1999) in the first and fourth quarters of 1998 or 1999. However, this assumes that these fishermen would not fish in any other area. NMFS believes that, although some revenues may be lost as a result of this closure, fishermen may be able to regain some of their revenues by fishing outside the restricted area. However, given the fact that the average gross revenues in 1998 and 1999 from the area outside the closed area is over 65 percent less than the average gross revenues from inside the closed area, NMFS recognizes that a large part of the revenues from fishing in the Grand Banks area could be lost. If fishermen decide not to fish or move to other areas, this reduction in revenues will be felt in the industries that support and rely on fishing. Thus, this closure could have a significant impact on the social communities that rely on the fishing revenue generated from that area.

Requiring the use of line clippers and dipnets to release hooked turtles is not expected to increase costs substantially. A similar rule for the fisheries in the Western Pacific estimated that the total cost for the materials to fabricate and/or purchase line clippers and dipnets to be $250 (65 FR 16347). Use of line clippers and dipnets to release sea turtles is unlikely to change catch rates of target catch; therefore, this management measure is unlikely to change the gross revenues of fishermen. Because of the relative ease and cost of the new gear, these requirements are not expected to negatively impact the relevant fishing communities.

Prohibited Shark Species

On June 12, 2000, a Judge granted a joint motion to allow NMFS to proceed with the implementation and enforcement of the prohibited shark species provisions in the HMS FMP that had been enjoined since June 30, 1999. The FMP prohibits the retention of shark species (exception for deepwater sharks) unless their stock size can support and sustain fishing mortality. All sharks not authorized to be retained must be released in a manner that ensures the maximum

probability of survival.

One of the species that is prohibited in the dusky shark, the prohibition of which will likely have adverse social impacts on both the commercial and recreational fisheries. Dusky sharks are preferentially retained relative to other shark species captured in the commercial directed shark fisheries and are targeted as a large game fish in recreational fisheries. Because approximately two to five percent of the large coastal shark commercial landings by weight are comprised of dusky sharks, commercial fishermen might experience reduced revenues. For the other large coastal, pelagic, and small coastal shark species, this action will likely have a negligible economic impact because only the uncommon species are prohibited and they comprise a minor portion of the landings.

Reduction of Bycatch, Bycatch Mortality, and Incidental Catch in the Atlantic Pelagic Longline Fishery

The regulation implementing time/area closures to reduce bycatch and prohibit the use of live bait in the pelagic longline fishery in the Gulf of Mexico and western Atlantic Ocean became effective on August 1, 2000 (65 FR 47213). To determine the socio-economic impact of this measure, NMFS summed the gross revenues per species for each vessel to arrive at the total gross revenues in the pelagic longline fishery, an average of $137,126 per permit holder. NMFS then examined the impact of the closure if the fish were lost because of the time/area closure. This type of analysis indicates the maximum amount of gross revenues which could be lost because of a time/area closure.

Based on average price and weight data, the fishermen who reported landings from the DeSoto Canyon area in the pelagic logbook in 1998 had estimated gross revenues from the DeSoto Canyon ranging from $681 to $84,959 with an average of $17,254 per permit holder. With the DeSoto Canyon closure alone, NMFS estimates that the average gross revenue per permit holder from all landings in the Gulf of Mexico and the Atlantic Ocean will decrease by 1.8 percent to $134,705.

Fishermen who reported landings from the Florida East Coast and Charleston Bump closure areas in the pelagic logbook in 1998 had estimated gross revenues from this area ranging from $435 to $161,910 with an average of $36,129 per permit holder, based on average price and weight data. With this closure alone, NMFS estimates that the average gross revenue per permit holder from all landings in the Gulf of Mexico and the Atlantic Ocean will decrease by 2.9 percent to $133,114.

In general, the DeSoto Canyon, Charleston Bump, and East Florida Coast time/area closures could have significant social impacts on pelagic longline fishermen and related industries. The comments received mention that there are three basic alternatives for pelagic longline fishermen who currently fish in the closed areas under the final time/area actions. Pelagic longline

fishermen (e.g., permit holders, captain, crew) and their families could relocate their home ports to the open areas in order to recoup their losses under the closure. Commercial fishermen suggested that delaying implementation of the time/area closures could give fishermen and their families the time needed to relocate and could alleviate some of the economic impacts. There is also a possibility that vessels with home ports close to the open areas could safely fish in those open areas. However, there are vessels, particularly the smaller vessels home-based in FL and SC, that may be unable to transfer effort to the open areas due to safety concerns. NMFS received a number of comments concerning the safety of these smaller vessels. In addition, although these vessels that have home ports near the perimeters of the closed areas would not need time to relocate, they would still likely have significant economic impacts if they need to spend more time at sea in order to reach the open waters. If this occurs, the captains and crew who live in these areas may be away from home more than under the status quo. Some pelagic longline fishermen may decide or may be forced to leave the fishery altogether as a result of the regulations in this document.

Thus, the final closures could have three immediate impacts on fishing communities in the Gulf of Mexico and the South Atlantic Bight: 1) fishermen could spend more time away from home and their families, 2) fishermen could move from a community in the closed area to a community in the open area, or 3) fishermen could leave the fishery. If pelagic longline fishermen decide to move as a result of the final closures, communities outside, or near the edge of, the time/area closure might benefit. If pelagic longline fishermen move or leave the fishery, commercial communities within the closure areas could have substantial negative social impacts.

Vessel Monitoring System Remand

The HMS FMP which was published May 28, 1999 (64 FR 29090), required every pelagic longline fisherman that operates or owns a commercial vessel permitted to catch Atlantic highly migratory species to install a vessel monitoring system (VMS) unit and operate it whenever the vessel leaves port with pelagic longline gear onboard. The VMS primarily allows for enforcement of closed areas and increased safety at sea. NMFS required every HMS permitted pelagic vessel to install an approved unit by October 1, 2000. On September 25, 2000, the requirement of all pelagic longline fishers possessing a VMS was remanded to NMFS by the District Court for the District of Columbia for further consideration. Because of the proximity of the ruling to the effective date of the rule, some fishermen have purchased and installed a VMS unit to comply with the regulations.

The suspension of the VMS requirement may have placed an economic burden upon these fishermen. Currently, there are 13 VMS units that have been purchased and not returned or retained for business reasons. It can be assumed that some of these units were bought to comply with the regulation prior to its remand. The cost incurred by each fisherman ranges from $2,499 to $3,800 per unit plus installation fees depending upon the model. When the operating costs and the cost of repairs are considered, the VMS unit represents a substantial investment for the

average longline fisherman.

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. The census and sampling data utilized in the regulatory actions are necessary and required to examine the impacts and benefits of proposed and selected alternatives. The continued process of updating existing data and supplementing it with new information is vital to improving the knowledge of managers with regard to each specific fishery. For example, the census and other public data, when combined 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 knowledge of fishing and the environment gained by fishermen to be usefully incorporated into fisheries management.

Section 6 References

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7. FISH PROCESSING, INDUSTRY, AND TRADE

Over the past three to four years, the United States has taken steps to use international trade information to further U.S. conservation policy related to Atlantic HMS. While these steps may seem small and the process 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 in World Court. 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). In September 2000, the ICCAT Advisory Committee was presented with a great deal of information regarding the use of trade data to enhance compliance at a workshop led by NMFS, NOAA, and Department of State trade experts. Following that workshop, the U.S. delegation supported a 2000 ICCAT recommendation that would require countries to increase documentation and monitoring of trade in bigeye tuna and swordfish for compliance purposes.

Because there are "missing links" surrounding the harvest, processing, and trade of Atlantic HMS, NMFS cannot recreate 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 requires the Secretary of Commerce to ban shark finning in the United States and to begin discussions on developing agreements to prohibit shark finning internationally. 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 ranges from the simple process of dressing and icing 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 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 for Law Enforcement to monitor incoming shipments of seafood, including highly migratory species.

FDA's Seafood Hazard Analysis Critical Control Point (HACCP) program regulations

require processors of fish and fishery products to operate preventive control systems for 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. 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 practices and conditions being observed in the plant and it discourages fraud. NMFS works closely with the FDA, in support of the HACCP program.

Just as HACCP plans vary between processors, transportation of the seafood to market also varies widely from the direct domestic sale of some shark or swordfish meat by a fisherman to a restaurant (carried by truck) to the quick, and sometimes complicated, export of bluefin tuna from fisherman to dealer to broker to the Japanese auction (carried by 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 NMFS has analyzed, as well as a brief description of the processing and trade industries employed in transitioning Atlantic HMS from the ocean to the plate.

Processing and Wholesale Sectors

Quantitatively, NMFS 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 processed products (e.g., steaks and fillets). The utilization of sharks is also not well known since trade statistics frequently do not indicate product forms such as skins and leather, jaws, fishmeal and fertilizer, liver oil, and cartilage (Rose, 1996). Domestically-landed sandbar and blacktip shark meat may be sold to supermarkets and processors of frozen fish products. NMFS continues to work with industry to collect information specific to U.S. and foreign processing of Atlantic HMS to better track markets, conserve stocks, and

manage sustainable fisheries.

The U.S. processing and wholesale sectors are dependent on both the 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 grocery store chains. Employment varies widely among processing firms and may be seasonal unless the firm relies on imported seafood or a wide range of domestic seafood. The majority of firms handle other types of seafood and are not solely dependent on HMS. Other participants in the commercial trade sector include brokers, freight forwarders, and carriers (primarily commercial airlines, trucking, and shipping companies). Swordfish, tunas, and sharks are important commodities on world markets, generating significant amounts in export earnings in recent years. NMFS has received comments in the past year indicating the social demographics of some processing firms, particularly in South Carolina and Louisiana. NMFS considers social information on all sectors of HMS constituents when evaluating impacts of proposed regulations.

In recent years, NMFS has 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 they can specify the product needed to buy or sell in all detail, using seafood- specific terminology. The platforms are purportedly very easy to use because they mimic the pattern of traditional negotiations in the seafood industry. NMFS expects that the use of the Internet will change the way HMS trade occurs substantially in the future and NMFS staff continue to learn about 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, NMFS 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 NMFS 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 purposes 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 NMFS'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 were not less than the U.S. minimum size of 33 lb dressed weight. In order to implement a 1999 ICCAT recommendation to prohibit the import of swordfish harvested by Belize and Honduras, Japan implemented a swordfish monitoring program in 2000 that is similar to the U.S. COE program. In addition, at its 2000 meeting, ICCAT agreed to develop international statistical document programs for Atlantic swordfish and bigeye tuna. Such programs are to be modeled in principle after the ICCAT BSD program. The target data for implementation of these new international programs is January 2002.

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 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 NMFS 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 document 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 will be convened prior to the November 2001 ICCAT meeting to resolve issues relating to the implementation of the programs. The United States intends to participate in the development process. The target for full implementation of the programs is January 1, 2002. As a result of the recently passed shark finning bill, 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 U.S. actions are consistent with international obligations.

7.1.1 Exports

Existing programs at NMFS monitor exports of fish products and makes Bureau of the Census data available online to the public at www.st.nmfs.gov/st1/trade/index. NMFS also collects detailed export data on Atlantic bluefin tuna, most of which are exported to Japan and 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. 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 of Bluefin Tuna (Atlantic and Pacific)**. As reported through the Bluefin Tuna Statistical Document Program, 1996 - 1999. U.S. BSD Program, NMFS NERO.

	Commercial Landings of Atlantic BFT (mt dw)	Exports of Atlantic BFT (mt dw)	Exports of Pacific BFT (mt dw)	Total U.S. Exports of BFT (mt dw)
1996	749.8	661.7	60.7	722.4
1997	826.8	698.7	917.3	1,616.0
1998	849.1	658.6	694.2	1,352.7
1999	876.0	733.9	95.7	1,036.8

Information on exports of bluefin tuna for the first half (January through June) of 2000 is also available. Preliminary data indicate that 39.2 mt of west Atlantic bluefin tuna, and 5.4 mt of Pacific bluefin tuna were exported from the United States during this time period. These figures are larger than in 1999 in the same time period possibly due to increased availability of BFT to the U.S. harpoon fishermen, whose season began June 1, 2000. It should be noted, however, that most landings (and exports) of bluefin tuna in the United States occur during the second half of the calendar year.

Shark Exports

NMFS also collects trade data on the export of sharks, although not in the level of detail found in the BSD program. Shark bycatch information is submitted to ICCAT and to the Food and Agriculture Organization (FAO), but no regional fishery management organization exercises management authority over Atlantic shark species as yet. Other 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 1998, 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 1995-1999. Sharks are targeted in the coastal Pacific Ocean by the driftnet thresher fishery and are caught incidental to the Bering groundfish (trawl) 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 1995-1999 U.S. Exports of Shark Products (kg). Bureau of Census data.

Year	Shark Fins Dried (kg, US$)*		Non-specified Fresh Shark (kg, US$)		Non-specified Frozen Shark (kg, US$)	
1995	NA	NA	99,101	303,319	309,705	929,787
1996	NA	NA	640,677	1,342,273	358,000	969,955
1997	NA	NA	459,542	920,887	439,992	884,588
1998	141,149	1,264,077	524,249	814,319	102,939	250,107
1999	106,723	911,671	270,343	487,610	155,275	461,362

* 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.

Note that while exports of fresh shark decreased by nearly half since 1998, exports of frozen shark meat increased minimally. However, the average price quoted for exports of fresh shark increased from $1.55/kg in 1998 to $1.80/kg in 1999. The average price for frozen shark meat increased from $2.42/kg in 1998 to $2.97/kg in 1999. Shark fin exports decreased in 1999 from 1998 levels, possibly as a result of new restrictive legislation in the Pacific which bans the practice of finning and requires fishermen to land weight of fins no more than 10 percent of shark meat landed. In addition, anecdotal information indicates that two Asian airlines have decided against serving shark fin soup on major flights. These high volume buyers may not be requesting the levels of supplies as they had in the past from the United States. The average price for exported shark fins also decreased.

It should be noted that there is no tracking of other shark products besides meat and fins. Therefore, NMFS cannot track trade in shark leather, oil, or shark cartilage products. 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.

Summary of Atlantic HMS Exports

In 1999, the United States exported 907,190 mt of edible fishery products worth $2.8 billion. Fresh and frozen items (non-canned) were 725,760 mt, valued at $2.2 billion. Atlantic HMS exports are dominated by bluefin tuna and sharks. According to the *Fisheries of the United States, 1999*, 1,220 mt ww of bluefin tuna were landed in the United States in 1998 from all oceans (a 60 percent decrease from the previous year). When compared with 1999 data from U.S. BSD program, after applying a 1.25 multiplier to estimate ww, it appears that roughly 85 percent of bluefin tuna landed in the Unites States were exported. The nature of reporting on sharks, particularly distinctions between fins and whole fish, makes comparison too difficult. However, overseas markets provide a profitable outlet for many U.S. Atlantic HMS fishermen

and may provide superior markets compared with 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 NMFS 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 NMFS. Additional detailed information is collected by NMFS on bluefin tuna and swordfish imports and is discussed in further depth below. For both bluefin tuna and swordfish imports, NMFS 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, NMFS receives general data about that shipment (exporting country, date of entry, weight of shipment, general product form) on the entry form. NMFS could then ensure that an importer activity report had been submitted detailing prices and specific product forms. NMFS 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, NMFS 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 NMFS to track shipments of bluefin tuna and enforce dealer reporting requirements. United States imports and re-exports of bluefin tuna for 1996 through 1999, 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 NMFS 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 and the Asian economic crisis continues. The recent rise in the popularity of raw tuna in the United States has also prompted increasing 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

1997 and 1999 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, 1996 - 1999.

	U.S. BSD Program		U.S. Customs Data (mt dw)
	Imports (mt dw)	Re-exports (mt dw)	
1996	1.9	1.3	N/A
1997	5.3	0.4	109.5
1998	99.9	1.9	225.6
1999	367	11.1	554

Information on imports and re-exports of bluefin tuna for the first half (January through June) of 2000 is also available. Preliminary data indicate that 55.7 mt were imported into the United States, and an additional 4.1 mt were re-exported during this period.

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, NMFS 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. Table 7.4 summarizes the bi-weekly dealer report and the COE data for the 1999 fishing year (June 1999 through May 2000).

Table 7.4 **Swordfish import data collected under the Swordfish Import Monitoring Program (lbs) for the 2000 calendar year.**

	Ocean of Origin			
Flag of Harvesting Vessel	Atlantic	Pacific	Indian	
Australia	0.0	408.8	17.0	425.8
Barbados	9.4	0.0	0.0	9.4
Brazil	2,763.4	0.0	0.0	2,763.4
Canada	727.6	0.0	0.0	727.6
Chile	0.0	1,866.8	0.0	1,866.8
Columbia	0.0	0.2	0.0	0.2
Costa Rica	0.0	575.9	0.0	575.9
Ecuador	0.0	297.4	0.0	297.4
El Salvador	0.0	25.6	0.0	25.6
Fiji Islands	0.0	118.4	0.0	118.4
Grenada	22.8	0.0	0.0	22.8
Guam	0.0	1.3	0.0	1.3

Indonesia	0.0	0.0	156.3	156.3
Japan	0.0	395.8	0.0	395.8
Mexico	0.0	503.0	0.0	503.0
Micronesia	0.0	0.5	0.0	0.5
	Ocean of Origin			
Flag of Harvesting Vessel	**Atlantic**	**Pacific**	**Indian**	
Netherland Antilles	**1.6**	**0.0**	**0.0**	**1.6**
New Zealand	**0.0**	**573.9**	**0.0**	**573.9**
Panama	**2.5**	**0.7**	**0.0**	**3.2**
Peru	**0.0**	**9.5**	**0.0**	**9.5**
Philippines	**40.2**	**76.6**	**0.0**	**116.8**
Samoa	**0.0**	**5.6**	**0.0**	**5.6**
Singapore	**0.0**	**42.7**	**0.0**	**42.7**
South Africa	**2,252.5**	**0.0**	**4.3**	**2,256.8**
Taiwan	**584.6**	**88.9**	**8,496.2**	**9,169.7**
Trinidad & Tobago	**29.9**	**0.0**	**0.0**	**29.9**
United States	**4.4**	**0.0**	**0.0**	**4.4**
Uruguay	**312.8**	**0.0**	**0.0**	**312.8**
Venezuela	**19.9**	**0.0**	**0.0**	**19.9**
Vietnam	**0.0**	**62.4**	**0.0**	**62.4**
Total	**6,771.6**	**5,054.0**	**8,673.8**	**20,499.4**

Table 7.5 Swordfish Products imported: 1995-1999. Bureau of Census data.

Year	**Frozen (kg)**			**Fresh (kg)**		**Total for all products (kg)**	
	Fillets	**Steaks**	**Other**	**Steaks**	**Other**	**kg**	**$**
1995			**477,224**		**4,204,043**	**4,681,267**	**31,910,041**
1996			**404,118**		**4,735,478**	**5,139,596**	**32,948,992**
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**

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. 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.

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. NMFS 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). NMFS does not have specific product information on imported shark meat such as the proportion of fillets, steaks, or loins. NMFS 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 more than tripled since 1995 while imports of shark fins have decreased by approximately 50 percent (by weight) (Table 7.6).

Table 7.6 1995-1999 U.S. Imports of Shark Products. Bureau of 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$
1995	142,235	2,348,411	1,255,512	3,577,897	46,889	558,201	1,444,636	6,484,509
1996	60,407	2,270,261	1,330,688	3,618,205	21,244	489,442	1,412,339	6,377,908
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

Summary of Imported HMS

Atlantic swordfish is an important U.S. import. According to the *Fisheries of the United States, 1999*, approximately $33.4 million of swordfish was landed commercially from all oceans by U.S. fishermen in 1999 (7,267 mt or $2.08/lb). In contrast, $71.7 million (13,814 mt or $2.35/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. As Atlantic swordfish quotas decrease over the next few years to support rebuilding efforts, swordfish from the Pacific and Indian Oceans will continue to supply the U.S. market. 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 NMFS with information on tuna trade.

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 increased landings. 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 a 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 members that are not in compliance 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, NMFS 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. Honduras and Belize continue to have vessels that fish in a manner that diminishes the effectiveness of ICCAT's conservation and management measures.

In 1999, ICCAT also 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, NMFS prohibited the importation of Atlantic bluefin tuna and its products from Equatorial Guinea.

In 2000, NMFS took the following actions regarding import restrictions, consistent with 1999 recommendations from the International Commission for the Conservation of Atlantic Tunas (ICCAT):

- Prohibit the importation of Atlantic bluefin tuna and its products from Equatorial Guinea

- Prohibit the importation of Atlantic swordfish and its products from Belize and Honduras

- Remove a prohibition on the importation of Atlantic bluefin tuna from Panama

At its 1999 meeting, ICCAT identified 11 countries under its 1998 unregulated and unreported catches resolution as nations whose large-scale longline vessels have been fishing for ICCAT species in a manner that diminishes the effectiveness of ICCAT conservation and management measures. At its 2000, ICCAT identified 5 of the original 11 countries (Belize, Honduras, Equatorial Guinea, Cambodia, and St. Vincent and the Grenadines) for a second time and adopted a measure requiring its members to ban the import of bigeye tuna harvested by vessels of these five countries. Data obtained by monitoring international trade in highly migratory species was instrumental in making the decision 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.

At the 2000 ICCAT meeting, parties agreed to prohibit the importation of Atlantic bigeye tuna and its products from Belize, Cambodia, Equatorial Guinea, Honduras, and St. Vincent and the Grenadines. Consistent with this recommendation, the United States will implement such a trade restriction in 2001, except for Honduras which would be effective January 1, 2002, consistent with the recommendation from ICCAT.

7.5 Conclusions and Future Plans

NMFS 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, NMFS 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.

NMFS 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, NMFS 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. NMFS expects that ICCAT will increase its use trade data in its efforts to monitor, assess, and control fishing activities and to conserve the international resources under its authority.

Section 7 References

Rose, D. 1996. An Overview of World Trade in Sharks. TRAFFIC International. 105 pp.

8. BYCATCH

There have been a few important studies evaluating methods to reduce bycatch and bycatch mortality in 2000. NMFS took a major step towards reducing bycatch in the pelagic longline fishery through development of Regulatory Amendment One to the HMS FMP and implementing regulations to close large areas and require gear modifications where bycatch rates have historically been high. In addition, circle hooks have emerged as a voluntary measure recreational fishermen have chosen to increase survival of released tunas and billfish. Bycatch information relevant to each HMS gear type has already been discussed in previous sections of this document. In addition to bycatch of HMS and other species by fishermen targeting HMS, there is the issue of HMS as bycatch in other fisheries as well as the "incidental catch" of marine mammals. The Magnuson-Stevens Act refers only to finfish and sea turtles as bycatch. As a result, other species such as sea birds 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.

8.1 Comprehensive Bycatch Reduction Strategy

The NMFS HMS bycatch reduction program includes an evaluation of current data collection programs, implementation of bycatch reduction measures such as gear modifications and time/area closures, and continued support of data collection and research relating to bycatch. Details on bycatch and bycatch reduction measures can be found in Section 3.5 of the HMS FMP and in Regulatory Amendment One to the HMS FMP (NMFS, 2000a).

Bycatch Reporting Methodology

NMFS utilizes self-reported data (pelagic logbook program), 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., alive vs. dead. Post-release mortality of HMS is accounted for in stock assessments to the extent that the data allow.

In addition to existing programs in the commercial and recreational HMS fisheries, NMFS implemented a final action in the HMS FMP to place observers on charter/headboat vessels whose owners volunteer for the program (Section 3.8.1). As with charter/headboats, NMFS has the authority to use observers to collect bycatch information from Harpoon, Purse Seine, Angling, and General category vessels fishing for tunas. Before these vessels can be selected for catch, bycatch, and effort reporting, a suitable report form must be developed for these gears. To address this in 2000, NMFS completed an analysis of participation in Federal logbook programs coastwide (Northeast, Southeast, and Gulf of Mexico) to determine the "gaps" in HMS catch and

effort information. Furthermore, the compatibility of logbook programs and forms already in place is being evaluated to determine if expanding an existing logbook program would meet HMS management needs, or if a completely new program and/or forms would be required.

Annually, NMFS submits data (Task I) to ICCAT on mortality estimates (dead discards). These data are used annually and included in the SAFE report to evaluate bycatch trends in HMS fisheries. NMFS collects bycatch data from the dockside survey for rod and reel fishermen and uses these data (from LPS) to estimate bluefin tuna dead discards. However, bluefin and yellowfin tuna are currently the only species for which expanded estimates are currently made from the LPS. Statistical problems associated with small sample size remain an obstacle to estimating bycatch in the rod and reel fishery, however NMFS is addressing these problems.

Marine Mammals

NMFS relies on both fishery-dependent and fishery-independent data to produce stock assessments for marine mammals in the Atlantic Ocean, Gulf of Mexico, and Caribbean sea. The *draft* stock assessment reports are typically published around January and final reports are typically published in the Fall. Final stock assessment reports for 2000 will be available soon. The draft 2001 reports are expected in Spring 2001; the proposed 2001 MMPA List of Fisheries published in January 2001.

NMFS continues to investigate serious injuries to marine mammals as they are released from fishing gear. In April 1999, NMFS held a joint meeting of the three regional scientific review groups to further discuss the issue. Although serious injury guidelines have not been published, NMFS will apply the criteria listed by the review groups to make determinations for specific fisheries.

At a recent sub-group meeting of the Atlantic States Marine Fisheries Commission, NMFS and state agency staff discussed the need for collecting information about protected species bycatch in recreational fisheries. The sub-group recommended that agencies should investigate options for quantifying interactions between recreational gear. The impetus for the recommendation was based on the perception that there may be an increasing problem of interactions (i.e., entanglements) between recreational fishing gear and marine mammals, particularly harbor porpoise and bottlenose dolphin. Although stranding data are preliminary, there is some evidence of protected species entanglements (primarily bottlenose dolphin) with recreational fishing gear (primarily monofilament line and fishing lures). Neither states nor NMFS have any directed monitoring program to identify recreational fishing interactions with protected species. The high number of recreational fishing participants, combined with the low probability of encountering a protected species, makes direct observation through an at-sea observer program immensely difficult and costly, with little return. However, there have been discussions about several efforts that may help to identify “hot spots” of recreational fishing/protected species interactions.

Sea Turtles

NMFS took steps in 2000 to finalize serious injury guidelines for sea turtles entangled in fishing gear. Those guidelines are being revised and will be available to the public in early 2001. On October 13, 2000, NMFS published an emergency rule (65 FR 60889) implementing a 180-day closure in the Grand Banks area, and requiring the use of line clippers and dipnets to reduce bycatch mortality of incidentally caught sea turtles in the pelagic longline fishery. NMFS also funded a project in the Azores studying turtle injuries and mortalities and gear modifications. NMFS expects the final report on that project in January 2001. These actions could have significant impacts on the management and operation of the pelagic longline fishery. The guidelines are also likely to affect any HMS fishery that interacts with sea turtles, including the bottom longline fishery and shark drift gillnet fishery.

Sea Birds

The National Plan of Action for sea birds is currently being finalized. The HMS Division will 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 takes appear to be relatively low in the pelagic longline fishery, adoption of immediate measures is unlikely.

A Workshop on Seabird Incidental Catch in the Waters of Arctic Countries was held in Canada in April 2000, and ICCAT was represented at that meeting. This workshop was the first formal opportunity for different stakeholders to gather and discuss the incidental catch of seabird issue since the FAO's approval of the *International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries* (IPOA-Seabirds), a voluntary instrument of the FAO. The workshop concluded that cooperation, collaboration and communication among scientists, managers, fishers and conservationists are considered to be essential. The importance of long-term seabird population monitoring and bycatch assessment was emphasized in order to document species composition and mortality, assess population level impacts and evaluate improvements in mitigation methods. Seabird incidental take in tuna longline fisheries appears not to be a substantial issue, though this does not preclude the collection of data through Observer programs. The United States continues to support ICCAT's interest in sea bird bycatch in international longline fisheries. The ICCAT sub-Committee on bycatch noted that it continues to recommend that ICCAT member nations collect bycatch information on seabirds and other species taken coincident to fishery effort directed at Atlantic tunas and tuna-like species to quantify the overall level of interactions.

8.2 Bycatch of Highly Migratory Species in Other Fisheries

NMFS is concerned about bycatch mortality of Atlantic HMS in any federal or state-managed fishery which captures them. NMFS plans to address bycatch of these species in the appropriate FMPs. 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. NMFS continues to solicit bycatch data on HMS from all state, interjurisdictional, and federal data collection divisions. NMFS 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 landed 14.2 mt of Atlantic HMS in 1999 (Table 8.1) incidental to the squid, mackerel, and butterfish trawl fishery (NMFS, 2000b). Landings were increased over 1998 landings for every HMS encountered, except albacore tuna. These fishermen, using mid-water gear, landed yellowfin tuna, skipjack tuna, albacore tuna, bigeye tuna, and swordfish as incidental to target species. 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 NMFS has requested funding for auxiliary observer coverage in this fishery to document bycatch rates of HMS in 2001. 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. NMFS continues to work with squid fishermen through the existing observer program to reduce bycatch.

Table 8.1 **Atlantic HMS Landed Incidental to Squid Trawl Fishing Operations in 1998-1999.** Data based on tally sheets submitted to NMFS (NMFS, 2000b).

Species	1998 (mt ww)	1999
Yellowfin tuna	0.7	7.5
Skipjack Tuna	0.2	1.0
Bigeye Tuna	0.5	1.2
Albacore	2.4	0.4
Swordfish	5.9	7.5
Total	**9.7**	**14.2**

Menhaden Purse Seine

A recent NMFS-funded study concluded a profile of shark bycatch in the menhaden purse seine fishery. Sharks were caught incidentally in approximately 30 percent of the purse seine sets. Blacktip sharks were the numerically dominant species. An estimated 30,000 sharks are taken in this fishery annually (deSilva, Condrey, and Thompson, 2000).

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.

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. The magnitude of this bycatch, however, is not considered in the most recent LCS assessment. In general, requirements for turtle excluder devices in this fishery have probably resulted in less bycatch; sharks are physically excluded from entering the gear. The upcoming SCS assessment, to be completed in 2001, will include estimates of SCS bycatch which are expected to greatly exceed the magnitude of the landings themselves (E. Cortes, NMFS, Panama City, FL, pers. comm.).

Summary

Although bycatch of swordfish and tunas in the squid trawl fishery is substantial, Atlantic shark bycatch in non-HMS fisheries is a greater concern. Nearly 12 percent (approximately 40,600) of the LCS coastal sharks accounted for in the 1998 shark evaluation workshop models were bycatch in the menhaden fishery, the longline fishery, and other coastal fisheries in the Gulf of Mexico and South Atlantic. The stock assessment models do not account for shark bycatch mortality associated with mid-Atlantic (north of North Carolina) or New England fisheries. Further, bycatch of SCS in non-HMS fisheries is expected to greatly exceed landings for 2000. NMFS will consider options for minimizing bycatch of SCS in other fisheries after the 2001 assessment is completed. Although the HMS FMP requires counting dead discards against Atlantic shark quotas, this management measure is currently not in force per a settlement agreement.

8.3 Evaluation of Bycatch Reduction Measures

The following section provides a review current management measures:

- Reduce length of longline to increase survival of mammals:

NMFS is not able to evaluate the effectiveness of this measure at this time as the data have not yet been prepared for analysis.

- Close area in June to decrease bluefin tuna bycatch in the pelagic longline fishery:

The number of bluefin tuna landed and discarded by month and year is reported in the pelagic logbook. The following tables (Table 8.2 and Table 8.3) provide an enumeration of logbook submissions of the disposition of bluefin tuna catches (kept, discarded dead, discarded alive). Caution should be exercised in utilizing these data to determine the effectiveness of the June closure that went into effect during 1999 as a result of implementing the HMS consolidated regulations (May 28, 1999; 64 FR 29090). This information also does not consider the pooling method utilized to report catch to ICCAT. In Table 8.2, the rows designated as"closed" represent the area in the Northeast/Mid-Atlantic Bight closed to pelagic longline fishing during the month of June. "Open" represents all other areas in the Atlantic Ocean.

Table 8.2. Number of bluefin tuna (BFT) reported in the pelagic logbook program as kept, discarded dead, or discarded alive.

Month	Area	BFT kept			BFT discarded dead					
		1997	1998	1999	1997	1998	1999	1997	1998	
Jan	Closed	0	0	0	0	0	0	0	0	0
	Open	18	9	19	5	15	3	5	35	8
Feb	Closed	0	0	0	0	0	0	0	0	0
	Open	10	10	24	1	11	7	12	14	9
Mar	Closed	0	0	0	0	0	0	0	0	0
	Open	23	17	31	4	14	13	9	51	27
Apr	Closed	0	0	0	0	0	0	0	0	0
	Open	4	14	39	2	6	50	6	17	39
May	Closed	1	1	1	2	1	2	4	1	20
	Open	21	23	25	18	21	42	26	33	94
June	Closed	14	10	0	144	156	0	159	278	
	Open	29	25	29	56	182	87	42	194	124
July	Closed	3	13	7	3	32	2	15	53	6
	Open	35	30	11	32	20	5	57	35	12
Aug	Closed	0	0	2	0	0	0	0	0	0
	Open	23	6	9	1	2	1	5	2	0
Sept	Closed	0	0	0	0	0	1	0	0	0

		1997	1998	1999	1997	1998	1999	1997	1998	1999
	Open	12	4	0	0	1	0	0	4	0
Oct	Closed	0	7	6	0	9	0	1	30	2
	Open	9	25	12	0	0	0	0	1	0
Nov	Closed	7	10	2	7	14	1	6	20	0
	Open	5	11	9	0	11	1	7	33	1
Dec	Closed	10	1	2	22	3	1	39	0	0
	Open	10	16	15	14	4	5	11	6	45
Total		234	232	243	311	502	221	404	807	387

Catch patterns of other target species and bycatch by pelagic longline gear are also presented by pooling the number of fish landed and discarded by month as reported in the pelagic logbook. The portion of Table 8.3 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 areas of the Atlantic Ocean fished by U.S.-flagged pelagic longline vessels. "Discarded" is both discarded dead and discarded alive.

Table 8.3. Number of bluefin tuna, sharks, billfish, tunas and swordfish kept and discarded inside and outside of the June, Northeast/Mid-Atlantic Bight.

Species	Closed area					
	1997	1998	1999	1997	1998	
BFT kept	35	42	20	199	190	223
BFT discarded	402	597	35	313	712	
Swordfish kept	2,075	3,315	1,329	67,000	66,000	63,000
Swordfish discarded	1,089	1,469	874	19,810	21,175	19,308
Tunas kept	11,644	10,977	14,214	97,323	68,243	88,178
Tunas discarded	490	363	680	4,476	5,957	3,831
Pelagic sharks kept	401	368	271	4,834	3,388	2,543

Species	Closed area			Open area		
	1997	1998	1999	1997	1998	1999
Pelagic sharks discarded	16,672	12,486	4,858	66,108	32,126	24,082
LCS kept	1,734	816	1,030	25,500	11,492	12,024
LCS discarded	82	58	77	8,300	6,047	6,193
Billfish discarded	333	96	388	7,385	3,670	4,400
Turtle interactions	12	23	35	255	898	593

- Atlantic Large Whale Take Reduction Plan (ALWTRP) regulations:

Observers were placed on shark drift gillnet vessels during right whale season off the East Coast of Florida between Fort Pierce and West Palm Beach (Carlson, 2000) and covered 12 strikenet and 40 drift gillnet sets made during right whale season. No marine mammals (bottlenose dolphin and spotted dolphin) were observed caught and discarded dead. No large whales were encountered by this gear during right whale season (November 15- March 31, 1999).

- MMPA List of Fisheries Update/Stock Assessment:

NMFS continues to update the MMPA List of Fisheries and the 2000 final list is now available. Check out the Office of Protected Species webpage (http://www.nmfs.noaa.gov/prot_res/prot_res.html) or call Emily Hanson at 301-713-2322 for a copy of the draft 2000 stock assessment report for the Atlantic species.

- Meeting of the Atlantic Offshore Cetacean Take Reduction Team (AOCTRT)/Future Plans:

NMFS Office of Protected Resources hopes to reconvene the AOCTRT in 2001 to review new data for the pelagic longline fishery and to discuss additional take reduction measures in fisheries that interact with pilot whales (e.g. pelagic longline, monkfish gillnet, squid trawl, etc.). There were no meetings of this group in 2000 due to funding constraints.

- Observer coverage of shark gillnet fleet and pelagic longline fleet:

Due to the high costs of these observer programs and limited funding, NMFS is

considering requiring VMS in the shark gillnet fishery and will continue baseline coverage of both the shark gillnet fishery and the pelagic longline fishery using funds appropriated for the observer program for FY2001.

8.4 Recommendations to Reduce Bycatch

In 1998, NMFS published a National Bycatch Plan (NOAA, 1998). The plan recommended numerous actions to address bycatch mortality. Table 8.4 lists the recommendations and actions taken by NMFS thus far to address these issues.

Table 8.4 Recommendations for Addressing Bycatch Mortality in HMS Fisheries and Actions Planned or Taken to Address These Recommendations.

Recommendation	1999 Actions	2000 Actions	
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.	Research into estimating discard rates and volumes based on direct observations by scientific fishery observers was also continued.	Independent review of methodology used to estimate bluefin tuna dead discards.
Improve gear-handling techniques to reduce mortality.	Educational workshops for recreational and commercial fishermen.	Distributed handling protocols for marine mammals and sea turtles	Hold pelagic longline gear workshop in Jan. 2001 Require line clippers and dipnets
Conduct research on gear-deployment methods that will reduce interactions between and mortality of protected species that encounter fishing gear.	Transfer funding for gear development at 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 don't attract turtles, other gear modifications (NSIL, 2000)	Pelagic longline gear workshop

Recommendation	1999 Actions	2000 Actions	
Work cooperatively with the fishing industry to transfer new knowledge and techniques between fishermen and researchers.		Educational workshops include research results on the agenda. Cooperative research with pelagic longline industry members to explore lightstick color and design effects on turtle hooking rates	NMFS to host Jan. 2001 gear workshop
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)	Educational workshop for recreational fishermen at Miami International Boat Show in Feb. 2001.
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.	NMFS funded research includes: • Center for shark research at Mote Marine Lab: shark biology, FY98 • Univ of MI: shark nursery grounds, FY98 • Gulf and South Atlantic Fishery Development Foundation: observer program and biology, FY98 • COASTSPAN: a study to identify shark nursery areas, FY 98 • Participation in pelagic shark assessment in February, 2000.	NMFS developed a draft National Plan of Action for Sharks 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. Refer to Sections 2 and 4 for description of NMFS-funded projects ICCAT Bycatch sub-committee recommended that SCRS conduct shark assessments in 2002.	Final Shark NPOA LCS Assessment SCS Assessment Continuation of shark research programs
Increase research on the role of apex predators in structuring marine ecosystems, and assess the effects of bycatch of these stocks.	NMFS funds COASTSPAN, a study to identify shark nursery areas. NMFS includes bycatch data in shark assessment	NMFS funds COASTSPAN, a study to identify shark nursery areas.	NMFS to include bycatch data in small coastal shark assessment Continue COASTSPAN program

Recommendation	1999 Actions	2000 Actions	Expected Actions for 2001
Reduce mortality and bycatch mortality of billfish captured in the directed fisheries for Atlantic HMS.		Time/area closures in the South Atlantic Bight and Gulf of Mexico; encourage 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 NMFS scientists (Prince, Venizelos, and Ortiz, 2000)	
Determine the status of sailfish populations.			No final timeline established to date
Conduct research on post-release mortality of recreationally-caught billfish, tunas, and sharks.	Research being funded by NMFS includes: • MA Div. Marine Fisheries: Effects of Hook Design, FY98 • Bluefin tuna tagging Sponsored Catch and Release Conference in Nov. 1999 to share data on this topic, identify further research needs	Refer to research section for information on NMFS-funded tagging programs	
Improve data collection and monitoring of the recreational tuna, shark, and billfish fisheries.	New voluntary Charter/Headboat observer program and logbook program Increased tournament registration and reporting.	Increased enforcement of tournament reporting and registration requirements	Consider options for new monitoring system for recreational billfish and swordfish landings

* Because stock assessments are conducted internationally by SCRS, NMFS does not produce domestic stock assessments for ICCAT species. However, NMFS 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.

8.5 Summary

It is difficult to compare fishing gears due to the differences in areas and seasons fished. Table 8.5 summarizes the total percentage of mortality attributed to bycatch for Atlantic HMS.

Table 8.5 **Percent of Stock-Wide Mortality Attributed to U.S Bycatch for HMS Stocks in 1998-1999 by weight (unless stated otherwise; Reported discards/total landings + discards)*.** Sources: SCRS, 1999, 2000; Cortes, 1999 (sharks only).

Species/Stock	Percent of Mortality Attributed to Bycatch in 1998	Percent of Mortality Attributed to Bycatch in 1999
North Atlantic Swordfish	4%	4%
South Atlantic Swordfish	less than 0.1%	less than 0.1%
West Atlantic Bluefin Tuna*	4%	5.4%
Large Coastal Sharks**	10.5% (by number)***	15% (by number)***
Pelagic Sharks**	30.5% (by number)****	16.2% (by number)****
Small Coastal Sharks**	Unknown	In preparation*****
North Atlantic Blue Marlin	4%	7%
North Atlantic White Marlin	10%	18%
Sailfish	3%	13%
Spearfish	0%	0%

*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.
**There is no international estimate of total landings or discards of sharks, the percentages therefore reflect the U.S. mortality due to bycatch.
***Cortes, 2000
****Recreational landings estimates form Cortes 2000; commercial estimates from Cortes 2000 and Cramer 1999 and 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 2000, respectively.
*****A stock assessment for SCS will be conducted in 2001, which will include bycatch estimates

In Table 3.47 of the HMS FMP, NMFS identified the significance of bycatch of certain species in various HMS fisheries. Table 8.6 below indicates action NMFS has taken to address those issues and reduce bycatch.

Table 8.6 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; Grand Banks area temporarily closed • Gear modifications, educational workshops • Move after one entanglement
Bottom Longline	• undersized target • prohibited shark species	**Note**: Due to a court injunction, minimum sizes are not in effect in the commercial fishery.
Shark Gillnet	• undersized target • protected species • prohibited shark species	• Observer coverage to collect necessary data • Proposed VMS requirement during right whale season • Closed area to drift gillnets (strikenets only)

Section 8 References

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9. HMS PERMITS

9.1 Capacity in HMS Fisheries

One major concern in the management of commercial fisheries is overcapitalization. Limited access and permitting mechanisms are ways of addressing the "too many fishermen chasing too few fish" dilemma that faces many of the world's fish stocks. Overcapitalization and open access fisheries are associated with many problems, including derby fisheries and market gluts, poor product quality, safety concerns, and loss of market niches due to shortened fishing seasons and reliance on imported fish. To date, HMS has responded to overcapitalization issues through a variety of methods in addition to limited access to swordfish, shark, or tuna longline permits. Individual Vessel Quotas (IVQs) for bluefin tuna purse seiners were implemented in 1982 to exclude new entrants into the fishery. In 1991, NMFS 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, NMFS established a control date for the shark fishery (February 22, 1994). In 1995 and 1996, NMFS held a number of workshops to discuss limited access in the Atlantic HMS fisheries. In addition, NMFS published a concept paper on limited access for Atlantic HMS (NMFS, 1995) and established a control date (September 1, 1994) for the Atlantic tunas fisheries. More recently, on July 1, 1999, NMFS implemented a limited access program for the commercial Atlantic shark, swordfish, and Atlantic tunas longline category fisheries.

As a result of an international effort begun by FAO in 1998 to develop definitions and metrics to measure fishing capacity and NOAA's Build Sustainable Fisheries (BFS) objective to eliminate excess capacity in 20 percent of federally managed fisheries by 2005, NMFS developed a project to define and measure domestic fishing capacity to determine 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 measures and metrics with which capacity could be measured. A qualitative and quantitative report assessing capacity levels in U.S. fisheries is being completed. The results of the qualitative study are under review and are expected to be available in early 2001. The quantitative report is still under development, but should also be completed in 2001. Preliminary results indicate that the potential production of the commercial fleet is in excess of the actual level of production which suggests that excess capacity exists in the Atlantic HMS fisheries. Once the final qualitative report is available, NMFS will begin to discuss with industry options for reducing the capacity in Atlantic HMS fisheries.

9.2 Limited Access Permits for Atlantic Swordfish, Atlantic Sharks, and Atlantic Tunas Longline Category

9.2.1 Status 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.

As stated in the HMS FMP, the goal of this *first step* of limited access in the Atlantic swordfish, shark, and tuna longline fisheries is *to begin to* rationalize current harvesting capacity with the available quota and reduce latent effort without significantly affecting the livelihoods of those who are substantially dependent on the fisheries (in other words, to prevent further overcapitalization).

The final eligibility criteria, which were based on current and historical participation, are summarized in Table 9.1.

Table 9.1 Limited Access Eligibility Criteria*

Fishery	Historical Permit Time Frame	Directed Permit Landings Threshold	Incidental Permit Landings Threshold	Recent Permit Time Frame
Swordfish	June 30, 1994 to Dec. 31, 1997	25 swordfish, or at least $5,000 gross revenue from sales of swordfish, per year in any 2 years between 1987 and 1997	11 swordfish total from 1987 to 1997 and meeting the minimum earned income requirement*	June 1, 1998 to Nov. 30, 1998
Shark	June 30, 1994 to Dec. 31, 1997	102 sharks, or at least $5,000 gross revenue from sales of sharks, per year in any 2 years between 1991 and 1997	7 sharks total from 1991 to 1997	Jan. 1, 1998 to Dec. 31, 1998
Tuna Longline	NA	NA	NA	Jan. 1, 1998 to Dec. 31, 1998
Swordfish Handgear	Must provide documentation of (1) having been issued a swordfish permit for use with harpoon gear or (2) having landed swordfish with handgear as evidenced by logbook records, verifiable sales slips or receipts from registered dealers, or state landings records. Permits also will be issued to fishermen who meet the minimum earned income requirement.**			

*Two exemptions provided for persons that acquired ownership of a vessel and its landings history after December 31, 1997, and for persons that first obtained a shark or swordfish permit in 1997.

**The minimum earned income requirement states that owners must provide documentation that more than 50 percent of their earned income from commercial fishing came through the harvest and first sale of fish or from charter/headboat fishing, or at least $20,000 gross revenue from commercial fishing, during 1 of the last 3 calendar years.

In May, 1999, NMFS mailed permits to 796 vessel owners that met the final eligibility criteria, based on permit and landings records (203 directed swordfish, 218 incidental swordfish, 213 directed shark, 583 incidental shark, and 421 tuna Incidental/Longline limited access permits). NMFS finished processing the last of the appeals in September, 2000. Overall, NMFS received approximately 593 applications, 397 of which resulted in approval for a limited access permit. NMFS received 65 appeals, 24 of which resulted in the issuance of a limited access permit.

Between the permits issued in May, 1999, and successful applications/appeals, a total of 982 limited access permits have been issued. Approximately 240 directed swordfish, 203 incidental swordfish, and 125 swordfish handgear limited access permits were issued. Approximately 287 directed shark and 585 incidental shark limited access permits were issued. Approximately 292 tuna longline limited access permits were issued. The distribution of limited access permits by state is in Table 9.2.

The number of tuna longline permit holders in Table 9.2 should equal the sum of directed and incidental swordfish permit holders. In many cases, it does not. NMFS is aware of a number of permit holders that have not renewed their limited access permit(s). It is possible that some of the discrepancies in numbers can be explained by expired permits. In October, 2000, NMFS sent out a notice reminding permit holders to renew their permits.

Table 9.2 Distribution of Limited Access Permits as of October, 2000.

State	# Directed Swordfish	# Incidental Swordfish	# Swordfish Handgear	# Directed Shark	# Incidental Shark	# Tuna Longline	
ME	4	9	8	5	22	4	35/52
NH	-	1	2	1	5	1	8/10
MA	12	9	31	2	21	3	53/78
RI	8	7	31	1	17	7	46/71
CT	1	2	1	-	3	1	4/8
NY	20	11	13	9	30	21	50/104
NJ	35	31	16	37	48	56	99/223
DE	2	1	-	1	3	1	4/8
MD	8	2	-	3	7	9	11/29
VA	3	9	-	6	12	9	18/39
NC	9	41	5	24	54	19	82/152
SC	5	1	-	7	18	5	25/36
GA	1	1	-	2	6	1	8/11
FL	85	48	18	169	233	93	412/646
AL	3	2	-	1	6	2	7/14
MS	-	2	-	2	9	1	11/14
LA	36	12	-	9	62	42	72/161
TX	5	13	-	8	25	14	33/65
CA	1	1	-	-	2	2	2/6
VI	2	-	-	-	2	1	2/5
TOTAL	240	203	125	287	585	292	982/1732

9.2.2 Possible Next Steps

As emphasized in the HMS FMP, the current limited access system is only a first step. Based on the relative success of the system in place, additional steps may be taken to address overcapitalization. Now that the application/appeal process of implementing limited access is complete, NMFS will be able to monitor the success of the limited access program. NMFS will continue to solicit constituent comments on limited access and to examine improvements in the program over the next year. 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.

As discussed in the 2000 SAFE report, there are a number of considerations to any change in a permitting system. Some of these considerations are listed below. NMFS will ensure an adequate comment period and public hearings before making any changes to the commercial shark, swordfish, or Atlantic tunas longline category permits.

Points to consider when developing future management measures (from NMFS, 1999):

- Is there broad stakeholder support and participation?
- Is the fishery amenable to cost-effective monitoring and enforcement?
- Is there adequate data, particularly concerning the socioeconomic effects of an IFQ? If not, what is needed?
- Is Federal-state cooperative management for sharks required before an ITQ program could be truly effective?

Trade-offs of implementing additional management measures:

- Increased economic efficiency may result in decreased employment.
- Decreased ability for young people without substantial capital to enter the fishery.
- Longer seasons promoting decreased derby conditions.
- Increased stability in the fishery, markets, and availability of fresh product for the public.
- Privatization of public resource and the creation of an expectation that allocation is a "right".
- Potential windfall if initial allocation is "gifted" (possibly reduced through fees or taxes).
- Bycatch reduction.

9.2.3 Upgrading and Safety Issues

When this limited access program was implemented, NMFS included upgrading restrictions that were the same as those implemented by the New England Fishery Management Council (NEFMC) and Mid-Atlantic Fishery Management Council (MAFMC) in order to help minimize the number of regulations for fishermen in those areas. These regulations restrict vessels from any increase over 10 percent length overall (LOA), 10 percent gross or net tonnage, and 20 percent horsepower. NMFS continues to receive comments that these vessel upgrading restrictions are not appropriate for primarily longline fisheries, are not the preferred vessel characteristics to limit overcapitalization, and have substantial safety at sea concerns. In the past year, NMFS 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. NMFS did not implement hold capacity as a measure to limit vessel upgrading due to the lack of standard measurements of vessel hold capacity as well as the lack of consistent collection of this information for HMS commercial vessels as part of existing vessel registration systems. NMFS continues to consider other options (see Section 10.1.1.4) and, as with any potential changes in the permitting system, will ensure adequate public comment before changing the regulations.

9.3 Atlantic Tuna Permits

In 2000, NMFS contracted Commerce One, formerly known as AppNet, Inc., 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 in 2000 are valid from the date of issuance through May 31, 2001. The Atlantic tunas permit will then be 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 9.3.

Table 9.3 **The number of Atlantic tunas permit holders in each category as of October, 2000.** The actual number of permit holders in each category are subject to change.

Category	Number of Permit holders
Longline	292
Angling	14,908
Charter/headboat	2,728
Harpoon	44
Trap	4
General	6,705
Purse Seine	5
Total	24,686

9.4 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. Negative reports for shark and swordfish dealers are required when no purchases are made to facilitate quota monitoring (i.e., NMFS can determine who has not purchased fish versus who has neglected to report). NMFS is

considering mandatory negative reporting for BAYS tunas dealers. NMFS continues to automate and improve its permitting and dealer reporting systems and plans to make additional permit applications and renewals available online in the near future. The number of dealer permits issued by state and species is listed in Table 9.4.

Table 9.4 **Number of dealer permits issued in each state as of October, 2000.** The actual number of permits per state may change as permit holders move or sell their businesses.

State	Atlantic tunas	Atlantic swordfish	Atlantic sharks	
AL	-	3	2	5
CA	40	36	5	81
CT	7	-	-	7
DE	3	2	2	7
FL	23	94	100	217
GA	-	2	2	4
GU	1	-	-	1
HI	5	7	4	16
IL	1	1	1	3
KY	1	-	-	1
LA	16	16	16	48
MA	125	27	18	170
MD	12	7	6	25
ME	48	2	2	52
MO	-	-	1	1
MS	-	1	2	3
NC	31	11	15	57
NH	10	-	2	12
NJ	40	15	13	68
NY	69	22	13	104
OR	1	-	-	1
PA	1	4	1	6
PR	9	2	2	13
RI	32	10	7	49
SC	8	11	16	35
TX	2	10	11	23

State	Atlantic tunas	Atlantic swordfish	Atlantic sharks	TOTAL: # of permits
VA	19	4	4	27
VI	38	2	2	42
WA	2	6	1	9
Canada	-	13	3	16
Chile	-	1	-	1
New Zealand	-	2	-	2
Uruguay	-	1	-	1
TOTAL	544	312	251	1107

9.5 HMS Charter/Headboat Permits

The HMS FMP implements 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 will replace the current Atlantic tunas Charter/Headboat permit. NMFS has received approval for these permits under the Paperwork Reduction Act and is in the process of articulating the full range of alternatives to address the new charter/headboat requirements. NMFS anticipates that the HMS charter/headboat program will be effective on June 1, 2001. At that time, anyone wishing to engage in charter/headboat activities for any HMS species will be required to hold an HMS charter/headboat permit.

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. In addition, NMFS 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.

In 2000, NMFS issued the following: 14 EFPs to collect sharks for display purposes,

including one which authorized the collection of tunas, as well; four EFPs for reseach conducted from non-scientific research vessels, including two permits for shark research, and one each for tuna and billfish research; six SRPs for research conducted from scientific research vessels, including four permits for bluefin tuna archival tagging and two for billfish research. Year-end reports for these permits are required, and are expected to be submitted to NMFS in early 2001.

Section 9 References

NMFS. 1995. Towards Rationalization of Fisheries for Atlantic Highly Migratory Species. July, 1995. Silver Spring, MD.

NMFS. 1999. National Marine Fisheries Service's IFQ Advisory Panel Report on the National Research Council Report "Sharing the Fish: Toward a National Policy on Individual Fishing Quotas".

10. OUTLOOK

The year 2000 was eventful for the HMS Division. Management measures from the HMS FMP and the Billfish Amendment are still in the process of being implemented and evaluated. New SCRS information, new ICCAT recommendations, and other recently released studies need to be recognized and incorporated, consistent with National Standard 2. The swordfish, tuna, shark and billfish fisheries were also monitored during the year. The information provided in this section serves as a means of introducing some of the issues that will need to be addressed in the near future; some issues are new, while other are continuations of previous years' efforts. As the SAFE report is intended to provide information to help develop and evaluate regulatory adjustments, an outlook on the future of HMS fisheries management strategies is both valuable and necessary.

10.1 Current Issues and Potential Options for Consideration during 2001

This section provides background material on some of the issues that are currently being addressed or anticipated to be of concern during calendar year 2001, and is provided strictly to present material for discussion purposes. These issues are based on input from public hearings, Advisory Panel meetings, Congressional briefings, staff concerns, and other forums. To that end, the issues discussed below are purposely broad in scope, with suggested potential options that encompass a wide spectrum of approaches that *could* be considered. The order of discussion does not reflect any relative order of importance. The information provided in this section can also be used as a starting point for discussion for the 2001 joint HMS and Billfish Advisory Panel meeting. It is important to note that the following discussion is not meant to be an exhaustive listing of the issues of concern to the management of HMS fisheries, rather it is an anticipatory look forward.

10.1.1 Monitoring HMS Fisheries

10.1.1.1 HMS Recreational Fisheries

Monitoring HMS recreational fisheries, particularly Atlantic billfish and swordfish, can be a challenge due to the rare event nature of these fisheries (i.e., fewer boats fishing offshore than inshore and success rates may be lower for large pelagics than for inshore species), the timing of landings (e.g., late-day returns from offshore trips), and the wide geographic range of landings (i.e., Texas to Maine and the Caribbean). Trips landing swordfish, sharks, blue marlin, white marlin, and sailfish are intercepted relatively infrequently within the scope of NMFS' current recreational statistical programs (Marine Recreational Fisheries Statistics Survey and Large Pelagics Survey). Further, species identification, particularly of shark species, is problematic for many recreational anglers. The Billfish Amendment and the HMS FMP established new requirements for registration of, and reporting by, tournaments scoring billfish, swordfish, tunas

and sharks. While landings reporting for HMS tournaments is becoming more comprehensive, a significant amount of recreational fishing effort for Atlantic HMS occurs outside of the tournament context. The HMS FMP included a commitment to count recreational landings of north Atlantic swordfish against the incidental catch quota. Additional emphasis on the need to enhance recreational monitoring resulted from a 2000 ICCAT recommendation that limited recreational landings of Atlantic blue and white marlin by the United States to 250 fish, combined. NMFS published an ANPR on August 6, 2000, (65 FR 48671) to solicit comments from the public regarding, among several other issues, monitoring of recreational landings of Atlantic billfish and swordfish.

Issue 1: Improve Monitoring of Recreational HMS Landings

NMFS is considering several management alternatives to improve the level of precision in monitoring of recreational landings of HMS. The following table offers four options, along with prospective pros, cons and costs, that NMFS could establish either independently or in combination.

Option	**Pros**	**Cons**	**Cost**
Call-in system to report landings	Easy to implement through a contractor or in-house	Non-compliance concerns, angler may forget to call in.	Minimal
Fax/OCR - similar to system currently in use to monitor BFT	Low personnel costs and easy updating of data files	Lack of access to fax machine; non-compliance concerns	$40,000
Landing Tags	Improved estimates of recreational landings and enforcement are likely	Need a coordinator in SERO/Miami; Implementation over wide geographic area; non-compliance issue; tracking of unused tags	Full-time position, plus approximately $10,000
Augment State monitoring programs	Allows local expertise within each state to be utilized	Cost could be prohibitive considering the number of states/territories involved	Depends upon negotiation of cooperative agreements, but could be approximately $200,000
Increased Dockside Surveys	Biological measurements, direct accounting	Cost prohibitive Small sample size	Unknown additional costs to either LPS or MRFSS

Issue 2: Compliance with ICCAT Recommendation to Limit Atlantic Marlin Landings

The Secretary of Commerce has the responsibility, under the Atlantic Tunas Convention Act (ATCA), to implement ICCAT recommendations. The primary issue for the United States resulting from the 2000 ICCAT recommendations for blue and white marlin is determining the appropriate management strategy to ensure compliance with the annual cap of 250 marlin (total of blue marlin and white marlin recreational landings combined) for 2001 and 2002. The fishing season for Atlantic billfish is June 1 through May 31, therefore additional regulations, if needed, will need to be in place by June 1, 2001, (beginning of the 2001 season).

Option 1, Increase Minimum Size: An increase to the minimum size limit of blue and white marlin would further reduce the number of marlin landed, as estimated by the RBS, increasing the likelihood that total blue and white marlin landings (i.e., tournament and non-tournament) would be within the limits established by the 2000 ICCAT recommendation. The Billfish Amendment established a management strategy of controlling recreational billfish recreational landing through size limits. By following the same management philosophy, landings could be further reduced to minimize the possibility of exceeding the target cap of 250 marlin recreational landings by increasing minimum size limits.

Option 2, Prohibit Atlantic blue marlin and white marlin landings in tournaments: This option would eliminate landings during times of most concentrated effort. Some tournaments already have no-kill format; this would encourage a catch-and-release ethic among anglers and may reduce waste. However, this option would likely result in negative social and economic impacts, particularly if fewer people participate in these events.

Option 3, Prohibit landings outside of tournaments: This option could simplify the process of monitoring billfish landings since current programs (i.e., RBS) could be utilized to effectively account for blue and white marlin landings. On the flip-side, this option could encourage season-long tournaments to develop thereby minimizing the effectiveness of this alternative. Further, prohibiting landings of marlin outside of tournaments could be perceived as unfairly penalizing anglers, and associated businesses, who cannot afford to fish in tournaments or who are not interested in tournament fishing.

Option 4, Allocate 250 landing tags: Under this option a landing tag would be required for any U.S. citizen to land an Atlantic blue or white marlin within the management unit (Atlantic Ocean).

Option 5, Status Quo: Under this option, no changes would be made to current regulations relating to size limits or retention by U.S. recreational anglers.

Issue 3: North Atlantic Swordfish Recreational Fishery

In recent months, NMFS has received information regarding the growing recreational fishery for North Atlantic swordfish off the U.S. Atlantic coast, particularly along the

southeastern coast of Florida. This information has been confirmed through direct observation by HMS staff, OLE, as well as numerous published articles. As noted in Section 4.4 of this report, these recreational swordfish landings must be counted against the Incidental quota. It is anticipated that as the pelagic longline closures are implemented in the Atlantic, this fishery, along with commercial handline fishing, will likely experience continued growth. In addition to the monitoring concerns discussed above, other components of this issue that may be addressed in 2001, include:

- establishing recreational bag limits;
- evaluating the use of "bang sticks" to boat fish; and
- evaluating post-hooking release mortality rates for undersized fish.

10.1.1.2 Charter/Headboat Permits

The FMP for Atlantic Tunas, Swordfish and Sharks, and the Billfish Amendment included final actions establishing a requirement for charter/headboats (CHB) that fish for HMS to obtain an annual permit, as an extension of the current charter/headboat permit for Atlantic tunas. Development of an HMS CHB permit was included as part of a suite of actions directed toward improving monitoring of the recreational segment of HMS fisheries by providing estimates of number of participants, effort, catch and bycatch (including discards). In the final consolidated rule, NMFS delayed the effective date of the HMS CHB permit pending Office of Management and Budget (OMB) approval of an increase in reporting burden due to a specific HMS permit. OMB approval was received in August 2000 and thus, once NMFS publishes a Federal Register Notice notifying the public and establishing an effective date, all for-hire vessels will be required to obtain an Atlantic HMS CHB permit prior to taking fee-paying anglers for fishing trips targeting or catching Atlantic tunas, swordfish, billfishes or sharks within the U.S. EEZ, as appropriate. However, revised regulations are needed to the consolidated regulations implementing the FMPs for Atlantic Swordfish, Tunas and Sharks and Atlantic Billfish to clarify certain provisions pertaining to the definition and operations of CHB and other related matters.

NMFS is aware of a number of issues that need to be resolved to ensure consistency between current regulations and the CHB permit requirement. Some items that should be clarified prior to implementation of the HMS CHB permit include captain requirements, sale of fish, and applicability of daily catch limits on board vessels used for several purposes. These issues are discussed generally below. NMFS is aware that there may be other inconsistencies or concerns with issuance of an HMS CHB permit and the current HMS regulations. NMFS welcomes any suggestions or comments.

Issue 1: Definition of Charter/Headboat

This action would clarify the existing definition of a CHB operation and which vessels would be required to obtain an HMS CHB permit.

Option 1: Define CHB operations as carrying a passenger who pays a fee or having a specified number of persons aboard. The number of persons aboard would be enumerated inclusive of the operator and crew.

a) carrying more than three/four persons for a vessel licensed to carry six or fewer, or

b) carrying more than the required number of crew for an inspected vessel, or

c) some other enumeration strategy

Option 2: Licenced captain onboard, or proper documentation onboard.

Option 3: Some other defining characteristic(s)

Issue 2: Clarification of Regulations for Charter/Headboats

NMFS recognizes that certain vessels operating as charter vessels and headboats by taking anglers fishing for HMS on a fee basis may, on occasion, sell fish taken by those anglers. Additionally, some of these vessels may, when not operating as a CHB, directly engage in commercial fishing operations. As the retention limits applicable to the recreational fisheries for HMS do not generally apply to persons aboard permitted commercial fishing vessels, it is necessary to specify the circumstances under which persons aboard a CHB vessel are subject to the recreational regulations and when they are subject to the commercial regulations. Allowing vessels with an HMS CHB permit the flexibility to engage in both commercial and recreational fishing operations raises regulatory and enforcement concerns as different regulations may apply depending on whether the CHB vessel is fishing commercially or recreationally. In the case of BFT fishing, such duel designation is practical because the quota categories are related to size classes of fish which in turn are divided between commercial versus recreational fishing categories. Thus, the size of the fish itself determines authorized catch limits and disposition and whether the CHB is defined as conducting a commercial or a recreational fishing trip. As no sale of billfish is allowed all CHBs trips targeting billfish are defined as recreational. However, regulations regarding allowed catch limits, size limits and authorized disposition applicable to sharks, swordfish, and yellowfin tuna (YFT) taken aboard vessels issued HMS CHB permits will require further clarification and are discussed below.

Permit Requirements

This action would clarify the regulatory text defining what permits CHB vessels may need in order to fish for or sell HMS. This is an important consideration for a number of reasons. Current regulations restrict vessels with an Atlantic tunas permit to one category only. In other words, vessels with a CHB category Atlantic tunas permit cannot hold any other Atlantic tunas category permit. However, vessels with a swordfish directed or incidental limited access permit are required to hold an Atlantic tunas longline category permit. Thus, if the HMS CHB permit is treated similarly to the current Atlantic tunas CHB category, the regulations would preclude vessels with a CHB permit from having a swordfish directed or incidental limited access permit. Potential options are discussed below.

Option 1: Maintain the current Atlantic tunas permit regulations for vessels with an HMS CHB permit and require that CHB vessels that wish to sell swordfish hold a swordfish handgear limited access permit.

Option 2: Maintain the current Atlantic tunas permit regulations for vessels with an HMS CHB permit and prohibit vessels with CHB permit from selling swordfish caught during a CHB trip (i.e., CHB trips would be considered recreational only with regard to swordfish regardless of any commercial swordfish permit held by the vessel owner).

Option 3: Allow vessels with an HMS CHB permit to hold a different Atlantic tunas category permit in addition to the CHB permit.

Option 4: Other alternatives.

Retention Limits for YFT

In a technical amendment to the consolidated regulations, NMFS recently clarified that the recreational retention limit of 3 YFT per person per day applies at all times to persons fishing aboard vessels permitted in the Atlantic tunas CHB category. While the Atlantic tunas CHB category permit is classified as a commercial permit, and fish landed by persons aboard such vessels may be sold to permitted dealers, the number of fish landed cannot exceed three times the number of persons aboard, including captain and crew. Since the technical amendment was issued, NMFS has received comment that applying the YFT retention limit at all times precludes legitimate commercial activity when the vessels are not carrying fee-paying anglers. These commenters have indicated that a few dozen charter vessels in the Mid-Atlantic region have historically conducted commercial fishing trips for YFT when not operating as a for-hire vessel.

Option 1: Apply YFT retention limits to vessels issued an HMS CHB permit only when such vessels are operating a charter vessel or headboat as defined above (i.e., classification based on fees or number of passengers aboard).

Option 2: Apply limit of 3 YFT/person all the time.

Option 3: Other alternatives.

Retention Limits for Sharks

Another area of concern relates to CHB operations and retention of sharks aboard vessels issued limited access permits for sharks after closure of a shark management group if the vessel has also been issued an HMS CHB permit and fee-paying anglers are aboard. The current recreational limit for sharks (one shark per vessel per trip with a minimum size of 4.5 feet fork length) pertains to all shark species with the exception of Atlantic sharpnose sharks (one Atlantic sharpnose shark per person per trip with no minimum size). Generally, however, only the season for the large coastal species group closes early.

Option 1: During a shark closure, require that the recreational regulations be observed regardless of the shark species caught, that the sharks be landed in whole form, and that the

sharks are not sold.

Option 2: Allow some other catch limits specifically for CHBs, perhaps based on the licence size (6-pack vs. larger number of passenger licenced vessels).

Option 3: Designate CHBs with fee-paying anglers aboard as recreational vessels only with regard to Atlantic sharks, regardless of any commercial shark permits maintained by the vessel owner and regardless of any open season for sharks.

Option 3: Other alternatives.

Retention of Swordfish

Another area of concern relates to CHB operations and retention of swordfish aboard vessels issued limited access permits for swordfish after closure of either swordfish quota groups, if the vessel has also been issued an HMS CHB permit. Current commercial restrictions limit the number of swordfish available to vessels with limited access permits during a closure depending on the gear type used. The options available to address this concern depend on the option chosen as a permit requirement, as described above for retention of sharks.

Issue 3: Requirements for licensed captains

Current regulations require that, for a vessel issued an Atlantic Tunas CHB category permit, a Coast Guard licensed operator must be on board when fishing for or retaining Atlantic tunas.

Option 1: Extend that same requirement to vessels issued the HMS CHB permit. NMFS has received comment that the licensed operator requirement is overly restrictive for non-licensed owners of permitted vessels who wish to fish for HMS as a private vessel (i.e., no fee-paying anglers aboard). Without such a requirement, however, owners of private vessels would have an incentive to select the CHB permit to be eligible to sell fish and/or avoid retention limits otherwise applicable to the recreational fishery. Such an incentive would likely result in a large number of private vessels applying for the CHB permit category and would undermine the statistical purpose of separating the for-hire sector of the HMS fleet.

Option 2: Do not require a licenced captain to be onboard, just require the proper documentation to be onboard.

Option 3: Other alternatives

10.1.1.3 Implementing Extended HMS Vessel Logbook Reporting

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. 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 NMFS.

Currently in the HMS fisheries 100 percent of shark and swordfish permit holders and 100 percent of Atlantic tunas longline category vessels are already required to submit logbook reports under the NMFS Southeast Science Center Vessel Logbook program. These vessels or other vessels may also submit logbooks, or reports with similar types of information, under other Federal and State programs. NMFS intends to use existing forms and logbooks wherever possible to implement the requirement of the HMS FMP to address data gaps from certain aspects of HMS fisheries (i.e., socio-economic data, recreational effort, and discards) to generate a comprehensive approach to data collection for all HMS fisheries. Various methods are available to improve HMS data collection programs for enhanced management of the fishery while meeting these goals. These options are presented below with a brief summary of some of the potential consequences.

Issue 1: Selection of Vessel Owners/Operators for Reporting in Logbooks:

Status Quo: 100 percent of all shark and swordfish permit holders and Atlantic tunas longline category permit holders.

Other Options:

a) Select 10 percent of all Atlantic tunas commercial permitted vessels (i.e., General category, harpoon, purse seine, trap).
b) Select 10 percent of Atlantic tuna charter/headboat category vessels.
c) Select 10 percent of Atlantic tunas recreational permitted vessels.
d) Any combination of one or more of the above.
e) Other (i.e., different percentages etc.).

Selecting vessels to participate in a logbook program, beyond that of the status quo, would significantly and positively increase NMFS' understanding of impacts of different gear-types and the associated social and economic impacts of proposed management measures. Depending on the percentage level of vessels selected (and the methods chosen for reporting - see below) there could also be a significant increase in the administrative burden on the agency to distribute and collect the logbook reports. Reporting burdens on individual participants may increase, if selected, if the individual does not already report similar data through another program or if the individual is already required to report in other logbooks that do not collect information on HMS.

Issue 2: Logbook Format

Status Quo: Use existing logbooks (i.e., Southeast pelagic longline vessel logbook,

Northeast Vessel Trip Reports etc)

Other Options:

a) Design new paper logbooks.
b) Develop electronic HMS only logbook program (i.e., use Internet and/or vessel computers).
c) Develop new logbook (paper or electronic) to cover all fish species.
d) Other.

Under the status quo vessel logbook information for the Atlantic is collected through a number of different programs at different locations, primarily located in the Southeast Fisheries Science Center in Miami and the Northeast Regional Office in Gloucester. One option would be to use these existing programs and avoid the need to generate a different and potentially duplicative logbook. However, certain existing programs may not collect all the data needed by HMS and creation of a comprehensive database may be difficult. Creation of a customized logbook to specifically address HMS data needs would help address data gaps, and streamline data collection efforts, but may result in fishermen completing multiple logbooks with similar information requirements in each. A new electronic reporting system may alleviate burdens on both the fishermen and the agency to report and collect information but much of the necessary technology is still in the developmental stage. Recent experiences with the tuna permit program show that many fishermen use the Internet to obtain fisheries information indicating that it may be possible to adapt this existing technology for use in a logbook program.

10.1.1.4 HMS Permitting Issues

Background[1]

Limited Access for Sharks, Swordfish, and Tunas (Longline)

NMFS implemented limited access in the commercial Atlantic shark, swordfish, and tuna (longline category only) in 1999. Prior to that time, commercial swordfish, shark, and tuna longline category permits were open access, meaning that any vessel owner could qualify [2]; there was no distinction by permit type (directed, incidental, etc.); permits were independent of each other (there was no requirement to hold more than one permit for any reason); and permits were issued on a species-basis only (no consideration of gear type (other than bluefin tuna permits - see

[1]For a full discussion of the limited access system, see Chapter 9.

[2]Commercial shark permits were subject to a minimum earned income requirement that either the vessel owner or operator could meet; however, this requirement was ineffective in limiting the number of commercial shark permit holders.

below)).

The limited access system implemented in the 1999 HMS FMP made several changes, including: (1) establishing different permit types for swordfish and sharks - directed, incidental, and swordfish handgear; (2) establishing eligibility requirements (based on historic and current participation in the respective fisheries) in order to qualify for those different types of permits; and (3) requiring for the first time that combinations of permit types be held by vessel owners in certain fisheries. For example, if a vessel owner qualified for any type of swordfish Limited Access Permit (LAP), then a shark LAP and a tuna longline category LAP must also be held for the swordfish LAP to be considered valid (NMFS issued these permits initially but it is the responsibility of vessel owners to maintain them).

The intent of requiring these permit linkages was to ensure complete reporting of all HMS and to prevent discards of HMS by vessels that would catch a particular HMS (either as bycatch or as a secondary target species) while conducting fisheries for another HMS. For example, in pelagic longline fisheries that target swordfish, tunas and sharks are frequent secondary or bycatch species. Thus, it was necessary to provide and require shark and tuna permits for vessels that qualified for swordfish LAPs.

RENEWAL - Shark, swordfish, and tuna (longline only) LAPs must be renewed within one year of the expiration date (e.g., if a permit expires on 1/31/01, it must be renewed no later than 1/31/02). If a permit is not renewed within one year of the expiration date, that permit may not be renewed and that permit is essentially "lost."

TRANSFERS/UPGRADING RESTRICTIONS - Shark, swordfish, and tuna (longline only) are subject to transfer and upgrading restrictions. The original vessel for which the limited access permits was issued constitutes the "baseline" for transfers. Transfers are only authorized if the transfer to the "new" vessel does not result in an increase of 10 percent of the length overall, gross and net tonnage, and 20 percent of the horsepower, relative to the baseline.

Atlantic Tunas Permits

Commercial tuna vessel permits are issued in five gear-based categories - General (commercial handgear), Harpoon, Trap, Longline, and Purse Seine, plus the recreational-only Angling category permit. With the exception of the purse seine and longline categories, the gear restrictions of each category apply only to bluefin tuna; permit holders in any category may land bigeye, albacore, yellowfin, and skipjack (BAYS) tunas with any authorized gear. The Purse Seine category operates under an Individual Transferable Vessel Quota system, and has been limited Access since 1982. The tuna longline category permit became limited access with the implementation of limited access for sharks and swordfish in 1999. For the other tuna permit categories, a vessel can only hold a permit in one category, but category changes are allowed once per year. There is also a Charter/Headboat permit for Atlantic tunas, which is being converted to

an Atlantic *HMS* Charter/Headboat permit in 2001. The allowable/permitted activities for vessels with Charter/Headboats can be confusing, and are the subject of a separate Issues/Options document in this SAFE Report. Permitting and Charter/Headboat issues are very closely linked and should be considered comprehensively.

Issue 1**.** NMFS has received comments that the requirement to hold several limited access permits is confusing, often misunderstood, and cumbersome, and some of the required permit combinations are not appropriate in all cases (e.g., squid trawlers that are required to hold tuna longline category permits);

Options:

1) Status Quo - no changes in permit structure. This option would not address existing permit holder confusion but also would not introduce additional, potentially confusing, changes.

2) Keep the status quo permit structure but address individual issues (e.g., permit combinations for squid trawlers) as necessary. This could likely be addressed in the short-term through proposed and final rulemaking. Actions that could be taken include:

a) *Allow conversion from swordfish directed LAPs to swordfish handgear LAPs* - this would allow a vessel owner to convert a directed swordfish permit to a swordfish handgear permit, which does not require either shark or tuna longline category permits. This option would allow traditional handgear fishermen that qualified for swordfish directed LAPs to use the traditional gear without other permit combinations.

b) *Allow conversion from swordfish directed, incidental, or handgear permits and shark directed or incidental permits to HMS Charter/Headboat permits* - this would allow charter/headboat operators that retain and sell swordfish and sharks and that qualified for limited access permits to convert their permit to an HMS Charter/Headboat permit, which does not require other HMS permit combinations. The implications of allowing an incidental swordfish or shark permit to convert to a directed charter/headboat permit would have to be considered. See the issues/options paper on HMS Charter/Headboat permits for a full discussion of these issues.

c) Eliminate the requirement for vessels with directed or incidental swordfish LAPs to hold a tuna longline category permit - this would allow a vessel with a directed or incidental swordfish LAP to have any kind of commercial tuna permit. Longline retention of BAYS would be allowed by all vessels with swordfish LAP so long as they have a commercial tuna permit, while BFT retention would be allowed based on the type of tuna permit held. This option would be similar to the regulations

prior to limited access. This option would alleviate current conflicts with vessels using multiple gear types for different HMS. However, fishermen who use longlines without a tuna longline category permit would have to discard any bluefin tuna caught, which could increase bluefin discards and raise enforcement concerns. Additionally, this may affect the results of any rulemaking regarding the bluefin tuna longline target catch requirements (see the issues/options paper on that subject).

d) Eliminate the requirement for squid trawl vessels that have been issued swordfish LAPs to have shark LAPs or a tuna longline category permit. This option would alleviate concerns that permit combinations are inappropriate for this gear type.

3) Permit by gear type - change permit structure to issue permits by gear type, not species. Possible gear permits could include pelagic longline, bottom longline, drift gillnet, handgear, charter/headboat, and squid trawl. Permits could differentiate by directed or incidental levels through endorsements or classes (e.g., default pelagic longline permit could include tuna, incidental swordfish, and incidental shark; directed swordfish and/or shark "endorsements" would allow targeting those species). This option could reduce or eliminate permit combinations by issuing a single permit to cover all managed HMS species, and could alleviate some charter/headboat concerns (outlined in the issues/options paper on Charter/Headboats). This option would not, however, address the issue of vessels that use multiple gear types. This option would likely require long-term rulemaking, and possibly an FMP amendment.

Issue 2: NMFS has received comments that the current upgrading restrictions are problematic for fisheries where length overall, gross and net tonnage, and horsepower are not relevant to vessel harvesting capacity (e.g., longline fisheries). However, the current upgrading restrictions are consistent with those in place for fisheries under New England and Mid Atlantic Council jurisdiction; changes in upgrading restrictions may be problematic for fishermen that participate in those fisheries.

Options:

1) Status Quo - no changes in transfer/upgrading restrictions

2) Keep the general status quo transfer/upgrade restrictions, but address individual issues as necessary. This could likely be addressed in the short-term thru proposed and final rulemaking. These changes could include the following:

a) Eliminate transfer/upgrading restrictions - this would make the permits freely transferable and would not restrict larger and more efficient vessels from entering the fishery. This option could increase overall fleet harvesting capacity and impact

small owner/operator fishing businesses.

b) Limit hold capacity in addition to, or instead of, LOA, gross and net tonnage, and horsepower - this would include hold capacity or make hold capacity the sole limitation as a more relevant harvesting capacity measure in longline fisheries. This option is potentially inconsistent with New England and Mid Atlantic Council regulations. Additionally, because hold capacity data is not universally collected for all permitted vessels, this option could require many permit holders to comply with increased data collection.

c) Allow a greater percentage increase from baseline. This option is inconsistent with New England and Mid Atlantic Council regulations but would increase flexibility in vessel upgrading/transfers.

d) Create vessel categories such as <30', 30-49', 50'-69', >70' (from Larkin, 1998) and allow upgrading either within a category, but not across categories, or upgrading across categories only once. This option is inconsistent with New England and Mid Atlantic Council regulations. This option could alleviate some upgrading issues by making vessels within a specified size range freely transferable.

Issue 3: NMFS has received comments that some fishermen may not be aware of the current regulations that permits must be renewed within one year of expiration.

Options:

1) Status Quo

2) Adopt different permit renewal time frames:

a) Eliminate permit renewal time frames - this would allow permits to lapse indefinitely and would allow vessels that leave the fishery or are inactive for extended period to reenter the fishery at any time.

b) Lengthen the permit renewal time frame - this would provide longer than a one year period for vessel owners to renew their permit before it is "lost."

c) Shorten the permit renewal time frame - this would provide less than a one year period for vessel owners to renew their permit before it is "lost."

d) Adopt the same expiration dates for Atlantic tunas, swordfish, and shark permits. Currently, tuna permits expire at the end of the calendar year and are issued by a contractor; swordfish and shark permits expire at the end of the permit holders' birthmonth and are issued by NMFS. This option would make all HMS

permits expire at the same time.

Issue 4: The only recreational permit for Atlantic HMS is that for tunas. In order to capture the entire universe of recreational fishermen (for monitoring or other purposes), permitting vessels fishing for other HMS may be necessary.

Options:

1) Status Quo

2) Create Atlantic HMS recreational permit - this would establish a permit to retain HMS recreationally. This option would extend coverage of the Atlantic Tuna Angling category permit to all managed HMS.

10.1.2 Management of HMS Quotas

10.1.2.1 Longline Incidental Bluefin Tuna Catch Limits

Since 1981, NMFS has implemented a prohibition on the use of longline gear in a directed BFT fishery. However, the regulations do allow for the retention of certain amounts of BFT caught incidentally when fishing for other species, depending on the amount of target species landed. These incidental and target levels have frequently been the subject of public hearings, public comments, and regulatory adjustments.

In 1998, ICCAT established an annual dead discard allowance of 79 metric tons (mt) for western BFT, 68 mt of which was allocated to the United States, and required that nations minimize dead discards of BFT to the extent practicable. In 1999, recognizing the need to further reduce dead discards of BFT, the final regulations implementing the HMS FMP established a closed area off of the Mid-Atlantic coast during June to reduce overall interaction rates with BFT by pelagic longliners.

Several issues have arisen since publication of the HMS FMP, which indicate the regulations regarding BFT retention by pelagic longline vessels need to be revisited.

Issue 1: Low Level of Compliance with Current Regulations

Recent analyses of landings data indicate that almost 80 percent of longline trips landing BFT in the northern area from 1995-1999 did not meet the target catch requirements. Compliance in the southern area is better, about seven percent of trips did not meet the target catch requirements during the same period. The reason for the lack of compliance may be a combination of several factors, including that current longline fishing practices include shorter trips with less target catch, making it difficult for many vessels to have the necessary target catch to retain BFT, and the target catch requirement regulations are difficult to enforce. Upon discovery of the level of compliance over the last several years, NMFS sent out letters to all longline vessels and tuna dealers, informing and reminding them of the current regulations. Stricter compliance with the regulations may have resulted in more discards during this time period.

Issue 2: Estimation of Dead Discards

Logbook tallies of dead discards of BFT have been lower during the late 1990s compared to the late 1980s and early 1990s. A recent SCRS paper, however, using methods similar to those used to estimate discards for other species by pelagic longline vessels, estimated that dead discards of BFT have not changed since the 1980s, and that dead discards may have been significantly higher than logbook tallies for recent years.

Issue 3: Continued Low Landings by Longline Vessels

For the last several years, the longline category has landed only about 50 percent of its initially allocated quota. As indicated above, many of these landings have been from trips that did not have the required target catch. If the regulations had been complied with, landings would have been even lower.

Any changes to the regulations should balance the requirements to minimize discards, minimize negative impacts to the target fishery, and avoid an incentive to target BFT. Changes could be based on analyses of current fishing patterns to determine whether the current or alternative geographic and seasonal divisions are best at meeting management objectives.

Results of some preliminary analyses were provided in an ANPR requesting comments on possible changes to the target catch requirements (65 FR 69492; November 17, 2000). Observer data from longline trips (from 1991 to 1994) indicate that two or fewer BFT were hooked on 91 percent of all observed trips. Longline landings information for 1998 and 1999 are presented in Table 1, and indicate that median values for landed catch (not including BFT) are approximately 3,000 lb (1,361 kg) for trips made in the months of January through April, and 3,800 lb (1,724 kg) for trips made in May through December, in fisheries south of 34° N. lat.; and 3,700 lb (1,679 kg) for trips made throughout the year in fisheries north of 34° N. lat. For the same time period, 75 percent of the trips had a landed catch (other than BFT) of at least 1,350 lb (613 kg) for trips made in the months of January through April, and 1,650 lb (749 kg) for trips made in May through December, in fisheries south of 34° N. lat; and 1,600 lb (726 kg) for trips made throughout the year in fisheries north of 34° N. lat.

Table 10.1 Landings (Other than Bluefin Tuna) in Pounds, by Trip, for Vessels Using Longline Gear, in Pounds, 1998-1999. Source: SEFSC Weighout Data.

	North (NC and North)			South (SC and South)			All Areas		
	Jan - Apr	May - Dec	Year Round	Jan - Apr	May - Dec	Year Round	Jan - Apr	May - Dec	Year Round
Avg.	4,281	7,018	6,537	4,562	4,836	4,740	4,516	5,549	5,241
Median	3,010	3,869	3,735	3,083	3,845	3,580	3,078	3,855	3,607
75 pctle.	1,419	1,728	1,683	1,364	1,665	1,540	1,387	1,699	1,586

Alternative target catch requirements are presented below with a brief summary of some of the possible consequences.

Option 1: Status quo: Persons aboard a vessel permitted in the Atlantic Tunas Longline Category may retain, possess, land and sell large medium and giant BFT taken incidentally in

fishing for other species. Limits on such retention/possession/landing/sale are as follows:

1) For landings south of 34°00' N. lat., one large medium or giant BFT per vessel per trip may be landed, provided that for the months of January through April at least 1,500 pounds (680 kg), and for the months of May through December at least 3,500 pounds (1,588 kg), either dressed or round weight, of species other than BFT are legally caught, retained, and offloaded from the same trip and are recorded on the dealer weighout as sold;

2) For landings north of 34°00' N. lat., landings per vessel per trip of large medium and giant BFT may not exceed two percent by weight, either dressed or round weight, of all other fish legally caught, retained, and offloaded from the same trip and which are recorded on the dealer weighout as sold.

Option 2: Adjust the target catch requirements while maintaining the current geographic and southern area seasonal subdivision.

For example, in the Longline south subcategory, from January through April, one fish per vessel per fishing trip with at least 1,500 lb (680 kg) of target catch, or two fish per vessel per trip with at least 4,500 lb (2,040 kg) of target catch; from May through December, one fish per vessel per fishing trip with at least 3,500 lb (1,588 kg) of target catch, or two fish per vessel per trip with at least 6,000 lb (2,722 kg) of target catch. In the Longline north subcategory, one fish per vessel per fishing trip with at least 3,500 lb (1,588 kg), or two fish per vessel per trip, with at least 6,000 lb (2,722 kg) of target catch. Under this alternative, another option could be to adjust only the percent target catch requirement for the Northern area (e.g., five or eight percent versus two percent) and to maintain the current target catch requirements, by season, for the south.

Option 3: Institute one target catch requirement (either a percent or a fixed number of BFT coastwide regardless of season.

For example, one BFT per vessel per fishing trip with at least 1,500 lb (680 kg) of target catch, or two fish per vessel per trip with at least 4,000 lb (1,815 kg) of target catch, or one BFT per trip, so long as other targeted species are landed. Under this alternative, another option could be to apply a percent target catch requirement coastwide.

Option 4: Adjust target catch requirements, geographic location and seasonal subdivisions.

For example, apply different target catch requirements (as discussed above under option 1) for different time periods (e.g., January through August) and for two or more subareas (e.g., north Atlantic, versus mid-Atlantic versus Gulf of Mexico).

It may be possible that altering the landings allowance/target catch requirements would

improve the effectiveness of the regulation. As discussed in the HMS FMP, analyses of catch data show no relationship between target catch and the number of BFT discarded. This is expected if the fishery is truly incidental. Since the implementation of the current target catch requirements numerous changes have occurred in the pelagic longline fishery and management regime (i.e., changing quotas for target fisheries, and implementation of limited access). Low longline landings, poor compliance with current target catch requirements, and recent estimates of dead discards, may mean that if current regulations were adhered to, dead discards of BFT could be much higher than those landed. Decreasing the target catch requirements would allow BFT to be retained on more fishing trips and could reduce dead discards but may also provide an incentive to target BFT. If landings increase to the point of exceeding the annual quota, any additional incidental catch would have to be discarded. Instituting one target catch requirement for the entire coast would be easier to administer and enforce and would be simpler for fishermen to implement. However, one uniform catch requirement would not take into account any seasonal and/or geographic fluctuations in the target fisheries which in turn could provide for variations in BFT target catch requirements to minimize negative impacts to the fishery. Taking into account seasonal and geographic variability in the fishery is complicated and could also vary from year to year, particularly if other factors, such as quota limits in target fisheries, do not remain constant over time. As mentioned above, any changes to the regulations would strive to strike a balance with the requirements to minimize discards, minimize negative impacts to the target fishery and avoid an incentive to target BFT.

10.1.2.2 General Category Effort Controls and Allocation of Quota Underage

General category effort controls consist of dividing the General category season into time period subquotas, and the use of restricted-fishing days (RFDs). Effort controls are intended to affect where and when Atlantic bluefin tuna (BFT) are harvested for a variety of management objectives. These objectives consist of attaining optimum yield, including improvement of scientific data collection purposes, such as CPUE, lengthening the season for market reasons, and addressing allocation issues. Overall, the temporal and spatial effort control options for the General category seek to lengthen the fishing season in a category with high participation and catch rates. However, over the last two seasons catch rates have been relatively low compared to the previous five years.

The United States allocates its annual BFT among six categories of the fishery in order to collect the broadest possible array of scientific information and to optimize social and economic benefits. NMFS established "base" quotas for each category in the BFT fishery based upon the historical share of landings in each of these categories. NMFS must adjust quotas on an annual basis to reflect overharvest or underharvest in each category during the previous year. If a quota category or subcategory exceeds its quota or adjusted quota in a particular year, its quota must be reduced by that amount for the following year. In the following year NMFS also may allocate any remaining quota from the Reserve to cover this overharvest. The total of the adjusted quotas and the Reserve will be consistent with ICCAT recommendations. Accounting for overharvests is not

intended to "punish" the category that exceeded its quota or adjusted quota or to “reward” other categories that did not exceed their quota or adjusted quota. Over the past two seasons there has been large underharvests in several BFT quota categories, especially the Angling and Longline categories.

NMFS has received comments from General category constituents in response to these catch rates, requesting the agency address the current structure of General category effort controls, particularly RFDs. NMFS has provided some options below with a brief summary of some of the consequences associated with each individual option.

Issue 1: General Category Effort Controls

Option 1: Status Quo, subperiod quota split: June- August (60%), September (30%), October- December (10%). RFDs: Sunday, Monday, Wednesday, plus days that correspond to Japanese market closures.
Option 2: Adjust or remove the current quota sub-period percentages and/or time frames
Option 3: Adjust or eliminate the number of RFDs
Option 4: Establish RFD schedule for the season, but only implement them when landings increase and meet some predetermined criteria (e.g., 3 days in a 7 day time period with landings in excess of 10 mt/day). Looking at this years catch rates, RFDs would have been implemented on September 1, 2000.
Option 5: Any combination of one or more of the above
Option 6: Other

Implementing any of these alternatives should not have any ecological effects, either negative or positive, as the options would not alter the amount of BFT caught or landed by the General category. These options will potentially have effects that are economic, social and/or administrative in nature. Effort controls have been used in the past to have positive economic, social, and scientific consequences by extending the fishing season over time and space while avoiding market gluts. However, some members of the industry have argued that effort controls do not work and although they may extend the season the impacts are negligible and do not assist with market prices. Changing RFDs and other effort controls based on recent years experience may not necessarily yield the positive results due to year to year variability inherent to the fishery, such as migratory patterns or oceanographic conditions. Implementation of similar quota subdivisions and RFDs, as used in the past two years, may assist the agency with consistency of enforcement and administration while providing the industry with predictability to the pattern of fishing days in the General category.

Issue 2: Allocation of Quota Underage

To address this issue of large amounts of quota “roll-over” from one year to another several options are listed below.

Option 1: Status Quo:Underage from a particular category is added to that category's base quota the following fishing year.

Option 2: Adjust quota allocation percentages established in the HMS FMP for individual categories (i.e. redistribute quota to those categories with higher landing rates)

Option 3: Limit individual category quota transfers to some percentage of the base quota for that category, while redistributing the remaining category quota to the overall domestic quota

Option 4: Any combination of one or more of the above.

Option 5: Other

Under Option 1 (status quo), carrying-over large amounts of quota from one year to the next in a particular category could have negative biological as well as social and management impacts. For example, large carry-overs of unharvested quota may provide for the start of new unsustainable fisheries. Also, excessive fishing mortality during one year may significantly impact a particular year class and hinder long-term rebuilding. Option 2 requires adjustment of the HMS FMP and could incur extensive administrative and socio/economic burdens, and may open up the contentious issue of domestic quota allocation. Option 3 could alleviate extensive individual category roll-overs from one year to the next by redistributing a portion of the quota underage to all fishery participants based on quota allocations specified in the HMS FMP. For example, 20 percent of a category's quota underage could be allocated back to that same category the following year. The remaining quota underage could then be added to the total domestic landings quota and then redistributed to all quota categories based upon quota allocations specified in the HMS FMP. This potentially reduces the amount of excessive roll overs to any one category while maintaining consistency with ICCAT's recommendations.

10.1.3 Addressing Protected Resource Issues Related to HMS Fisheries

HMS fishermen occasionally encounter sea turtles, marine mammals and sea birds, hooked or entangled in their fishing gear. Under the authorities of the Marine Mammal Protection Act, the Migratory Bird Act, and the Endangered Species Act, NMFS must protect these animals and reduce takes in fisheries. The pelagic longline fishery is a Category I fishery under the MMPA and NMFS also has significant concerns about interactions with endangered animals (jeopardy finding for turtles). The bottom longline fishery is a Category III fishery which also has occasional endangered species encounters. The southeast shark gillnet fishery is a Category II fishery which has the potential for serious ESA concerns (entanglement of a right whale). The commercial hand gear and purse seine fisheries are Category III with potential ESA concerns in the purse seine fishery due to observed entanglement of large whales. The HMS recreational fisheries have potential ESA concerns due to reported interactions with turtles. HMS is current in reinitiating consultation on the June 30, 1999, Biological Opinion.

10.2 Outlook by Species

Swordfish

The 1999 SCRS stock assessment on North and South Atlantic swordfish was somewhat optimistic. The positive outlook provided by the 1999 swordfish stock assessment spurred the adoption of a 10-year rebuilding program at ICCAT. A reduction in quotas sets the stage for long-term sustainable fisheries Atlantic-wide. The mortality of small swordfish was addressed through time/area closures in the United States, accounting for dead discards of small swordfish as part of the total allowable catch, and the resolution to examine possible areas of small fish concentration *outside* the U.S. EEZ. Reductions in the mortality of small swordfish may yield significant long-term gains in yield. Concerns remain regarding the impact of the ICCAT recommendations implementing a dead discard allowance for U.S. commercial fishermen for the 2000 fishing season and beyond to 2003 when the dead discard allowance levels are reduced to zero.

In terms of addressing Illegal, Unregulated and Unreported (IUU) vessels and other vessels (belonging to both non-Contracting and Contracting Parties), ICCAT took important steps in 1999 to encourage all countries to report harvests of ICCAT-regulated species. The United States has implemented the 1999 ICCAT recommendation that prohibits imports of swordfish and tunas from non-compliant countries. Collection of swordfish import data will prove to be an important data source in the future to identify countries that are fishing in such a manner that diminishes the effectiveness of ICCAT conservation and management measures.

Due to the changes in the pelagic longline fishery resulting from implementation of extensive time/area closures, NMFS will be re-evaluating the comprehensive management of this fishery. NMFS will consider re-evaluating incidental catch limits in the commercial swordfish fishery in the future.

As anticipated in the 2000 SAFE report, the recreational swordfish fishery experienced an additional growth in popularity during 2000, not only along the east Florida coast, but in the mid-Atlantic Bight and off New Jersey as well. Further expansion of the recreational fishery during 2001 may necessitate expanded efforts to accurately monitor recreational landings. NMFS is developing plans to amend existing monitoring programs in order to collect additional data from this fishery. Additional concerns regarding sale of recreational-caught swordfish and the number of fish landed will also be considered.

Tunas

Most of the tuna-related issues are addressed in Section 10.1. Issues regarding the yellowfin tuna bag limits, bluefin tuna bycatch and discards in pelagic longline fisheries, quota management, rebuilding programs for overfished species, and stock definition for bluefin tuna will

continue to be of concern during 2001. The most recent stock assessment for bluefin indicated that the 20 year rebuilding program is on track. Newly established totally established catches for bigeye tuna dn northern albacore should serve as an important step toward rebuilding these overfished stocks.

Billfish

The 2000 ICCAT recommendation related to Atlantic blue and white marlin may requiren agency actions to address recreational landing levels. One of the critical components of U.S. compliance will be development of adequate monitoring tools, as discussed under Section 10.1.1.1. Improving the tournament registration and reporting process will also be examined in 2001. Monitoring the impact of the time/area closures and live bait prohibition in the Gulf of Mexico by pelagic longline fishermen and the resulting reduction in billfish bycatch will also be an important element in the near-future management of billfish resources.

Sharks

The HMS FMP incorporated the most recent stock assessment information, and included a rebuilding plan for the overfished LCS as well as precautionary management measures for SCS and pelagic sharks. However, the outlook for LCS at this time is uncertain. The 1998 stock evaluation workshop (SEW) indicated that LCS continue to be overfished in terms of excessive fishing mortality rates and depleted stock biomass. Projections in the 1998 SEW indicate that continued fishing at pre-HMS FMP levels will result in LCS stock declines at approximately 13 percent annually. The HMS FMP contained numerous measures to stop overfishing of LCS and begin rebuilding. Many of the commercial shark measures in the HMS FMP could not be implemented due to a court injunction. In December 2000, the court stipulated to a settlement agreement that calls for, among other things, maintaining the 1997 LCS quotas, an independent review of the 1998 SEW, and a new LCS stock assessment in 2001. Depending on the results of this review, NMFS may implement the HMS FMP management measures or NMFS may have to maintain the 1997 management measures until a new stock assessment is conducted. NMFS is currently working on an emergency rule to implement the terms of the settlement agreement.

While current fishing mortality and stock abundance estimates for SCS indicate that these species are fully fished, a stock assessment has not been conducted since 1993 and recent trends in landings and fishing practices need to be analyzed. The settlement agreement calls for NMFS to maintain the 1997 SCS quotas and conduct a new stock assessment for SCS. NMFS anticipates completing this stock assessment in 2001 and will proceed with rulemaking, as necessary, based on the results of the stock assessment. Similarly, the HMS FMP management measures for pelagic sharks were adopted to ensure that all sources of fishing mortality are accounted for and to limit expansion of fishing pressure until additional analyses can be conducted. The HMS FMP management measures for pelagic sharks can now be implemented under the settlement agreement. Additionally, NMFS expects stock assessments for some pelagic

shark species to be conducted in 2002.

International efforts to conserve and manage sharks continue to gain momentum. The ICCAT Sub-committee on bycatch held a workshop to analyze pelagic shark catch rates and an internaional pelagic shark workshop was held in February 2000. NMFS expects to release the Final National Plan of Action for shark conservation and management, consistent with FAO guidelines and requirements early this year. Additionally, as a result of the signing of the Shark Finning Ban Bill in December 2000, NMFS expects to ban finning of sharks in the United States and monitor the shark fin trade on an international level in 2001. These actions should contribute to the general awareness of the need for long-term, rational domestic and international management of all sharks.

10.3 Data and Monitoring Issues

Improving data coordination is essential for successful HMS management. As fisheries resources become increasingly managed under quota systems, real time monitoring is critical, as discussed above under Section 10.1.1. Failure to abide by the quota levels established by international agreement may result in penalties assessed against future U.S. harvests. In order for the United States to continue to serve as a leader in the conservation of these resources, the development and use of innovative techniques must receive proper attention and funding. The following is a short list of data management tools and techniques that may assist in HMS management:

- The development of streamlined systems that transcend the traditional regional structures of NMFS data collection, entry, and dissemination.
- Implementation of VMS in the pelagic longline and shark drift gillnet fisheries.
- Improvement in the coordination of data collection and organization among various components of the agency.
- Use of contractors to consolidate data and add to the rapid dispersal of information.
- Placement of summary data on the HMS web page.
- Placing data in consolidated Oracle tables for easier access of data by scientists and managers.
- Improved tracking of dealer reports.
- Resolution of the LPS status including a retrospective analysis of the existing

system and the exploration of alternative methods to gather increasingly accurate data from the recreational components in the future.

- The use of electronic logbooks to facilitate reporting and data analysis.

NMFS is also developing a simple, user-friendly identification guide to commonly fished Atlantic HMS. The manual is intended for use by fishermen, enforcement officers, and fishery samplers. Particularly for the wide variety of Atlantic sharks, identification down to the species level is difficult for many recreational and commercial fishermen. Disseminating these guides is expected to increase the quality of species-specific landing data, and compliment the observer, logbook, and dockside monitoring systems already in place.

10.4 Public Outreach

A critical element of effective fishery management is providing a forum for information exchange, both from the standpoint of communicating new or changing regulations, as well as providing an opportunity to garner input from constituents that are involved in various components of HMS fisheries. In 2001, personnel from the HMS Division will be participating in events such as the Miami Boat Show, Boston Seafood Show, Maine Fishermen's Forum, fishing tournaments, scientific meetings and other forum to enhance HMS outreach capabilities. Efforts will also continue to enhance the HMS fax network, web pages, and toll-free HMS information telephone service to improve communication with HMS constituents.

10.5 Research Needs

The Comprehensive Research and Monitoring Plan for Atlantic Highly Migratory Species published in 1999 (Appendix I of 2000 SAFE report) detailed research underway as well as those studies that may directly benefit future HMS management. Summaries of current research are provided under specific species or sub-topics in sections 2 through 9 of the 2001 SAFE report.

10.6 Conclusion

The SAFE report is designed to not only summarize the current condition of the resource, but also address whether or not the fishery is operating properly under the mandates of the Magnuson-Stevens Fishery Conservation and Management Act and the Sustainable Fisheries Act. Through an annual appraisal of recent information, the SAFE report allows for a re-evaluation of management measures in light of the Magnuson-Stevens provisions and the National Standard Guidelines. In 2001, HMS plans to continue implementing and evaluating the FMP measures in an attempt to remedy the overcapitalization and overfishing problems that affect many highly migratory species. The 2001 AP meeting provides an excellent opportunity to identify and discuss those issues raised in the SAFE report which require further management actions. Through continuous public and constituent interaction, increased monitoring, ongoing life history

work, and additional socio-economic assessment, NMFS strives to continue building sustainable fisheries for all Atlantic highly migratory species.