Stock Assessment and Fishery Evaluation for Atlantic Highly Migratory Species 2002

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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March 2002

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).

Charter/Headboat Permits:

Questions regarding the Highly Migratory Species Charter/Headboat 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).

HMS Infoline and Website

Information on regulations, public meetings, and landings reports can be obtained from the HMS Infoline at (800) 894-5528 or the website (www.nmfs.noaa.gov/sfa/hmspg.html).

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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 Fishery Conservation and Management Act (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 resources, 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 2002 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 2001. 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 a stock assessment for sailfish and spearfish in 2001. However, quantitative assessment models were not able to provide satisfactory or reliable stock information. New analyses do not provide any information on the maximum sustainable yield (MSY) or other stock benchmarks for Western Atlantic composite (sailfish/spearfish) or sailfish-only stock. Yet, recent catch levels for composite and sailfish only stocks appear sustainable because over the past two decades catch per unit effort (CPUE) and catch have remained relatively constant.

Essential Fish Habitat

Several investigations continued surveying shark nursery grounds and pupping areas along the Atlantic and Gulf of Mexico coasts during 2001. Additionally, an investigation focused on Atlantic blue marlin spawning and nursery habitat utilization. Programs to track movements of adult and juvenile Atlantic bluefin tuna utilizing pop-up tags, archival tags, and ultrasonic depth-sensitive transmitters occurred during 2001.

Fishery Data Update

There are several sources of new information concerning HMS fisheries. These include mandatory permits for all charter and headboats fishing for HMS, as well as an HMS tournament database. 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 2001 are:

- implementation of a charter/headboat permit;
- HMS tournament registration;
- transfer of 400 mt ww from the 2001 swordfish quota to Japan;
- closure of Northeast Distant Statistical (NED) Reporting Area;
- NED pelagic longline experimental fishery;
- shark emergency rule that restored shark quotas to the 1997 levels; and
- peer review of the large coastal shark (LCS) stock assessment.

Economic Status of HMS Fisheries

The 2002 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 a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act.

Community and Social Data Update

Analyses relative to National Standard 8 of the Magnuson-Stevens Act rely heavily on the availability of community studies and profiles. As HMS 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 brief examination of the 2000 census. This section also provides a summary of expected community and social impacts of agency actions completed during 2001.

Fish Processing, Industry and Trade

Domestic and international consumer preference continues to play a large role in HMS markets. The Fish Processing, Industry and Trade section provides an overview of U.S. trade activities relative to HMS, required documentation, and summaries of U.S. imports and exports of HMS products. Bluefin tuna trade remains strictly monitored through use of the Bluefin Statistical Document program. Sharks and shark products continue to be an important export, although the nature of reporting is much less detailed than that used for bluefin tuna. Swordfish are an important import into the United States, as indicated by data collected through the Swordfish Import Monitoring Program. During 2000, a total of 11,361 metric tons of swordfish were imported into the United States. The use of trade data is an important tool in the monitoring and management of HMS and an effective supplement to existing information sources.

Bycatch

Bycatch of finfish and sea turtles and incidental catches of marine mammals and seabirds continue to be areas of concern in HMS management, with steps taken during 2001 in the pelagic longline fishery to protect sea turtles. These actions were taken in compliance with the HMS FMP and a Biological Opinion (BiOp) on HMS fisheries completed on June 14, 2001. A summary of agency actions taken during 2001 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 2001, there were 642 total shark permit holders (directed, incidental), 420 total swordfish permit holders (directed, incidental, handgear), and 213 current tuna pelagic longline permit holders. However, those participating in the directed swordfish fishery must also possess an incidental shark permit and a tuna pelagic longline permit, so the cumulative number of permits does not necessarily reflect the actual number of participants. This section provides additional management actions that may be considered to further reduce the number of permits, if deemed necessary. Options for upgrading and safety issues are also discussed.

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 2002, 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 there will be a continued focus 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, as well as monitoring and reporting of HMS tournaments. Further actions are expected related to the June 14, 2001, BiOp addressing loggerhead and leatherback sea turtle bycatch in Atlantic pelagic longline fisheries. The April 2002 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 HMS.

TABLE OF CONTENTS

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 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 resources, 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 the use of the best available scientific data in its decision making process.

The 2002 SAFE report for Atlantic HMS is a vehicle to introduce information made available after completion of the final HMS FMP and Billfish Amendment, 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 National Standard 2 guidelines, the report presents a comprehensive summary of the most recent Atlantic HMS fisheries-related data from a variety of sources across a wide range of disciplines. In addition, the current information is contrasted with previous years' data to highlight important trends and concerns for future management.

The SAFE report is divided into 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.

1.1 Update on HMS Activities During 2001

The year 2001 was very active for the HMS Division, with several significant actions completed during the year. On April 2-4, 2001, 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 2001, including the following issues:

- Recreational swordfish fishery
- Enhanced monitoring of recreational billfish fishery to insure compliance with the ICCAT marlin landings cap
- Implementing extended HMS vessel logbook reporting
  - Purpose and need
  - Financial constraints on fishermen
  - Legal issues
  - Integration with other initiatives
  - Operational design
- HMS charter/headboat permit requirements
- Reducing bycatch
- Longline incidental bluefin tuna (BFT) catch limits
- Advisory panel operating plan

The international Atlantic swordfish rebuilding program developed as a result of a 1999 ICCAT recommendation was implemented in 2000, 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. In 2001, a 400 mt portion of the U.S. swordfish quota was given to Japan who had overages in their swordfish fishery, in return for future conservation considerations.

Numerous Atlantic tuna actions were completed during 2001, with several relating to bluefin tuna (BFT), including annual quota specifications, closures, in-season transfers in quota distribution, and adjustments to Angling and General category retention limits. NMFS also published a final rule to implement mandatory dealer reporting of Atlantic bigeye, albacore, yellowfin and skipjack tunas, and to move the bluefin tuna Angling category north/south division line and adjust the quota distribution between the two areas accordingly (August 15, 2001; 66 FR 42801).

The Final National Plan of Action (NPOA) for Conservation and Management of Sharks was published in 2001 and made available to the public. NMFS published observer coverage and gear-handling requirements in the shark drift gillnet fishery (March 30, 2001; 66 FR 17370) and

also published a proposed rule prohibiting the finning of sharks (June 28, 2001; 66 FR 34401). Other Atlantic shark-related actions during this year included publication of large coastal shark (LCS), small coastal shark (SCS) and pelagic shark quotas, and fishing season notifications. Several applications for Exempted Fishing Permits (EFP) 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 2001.

There were nine active lawsuits during 2001, with a tenth lawsuit filed in January of 2002. In response to the settlement agreement reached in two shark-related lawsuits, NMFS published an emergency rule on March 6, 2001 (66 FR 13441), which expired on September 4, 2001. The emergency rule established the LCS and SCS commercial quotas at 1,285 and 1,760 mt dw, respectively (1997 levels), and suspended the regulations on splitting the LCS management group into ridgeback and non-ridgeback LCS subgroups, the commercial LCS ridgeback minimum size, and counting dead discards and state landings after Federal closures against Federal quotas. A third lawsuit was closed after the court ruled in favor of the agency, the three-fish yellowfin tuna possession limit, and shark recreational retention limits.

Another significant HMS issue that came to light during 2001 was the continued growth of a swordfish recreational fishery, particularly off the east Florida coast and mid-Atlantic regions. In response to the rapidly rebuilding fishery, NMFS published a proposed rule to establish a recreational retention limit and monitor landings in the Atlantic swordfish fishery (December 26, 2001; 66 FR 66386).

1.2 2001 ICCAT Accomplishments

In 2001, the ICCAT meeting was suspended without certain decisions necessary for the normal functioning of the Commission and for the adequate management of Atlantic highly migratory species. In order to continue progressing towards the objectives of ICCAT, the Commission will decide by correspondence on the manner in which to proceed. Various recommendations and resolutions were adopted by consensus at the 2001 meeting, including:

Compliance Committee

- Supplemental Recommendation on Compliance in the Bluefin Tuna and Atlantic Swordfish (SWO) Fisheries;
- Resolution by ICCAT on the Deadlines and Procedures for Data Submissions;
- Resolution Concerning a Management Standard for the Large-Scale Tuna Longline Fishery;
- Letter to Equatorial Guinea indicating continuance of trade restrictions;
- Revised Terms of Reference for the Working Group on Integrated Monitoring Measures;
- Compliance Tables and Interpretative Application Decisions; and

- Letter to Panama re: Identification under 1998 Unregulated and Unreported Fishing Resolution.

Tropical Tunas

- Recommendation by ICCAT on the 2002 Bigeye Tuna (BET) Conservation Measures.

Temperate Tunas-North

- Recommendation by ICCAT on Northern Albacore Catch Limits;
- 2001 Recommendation by ICCAT on Bluefin Tuna Research in the Central Atlantic Ocean; and
- ICCAT Resolution Regarding the SCRS Mixing Report on Atlantic Bluefin Tuna.

Working Group

- Resolution by ICCAT Concerning More Effective Measures to Prevent, Deter, and Eliminate Illegal, Unregulated, and Unreported (IUU) Fishing by Tuna Longline Vessels.

Many recommendations, resolutions, and other matters were not discussed in plenary but were approved by various Panels and Committees. These may be decided by mail vote in the near future. These include:

Working Group

- Recommendation by ICCAT Concerning the ICCAT BET Statistical Document Program;
- Supplemental Resolution Concerning ICCAT BET Statistical Document Program;
- Recommendation by ICCAT Establishing a SWO Statistical Document Program;
- Recommendation by ICCAT Concerning the Importation of BET and its Products from St. Vincent and the Grenadines;
- Resolution on Becoming a Cooperating Party, Entity, or Fishing Entity;
- Resolution by ICCAT Further Defining the Scope of IUU Fishing;
- Permanent Working Group Packet of Letters;
- Letter to Honduras re/ the Lifting of BFT and SWO Sanctions; Maintenance of BET Sanctions;
- Recommendation by ICCAT Concerning the Importation of BFT and SWO and their Products from Honduras;
- List of Large-Scale Longline Vessels Believed to be Engaged in IUU Fishing Activities; and

- Large-Scale Longline Vessels Listed on the 1999 and 2000 ICCAT Lists but which had no Record of Imports into Japan Since January 1, 2000.

Temperate Tunas-South

- Recommendation by ICCAT on Revision and Sharing of the Southern Albacore Catch Limit.

Other Species

- Recommendation by ICCAT on South Atlantic Swordfish;
- Recommendation by ICCAT to Amend the Plan to Rebuild Blue Marlin and White Marlin Populations;
- Resolution on Interpretation of the Recommendation to Establish a Rebuilding Program for North Atlantic Swordfish;
- Resolution by ICCAT on Atlantic Sharks; and
- Resolution by ICCAT for Evaluating Alternatives to Reduce Catches of Juveniles or Dead Discards of Swordfish.

One recommendation regarding east Atlantic bluefin tuna was discussed at plenary but was not adopted because there was no quorum. It is likely this topic will be addressed in debate early in 2002.

1.3 Summary of HMS Actions Published in the Federal Register during 2001

In summary, during calendar year 2001, the HMS Division completed a total of five proposed rules, ten final rules, 11 in-season actions (mainly related to the bluefin tuna fishery), six notices, five emergency rules, and two notices of availability (NOA). Table 1.1 provides a summary of all the Federal Register Notices filed during 2001 relating to specific actions taken by the HMS Division. All required analytical documents accompanied these actions (e.g., Environmental Assessments, Environmental Impact Statements, Regulatory Impact Reviews, Regulatory Flexibility Analyses, etc.).

Table 1.1 Summary of 2001 NMFS HMS actions

ACTION TYPE NMFS ID; RIN	ACTION DESCRIPTION	
Final Rule ID 121200G	Atlantic HMS; Pelagic Shark Species; Commercial Fishing Quota Notification	66 FR 55; 01/02/2001
Notice ID122800D	Atlantic HMS; Issuance of 2001 EFPs/SRPs	66 FR 779; 01/04/2001
Final Rule ID 110800A; RIN 0648-AJ67	Atlantic HMS; Pelagic Longline Fishery Vessel Monitoring Systems	66 FR 1907; 01/10/2001

ACTION TYPE NMFS ID; RIN	ACTION DESCRIPTION	
Final Rule Technical Amendment ID 122700B; RIN 0648-AO95	Atlantic HMS; Regulatory Adjustments to Clarify Blue Shark Quota, Revise Cross-References and Revised Specifications for Closed Areas	66 FR 8903; 02/05/2001
Notice of Availability ID 121300A	Atlantic HMS; Final Plan of Action for Conservation and Management of Sharks	66 FR 10484; 02/15/2001
Emergency Rule ID 120500A; RIN 0648-AO85	Atlantic HMS; Commercial Shark Management Measures	66 FR 13441; 03/06/2001
Notice ID 022701F	ICCAT Spring Species Working Group; Notice of Public Meeting	66 FR 14893; 03/14/2001
Notice ID 031401D	Atlantic HMS; Advisory Panel Meeting; Public Hearing	66 FR 15396; 03/19/2001
Interim Final Rule ID 110600A; RIN 0648-A076	Atlantic HMS; Pelagic Longline Fishery; Sea Turtle Protection; Shark Drift Gillnet Fishery; Observer Coverage and Gear and Handling Requirements	66 FR 17370; 03/30/2001
Proposed Rule ID 022201B; RIN 0648-AP13	Atlantic HMS; Pelagic Longline Management; Proposed Extension of Charleston Bump Closure	66 FR 17389; 03/30/2001
Proposed Rule ID 010301C; RIN 0648-AO96	Atlantic HMS; 2001 Atlantic Bluefin Tuna Quota Specifications and General Category Effort Controls	66 FR 17520; 04/02/2001
Notice of Availability ID 032601D	Atlantic HMS; Draft Biological Opinion	66 FR 18755; 04/11/2001
Notice ID 042301A	Atlantic HMS; Draft Biological Opinion; Extension of Comment Period	66 FR 21121; 04/27/2001
Proposed Rule Withdrawal ID 022201B; RIN 0648-AP13	Atlantic HMS; Pelagic Longline Management	66 FR 22994; 05/07/2001
Notice ID 051701H	Atlantic HMS; Notice of Scoping Workshop on Development of ICCAT Statistical Document Program	66 FR 29529; 05/31/2001
Temporary Rule ID 051501C; RIN 0648-AP29	Atlantic Tuna Fisheries; Regulatory Adjustments; Amendment of Permit Category Change Deadline from 05/15 to 05/31 for 2001	66 FR 29510; 05/31/2001
Final Rule Technical Amendment ID 040601J; RIN 0648-AP23	Atlantic HMS; NOAA Information Collection Requirements; Regulatory Adjustments	66 FR 30651; 06/07/2001
Final Rule Inseason Action ID 051701G	Atlantic HMS; Bluefin Tuna Recreational Fishery; Retention Limit Adjustments	66 FR 31844; 06/13/2001

ACTION TYPE NMFS ID; RIN	ACTION DESCRIPTION	
Final Rule ID 061101A	Atlantic HMS; Large Coastal, Pelagic, and Small Coastal Shark Species Fishing Season Notification	66 FR 33918; 06/26/2001
Proposed Rule ID 041901A; RIN 0648-AP21	Atlantic HMS; Fisheries of the Northeastern United States; Shark Finning Prohibition	66 FR 34401; 06/28/2001
Emergency Rule ID 060401B; RIN 0648-AP31	Atlantic HMS; Pelagic Longline Fishery; Sea Turtle Protection Measures; Implementation of 2001 BO	66 FR 36711; 07/13/2001
Final Rule ID 010301C; RIN 0648-AO96	Atlantic HMS; 2001 Atlantic Bluefin Tuna Quota Specifications and General Category Effort Controls	66 FR 37421; 07/18/2001
Final Rule Inseason Action ID 072501A	Atlantic HMS; Atlantic Bluefin Tuna; Adjustment of General Category Daily Retention Limit	66 FR 40151; 08/02/2001
Final Rule ID 031500A; RIN 0648-AN97	Atlantic HMS; Atlantic Tunas Reporting, Fishery Allocations and Regulatory Adjustments	66 FR 42801; 08/15/2001
Final Rule Inseason Action ID 080201B	Atlantic HMS; Bluefin Tuna Recreational Fishery; Retention Limit Adjustment	66 FR 42805; 08/15/2001
Final Rule Inseason Action ID 082701D	Atlantic HMS; Atlantic Bluefin Tuna Fisheries; Adjustment of Daily Retention Limit; Inseason Quota Transfer	66 FR 46400; 09/05/2001
Final Rule ID 082901B	Atlantic HMS; Large Coastal Shark Species; Postponement of Closure	66 FR 46401; 09/05/2001
Final Rule Inseason Action ID 070201A	Atlantic HMS; Swordfish Quota Adjustment; Adjustment of Annual Catch Quotas	66 FR 46401; 09/05/2001
Final Rule Inseason Action ID 091201C	Atlantic HMS; Atlantic Bluefin Tuna Fishery; Harpoon Category Closure; General Category Adjustment of Daily Retention Limit	66 FR 48221; 09/19/2001
Emergency Rule ID 060401B; RIN 0648-AP31	Atlantic HMS; Pelagic Longline Fishery; Sea Turtle Protection Measures; Revision	66 FR 48812; 09/24/2001
Final Rule Inseason Action ID 092001A	Atlantic HMS; Atlantic Bluefin Tuna Fisheries; General Category Daily Retention Limit Adjustment; Harpoon Category Reopening; Quota Transfer	66 FR 49321; 09/27/2001
Final Rule Inseason Action ID 101501B	Atlantic HMS; Atlantic Bluefin Tuna; Quota Transfers; General Category Daily Retention Limit Adjustment	66 FR 53346; 10/22/2001
Final Rule Inseason Action ID 102201D	Atlantic HMS; Atlantic Bluefin Tuna; Coastwide General Category Closure	66 FR 54165; 10/26/2001

ACTION TYPE NMFS ID; RIN	ACTION DESCRIPTION	
Final Rule Inseason Action ID 110601A	Atlantic HMS; Atlantic Bluefin Tuna; Quota Transfers; General Category Reopening	66 FR 57397; 11/15/2001
Proposed Rule ID 010201A; RIN 0648-AO93	Atlantic HMS; Quotas and Fishing Areas; Trade Monitoring	66 FR 57409; 11/15/2001
Notice ID 110201D	Atlantic HMS; Advisory Panels; Notice of Intent; Request for Nominations	66 FR 57424; 11/15/2001
Final Rule Inseason Action ID 112801A	Atlantic HMS; Atlantic Bluefin Tuna; General Category Closure	66 FR 63002; 12/04/2001
Emergency Rule ID 060401B; RIN 0648-AP31	Atlantic HMS; Pelagic Longline Fishery; Sea Turtle Protection Measures	66 FR 64378; 12/13/2001
Proposed Rule ID 032900A; RIN 0648-AN06	Atlantic HMS; Monitoring of Recreational Landings	66 FR 66386; 12/26/2001
Emergency Rule ID 110501B; RIN 0648-AP70	Atlantic HMS; Commercial Shark Management Measures; Fishing Season Notification	66 FR 67118; 12/28/2001

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 2001 for Atlantic sailfish and spearfish. 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 (0.5 -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*	Not estimated	*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} = .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		F_{99}/F_{MSY} = 0.57		Not overfished; overfishing not occurring *
West Atlantic Skipjack Tuna	unknown	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	not estimated	*0.75B_{MSY}*	not estimated	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.

General Information about Research

Research continued on genetic discreteness of large pelagic fishes in the Atlantic, larval surveys for bluefin tuna and other large pelagics in the Gulf of Mexico, new methods for estimating and indexing abundance, robust estimation techniques for sequential population analyses, and estimating discards based on direct observations by scientific fishery observers. Research was also conducted on approaches for characterization of uncertainty in assessments and methods for translating that uncertainty into risk levels associated with alternative approaches.

U.S. scientists also continued to coordinate efforts for the ICCAT Enhanced Research Program for Billfish and for the Bluefin Year Program. Collaborative research with scientists from ICCAT member nations and cooperating parties continues. In early 2000, the NMFS Southeast Fisheries Science Center (SEFSC) hosted a Brazilian scientist for several months and in 2001, a Spanish scientist was also hosted for several months. The intent of this collaboration is to improve our capacity to collaborate on stock assessment research with Brazil, Spain, and other countries. Collaboration with United Kingdom, French, Spanish, and other European Community scientists on topics of evaluation of fishery management-assessment feedback approaches to ICCAT species continues.

A scientist at the University of Miami's Cooperative Unit for Fisheries Education and Research under sponsorship by the SEFSC, has conducted training under the COPEMED banner to provide tools to North African scientists so that they can increase their participation in the ICCAT assessment process of Mediterranean bluefin and swordfish. Another SEFSC scientist taught statistical methods for evaluating relative abundance patterns to a group of 21 Spanish scientists at the Instituto Tecnologico Pesquero and Alimentario (AZTI), in November 2000. An SEFSC scientist also was hosted by the Instituto Espanol de Oceanographia (IEO), in June 2001, for collaboration on methods to standardize the Spanish Baitboat CPUE series for eastern Atlantic juvenile bluefin tuna. The products of this collaborative research and training are expected to enhance stock assessment analysis capabilities in the U.S. and other ICCAT member nations. Cooperative research by NMFS and the Instituto Nacional de la Pesca (INP) in Mexico was continued, resulting in further joint analyses of longline observer program data from the Gulf of Mexico fisheries of both countries.

Several studies dealing with methodological approaches to stock assessment and dealing with environmental influences on tuna and tuna-like fisheries were conducted. SCRS/01/43 provided a Bayesian approach to standardizing catch rate time series, and SCRS/01/32 discussed the correlation (or lack thereof) of the North Atlantic Oscillation Index with west Atlantic bluefin tuna year class strength. Other research on these and additional areas are identified in the following sections.

Tagging

Participants in the SEFSC's Cooperative Tagging Center (CTC) and the Billfish Foundation Tagging Program (TBF) tagged and released 9,149 billfishes (including swordfish) and 850 tunas in 2000. This represents an increase of about 7% from 1999 levels for billfish and a decrease of 13% for tunas. A number of electronic tagging studies involving bluefin tuna and billfish were also carried out in 2000 and 2001. These are discussed in the bluefin and billfish research sections of this chapter.

There were 151 billfish recaptures from the CTC and TBF reported in 2000, representing a decrease of 49% from 1999. Among the 2000 CTC billfish recaptures there were 55 blue marlin, 12 white marlin, 65 sailfish, and 12 swordfish. For the CTC and TBF, a total of 37 tunas were recorded recaptured in 2000; these were 27 bluefin and 10 yellowfin tuna. These recaptures represent a 62% decrease with respect to 1999. 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 NMFS Cooperative Shark Tagging Program (CSTP) tagged approximately 6,000 sharks in 2001 with reported captures of 510 sharks tagged in previous years. Between 1962 and 2000, more than 165,700 sharks of 40 species have been tagged and more than 9,500 sharks of 32 species have been recaptured, as a result of the CSTP. To date, the Mote Marine Laboratory Center for Shark Research (CSR) has tagged 9,741 sharks of 16 species and has received data on 355 recaptures.

2.1 Stock Assessment Update: ATLANTIC SWORDFISH

2.1.1 Life History/Species Biology Information

This section is taken directly from the 2001 SCRS Report which summarizes all recent data on Atlantic swordfish.

Swordfish are distributed widely in the Atlantic Ocean and Mediterranean Sea, and range from Canada to Argentina on the western side, and from Norway to South Africa on the eastern side. The management units for assessment purposes are a separate Mediterranean group, and North and South Atlantic groups separated at 5°N. This stock separation is supported by recent genetic analyses. However, the precise boundaries between stocks are uncertain, and mixing is expected to be highest at the boundary in the tropical zone. Therefore, there is uncertainty as to whether the management units used correspond exactly to the biological stock units. Hence, it is important to have effective management measures throughout the Atlantic and Mediterranean.

Swordfish feed on a wide variety of prey including groundfish, pelagics, deep-water fish and invertebrates. They are believed to feed throughout the water column, following the diel migration of the deep-scattering layer by maintaining their position within a preferred level of illumination (isolume). They are typically caught on pelagic longlines at night when they feed in surface waters.

Swordfish spawn in the warm tropical and subtropical waters throughout the year, although seasonality has been reported. They are found in the colder temperate waters during summer months. Young swordfish grow very rapidly, reaching about 140 cm LJFL (lower-jaw fork length) by age 3, but grow slowly thereafter. Females grow faster than males and reach a larger maximum size. Swordfish are difficult to age, but 53% of females are considered mature by age 5, at a length of about 180 cm.

2.1.2 Recent Stock Assessment Results

In 2000 and 2001, SCRS examined updated North and South Atlantic CPUE data. The time series show similar trends to those in recent years. The available series for the North Atlantic stock continue to show signs of optimism as observed in 1999 and 2000.

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 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 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, 2001, unless otherwise indicated.

Stock (2 stocks; divided at 5°N. Lat.)	**North 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}) *Minimum Stock Size Threshold*	0.65 (0.51-1.05) *$0.8B_{MSY}$*	1.10 (0.84-1.40) *$0.8B_{MSY}$*
Current Fishing Mortality Rate F_{1998}/F_{MSY} *Maximum Fishing Mortality Threshold*	1.34 (0.84-2.05) *F_{1998}/F_{MSY}* = 1.00	0.81 (0.47-2.54) *F_{1998}/F_{MSY}* = 1.00
Maximum Sustainable Yield	13,370mt (7,625 - 15,900mt)	13,650 mt (5,028 - 19,580 mt)
Current (2000) Yield	11,210 mt	14,340 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.

2.1.4 Evaluation of Current Management Measures

Catch limits: The North Atlantic swordfish catch limit (stock-wide) for 2000 was 10,600 mt (10,200 mt landed and 400 mt discarded dead). The reported landings were 10,078 mt and the estimated dead discards were 1,132 mt. The South Atlantic catch limit for 2000 was 14,620 mt. The reported landings were 14,338 mt. In 2000, U.S. fishermen were limited to a 2,951 mt catch limit and a 320 mt dead discard allowance for North Atlantic swordfish and a 384 mt catch limit for South Atlantic swordfish. The reported landings for U.S. fishermen for 2000 was 2864.3 mt and 488.9 mt dead discards for the North Atlantic fishery, resulting in an underharvest of 87 mt, but a overage in the dead discard allowance of 168 mt. Reported landings from U.S. fishermen in the South Atlantic fishery was 51 mt, resulting in a 333 mt underharvest.

Minimum size limit: Calculations to evaluate compliance with the swordfish minimum size limit were not made by SCRS in 2000 or 2001. However, based on estimates made for 1998 fishing activities, SCRS could calculate that the percentage of landings less than 125 cm LJFL would be about 23 percent.

The Swordfish Certificate of Eligibility program was implemented to support enforcement of the U.S. minimum size requirement. That program requires that all imported swordfish be accompanied by a document stating that the fish meets the minimum size requirement, or that if it doesn't, it was harvested from other than the Atlantic Ocean. Importers must submit copies of all COEs on a bi-weekly basis which are then compared to dealer reports on purchased fish, and U.S. Customs data.

Stock structure: NMFS is concerned about the uncertainties in the stock structure of Atlantic swordfish and its management implications.

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

Note that evaluation of international management measures on a stock-wide basis can only occur based on *reported* landings and discards. A significant problem exists internationally with the underreporting of fishing activities. Therefore, overfishing of North Atlantic swordfish continues to occur, likely at a rate higher than estimated.

2.2 Stock Assessment Update: ATLANTIC BLUEFIN TUNA

2.2.1 Life History/Species Biology Information

Basic information on the life history of west Atlantic bluefin tuna can be found in the HMS FMP (Sections 2.2.1 and 6.3.1.3). There are numerous research projects underway regarding the life history of west Atlantic bluefin tuna. Much of the information below is taken from the 2001 U.S. National Report to ICCAT.

As part of its commitment to ICCAT's Bluefin Year Program (BYP), research supported by the United States has concentrated on ichthyoplankton sampling, reproductive biology, methods to evaluate hypotheses about movement patterns, spawning area fidelity and stock structure investigations. A BYP planning meeting was hosted at the SEFSC in May, 2001, to review activities of eastern and western researchers relative to further study of bluefin reproductive biology in the central North Atlantic and in the Mediterranean. The results of the initial survey of the Central North Atlantic study area are provided in SCRS/01/31 (rev).

Ichthyoplankton surveys in the Gulf of Mexico during the bluefin spawning season were continued in 2000 and 2001. 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 National Oceanographic and Atmospheric Administration laboratory in Charleston, SC is acting as a sample archive center and has tissues from all bluefin collected for stock structure research by the National Marine Fisheries Service since 1996 and some or all samples collected by researchers from various institutions including the University of South Carolina, the Virginia Institute of Marine Science, the University of Maryland and the Massachusetts Department of Marine Fisheries.

SCRS/01/54 further addressed the issue of panmixia in bluefin tuna, by examining both mitochondrial DNA control region nucleotide sequences and nuclear gene ldhA allele frequencies in replicate samples of northern bluefin tuna from the Mediterranean Sea and the northwestern Atlantic Ocean. Analyses of both types of data revealed no significant differences between samples from the two regions. The authors noted that failure to find genetic evidence for population substructure does not constitute evidence for a single panmictic population. It is possible that multiple subpopulations do exist, and that genetic differentiation at the loci analyzed in this study has not occurred because of large population sizes and/or low levels of reproductively successful migration between the sub-populations.

Researchers from the Virginia Institute of Marine Science and Texas A & M University have developed seven tetra-nucleootide markers and at least fifteen di- and tri-nucleotide markers for Atlantic bluefin. These are in addition to three single-copy nuclear DNA markers for bluefin developed by these investigators several years ago. This suite of markers potentially provides a more powerful tool for determining whether genetic differences indicative of reproductive isolation exist in Atlantic bluefin.

Scientists from the Texas A&M University, the University of Maryland and the National Marine Fisheries Service continued research on the feasibility of using otolith microconstituents to distinguish bluefin stocks. Building on prior years work, in SCRS/01/113, otolith chemistry of Atlantic bluefin tuna was measured to determine the feasibility of the approach for discriminating juveniles (age-0 and age-1) from eastern and western nurseries. Findings suggest that otolith chemistry of juvenile Atlantic bluefin from different nurseries and sub-nurseries are distinct and elemental signatures show some degree of temporal persistence, indicating the technique has considerable potential for use in future assessments of population connectivity and stock structure. The results of this research were further discussed and reported upon at the ICCAT intersessional on bluefin tuna mixing.

Research on bluefin tuna movement patterns using electronic tags and on the associated methodology was continued in 2000 and 2001. Tagging activities continued off North Carolina (scientists from Stanford University, Monterey Bay Aquarium and NMFS) and off northeast North America (by scientists from (1) New England Aquarium, Massachusetts Division of Marine Fisheries. and D.F.O. from Canada and (2) Stanford University and the Monterey Bay Aquarium). Additionally researchers from Stanford University and the Monterey Bay Aquarium continued studying the feasibility of tagging bluefin tuna in the Gulf of Mexico, successfully releasing 4 bluefin with electronic tags in 1999, about 10 fish in 2000, and 5 fish in 2001.

SCRS/01/57 reported upon the results obtained from tagging of Atlantic bluefin tuna with implantable archival and pop-up satellite archival tags, which were further discussed during the ICCAT intersessional meeting on Bluefin Tuna Mixing. A summary of pop-up satellite tagging of giant bluefin tuna in the joint U.S.-Canadian program in the Gulf of Maine and Canadian Atlantic was reported by Lutcavage et al. (SCRS/00/95) and updated in a Canadian document SCRS/01/53. These results were used to plan a long line research cruise to the central north Atlantic that took place from 26 June to 19 July, 2001 (SCRS/01/31). The results of this research was further discussed and reported upon during the ICCAT intersessional meeting on Bluefin Tuna Mixing.

The accumulation of evidence reviewed in 2001 during the Workshop on Bluefin Tuna Mixing indicates that movement of bluefin tuna across the current east/west management boundary in the Atlantic does occur. A plan for modeling taking this mixing into account was developed to integrate the accumulation of knowledge on movement into assessments and to evaluate the effectiveness of alternative spatial boundaries. Completion of this activity may allow

the commission to develop more flexible/complex management strategies. However, this activity is expected to take several years. The report therefore suggests several short term management options that could be used as interim measures, and which could be included in the next stock assessment. These include creating a central-north Atlantic management unit, in which catch limits and rigorous scientific monitoring requirements would be imposed, and expanding the western Atlantic management area by moving the boundary line east, which would include certain areas of the central-north Atlantic in the western management unit. The report of the Mixing workshop recommended that the SCRS, integrate these options, as well as the status quo, into the next assessment, scheduled for 2002.

SCRS/01/51 examined the implications of adopting the one-stock hypothesis for VPA assessments of Atlantic bluefin. The one-stock VPA gave a very similar picture to the combined results of the separate eastern and western VPA's because the catches from the East stock are much larger. The document concludes that a one-stock analysis may be useful as a reference of total population size, but is risky as a basis for setting management policies as severe overfishing of the less abundant stock may go undetected.

SCRS/01/52 discusses aspects of earlier analyses of bluefin tuna mixing. It is suggested that a key matter of concern is the different growth curves used at present for West and East, which cause mixing analyses to be internally inconsistent in treating some fish of rather different lengths as having the same age. The document suggests a possible solution to this is to move towards length-based assessments, which it also notes may provide a more reliable basis for modeling the catches of larger fish than the present assumption of temporally invariant F10+/F9 ratios.

SCRS/01/56 pointed out that the substantial life history differences between Eastern and Western populations favor the idea that Atlantic bluefin tuna is not a true metapopulation and that the overlap model probably has more credence than the diffusion model. However, alternate or anomalous migration pathways within populations *(i.e.* contingent structure) of bluefin tuna will not be accommodated easily into models until we learn more about them and their causes. Otolith microconstituent studies are proposed as perhaps the most effective means of doing this.

SCRS/01/55 points out that the life history and tagging data support the idea that at least two biotypes exist for Atlantic bluefin tuna, but that none of the data so far available are sufficient to rule out any of the mixing-related hypotheses (other than the hypothesis that movement across the 45ºW line is negligible). Inasmuch as the management advice may differ under different mixing scenarios, the authors advocate a Bayesian decision-analysis whereby the potential consequences of alternative management actions are evaluated under several plausible model scenarios keeping in mind the weight of evidence in support of each model.

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. No new stock assessment was conducted Atlantic bluefin tuna (East or West) in 2001. 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 percent probability of allowing rebuilding to the associated B_{MSY} level by 2018. A constant catch of 2,500 mt per year has about a 56 percent 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 percent probability of allowing rebuilding to the 1975 stock size, and with a constant annual catch of 2,500 mt there is about a 47 percent 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, and an assessment was not conducted in 2001. 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 and 2000 totaled over 34,000 and 32,000 mt, respectively. 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 2001 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 2001 ICCAT meeting (See Section 1 of the SAFE report for more information on activities at ICCAT). 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 2001 meeting, ICCAT adopted a recommendation to support continued bluefin tuna research in the central north Atlantic.

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 (2000) Yield	2,395
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		High Recruitment Scenario	
	B/B_{1975}	B/B_{MSY}	B/B_{1975}	B/B_{MSY}
500	98 %	100 %	99 %	86 %

Catch (mt)	Low Recruitment Scenario		High Recruitment Scenario	
1,000	94 %	100 %	99 %	79 %
1,500	87 %	100 %	97 %	71 %
2,000	74 %	100 %	87 %	62 %
2,300	61 %	99 %	82 %	53 %
2,500	56 %	94 %	74 %	47 %
2,700	47 %	86 %	71 %	43 %
3,000	34 %	75 %	62 %	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 (2000) Yield	31,935 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 continued 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 latest stock assessment of Atlantic bigeye tuna was conducted 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. The next assessment of Atlantic bigeye is scheduled for the fall of 2002.

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 established the first-ever catch limits for bigeye tuna, which went into effect in 2001. At the 2001 meeting, ICCAT adopted a similar recommendation for 2002. While the measures adopted will not be sufficient to rebuild the stock, bigeye catches in 2000 (approx. 99,000 mt) were down significantly from the 1999 level of 120,883 mt, 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 (2000) Yield	98,608 mt
Current (1998) 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 2001, Several collaborative studies were conducted by U.S. scientists in cooperation with scientists from other countries. One collaborative study (SCRS/01/44) investigated the effect of time-correlated uncertainty on the management of yellowfin tuna stocks, while another (SCRS/01/39) investigated time trends in abundance and catchability of yellowfin tuna and their relationship to the North Atlantic Oscillation index.

Cooperative research by the NMFS and the INP in Mexico continued. Cooperative research plans include further development of abundance indices for sharks and other tunas, as well as the refinement of the yellowfin tuna indices as additional data becomes available. Cooperative research on yellowfin tuna abundance indices, catch at age, and life-history studies is also continuing with Venezuelan scientists.

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 latest stock assessment for Atlantic yellowfin tuna, conducted in 2000, incorporated various age-structured and production models. 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_{99}/B_{MSY} = 1.03 $0.5B_{MSY}$ (age 2+)
Current Relative Fishing Mortality Rate F_{1999}/F_{MSY} *Maximum Fishing Mortality Threshold*	F_{99}/F_{MSY} = 0.88 - 1.16 F_{year}/F_{MSY} = 1.00

Maximum Sustainable Yield	144,600 - 152,200 mt
Current (2000) Yield	135,200
Current (2000) 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

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

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 the North Atlantic stock/management unit, as well as minor catches of South Atlantic albacore.

The latest stock assessment for Atlantic albacore tuna was conducted in 2000. Results of the North Atlantic assessment were consistent with previous findings. Equilibrium yield analyses 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. A recommendation to continue this level of catch in 2002 was adopted at the 2001 ICCAT meeting.

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 (2000) Yield	33,134 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 (2000) Yield	26,310 mt
Current Replacement Yield	29,200 mt (12,100 - 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, the SCRS has not conducted a stock assessment for Atlantic (west or east) skipjack tuna since 1999, and few definitive conclusions on the status of the stocks can be made.

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 (2000) Yield	26,406 mt
Current Replacement Yield	not estimated

Outlook	unknown

2.4 Stock Assessment Update: ATLANTIC BILLFISH

2.4.1 Life History/Species Biology Information

Blue and White Marlin

Blue and white marlin are found throughout tropical and temperate waters of the Atlantic ocean and adjacent seas, and range from Canada to Argentina on the west side, and from the Azores to South Africa on the eastern side. Blue marlin are large apex predators with an average weight of about 100-175 kg. The average size of white marlin is about 20-30 kg. Blue marlin have an extensive geographical range, migratory patterns that include trans-Atlantic as well as trans-Equatorial movements, and are generally considered to be a rare and solitary species relative to the schooling scombrids. Although white marlin are generally considered to be a rare and solitary species, they are known to occur in small groups consisting of several individuals. Blue marlin are considered sexually mature by ages 2-4, spawn in tropical and and subtropical waters in the summer and fall, and are found in the colder temperate waters during the summer. Young blue marlin are one of the fastest, if not the fastest growing of all teleosts, reaching from 30-45 kg by age 1. Female white and blue marlin grow faster and reach a much larger maximum size than males. Very little is known about the age and growth of white marlin, although they are considered to be very fast growing, as are all the Istiophoridae.

Blue and white marlin feed on a wide variety of fish and squid. They are found predominately in the open ocean near the upper reaches of the water column and are caught most frequently as a bycatch by the offshore longline fisheries which target tropical or temperate tunas using gear intended to fish shallow. However, significant bycatch landings are also made by offshore longline fisheries that target swordfish and bigeye tuna using gear intended to fish deep.

The 4th Billfish Workshop reviewed all available data on stock structure and concluded that the single Atlantic hypothesis should be used as the management unit for blue and white marlin.

Sailfish/Spearfish

This section was excerpted in its entirety from SCRS (2001).

Sailfish and spearfish have a pan-tropical distribution. Although sailfish have highest concentrations in coastal waters (more than any other Istiophorid), they are still found in oceanic waters. Spearfish are most abundant in offshore temperate waters. No trans-Atlantic movements have been recorded, suggesting a lack of mixing between east and west. Although sailfish and spearfish are generally considered to be rare and solitary species relative to the schooling scombrids, sailfish are the most common Atlantic Istiophorid and are known to occur along

tropical coastal waters in small groups consisting of at least a dozen individuals. Spearfish are generally the rarest Atlantic Istiophorid.

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

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

Sailfish are managed under a two-stock hypothesis. NMFS manages only the West Atlantic sailfish stock.

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.

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 (.25-.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 (900-2000 mt)	700 mt
Current (2000) Yield	3,155 mt	<1999 yield (information is incomplete)	506 mt (information is 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 Measures

SCRS (2001) states that the current assessment indicates that the blue and white marlin stocks are unlikely to recover if the landings of the 1996 ICCAT recommendation continue into

the future. Time area closures, reductions in fleet-wide effort, release of live fish, a better estimation of dead discards, and scientific observer sampling could be considered.

2.4.4 Evaluation of Current Management Measures

Catch Limits: While some countries have already implemented the billfish catch limits, information is not yet available to evaluate the effects of regulations agreed to at ICCAT in 2000 (e.g., reduction in landings).

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

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

There are no management measures in place specifically for sailfish/spearfish, with the exception of a spearfish possession prohibition.

2.5 Stock Assessment Update: ATLANTIC SHARKS

2.5.1 Life History/Species Biology Information

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

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

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

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

Tagging Studies

In order to continue to delineate shark distributions and migratory patterns, in 2001, the Cooperative Shark Tagging Program (CSTP) tagged approximately 6,000 sharks and 510 sharks tagged in previous years were recaptured. Between 1962 and 2000, more than 165,700 sharks of 40 species have been tagged and more than 9,500 sharks of 32 species have been recaptured as a result of the CSTP. Eighty-seven percent of the tags were represented by eight species: blue shark, sandbar shark, dusky shark, tiger shark, shortfin mako, blacktip shark, scalloped hammerhead, and Atlantic sharpnose shark. The number of sharks tagged varied from two for the smalleye hammerhead to 91,488 for the blue shark. Numbers of recaptures by species ranged

from one for the Greenland shark to 5,409 for the blue shark. Eighty-eight percent of the recaptures were made up of seven species: blue shark, sandbar shark, tiger shark, shortfin mako, lemon shark, dusky shark, and blacktip shark.

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

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

In June, the MEXUS-Gulf coastal shark survey was staged from Veracruz, Mexico on the R/V ONJUKU, and was conducted in the Gulf of Mexico along the Yucatan peninsula coast of the Bay of Compeche, Mexico. Gear included a one nautical mile monofilament mainline (940 lb test), 12 foot gangions of 730 lb test monofilament, #15/0 circle hooks baited with Atlantic bonito, and 11 lb weights at the start, mid, and end of the mainline. Bottom longline effort was 100 hooks fished for one hour (time from the last radar bouy being deployed to the first radar bouy being retrieved). The survey produced 37 sharks represented by 3 species caught in 38 sets. The most frequently captured shark was the Atlantic sharpnose shark (n=30), followed by the blacknose shark (n=4), and bonnethead (n=3). All viable live sharks were tagged and released

(n=33). Seventeen species of incidental catch (n=117) were recorded including red drum (n=23), hardhead catfish (n=23), red snapper (n=4), and southern stingray (n=16).

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

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

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

The CSR has also conducted tagging studies with the cooperation of the Instituto Nacional de la Pesca (INP) in Mexico. In the six field trips to date (1995, 1996, 1997, 1998, 2000, 2001), a total of 390 gillnet sets have been made resulting in the capture and tagging of 1,160 juvenile blacktip sharks with Spanish/English dart tags. In addition to blacktip sharks,

several other shark species have been documented inside the lagoon including the bonnethead, lemon shark, nurse shark and Atlantic sharpnose shark.

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

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

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

Research

To investigate post-release survivorship, a two-phase study was undertaken on the relationship between exhaustive exercise and recovery rates in neonatal and juvenile sandbar sharks in 1999 utilizing sharks made available by the COASTSPAN Delaware Bay sampling program (Spargo et. al. 2001). The first phase involved a field study that would mimic the natural conditions facing sandbar sharks when subjected to angling and would quantify the effects of exhaustive exercise. The second phase, with the sharks in captivity, experimentally reproduced the recovery phase that would naturally occur after exposure to exhaustive exercise. The purpose

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

2.5.2 Most Recent Stock Assessment Data

No new stock assessments were conducted for Atlantic sharks in 2001, although assessments for large coastal and small coastal sharks had been scheduled for this year. These assessments are now rescheduled for 2002. 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. Additional information on recent management and plans for the 2002 assessments can be found in Section 4.5 of this report.

In addition to the NMFS assessment of small coastal sharks, Mote Marine Laboratory and the Florida Museum of Natural History are assessing the status of small coastal shark species in the Gulf of Mexico and western North Atlantic. This project is funded by Florida Sea Grant. Age-structured population models have been developed and are in their final testing phase. The final data for the models are being collated and model runs using the final data should be finished and the final report written by mid-2002.

The SCRS Subcommittee on Bycatch has recommended that ICCAT take the lead in conducting stock assessments for Atlantic blue, porbeagle and shortfin mako sharks. The subcommittee held a data preparatory meeting to review all available shark statistics in September, 2001. Numerous papers on catches and catch rates as well as two papers on assessment methodologies were presented. The subcommittee emphasized that, although available basic fishery statistics were yet incomplete for many of the commercially important species, information on life history parameters for shark species was relatively good. Therefore, assessment models emphasizing knowledge about life history parameters will be one option for the assessment. Other methods using long-term tagging data were also suggested. It was also pointed out that the estimation of total removals by all fleets, including dead discards, needs to be given priority in reporting to permit conducting these assessments.

The Commission is considering adopting via mail vote a resolution that the SCRS should conduct assessments for Atlantic shortfin mako and blue sharks in 2004, and hold an interim

meeting in 2003, as SCRS considers necessary, to determine improvements in data collection. The Commission is also considering a resolution that all contracting parties, non-contracting parties, entities, and fishing entities should:

a) submit catch and effort data, including dead discard estimates, for porbeagle, shortfin mako, and blue sharks;

b) encourage live release of live sharks, to the extent possible, that are caught incidentally, especially juveniles;

c) minimize waste and discards from shark catches in accordance with article 7.2.2(g) of the Code of Conduct for Responsible Fisheries; and

d) voluntarily agree not to increase fishing effort targeting Atlantic porbeagle, shortfin mako, and blue sharks until sustainable levels of harvest can be determined through stock assessments.

Cortes (2001) updated catch rate information for pelagic sharks of the northwestern Atlantic, Gulf of Mexico, and Caribbean and analyzed trends. Available catch per unit effort time series include commercial data from the mandatory logbooks, vessel weigh-out records, observer reports, and recreational data from the Large Pelagic Survey. Time series were available for mako and thresher species, and blue, oceanic whitetip, and porbeagle sharks. Analysis of catch rate trends revealed that nine of the fourteen series had negative slopes, of which seven were significant, and five had positive slopes, of which one was significant. Two out of four series for blue sharks exhibited significant negative slopes and one had a significant positive slope. For makos, four of five series had negative slopes, three of which were significant. One of two series for both thresher sharks and oceanic whitetip sharks was significantly negative and the other positive, but not significantly. The one series for porbeagles had a non-significant negative slope (Cortes 2001).

A fishery-independent assessment of large and small coastal shark populations in coastal nursery areas of the northeast Gulf of Mexico was conducted using longlines and gillnets in two fixed sampling areas (Carlson 2001). Details on the sampling design are reported in Carlson and Brusher (1999). Visual examination of both nominal and standardized catch rate series found most species with no clear trend in the index. A slight declining trend was found for finetooth sharks, and for bonnetheads in the gillnet series (Carlson 2001).

Dusky Shark Status Review

The dusky shark was listed on the Endangered Species Act (ESA) Candidate Species List in 1997 due to its depleted stock status and concern for further stock declines. Inclusion on the Candidate Species List does not have any regulatory impacts; it is meant to highlight concern for the species and to encourage proactive conservation measures. (In 1999, regulations implementing the HMS FMP added the dusky shark to the prohibited species management group and prohibited possession of the dusky shark in commercial and recreational fisheries; however, a court injunction prevented implementation of the prohibition in commercial fisheries until June

2000.) In order for a species to be considered for a proposal for listing as threatened or endangered under ESA, a review of the population status and sources of mortality must be conducted. NMFS solicited this status review for dusky sharks, which was completed in 2001.

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

Length frequency analyses of CSFOP data indicate a distinct shift in catch composition from a widely scattered size distribution in 1994 to catches comprised primarily of sharks less than 110 cm FL (0-2 age classes) in 1999 (Romine et al. 2001). VIMS data show a decrease in relative abundance from 1980 to 1992, however recent years (1997 to 2000), have shown an increase in relative abundance. CSFOP catch rate data show an increase from 1974 to 1999, particularly for dusky sharks less than 110 cm FL, although catch rates of sharks greater than 170 cm FL declined over the period. The decrease in catch rates of older mature animals was also seen in the VIMS data. The increase in catch rates of small sharks does not appear to be caused by a shift of the fishery to inshore waters where small sharks are more abundant because depth of set locations increased for the time period (Romine et al. 2001).

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

Canadian Assessment of Porbeagles

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

estimates for a natural mortality rate of 0.10, which increase after sexual maturity (0.20 in females) (Campana et al. 2001).

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

Table 2.5.1 Summary Table 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

Research funded primarily through the NMFS HMS Management Division extended the Mote Marine Laboratory Center for Shark Research (CSR) shark nursery studies in the eastern Gulf of Mexico from 1992-2001, allowing relatively continuous sampling of the juvenile sharks in these nurseries in the years between the two NMFS/MARFIN projects (1993-1995) as well as the years subsequent to MARFIN funding (1997-2001). This NMFS-sponsored research included exploratory surveys, standardized gill net collections, abundance studies, and conventional tagging and acoustic tracking of juvenile sharks in nursery areas of the Florida Gulf coast. Relative abundance of juvenile blacktip sharks in the nursery areas of Yankeetown and Charlotte Harbor, Florida, continued to be monitored in 1999 and 2000. Gill net surveys during those years resulted in the capture of seven shark species and 907 sharks, of which 435 were tagged and released.

A number of other studies have contributed to the body of 1991-2001 CSR data on shark nursery areas in the eastern Gulf of Mexico. These include: collaborative field collections and shark tagging with Florida Department of Environmental Protection; an ongoing study of juvenile blacktip shark movements and habitat using acoustic tracking (initially funded by NMFS/HMS, now supported primarily by the National Science Foundation); and studies of the endocrinology and reproduction of the bonnethead shark. Among these was a major U.S. Environmental Protection Agency-funded project on the mechanisms and effects of endocrine disruption in the bonnethead shark. This research involved extensive field work and collections of small sharks in eastern Gulf coastal waters from 1998-2000, resulting in the capture of 1,439 sharks of 8 species, with 772 being tagged and released.

An array of acoustic receivers deployed within Terra Ceia Bay, a known blacktip shark primary nursery area inside Tampa Bay, has been used to monitor the long-term movements and behavior patterns of young blacktip sharks. Over the course of three years, 91 neonate blacktip

sharks were fitted with acoustic transmitters and monitored for periods of 1-167 days. Data from these animals suggest three types of movement/behavior patterns: 1) animals that leave the nursery area after a relatively short duration and do not return; 2) animals that move into and out of the nursery area; and 3) animals that remain within the nursery area until the end of the summer when they leave to migrate south. The initial activity space of juvenile blacktip sharks inside Terra Ceia Bay is small and confined to one portion of the nursery area. However, habitat use increases over time as the sharks expand their home ranges and the proportions of the bay used. Temperature appears to provide a strong cue for animals to leave the nursery area as the colder fall months approach.

In addition to these various projects in the eastern Gulf, the CSR also has collected data on shark nursery areas along the east coast of Florida (in collaboration with the University of Central Florida), the Texas Gulf coast (in collaboration with the Texas Parks and Wildlife Department), and at a number of locations in Mexican coastal waters (in collaboration with Mexico's Instituto Nacional de la Pesca (INP). These activities have been largely supported by NMFS/HMS funding to the CSR. The Texas research is an ongoing effort to study the exchange rate of western Gulf sharks between the United States and Mexico. The work in Mexico with the INP is a long-term program, established in 1994, to understand the status of Mexican shark resources and distribution of shark nursery areas in Mexico.

A study of juvenile sharks in Apalachicola Bay is underway to examine resource partitioning, prey type and size selectivity, and habitat overlap for Atlantic sharpnose, blacktip, spinner, and finetooth sharks (Bethea et al. 2001). Preliminary diet analyses show teleost fish to be an important prey item for all four species, however, there is evidence of some resource partitioning (e.g., epibenthic vs pelagic teleost prey). Further quantification of habitat use by blacktip and spinner sharks will be examined using biotelemetry. Results will provide a better understanding of juvenile shark foraging ecology and habitat utilization.

2000 Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) Survey (McCandless and Pratt, 2001)

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

In 1998, the 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. Results presented here are a summary of the work conducted in 2000, the third year 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.

State cooperators in 2000 included the North Carolina Division of Marine Fisheries, the South Carolina Department of Natural Resources, and the University of Georgia Marine Extension service. Researchers from the NMFS APP and the University of Rhode Island conducted the COASTSPAN study in Delaware Bay. COASTSPAN is funded by the NMFS Highly Migratory Species Management Division.

COASTSPAN cooperators sampled a total of 2,132 sharks in 2000. Seven hundred and fifty-five of the sharks sampled were tagged with fin tags and released. Neonate and juvenile sharks caught by the cooperators included the following: Atlantic sharpnose, blacknose, blacktip, bonnethead, finetooth, lemon, nurse, sandbar, sand tiger, scalloped hammerhead, tiger, and spinner sharks.

DELAWARE BAY: COASTSPAN results show the importance of Delaware Bay as a pupping and nursery ground for sandbar sharks, and in the HMS FMP it has been designated EFH for the species. In addition, the middle and lower Bay has been designated a Habitat Area of Particular Concern for this species, consistent with provisions of the EFH regulations. Sandbar sharks in the Bay were captured from May through September of 2000 in waters with temperatures ranging from 15.5° to 26.0° C, salinity from 18.3 to 30.1 ppt, and depths from 1.6 to 23.0 m. Neonate and juvenile sandbar sharks were most abundant along the Bay's western shore from Pickering Beach to Broadkill Beach, with some localized abundance around shoals and ship wrecks on the New Jersey side of the Bay. Neonates were more abundant than juveniles, especially along the Delaware coast of the Bay, taking refuge in the shallow, protected (lower current) areas on both sides of the Bay. The less numerous juveniles appeared to be more evenly distributed throughout the Bay. Although present, neither neonates nor juveniles appeared to be abundant throughout the deeper waters in the center of the Bay. Sharks that were caught near the mouth of the Bay were only captured in late September. It is probable that their presence in the lower Bay is related to their fall migration south to the overwintering nursery grounds off North Carolina and South Carolina.

Sand tiger sharks, although far fewer in numbers than sandbar sharks, were also found in Delaware Bay, in water temperatures ranging from 19.0° to 26.0° C, salinity from 23.0 to 25.7

ppt, and depths from 2.8 to 7.0 m. The presence of these individuals, which were of juvenile size, suggest that the Bay may be a secondary nursery ground for this species.

NORTH CAROLINA: Sharks in North Carolina were sampled during June and July of 2000. Species composition consisted of Atlantic sharpnose, blacktip, finetooth, sandbar, scalloped hammerhead, and spinner sharks. Atlantic sharpnose sharks were the most commonly caught sharks sampled, followed by spinner and scalloped hammerhead sharks. With the exception of the Atlantic sharpnose sharks, most of which were adults, most of the sharks captured were neonates and juveniles. Water temperatures where the sharks were captured ranged from 19.4° to 29.3° C, and water depths from 3.0 to 14.2 m.

SOUTH CAROLINA: Sharks in South Carolina were sampled from April to November of 2000. Species composition consisted of Atlantic sharpnose, blacknose, blacktip, bonnethead, finetooth, lemon, nurse, sandbar, scalloped hammerhead, spinner, and tiger sharks. Atlantic sharpnose sharks were the most commonly caught sharks sampled, followed by blacknose and finetooth sharks. With the exception of the Atlantic sharpnose sharks, most of which were adults, most of the sharks captured were juveniles. Water temperatures where the sharks were captured ranged from 15.0° to 30.0° C, and water depths from 1 to 15 m.

GEORGIA: Sharks in Georgia waters were sampled from May to September of 2000, with effort focused in the St. Andrew, St. Simons, and Altamaha Sound systems. Species composition consisted of Atlantic sharpnose, blacktip, bonnethead, finetooth, sandbar, scalloped hammerhead, and spinner sharks. Atlantic sharpnose sharks were the most commonly caught sharks sampled, followed by bonnethead and blacktip sharks. Nearly all of the sharks captured were neonates and juveniles, with neonates outnumbering the juveniles. Water temperatures where the sharks were captured ranged from 26.4° to 30.8° C, salinity from 21.6 to 36.6 ppt, and water depths from 2.4 to 13.1 m.

3.2 Atlantic Billfish

Blue Marlin Spawning and Nursery Habitat Research (Serafy et. al., 2001)

Fishing has led to significant and continuing declines in billfish stocks, particularly those of the Atlantic blue and white marlin. A major barrier to effective management is the lack of fundamental biological knowledge of these highly migratory oceanic predators and the dynamics of their “blue water” environment. Data pertaining to their distribution, abundance, and seasonality are relatively rare. This, combined with the great difficulty in identifying young billfish to species, has limited our understanding of their distribution and abundance as well as the timing and location of spawning activity. Without knowledge of the spatio-temporal extent of spawning and nursery grounds, fishery managers cannot consider the use of measures such as time-area fishing closures and protecting critical habitats.

The SEFSC and the University of Miami are cooperatively undertaking a project that examines EFH for blue marlin focusing on Exuma Sound, a semi-enclosed body of water bounded by the islands of the Bahamas. Sampling for larval billfish was conducted in July of 2000 throughout the sound's surface waters and in adjacent, open waters of the Atlantic Ocean. The objectives of this effort were to explore the Sound's surface waters for early life stages of billfish, examine patterns of larval billfish occurrence, density and size, and to estimate when and where spawning likely occurred.

The study yielded very high numbers of larval blue marlin - of 99 billfish larvae collected, 90 were identified as blue marlin and three as sailfish. They were collected primarily in the eastern half of the Sound, with highest densities in areas where exchange with waters of the Atlantic is greatest. Surface water temperature ranged from 28.5° to 30.0° C, and salinity from 35.8 to 36.8 psu. Larval age estimates, distributional data, and surface transport information suggest that the larvae collected were the result of recent spawning - less than 18 days prior to sampling - at or near the mouth of Exuma Sound, and that this area may extend southeast beyond the mouth possibly as far as 200 km.

Results indicate that, clearly, this water body can function as a nursery area for blue marlin, and possibly other billfish species, at least during the summer. However, before the Sound's importance as blue marlin nursery habitat can be ascertained, further sampling is required to assess the frequency and magnitude of larval entrainment into the Sound and growth and survivorship rates of those entrained. Research of this type may represent a first step towards the ultimate protection of areas that appear important for blue marlin and possibly other highly migratory species.

3.3 Atlantic Bluefin Tuna

Movements and Environmental Preferences of Atlantic Bluefin Tuna

The cooperative Stanford University/NMFS study addressing the trans-Atlantic movements and thermal biology of Atlantic bluefin tuna has provided valuable information on the migratory and diving behavior of the species, and the environmental conditions it encounters (Block et. al., 2001). These studies, which were initiated in 1996, were conducted using pop-up archival satellite tags that download data to a computer via satellite once released from the fish and also archival tags that are implanted in the fish where they continuously record data. A total of 377 bluefin tuna have been tagged with one or both of these tags off the east coast of North America. In addition, 7065 bluefin tuna have been conventionally tagged in the winter Carolina fisheries. Eighteen percent of the archival tagged bluefin tuna and 4 percent of conventionally tagged bluefin tuna have been recaptured, and data has been acquired from 90 percent of the deployed pop-up tags. The information obtained from these sources has provided an insight into the seasonal movements and environmental preferences of the species. It has also provided

valuable information regarding the question of mixing of the western and eastern populations of the Atlantic bluefin tuna.

Bluefin tuna tagged in the west displayed four types of migratory behavior: (1) western Atlantic residency for one year or more without visiting known spawning areas, (2) western Atlantic residency for one year with Gulf of Mexico visitation during the breeding season, (3) trans-Atlantic movements to the east Atlantic and back in the same year, and (4) trans Atlantic movements from the west to the east Atlantic or Mediterranean Sea after 1 to 3 years of western residency. A significant finding of the study, however, is that western and eastern populations of bluefin tuna "mix" to a far greater degree than previously thought. The study concludes that there is a mixing of tuna in western and eastern feeding grounds, but that the fish may separate for spawning in either the Gulf of Mexico or Mediterranean Sea, the two known major breeding grounds for the bluefin tuna.

Most bluefin tuna tagged off the North Carolina coast remained there in the winter and proceeded offshore in the early spring. Offshore movements were along the Gulf Stream eastward toward Bermuda or southeast toward the Bahamas. The majority displayed a western residency track the year after release, moving from the Carolinas along the northern edge of the Gulf Stream in the spring and toward the New England and Canadian shelf in the summer, remaining there through the autumn while often ranging into the mid-North Atlantic, and returning to the Carolinas or Bahamas by winter. Western-tagged bluefin tuna are capable of moving from the continental shelf of North America to the eastern Atlantic in 40 days, migrating from the west to the east and back again in the same year, indicating that these bluefin tuna are vulnerable to fishing mortality from all Atlantic bluefin tuna fisheries.

Adolescent and mature western-tagged bluefin tuna display western residency for 1 to 3 years without moving to either breeding ground. Twelve archival-tagged bluefin tuna showed visitation to Gulf of Mexico breeding grounds during the spawning season, and exiting the Gulf in late June, traveling toward northern waters. Seven bluefin tuna were recaptured in the eastern Mediterranean Sea, south of Malta or north of Sicily, in mid-May and June. That west Atlantic bluefin tuna move to both the Gulf of Mexico and the eastern Mediterranean Sea during the breeding season emphasizes the need to protect both of these major spawning regions as they both directly affect the western fishery.

Archival tags also provided data on vertical movement patterns, environmental preferences, and thermal biology of the Atlantic bluefin tuna. Bluefin tuna most often occupy the upper 300 m of the water column and occasionally dive 1000 m to deep cold waters. Measurements of internal body temperature indicated large thermal gradients between ambient and internal temperatures can occur. Although individuals experienced a wide range of environmental temperatures, from 2.8˚ to 30.6˚ C, they maintained a relatively constant internal temperature of about 25˚ C. Maintaining a high stable body temperature may enhance muscle power, enabling the tuna to swim rapidly. Several mature bluefin tuna occupied waters warmer

than 23˚ C for short durations throughout the year. These included encounters in warm core rings off New England, Gulf stream waters off North Carolina, the Florida-Georgia Bight, the Bahamas, Bermuda, and the eastern Caribbean Sea.

Beginning in 1997, studies led by the New England Aquarium have implanted pop-up and pop-up archival satellite tags on northern Atlantic bluefin tuna. In the first year of the study, working with fishermen in the rod and reel, harpoon, and purse seine fisheries, researchers tagged and released 20 giant bluefin tuna with pop-up satellite tags (Lutcavage et. al., 1999). Seventeen tags jettisoned from the fish on schedule (late January through late July) and reported their locations. The 12 tags reporting during May-July were all located north of 33˚ N latitude, in a region of the mid-Atlantic Ocean bounded by Bermuda and the Azores. Their initial findings demonstrated the presence of adult bluefin tuna in the mid-Atlantic region during their presumed spawning period. This finding challenged one of the main assumptions underlying current management policies, that the western Atlantic stock of bluefin tuna spawn exclusively in the Gulf of Mexico.

Since 1998, working with NMFS and Canada's Department of Fisheries and Oceans scientists, the NW Atlantic tagging team led by the New England Aquarium deployed additional pop-up tags. Results from the 1998 season tags show a mid-Atlantic distribution of giant bluefin that is consistent with results from the previous year. In 1998, the team successfully tested the newly developed pop-up archival tags that record light levels, in order to provide a daily estimate of geolocation. A summary of pop-up satellite tagging of giant bluefin tuna in the joint United States/Canadian program in the Gulf of Maine and Canadian Atlantic Ocean was reported by Lutcavage et. al. (SCRS/00/95).

Tracking Adult and Juvenile Northern Bluefin Tuna using Ultrasonic Telemetry

Two recent studies used ultrasonic depth-sensitive transmitters to track the movements of adult (Lutcavage et. al., 2000) and juvenile (Brill et. al., in press) northern Atlantic bluefin tuna in the northwest Atlantic Ocean. The study on adult fish took place in the Gulf of Maine and the juvenile study tracked fish off the coast of Virginia.

In the study on adult fish, transmitters were attached to 11 free-swimming fish (136 to 340 kg estimated body mass) during the late summer and early fall of 1995-1997, and were each tracked for up to 48 hours. Mean swimming depth for all adult fish was 14 (+/- 4.7) m and maximum depth for individuals ranged from 22 to 215 m. All but one fish made their deepest descents at dawn and dusk. In general, adult bluefin tuna spent < 8 percent of their time at the surface (0 to 1 m), <19 percent in the top 4 m, but > 90 percent in the uppermost 30 m. Sea surface temperatures during tracking were 11.5 to 22.0 ° C, and minimum temperatures encountered by the fish ranged from 6.0 to 9.0 ° C. The tracked bluefin tuna and their schools frequented ocean fronts marked by mixed vertebrate feeding assemblages, which included seabirds, baleen whales, basking sharks, and other bluefin schools.

In the study on juvenile fish, transmitters were attached to 5 fish (6.8 to 18.7 kg estimated body mass) during the late spring and summer of 1998, and each were tracked for 30 to 48 hours. The fish spent the majority of their time over the continental shelf in relatively shallow water (generally > 40 m deep). They made use of the entire water column in spite of relatively steep vertical thermal gradients (≈24°C at the surface and ≈12C°at 40 m depth). The fish were found to spend the majority of their time (≈90 percent) above 15 m and in water warmer than 20°C. Their horizontal movements were uncorrelated with sea surface temperature. This most likely results from the inability of juvenile bluefin tuna to detect the relative minor horizontal temperature gradients (generally less then 0.5°C km^{-1}) due to the steep vertical temperature gradients (up to ≈0.6°C m^{-1}) they experience during their rapid vertical movements. In contrast, based on satellite-derived ocean color data, water clarity did appear to influence behavior. The fish remained in the intermediate water mass between the highly turbid and phytoplankton-rich plume exiting the Chesapeake Bay (and similar coastal waters) and the very clear oligotrophic water east of the continental shelf break.

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4. FISHERY DATA UPDATE

In this section of the 2002 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: 2001 (NMFS, 2001b), 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 August 15, 2001 (66 FR 42780). On January 17, 2002, NMFS published a notice that the 2001 LOF remains in effect for 2002 (67 FR 2410). 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 catch-all 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 2001 SCRS Report which

reflects catch data on a calendar year basis through 2000. 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 2000 U.S. vs International Catch of HMS (mt ww) other than sharks.** Source: SCRS, 2001; NMFS, 2001b).

Species	Total International Reported Catch	Region of U.S. Involvement	Total Regional Catch	U.S. Catch	U.S. Percentage of Regional Catch	
Atlantic Swordfish	40,959.98 (Atlantic and Mediterranean)	North Atlantic (NA) and South Atlantic (SA)	25,550 (11,210 NA, 14,340 SA)	2,915.3 (488.9 mt discards) (2,864.3 + 488.9 mt discards NA, 51 mt SA)	11.4% (25.55% NA, 0.36% SA)	7.12% (includes Med catches)
Atlantic Bluefin Tuna	36,022.97	West Atlantic	2,395	1,212 (173 mt discards)	50.61%	3.36%
Atlantic Bigeye Tuna	99,981.93	Total Atlantic	99,981.93	574	0.57%	0.57%
Atlantic Yellowfin Tuna	135,231.2	West Atlantic	28,129	7,051	25.07%	5.21%
Atlantic Albacore Tuna	69,262.19	North Atlantic	33,134	406	1.23%	0.59%
Atlantic Skipjack Tuna	139,301.7	West Atlantic	26,406	44	0.17%	0.03%
Atlantic Blue Marlin	3,154.717	North Atlantic	818	83.7 (59.7 mt discards)	10.23%	2.65%

Species	Total International Reported Catch	Region of U.S. Involvement	Total Regional Catch	U.S. Catch	U.S. Percentage of Regional Catch	
Atlantic White Marlin	839.449	North Atlantic	317	41 (40.8 mt discards)	12.93%	4.88%
Atlantic Sailfish	1,901.255	West Atlantic	506	47.3 (mt discards)	9.35%	2.49%

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 retained or discarded for economic and regulatory reasons. A complete discussion of the pelagic longline fishery can be found in the final environmental impact statement to reduce bycatch in the Atlantic pelagic longline fishery (NMFS 2000). This gear type is possibly the most regulated of all HMS gear types due to the nature of the gear and its catch/bycatch.

Bycatch in this fishery is discussed in Section 4.1.4 and Section 8 of this document. Like fishermen using other fishing gears, pelagic longline fishermen are subject to minimum sizes for yellowfin, bigeye, and bluefin tuna, and swordfish 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 are also time/area closures for pelagic longline fishermen designed to reduce the incidental catch of bluefin tuna and sea turtles. In order to enforce time/area closures and to monitor the fishery, NMFS would like to require all pelagic longline vessels to report positions on an approved vessel monitoring system (VMS). Implementation of the VMS program is delayed pending the outcome of ongoing litigation.

In addition to regulations designed to reduce bycatch and bycatch mortality, pelagic longline fishermen are subject to quota management for swordfish, sharks, and bluefin tuna. Quota monitoring requires seasonal regulations, closures, and in some cases target catch requirements. In order to document catch and effort, pelagic longline fishermen are subject to permitting and reporting requirements, including logbooks and observer coverage. In 1999, 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.

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 1996-2000 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 1996-2000 (mt ww)*. Source: NMFS 2001b and NMFS 2001a.

	1996	1997	1998	1999	2000
Swordfish *landings*	3,599.8	3,350.1	3,158.9	3,047.6	2,968.6
Swordfish *dead discards***	589	467	443	500	491
Yellowfin Tuna	3,285	3,773.6	2,,447.9	3,374.9	2,901.1
Bigeye Tuna	660.5	794.8	695.3	929.1	531.9
Bluefin Tuna *landings*	67.9	49.8	48.8	73.5	66.1
Bluefin Tuna *dead discards****	73.5-168	37.1-148	64-102	30-151	67 - 173
Albacore Tuna	109.4	189.1	180.1	194.5	147.4
Skipjack Tuna	0.3	3.5	1.3	2.0	1.8
Blue Marlin*****	196.5	138.1	51.8	82.1	59.6
White Marlin*****	67.6	70.8	32.1	56.7	40.8
Sailfish*****	71.6	57.7	27.1	71.6	45.4
Total	**8,721.1 - 8,815.6**	**8,931.6 - 9,042.5**	**7,150.3 - 7,188.3**	**8,362.0 - 8,483.0**	**7,320.7 - 7,426.7**

*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. Source: SCRS 2001.
***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 2000, the provisional estimate of U.S. vessel landings and dead discards of swordfish (North and South Atlantic) was 3,497 mt (99 percent of these are longline landings and discards). This estimate is 2 percent lower than the estimate of 3,585 mt for 1999. 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 caught by the United States.

Table 4.1.2 Estimated International Longline Landings of HMS, Other than Sharks, for All Countries in the Atlantic: 1996-2000 (mt ww)*. Source: SCRS 2001

	1996	1997	1998	1999	2000
Swordfish (N.Atl + S. Atl)	31,331	30,302	24,376	25,308	23,796
Yellowfin Tuna (W. Atl)**	8,631	8,724	8,716	11,981	9,842
Bigeye Tuna	74,876	68,227	71,811	78,886	70,049
Bluefin Tuna (W. Atl.)**	528	382	764	914	589
Albacore Tuna (N. Atl + S. Atl)	25,092	23,490	23,573	27,203	28,221
Skipjack Tuna	26	65	99	49	28
Blue Marlin (N. Atl. + S. Atl.)***	3,444	3,612	2,483	2,442	1,934
White Marlin (N. Atl. + S. Atl.)***	1,237	974	884	954	798
Sailfish (W. Atl.)***	252	188	251	191	219
Total	**145,417**	**135,964**	**132,957**	**147,928**	**135,476**
U.S. Longline Landings (from U.S. Natl. Report, 2000)#	**8721.1**	**8931.6**	**7150.3**	**8362.0**	**7320.7**
U.S. Longline as Percentage of Longline Total	**6.0**	**6.6**	**5.4**	**5.6**	**5.4**

* landings include those classified by the SCRS as longline landings for all areas

**Note that the United States has not reported participation in the E. Atl yellowfin tuna fishery since 1983 and has not participated in the E. Atl bluefin tuna fishery since 1982.

***includes U.S. *dead discards*

includes swordfish longline discards and bluefin tuna discards

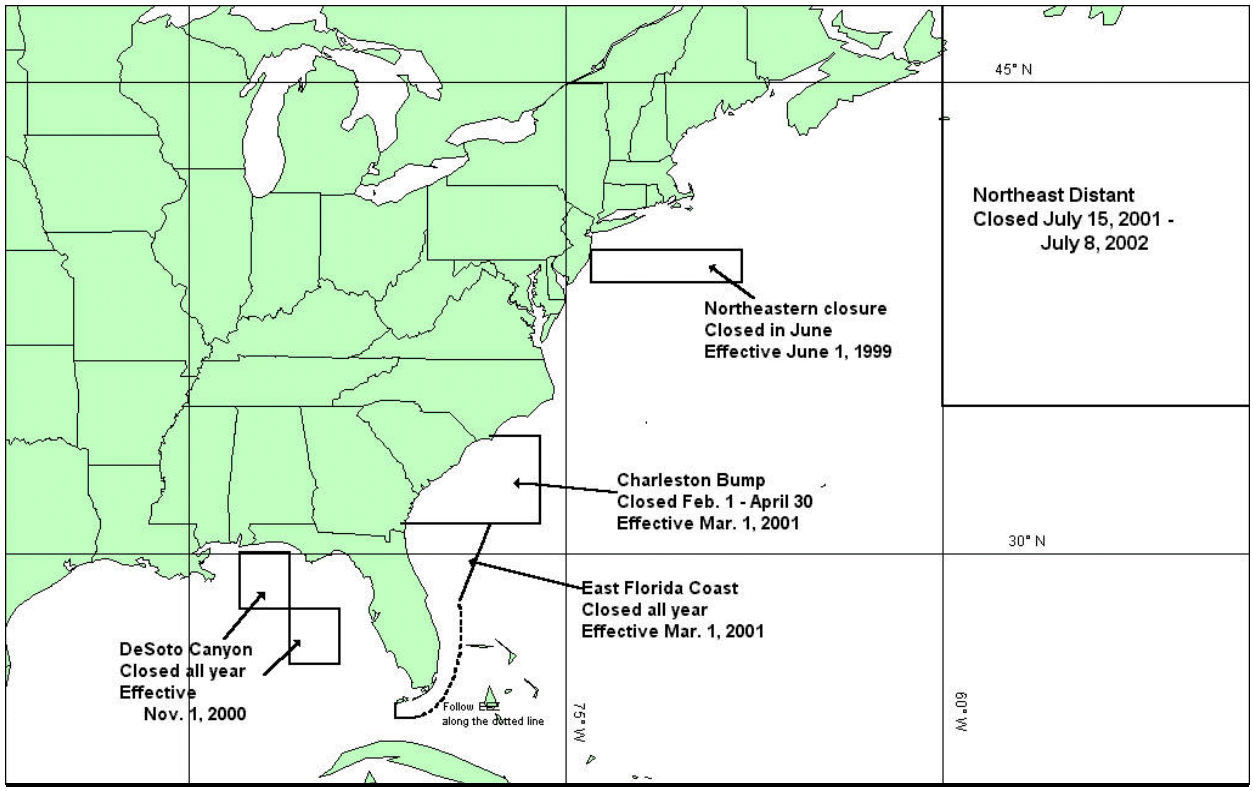
The U.S. longline fleet has historically accounted for a small percentage of total Atlantic landings of HMS. Even when including U.S. discards for bluefin tuna, swordfish, blue marlin, white marlin, and sailfish, the U.S. percentage still remains around 5 to 6 percent of all longline landings reported to ICCAT. The United States continues to work internationally to encourage other nations to protect overfished HMS.

4.1.4 Bycatch Issues and Data Associated with the Pelagic Longline Fishery

Fish are discarded 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 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 released. 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 longline vessels in the Gulf of Mexico.

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



Observer Program

Four hundred and sixty-four longline sets were observed and recorded by NMFS observers in 2000 (4.2% coverage of a total of 11,065 sets reported). Table 4.1.3 compares observer coverage in past years for this fleet. The HMS BiOp requires that 5 percent of the pelagic longline trips be selected for observer coverage. In addition, ICCAT requires 5 percent observer coverage for all trips targeting yellowfin tuna and/or bigeye tuna. Unfortunately, due to logistical problems, it 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 4.1.3 Observer Coverage of the Pelagic Longline Fishery. Source: Yeung, 2001.

Year	Number of Sets Observed	
1995	696	5.2

1996	361	2.5
1997	448	3.1
1998	287	2.9
1999	420	3.8
2000	464	4.2

Marine Mammals

In accordance with the Marine Mammal Protection Act (MMPA), 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 MMPA. In 2000, there were 14 observed takes of marine mammals by pelagic longlines. This number has been extrapolated out to an estimated 403 mammals fleet-wide (32 common dolphin, 93 Risso's dolphin, 231 pilot whale, 19 whale, 29 pygmy sperm whale) (Yeung, 2001). In addition to mammals released *dead* from fishing gear, which is uncommon in the pelagic longline fishery, NMFS must consider post-release mortality of mammals released *alive*.

Sea Turtles

The Atlantic pelagic longline fishery exceeded the authorized level of takes of loggerhead sea turtles in 1999. As a result, NMFS re-initiated consultation under Section 7 of ESA and published a BiOp on June 30, 2000. 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 "L-shaped" area of 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. The line clipper and dipnet requirements were implemented on a long-term basis by an interim final rule that became effective on April 10, 2001 (66 FR 17370). A new Biological Opinion was completed on June 14, 2001, that found that the actions of the pelagic longline fishery jeopardized the continued existence of the loggerhead and leatherback sea turtles. This document reported that the pelagic longline fishery interacted with an estimated 991 loggerhead and 1012 leatherback sea turtles in 1999. The estimated take levels for 2000 are 1256 loggerhead and 769 leatherback sea turtles (Yeung 2001). An emergency rule was published on July 13, 2001, (66 FR 36711) that closed the northeast distant statistical reporting area and modified how pelagic longline gear would be deployed. On December 13, 2001, NMFS extended the emergency rule for 180 days (66 FR 64378). NMFS is currently working on developing a proposed and final rule to implement these measures.

Seabirds

Gannetts, gulls, greater shearwaters, and storm petrels are occasionally hooked by Atlantic pelagic longlines. These species and all other seabirds are protected under the Migratory Bird Treaty Act. Seabird populations are often slow to recover from excess mortality as a consequence of their low reproductive potential (one egg per year and late sexual maturation). According to NMFS observer data from 2001, 8 greater shearwaters were hooked in June and July. The majority of longline interactions with seabirds occur as the gear is being set. The birds eat the bait and become hooked on the line; the line sinks and the birds are subsequently drowned.

The United States has developed a National Plan of Action in response to the FAO International Plan of Action to reduce incidental seabird 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 seabird takes by Atlantic pelagic longlines. Takes of seabirds 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 stock assessments. 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 has been applied in both Atlantic and Pacific fisheries. Further, the data have been used for scientific analyses by both ICCAT and the Inter-American Tropical Tuna Commission for a number of years.

The total estimated metric tons of dead discards of swordfish, sailfish, blue marlin, and white marlin decreased in 2000 compared to 1999 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 2001 U.S. National Report to ICCAT (NMFS 2001b). Longline dead discards of swordfish in 2000 were estimated to be 491 mt ww, a small decrease from the 1999 level of 500 mt ww (SCRS 2001).

Longline bycatch of billfish in 2000 decreased in many geographic areas from 1999 levels. Estimated billfish dead discards from commercial longlines were 59.6 mt for blue marlin, 40.8 mt for white marlin, and 45.2 mt for sailfish in 2000. In 1999, 82.1 mt blue marlin, 56.7 mt white marlin, and 71.6 mt sailfish were reported as dead discards. Blue marlin bycatch decreased substantially in every area except in the northwest Atlantic Ocean. The largest decrease was in the Gulf of Mexico, where it declined by almost 50 percent. The bycatch of white marlin decreased in all areas compared to 1999, most drastically in the northwest Atlantic Ocean and the

Caribbean Sea. Sailfish bycatch also decreased in general from 1999 to 2000. The decline was most noticeable in the Gulf of Mexico and the Caribbean Sea. Bluefin tuna dead discards from the pelagic longline fishery were 67 to 173 mt in 2000, depending on the methodology used for estimation, which is an increase for the 1999 levels of 30 to 151 mt.

4.1.5 Northeast Distant Area Experimental Fishery

In the fall of 2001, NMFS conducted the first year of an experimental fishery in the northeast distant statistical reporting area. The goal of the research is to examine gear modifications that will reduce the incidental catch of sea turtles without significantly decreasing the catch of target species. The measures that were examined in 2001 were the use of blue-dyed bait and spacing the gangion lines farther away from the float lines. During the course of the experiment, 184.5 sets were observed with 100 percent observer coverage. The participating vessels captured 111 loggerhead and 76 leatherback sea turtles. All the sea turtles were released alive and 16 loggerheads were tagged with satellite tags. In addition to the sea turtles, the vessels interacted with 4 Risso's dolphin, 1 northern bottlenose whale, and 1 striped dolphin. NMFS is currently analyzing the data to determine the effectiveness of the experimental measures.

4.1.6 Safety Issues Associated with the Fishery

Like all offshore fisheries, pelagic longlining can be dangerous. Trips can be long, 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. 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 1996 through 2000. 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: 1996-2000 (mt ww). NW Atlantic Fishing Area.

Species	1996	1997	1998	1999	2000
Bluefin Tuna	245.0	249.7	248.6	247.9	275.2
Yellowfin Tuna	6.8	0	0	0	0
Skipjack Tuna	0.7	0	0	0	0

4.2.3 U.S. vs. International Catch

The U.S. purse seine fleet has historically accounted for a small percentage of total Atlantic landings. Over the past five years, the U.S. purse seine fishery has contributed to less than 0.15% of the total purse seine landings reported to ICCAT.

Table 4.2.2 Estimated International Purse Seine Atlantic Tuna Landings in the Atlantic and Mediterranean: 1996-2000 (mt ww).

Species	1996	1997	1998	1999	2000
Bluefin Tuna	26,589	25,256	21,857	16,091	14,841
Yellowfin Tuna	89,156	78,370	83,659	77,581	75,057
Skipjack Tuna	91,520	76,171	77,594	97,794	82,779
Bigeye Tuna	26.919	19,057	16,370	21,437	18,378
Total	**234,184**	**198,858**	**199,480**	**212,903**	**191,055**
U.S. Total	**252.5**	**249.7**	**248.6**	**247.9**	**275.2**
U.S. Percentage	**0.11%**	**0.13%**	**0.12%**	**0.12%**	**0.14%**

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.

The SCRS evaluated the time/area closure at its 2001 meeting, and the results of the evaluation were similar to those of the previous year. The SCRS concluded that the catches of juvenile bigeye tuna would have been higher if the time/area closure were not in place. The SCRS also concluded that the time/area closure would have been more effective at reducing catches of juvenile bigeye if compliance with the closure had been better. No changes to the time/area closure were proposed or adopted at the 2001 ICCAT meeting, and the time/area closure will continue.

4.2.4 Bycatch Issues and Data Associated with the Fishery

The Atlantic bluefin tuna Purse Seine category fishery is currently listed as a Category III fishery under the Marine Mammal Protection Act. After a school of fish is located, a Purse Seine net is set by paying out the net in a circle around the school. This affords considerable control over what is encircled by the net and the net does not remain in the water for any considerable amount of time. Therefore, this gear-type is not likely to result in mortality or serious injury of marine mammals or sea turtles. As a result, it is 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.

Only five observed purse seine sets were made in the closed areas during the 2000 fishing season, and there was no bycatch of groundfish reported on these sets. In order to gather additional information on the impacts of this fishery in the closed areas, and to allow the purse seine fleet to utilize their allocated quota of bluefin tuna for 2001 and avoid conflicts with other gear types, NMFS issued EFPs to the purse seine fleet again in 2001, and placed observers on the vessels. The New England Fisheries Management Council is investigating revising the list of exempted gear to allow the tuna purse seiners access to the closed areas without Experimental Fishing Permits. The Council will utilize the data collected during the 2000 and 2001 experimental fisheries, and should have a final decision before the 2002 purse seine season.

[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.

4.2.5 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.

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 63 percent of total U.S. landings, and almost 70 percent of commercial bluefin landings. The commercial handgear fishery for bluefin tuna occurs mainly in New England, with vessels targeting large medium and giant bluefin 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 2000, four percent of the total yellowfin catch, or nine percent of the commercial yellowfin catch, was attributable to commercial handgear. The majority of these landings occurred in the northwest Atlantic Ocean. Commercial handgear landings of skipjack tuna accounted for approximately 22 percent of total skipjack landings, or about 67 percent of commercial skipjack landings. For albacore, commercial handgear landings accounted for less than two percent of total albacore landings, or about five percent of commercial albacore landings. Commercial 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 0.3 percent).

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 9 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 percent 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 1997-2000 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 swordfish catches (landings and discards) are presented in Section 2.3.3.

In October 1999, NMFS published revised statistics on the level of U.S. recreational and commercial landings of Atlantic yellowfin tuna since 1981 (64 FR 58035, October 28, 1999). Preliminary statistics were published in March 1996 (61 FR 10319, March 13, 1996), and NMFS received considerable public comment. NMFS published these final statistics to inform the public of updated data on landings trends in the yellowfin tuna recreational and commercial fisheries. A summary of these historical domestic recreational and commercial yellowfin landings (1981-1998) is presented in section 4.3.2 of the 2000 HMS SAFE Report.

Table 4.3.1 Domestic Landings for the Commercial Handgear Fishery, by Species and Gear, for 1997-2000 (mt ww). Source: U.S. National Report to ICCAT: 2001.

Species	Gear	1997	1998	1999	
Bluefin Tuna	Rod and Reel	617.8	603.4	643.6	579.3
	Handline	17.4	29.2	16.4	3.2
	Harpoon	97.5	133.4	114.4	184.2
	TOTAL	**732.7**	**766.0**	**774.4**	**766.7**
Bigeye Tuna	Troll	3.9	4.0	0	0
	Handline	2.7	0.1	12.3	5.7
	TOTAL	**6.6**	**4.1**	**12.3**	**5.7**
Albacore Tuna	Troll	5.2	5.8	0	0
	Handline	4.8	0	4.4	7.9
	TOTAL	**10.0**	**5.8**	**4.4**	**7.9**
Yellowfin Tuna	Troll	237.6	177.5	0	0

Species	Gear	1997	1998	1999	2000
	Handline	90.6	64.7	219.2	283.7
	TOTAL	**328.2**	**242.2**	**219.2**	**283.7**
Skipjack Tuna	Troll	7.9	0.4	0	0
	Handline	0.1	0	6.6	9.7
	TOTAL	**8.0**	**0.4**	**6.6**	**9.7**
Swordfish	Troll	0.4	0.7	0	0
	Handline	1.3	0	5.0	8.9
	Harpoon	0.7	1.5	0	0.6
	TOTAL	**2.4**	**2.2**	**5.0**	**9.5**

Table 4.3.2 Domestic Landings for the Commercial Handgear Fishery by Species and Region for 1996-2000 (mt ww). Source: U.S. National Report to ICCAT: 2001.

Species	Region	1997	1998	1999	
Bluefin Tuna	NW Atl	732.7	766.0	774.4	766.7
Bigeye Tuna	NW Atl	6.6	4.0	11.9	4.1
	GOM	0	0.1	0.2	0.1
	Carib	0	0	0.2	1.5
Albacore Tuna	NW Atl	6.4	5.8	0.6	2.9
	GOM	0	0	$\leq$ .05	0
	Carib	3.6	0	3.8	5.0
Yellowfin Tuna	NW Atl	252.3	177.5	192.0	235.7
	GOM	55.6	60.8	12.7	28.6
	Carib	20.3	3.9	14.5	19.4
Skipjack Tuna	NW Atl	0.7	0.4	0.2	0.2
	GOM	0	0	0.4	0.6
	Carib	7.3	0	5.8	8.8
Swordfish	NW Atl	2.4	2.2	5.0	8.3

Species	Region	1997	1998	1999	2000
	GOM	0	0	≤ .05	1.2

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 2000 and 2001. 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 and bluefin tunas, and sharks. It should be noted that these estimates are still preliminary and subject to change.

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

State/Area	Private Vessel Trips	Charter Trips	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**

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

State/Area	Private Vessel Trips	Charter Trips	
VA	910	307	1,217
MD/DE and Cape May County, NJ	2,675	655	3,330

NJ (not including Cape May County)	3,040	660	3,700
NY	2,039	280	2,319
CT/RI	497	203	700
MA	3,641	567	4,208
NH/ME	1,944	133	2,077
Total	**14,746**	**2,805**	**17,551**

4.3.3 U.S. vs. International Catch

SCRS data do not 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 2000 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 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 U.S. 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. Over the last several years,

there has been a significant General category BFT fishery in late September and October (and even the early part of November) occurring off Southeastern New England. The fishery is prosecuted approximately 60-70 miles from shore, in weather conditions that are often marginal. There have been several cases of vessels participating in this fishery that have capsized due to weight while attempting to boat commercial-sized bluefin tuna (measuring 73 inches or greater and weighing several hundred pounds).

Currently, 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.

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

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 information indicates that a recreational swordfish fishery is rebuilding in the Mid-Atlantic Bight, as well as 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. However, a proposed rule was published (December 26, 2001; 66 FR 66386) that would implement a recreational possession limit within the swordfish fishery. 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. Phase One of the ICCAT Atlantic marlin rebuilding plan requires that countries reduce white marlin landings by 67 percent and blue marlin landings by 50 percent from 1999 levels. The recommendation requires that the United States limit landings by U.S. recreational fishermen to 250 Atlantic BUM and WHM, combined, on an annual basis for 2001 and 2002. The United States also must continue monitoring of billfish tournaments through scientific observer coverage of at least five percent initially, with an objective of 10 percent coverage by 2002. Phase Two of the ICCAT Atlantic marlin rebuilding program will include a reassessment of the status of the BUM and WHM stocks during 2002.

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 1996-2000 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 1996-2000 (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	1999	
Bluefin tuna**	NW Atlantic	362	299	184	99.9	49.5
	GOM	0	0	0	0.4	0.9
	Total	362	299	184	100.3	50.4
Bigeye tuna	NW Atlantic	108.2	333.5	228.0	316.1	34.4
	GOM	0	0	0	1.8	0
	Total	108.2	333.5	228.0	317.9	34.4
Albacore	NW Atlantic	277.8	269.5	601.1	90.1	250.75
	GOM	61.7	65.2	0	0	0
	Total	339.5	334.7	601.1	90.1	250.75
Yellowfin tuna	NW Atlantic	4,484.8	3,560.9	2,845.7	3,818.2	3,809.5
	GOM	13.2	7.7	80.9	149.4	52.3
	Total	4,498	3,569	2,927	3,967.6	3,861.8
Skipjack tuna	NW Atlantic	48.1	42.0	49.5	63.6	13.1
	GOM	36.4	21.7	37.0	34.8	16.7
	Total	84.5	63.7	86.5	98.4	29.8
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	

Species	Region	1996	1997	1998	1999	2000
	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	21.3	15.6

* Rod and reel catches and landings for Atlantic tunas represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.
**Rod and Reel catch estimates for bluefin tuna in the U.S. National Report to ICCAT include both recreational and commercial landings. Rod and reel catch of bluefin less than 73" curved fork length (CFL) are recreational, and rod and reel catch of bluefin 73 inches CFL or greater are commercial. Rod and reel catch of bluefin > 73" CFL also includes a few metric tons of "trophy" bluefin (recreational bluefin 73").
***Blue marlin, white marlin, and sailfish landings are estimated based on the SEFSC Recreational Billfish Survey and the Large Pelagic Survey.

Atlantic Billfish Recreational Fishing

Due to the rare nature of billfish encounters and the difficulty of monitoring landings outside of tournament events, reporting of recreational billfish landings are sparse. However, in 2000, the Recreational Billfish Survey Program documented 119 blue marlin, 8 white marlin, and 16 sailfish landings.

In support of the sailfish assessment conducted at the 2001 SCRS billfish species group meeting, document SCRS/01/106 developed indices of abundance of sailfish from the United States recreational billfish tournament fishery for the period 1973-2000. The index of weight per 100 hours fishing was estimated from numbers of sailfish caught and reported in the logbooks submitted by tournament coordinators and NMFS observers under the Recreational Billfish Survey Program, as well as available size information. Document SCRS/01/138 estimated United States sailfish catch estimates from various recreational fishery surveys.

Swordfish Recreational Fishery

The recreational swordfish fishery in the North Atlantic Ocean has been 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. Occasional fish have also been encountered during trips off Maryland and Virginia. 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 or dead bait and additional attractants such as lightsticks, LED lights, and light bars suspended under the boat.

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. A proposed rule was published (December 26, 2001; 66 FR 66386) that includes the mandatory reporting of recreationally-landed swordfish via a toll-free call-in system. Recreational swordfish landings are counted against the Incidental quota.

Shark Recreational Fishery

Recreational landings of sharks are an important component of HMS fisheries. Recreational shark fishing with rod and reel is a popular sport at all social and economic levels, largely because of accessibility to the resource. Sharks can be caught virtually anywhere in salt water, with even large specimens available in the nearshore area to surf anglers or small boaters. Recreational shark fisheries are exploited primarily by private vessels and charter/headboats although there are some shore-based fishermen in the Florida Keys as well as offshore tournament fishing. 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: 1995-2000 (numbers of fish in thousands). 2000 data are preliminary. Source: Cortes 2000, Cortes 2001, and E. Cortes, 2001, pers. comm.

Species Group	1995	1996	1997	1998	1999	
LCS	176.3	188.5	165.1	169.8	90.1	130.4
Pelagic	32.5	21.6	8.7	11.8	11.1	12.8
SCS	170.7	113.5	98.5	169.8	111.5	158.5

Table 4.4.3 Recreational Harvest of Atlantic LCS by Species, in number of fish: 1997-1999. Source: Cortes 2000. Species-specific data for 2000 are under review at this time.

LCS Species	1997	1998	1999
Basking**	none reported	none reported	none reported
Bignose*	none reported	none reported	none reported
Bigeye sand tiger**	none reported	none reported	none reported

[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.

LCS Species	1997	1998	1999
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
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: 1997-2000. 2000 data are preliminary. Source: Cortes 2000, Cortes 2001.

Pelagic Shark Species	1997	1998	1999	
Bigeye thresher*	none reported	none reported	none reported	none reported
Bigeye sixgill*	none reported	none reported	none reported	none reported
Blue	4,236	6,085	5,218	6,779
Mako, Longfin*	none reported	none reported	none reported	none reported
Mako, Shortfin	3,025	5,633	1,383	5,563
Mako, Unclassified	10	8	none reported	none reported
Oceanic whitetip	none reported	none reported	none reported	none reported
Porbeagle	none reported	none reported	none reported	none reported
Sevengill*	none reported	none reported	none reported	none reported
Sixgill*	none reported	none reported	none reported	none reported
Thresher	1,472	36	4,512	505
Total:	8,743	11,762	11,113	12,847

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

Table 4.4.5 Recreational Harvest of Atlantic SCS by Species, in number of fish: 1997-1999. Source: Cortes 2000. Species-specific data for 2000 are under review at this time.

SCS Species	1997	1998	1999
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

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

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 include preliminary 2001 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	2000	2001	1997	1998	1999	2000	
White Marlin**	7	11	6	4	21	203	465	156	705	285
Blue Marlin**	2	3	3	0	0	30	27	28	1,886	68
Sailfish**	0	1	0	-	-	2	2	3	-	-
Swordfish	5	1	3	0	15	6	5	1	0	57
Bluefin Tuna	749	653	396	-	-	1,181	1,105	327	1,789	-
Bigeye Tuna	17	17	27	2,116	39	6	9	0	0	8
Yellowfin Tuna	1,632	2,646	2,501	26,727	11,833	224	645	682	1,436	546
Skipjack Tuna	285	261	146	-	0	468	267	88	0	0
Albacore Tuna	189	558	133	0	3,406	43	92	52	0	122
Thresher Shark	3	7	3	11	35	2	2	2	36	0
Mako Shark	51	78	49	0	120	86	92	49	0	486
Sandbar Shark	5	2	2	89	39	30	56	6	2	51
Dusky Shark	16	6	1	0	0	50	54	7	42	17
Tiger Shark	0	2	0	-	0	5	5	0	0	0

	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Blue Shark	68	26	11	473	6	1,897	780	572	13,769	2,019
Hammerhead Shark	1	1	1	3	4	4	4	5	0	2
Wahoo	6	71	45	803	125	1	2	0	0	14
Dolphinfish	920	7,263	2,139	7,753	8,364	61	194	73	4,878	345
King Mackerel	174	198	141	1,352	100	1	10	8	83	62
Atlantic Bonito	336	328	254	5,258	180	203	300	166	1,067	127
Little Tunny	587	1,231	97	403	216	1,015	1,507	133	783	204
Amberjack	3	6	9	3,154	55	18	40	24	463	0
Spanish Mackerel	-	-	-	190	23	-	-	-	0	0

*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 is 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. Additionally, an outreach program to encourage the use of circle hooks within HMS fisheries was introduced in a proposed rule published this year (December 26, 2001; 66 FR 66386).

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 percent, 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.

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. Additionally, as the recreational swordfish fishery off the southeastern coast of Florida occurs at night and usually in small boats ranging from 23 to 40 feet in length, it presents other unique risks. Shipping traffic regularly runs through the recreational swordfish fleet, which can lead to incidents if someone is not on watch at all times. 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 percent of all boating casualties were due to drowning and in approximately 90 percent of all the drowning deaths, the victim was not wearing a personal floatation device (PFD).

Table 4.4.7 1997 Reported Boating Casualties (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
TOTAL	**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). The HMS FMP reduced commercial LCS and SCS quotas, established ridgeback and non-ridgeback subgroups of LCS, implemented a minimum size for ridgeback LCS, reduced the non-ridgeback LCS commercial quota, established a commercial quota for blue sharks, established a species-specific quota for porbeagle sharks and reduced the pelagic shark commercial quota accordingly, reduced recreational retention limits for all sharks, expanded the list of prohibited shark species, implemented limited access in commercial fisheries, established new procedures for counting dead discards and state landings of sharks after Federal fishing season closures against Federal quotas, and established season-specific overharvest/underharvest adjustment procedures. The implementing regulations were published on May 28, 1999 (64 FR 29090).

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

On November 21, 2000, SOFA *et al*. and NMFS reached a settlement agreement that would dismiss both lawsuits brought by those parties. On December 7, 2000, Judge Merryday entered an order approving the settlement agreement. The terms of the settlement agreement specified several actions to be taken by the plaintiffs and by NMFS. NMFS implemented some of the terms of the settlement agreement via an emergency rule (March 6, 2001, 66 FR 13441), which expired on September 4, 2001. The emergency rule established the LCS and SCS commercial quotas at 1,285 and 1,760 mt dw, respectively (1997 levels), and suspended the regulations on splitting the LCS management group into ridgeback and non-ridgeback LCS subgroups, the commercial LCS ridgeback minimum size, and counting dead discards and state landings after Federal closures against Federal quotas.

The settlement agreement also required an independent (i.e., non-NMFS) review of the 1998 LCS stock assessment. The original settlement agreement determined that the Center for Independent Experts (CIE) would conduct the peer review. In May 2001, the CIE transmitted three peer reviews of the 1998 LCS stock assessment to NMFS. Upon examination, NMFS determined that the three peer reviews conducted by the CIE did not conform to the terms of the settlement agreement and therefore were not complete.

Due to these irregularities, in July 2001, NMFS and the plaintiffs revised certain sections of the settlement agreement. The revisions allowed for the Natural Resources Consultants, Inc. (NRC) to conduct a second peer review. While the CIE could complete the reviews following the terms of the original settlement agreement, the NRC reviews were the deciding set of reviews in terms of the settlement agreement. Both sets of reviews can be used for the next stock assessment. The revised settlement agreement also calls for the LCS and SCS stock assessments to be completed by April 1, 2002.

The terms of the revised settlement agreement stipulated that NRC would select independent scientists with expertise in international fisheries on HMS, shark population dynamics/life history, and methods of stock assessment in situations of incomplete data and that each reviewer would make one overall statement as to whether "the scientific conclusions and scientific management recommendations contained in the 1998 SEW Report are based on scientifically reasonable uses of appropriate fisheries stock assessment techniques and the best available biological and fishery information relating to LCS."

NMFS received the results of the complete peer reviews in October, 2001. Three of the four NRC reviewers found that the scientific conclusions and scientific management recommendations contained in the 1998 SEW report *were not* based on scientifically reasonable uses of appropriate fisheries stock assessment techniques and the best available biological fishery information relating to LCS. The settlement agreement stated that in this case, NMFS would take the appropriate action to maintain the 1997 LCS quota and catch accounting/monitoring procedures, pending a new LCS stock assessment. Accordingly, NMFS published an emergency rule on December 28, 2001 (66 FR 67118), that establishes the commercial LCS quota at 1,285 mt dw, consistent with the terms of the settlement. NMFS also suspended the regulations on splitting the LCS management group into ridgeback and non-ridgeback LCS subgroups, the ridgeback LCS minimum size, counting dead discards and state landings after Federal closures against Federal quotas, and season-specific quota adjustments for LCS and SCS pending the results of the new stock assessments.

The new LCS stock assessment will consider the recommendations of the reviewers and will also be independently peer reviewed. NMFS believes that in this case the independent reviews served as an important quality-control mechanism by which NMFS, plaintiffs, and

members of the public were assured that the best available scientific information and techniques will form the basis for future shark management actions.

The emergency rule also, consistent with the settlement agreement, establishes the 1997 commercial quota level of 1,760 mt dw for SCS pending completion of a new stock assessment. Upon completion of a new stock assessment, NMFS may enter into rulemaking to implement the commercial SCS quota level adopted in the HMS FMP, or take other appropriate action to conserve SCS while maintaining a sustainable fishery in the long-term, as necessary. The settlement agreement did not address any regulations affecting the pelagic shark, prohibited species, or recreational shark fisheries.

Additionally, because the settlement agreement dissolved the court injunction on all commercial quotas and because the pelagic shark quotas were no longer at issue, 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.

On December 5, 2000 (65 FR 75867), NMFS announced that the first semiannual season for LCS would open on January 1, 2001, and close on March 24, 2001; no closure dates were announced for the pelagic and SCS fisheries. The pelagic and SCS fisheries remained open for the entire semiannual season. Approximately 587.5 mt dw of the available commercial LCS quota of 642.5 mt dw was landed during the LCS open season. Dealer reports and state landings as of August 20, 2001, indicate that only 7.2 and 16.4 percent of the SCS (880 mt dw) and pelagic (290 mt dw) semiannual quotas, respectively, were reported landed.

Due to the underharvest of the available LCS quota, NMFS added the unharvested 55 mt dw to the available quota for the second semiannual LCS fishing season for a total of 697 mt dw. On June 26, 2001 (66 Fr 33918), NMFS announced that the second LCS fishing season would open on July 1, 2001, and close on August 31, 2001. Again, no closure dates were announced for the pelagic and SCS fisheries and these fisheries remained open for the entire semiannual season. On September 5, 2001 (66 FR 46401), due to reported landings that only 47 percent of the quota had been reached as of the end of July, NMFS extended the LCS fishing season through September 4, 2001, to ensure that eligible fishery participants had an adequate opportunity to harvest the available quota.

As of October 23, 2001, dealer reports and state landing reports indicate that approximately 603.8 mt dw of LCS or 86.6 percent of the available 697 mt dw had been landed in the second semiannual season. This was 93.2 mt dw (13.4 percent) under the available quota. Only a total of 111.3 mt dw and 30 mt dw of the SCS and pelagic semiannual quotas, respectively, had been reported at that time. No estimates of blue shark dead discards for 2001 are available at this time.

Thus, for 2001, approximately 1,190.6 mt dw (92.6 percent) of the annual LCS quota of 1,285 mt dw, approximately 175.2 mt dw (9.9 percent) of the annual SCS quota of 1,760 mt dw, and approximately 77.5 mt dw (13.3 percent) of the annual pelagic shark quota of 580 mt dw have been reported landed. These numbers are preliminary and are subject to change.

On December 28, 2001 (66 FR 67118), as part of the emergency rule mentioned above, NMFS announced that the LCS first semiannual season would close on April 15, 2002. Closure dates for the pelagic and SCS fisheries will be announced as necessary. 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.

Modifications to Observer Coverage Requirements

In the southeast shark gillnet fishery, NMFS modified the requirement to have 100 percent observer coverage at all times on March 30, 2001 (66 FR 17370), by reducing the level required to a statistically significant level outside of right whale calving season (100 percent observer coverage is still required during the right whale calving season from November 15 through April 1). This modification of observer coverage reduced administrative costs while maintaining statistically significant and adequate levels of coverage to provide reasonable estimates of sea turtle and marine mammal takes outside the right whale calving season. The level of observer coverage necessary to maintain statistical significance will be reevaluated annually and adjusted accordingly; no adjustments to the necessary level of observer coverage are expected in 2002.

As of January 2002, the observer coverage requirements in the bottom longline fishery for sharks changed from voluntary participation in the observer program to mandatory participation if selected. NMFS has selected approximately 32 vessels operating out of three major winter shark fishing areas in the North Carolina/South Atlantic Bight, Florida East Coast, and Florida Gulf Coast areas.

Alabama Shark Gillnet Fishery

Previous reports to NMFS indicated that a group of about six fishermen in Alabama were beginning a directed fishery for sharks using gillnets with 8-12 inch mesh and more than 2,000 yards of net. The information available to NMFS was that the fishery would operate solely in state waters. As of November 2001, the fishery does not appear to be operating due to lack of profitable markets (J. Duffy, Alabama Conservation and Marine Resources, pers. comm to J. Carlson, NMFS Southeast Fisheries Science Center, Panama City, Florida).

Directed Shark Observer Programs

The University of Florida is continuing an observer program of the directed bottom longline commercial shark fishery in the Atlantic and Gulf of Mexico to enhance the reliability of

management strategies for the shark fishery. Observers provide baseline characterization information, by region, on the species composition, relative abundance, and size composition within species for the large coastal and small coastal bottom longline shark fisheries. During the 2001 sampling season, a total of 36 shark trips were observed, representing 84 sets yielding 480,476 observed hook hours. Catches, catch rates, and disposition were documented for total of 3,937 LCS and 1,304 SCS. The biological data are being processed to identify catch patterns by species and region.

The 2001 observed catches of sharks in the directed bottom longline fishery are dominated by large coastal sharks (74.6 percent), with small coastal sharks comprising 25.2 percent and pelagic sharks comprising 0.2 percent (Table 4.5.1; G. Burgess, pers. comm. 2001). Sandbar sharks dominate the large coastal catch and landings (74.1 and 90.0 percent, respectively), followed by tiger sharks (10.8 and 2.3 percent, respectively), scalloped hammerheads (3 and 1.7 percent, respectively), and dusky sharks (2.2 and 1.6 percent, respectively; note that dusky sharks are a prohibited species so possession and landing is prohibited). Tiger sharks represent 56 percent of large coastal sharks tagged and released (Table 4.5.1).

Atlantic sharpnose sharks dominate the catches of small coastal sharks at 97.7 percent (Table 4.5.1). Approximately 99 percent of small coastal sharks are used for bait in this fishery (only 10 out of 1,466 individuals were landed). Only 12 pelagic sharks were caught and landed - eleven shortfin mako and one thresher shark (Table 4.5.1).

Table 4.5.1 Directed bottom longline shark observed catch and disposition for 2001. Source: G. Burgess, pers. comm. 2001.

	FLORID EAST COAST				FLORIDA GULF COAST				NORTH CAROLINA				TOTAL			
Species	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**
Sandbar	316	297	13	6	850	812	26	12	2052	1993	22	37	3218	3102	61	55
Blacktip	71	62	9		1	1			3	3			75	66	9	
Dusky	7	2	2	3	7	3	3	1	84	49	21	14	98	54	26	17
Silky	9	1	8		57	16	40	1	3	2	1		69	19	49	1
Bull	6	5	1		16	13	3						22	18	4	
Bignose					1		1						1		1	
Spinner	11	4	4	3	14	13	1		2	2			27	19	5	3
Night					12		12						12		12	
Lemon					10	10			1			1	11	10		1
Scalloped HH	4		4		67	27	40		62	32	27	3	133	59	71	3
Great HH	4	1	3		5	3	2		5	1	4		14	5	9	
Nurse	3			3	26		1	25	2			2	31	1		30
Tiger	118	19	35	64	45	15	13	17	310	24	32	254	473	58	80	335
Sand tiger	3			3					148		1	147	151		1	150
White	3		2	1									3		2	1
Unidentified					2		2						2		2	
Atlantic sharpnose	1065	1	1060	4	58		58		310	8	302		1433	9	1420	4
Bonnethead	6		6										6		6	

	FLORID EAST COAST				FLORIDA GULF COAST				NORTH CAROLINA				TOTAL			
Species	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**	**Caught**	**Kept**	**Other Kill**	**Tagged/ Released**
Blacknose	22		22		5	1	4						27	1	26	
Thresher	1	1											1	1		
Shortfin mako									11	11			11	11		
LCS	555	391	81	83	1113	913	144	56	2672	2107	108	457	4340	3411	333	596
SCS	1093	1	1088	4	63	1	62		310	8	302		1466	10	1452	4
Pelagic	1	1							11	11			12	12		
Total	**1649**	**393**	**1169**	**87**	**1176**	**914**	**206**	**56**	**2993**	**2126**	**410**	**457**	**5818**	**3433**	**1785**	**600**

NMFS conducts an observer program in the southeast shark drift gillnet fishery. During right whale calving season (November 15 through March 31), 100 percent observer coverage of all shark trips is required. Outside of right whale calving season, a statistically significant level of observer coverage is required (currently approximately 53 percent of all shark trips). Gillnet sets are generally made via drifting and strikenetting. Drift gillnet sets are made with one vessel and the gillnet is set in a straight line and allowed to fish passively. Strikenets are either set rapidly in a circle around a school of sharks with more than one vessel (a smaller strike vessel working with a larger driftnet vessel) or set directly behind the wake of a shrimp vessel when it begins haulback. In the latter case, only the driftnet vessel is required (Carlson 2001).

During the 2001 right whale calving season, a total of 70 drift gillnet sets and 12 strikenet sets were observed. Approximately 20 additional strikenet trips were made when the observer was on board but no strike was made due to inability to locate the school, sharks being located in state waters, and poor weather conditions. Observed catches on drift gillnet sets were comprised of 12 species of sharks (92.6 percent of numbers caught), 34 species of teleosts and rays (5.65 percent percent were teleosts, 1.58 percent were rays), three species of sea turtle (0.10 percent), and two species of marine mammals (0.04 percent; Tables 4.5.2, 4.5.10, and 4.5.11) (Carlson, 2001). By number, four species of sharks made up 94.3 percent of the sharks caught: blacktip (32.3 percent), bonnethead (31.2 percent), Atlantic sharpnose (22 percent), and finetooth sharks (8.8 percent; Carlson, 2001). By weight, the shark catch was made up primarily of blacktip (40.1 percent), bonnethead (17.5 percent), Atlantic sharpnose (14.4 percent), scalloped hammerhead (9.4 percent), and great hammerhead sharks (8.9 percent).

Observed catches on strikenet sets during the 2001 right whale calving season were comprised four species of sharks (99.9 percent of numbers caught) and three species of teleosts and rays (0.1 percent; Tables 4.5.3 and 4.5.12) (Carlson, 2001). No marine mammals or sea turtles were caught while strikenetting. Blacktip sharks made up 99.9 percent of the shark catch when strikenetting. Bycatch included great barracuda, Atlantic guitar fish, and gray triggerfish (Carlson 2001).

Table 4.5.2 Total Shark Catch in NMFS Observed Drift Gillnet Sets During 2001 Critical Right Whale Season: Source: Carlson, 2001.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	
Blacktip	4,774	99.9	0.1	0.0
Bonnethead	4,617	99.8	0.1	0.1
Atlantic sharpnose	3,259	100.0	0.0	0.0
Finetooth	1,320	100.0	0.0	0.0

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	
Blacknose	374	100.0	0.0	0.0
Scalloped hammerhead	168	98.2	0.0	1.8
Spinner	141	100.0	0.0	0.0
Great hammerhead	129	100.0	0.0	0.0
Bull	12	75.0	0.0	25.0
Tiger	5	100.0	0.0	0.0
Common thresher	4	100.0	0.0	0.0
Mackerel	3	100.0	0.0	0.0
Sandbar	2	100.0	0.0	0.0
Unknown requiem	1	100.0	0.0	0.0

Table 4.5.3 Total Shark Catch in NMFS Observed Strikenet Sets During 2001 Critical Right Whale Season: Source: Carlson, 2001.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Blacktip	3,037	100.0	0.0	0.0
Nurse	1	0.0	100.0	0.0
Bull	1	100.0	0.0	0.0
Blacknose	1	100.0	0.0	0.0

Outside the right whale calving season (April 1 through November 14), a total of 37 drift gillnet sets were observed from April through October (15 in 2000 and 22 in 2001) and a total of eight strikenet sets were observed from August to September (three in 2000 and five in 2001) (Carlson and Baremore, 2001). The observed drift gillnet catch consisted of 10 species of sharks, 25 species of teleosts and rays, and 1 species of sea turtle (Tables 4.5.4 and 4.5.13). Total observed catch composition (percent of numbers caught) were 70.5 percent sharks, 27.8 percent teleosts, 1.6 percent rays, 0.01 percent sea turtle, and no marine mammals. Three species of sharks made up 96.9 percent by number of the shark catch: Atlantic sharpnose (85.6 percent), blacknose (7.2 percent), and blacktip sharks (4.1 percent). By weight, Atlantic sharpnose sharks made up 58.3 percent, blacknose sharks 21.9 percent, and blacktip sharks 12.5 percent.

Observed catch in strikenet sets outside of right whale calving season consisted of four species of sharks (99.9 percent of the total number caught) and one species of ray (0.01 percent) (Table 4.5.5) (Carlson and Baremore, 2001). No sea turtles or marine mammals were observed caught. The blacknose shark made up 61.3 percent of the total number of sharks caught. Bycatch included only the cownose ray.

Table 4.5.4 Total drift gillnet shark catch by species during all observer trips, 2000 and 2001, outside of right whale calving season. Source: Carlson and Baremore, 2001.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	
Atlantic sharpnose	8,688	99.9	0.01	0.01
Blacknose	726	99.4	0.0	0.6
Blacktip	422	74.7	15.8	9.5
Finetooth	164	100.0	0.0	0.0
Bonnethead	123	100.0	0.0	0.0
Scalloped hammerhead	14	28.6	0.0	71.4
Tiger	3	0.0	66.7	33.3
Bull	2	100.0	0.0	0.0
Spinner	2	50.0	0.0	50.0
Great hammerhead	1	100.0	0.0	0.0

Table 4.5.5 Total strikenet shark catch by species during all observer trips, 2000 and 2001, outside of right whale calving season. Source: Carlson and Baremore, 2001.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Blacknose	111	100.0	0.0	0.0
Blacktip	54	11.9	25.9	62.9
Spinner	10	0.0	0.0	100.0
Finetooth	4	100.0	0.0	0.0

National Plan of Action for the Conservation and Management Of Sharks

On February 15, 2001, NMFS released the final National Plan of Action (NPOA) for the Conservation and Management of Sharks (66 FR 10484). The NPOA was developed pursuant to

the endorsement of the International Plan of Action (IPOA) by the United Nations' Food and Agriculture Organization Committee on Fisheries Ministerial Meeting in February 1999. The overall objective of the IPOA is to ensure conservation and management of sharks and their long-term sustainable use. The final NPOA, consistent with the Magnuson-Stevens Act, requires 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. For additional information on the U.S. NPOA and its implementation, see Appendix A.

Shark Finning Prohibition Act

Shark conservation is a serious concern, both domestically and internationally. The United States is of the view that all nations and relevant international fishery organizations should take action to ensure that shark populations are monitored and fishery conservation measures are implemented to ensure that shark stocks are protected from overexploitation. The strong international market for shark fins has increased the potential for harvesting shark stocks at unsustainable levels. In the Shark Finning Prohibition Act (Act), Congress found the practice of shark finning to be unacceptable in the United States (finning is the practice of removing the fin or fins from a shark (whether or not including the tail) and returning the remainder of the shark to the sea). Uncontrolled finning can be a factor leading to unsustainable shark harvests, and because the species of shark cannot be determined from the fins alone in most instances, the effects of the fisheries on specific shark species when finning is practiced cannot be determined. That is, the mortality cannot always be assigned to individual species, so the mortality statistics may not be reliably used in stock assessments. It is the intent of the Act to support sustainable use of shark stocks with a minimum of waste.

On December 21, 2000, President Clinton signed the Act into law (Public Law 106-557). This amended the Magnuson-Stevens Fishery Conservation and Management Act to prohibit any person under U.S. jurisdiction from (i) engaging in the finning of sharks; (ii) possessing shark fins aboard a fishing vessel without the corresponding carcass; and (iii) landing shark fins without the corresponding carcass. The Act also requires NMFS to promulgate regulations to implement the prohibitions of the statute. On June 28, 2001 (66 FR 34401), NMFS published a proposed rule that would implement the provisions of the Act. Final regulations were published on February 11, 2002 (67 FR 6194). No changes were made to regulations affecting Atlantic Federal commercial shark permit holders.

4.5.2 Most Recent Catch and Landings Data

Landings estimates for 2000 indicate that, compared to landings in 1999, commercial landings for LCS increased slightly by approximately 1,000 fish (Table 4.5.6). Landings estimates

for pelagic sharks for 2000 declined by 84.5 mt dw (Table 4.5.8). Species-specific landings estimates for LCS and SCS for 2000 are under review; Tables 4.5.7 and 4.5.9 provide those estimates for the years 1997-1999.

Table 4.5.6 Estimates of Total Landings and Dead Discards for Large Coastal Sharks: 1981-2000 (numbers of fish in thousands). 2000 data are preliminary. Source: Cortes, 2000; E.Cortes, pers. comm., 2001.

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	282.1
1982	16.2	0.9	413.9	N/A	N/A	N/A	431.0
1983	17.5	0.9	746.6	N/A	N/A	N/A	765.0
1984	23.9	1.3	254.6	N/A	N/A	N/A	279.8
1985	22.2	1.2	365.6	N/A	N/A	N/A	389.0
1986	54.0	2.9	426.1	24.9	N/A	N/A	507.9
1987	104.7	9.7	314.4	70.3	N/A	N/A	499.0
1988	274.6	11.4	300.6	113.3	N/A	N/A	699.9
1989	351.0	10.5	221.1	96.3	N/A	N/A	678.8
1990	267.5	8.0	213.2	52.1	N/A	N/A	540.8
1991	200.2	7.5	293.4	11.3	N/A	N/A	512.4
1992	215.2	20.9	304.9	N/A	N/A	N/A	541.1
1993	169.4	7.3	249.0	N/A	17.6	N/A	443.3
1994	228.0	8.8	160.9	N/A	22.8	26.2	446.7
1995	222.4	5.2	176.3	N/A	22.2	24.0	450.1
1996	160.6	5.7	188.5	N/A	16.1	25.1	396.0
1997	130.6	5.6	165.1	N/A	13.2	25.1	339.6
1998	174.9	4.3	169.8	N/A	11.2	25.1	385.3
1999	111.5	9.0	90.1	N/A	3.0	25.1	238.7

2000	112.7	9.4	130.4	N/A	4.3	25.1	281.9

Table 4.5.7 **Commercial landings of Large Coastal Sharks in lb dw: 1997-1999**. Source: Cortes, 2000. Species-specific landings data for 2000 are under review at this time.

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 4.5.8 **Commercial landings of Pelagic Sharks in lb dw: 1997-2000.** 2000 data are preliminary. Source: Cortes, 2000 and Cortes, 2001.

Pelagic Sharks	1997	1998	1999	2000**
Bigeye thresher*	5,308	1,403	17,759	none reported
Bigeye sixgill*	none reported	none reported	none reported	none reported
Blue	904	706	1,111	0.31
Mako, Longfin*	7,867	4,971	4,619	0.03
Mako, Shortfin	224,362	224,421	170,860	85.07
Mako, Unclassified	71,371	79,773	58,344	none reported
Oceanic whitetip	2,764	22,049	698	0.79
Porbeagle	4,222	19,795	5,362	0.54
Sevengill*	none reported	none reported	none reported	none reported
Sixgill*	none reported	none reported	none reported	none reported
Thresher	145,253	102,531	96,012	10.78
Unclassified pelagic	75,543	49,626	46,056	none reported
Total:	537,594 (244 mt dw)	505,275 (229 mt dw)	400,821 (182 mt dw)	(97.5 mt dw)

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

** in metric tons dressed weight.

Table 4.5.9 **Commercial Landings of Small Coastal Sharks in lb dw: 1997-1999**. Source: Cortes, 2000. Species-specific landings data for 2000 are under review at this time.

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 shark catches and landings 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 and 3.8 percent of the mortality of these species in that fishery in 1999 and 2000, respectively (Cortes, 2000; E. Cortes, pers. comm. 2001). Pelagic longline and coastal dead discards combined represented about five percent of total mortality of LCS in 1999 and 2000 (Cortes, 2000; E. Cortes, pers. comm. 2001) (Table 4.5.6). Observer data in the Gulf of Mexico menhaden fishery for the period 1994-1995 indicate that 75 percent of the sharks encountered died (Cortes, 2000).

Shark Bottom Longline Fisheries

Bottom longlining for sharks has relatively low observed bycatch rates. In 1998, observer data indicate that approximately 6,277 sharks were caught compared to 594 other fish, 12 invertebrates, and 3 sea turtles (Burgess and Johns, 1999). In terms of bycatch rates, observed shark catches constitute 91.1 percent of the 6,886 total animals caught, with other fish comprising 8.6 percent, invertebrates 0.17 percent, and sea turtles 0.04 percent. One delphinid was observed caught and released alive between 1994 and 1999 (G. Burgess, pers. comm. 2000). One pelican was observed caught and killed off the Florida Gulf Coast in January 1995 (G. Burgess, pers. comm. 2001).

A total of 37 sea turtles have been observed from 1994 through 2001 (G. Burgess, pers. comm. 2001). A total of 26 loggerhead turtles have been observed caught, with 18 released alive, 6 released dead, and 2 released condition unknown. A total of 4 leatherback turtles have been observed caught, with one released alive, one released dead, and 2 released condition unknown. An additional 7 unidentified species of sea turtle have been observed caught, with one released alive, one released dead, and five released condition unknown (G. Burgess, pers. comm. 2001).

Shark Drift Gillnet and Strikenet Fisheries

During the 2001 right whale calving season, observed drift gillnets sets caught 34 species of teleosts and rays (5.65 percent percent of the total number of animals caught were teleosts and 1.58 percent were rays), 3 species of sea turtle (0.10 percent), and 2 species of marine mammals (0.04 percent; Tables 4.5.10) (Carlson, 2001). Some bonnethead, scalloped hammerhead, and bull sharks were discarded dead in the drift gillnet fishery. Twelve sailfish and one longbill spearfish were also observed caught with five of the sailfish retained, two released alive, and five released dead. The longbill spearfish was released dead. Note that retention of billfish caught by gear other than rod and reel is prohibited.

Three teleost and one ray species made up 70.4 percent by number of the overall non-shark catch: king mackerel (29.7 percent), cownose ray (18.4 percent), cobia (13.7 percent), and red drum (8.6 percent). The highest proportion of species discarded dead (for those species with observed catch greater than 10 individuals) was for king mackerel (71.7 percent), red drum (55.6 percent), little tunny (42.9 percent), remora (41.2 percent), Atlantic sailfish (41.6 percent), and bluefish (12.2 percent). Spotted eagle rays, cownose rays, and manta rays had the highest discard alive proportion (100, 94.8, and 93.8 percent, respectively) (Carlson, 2001).

Table 4.5.10 Total Teleost and Ray Bycatch in NMFS Observed Drift Gillnet Sets During 2001 Right Whale Season. Source: Carlson 2001

Species	Total Number Caught	Kept (%)	Discard Alive (%)	
King mackerel	343	28.3	0.0	71.7
Cownose ray	213	3.3	94.8	1.9
Cobia	159	88.1	3.1	8.8
Red drum	99	22.2	22.2	55.6
Great barracuda	63	100.0	0.0	0.0
Bluefish	41	82.9	4.9	12.2

Species	Total Number Caught	Kept (%)	Discard Alive (%)	
Spanish mackerel	30	100.0	0.0	0.0
Little tunny	28	57.1	0.0	42.9
Spotted eagle ray	24	0.0	100.0	0.0
Crevalle jack	21	100.0	0.0	0.0
Remora	17	0.0	58.8	41.2
Atlantic manta ray	16	0.0	93.8	6.2
Tripletail	13	92.3	7.7	0.0
Atlantic sailfish	12	41.6	16.6	41.6
Wahoo	9	100.0	0.0	0.0
Atlantic thread herring	9	0.0	0.0	100.0
Blackfin tuna	6	83.3	0.0	16.4
Blue runner	5	100.0	0.0	0.0
Sheepshead	4	100.0	0.0	0.0
Triggerfish	2	0.0	50.0	50.0
Tarpon	2	0.0	0.0	100.0
Gag grouper	2	100.0	0.0	0.0
Pilot fish	2	0.0	0.0	100.0
Cero	2	100.0	0.0	0.0
Atlantic bumper	1	0.0	0.0	100.0
Dolphin	1	100.0	0.0	0.0
Southern stingray	1	0.0	0.0	100.0
Scrawled cowfish	1	0.0	100.0	0.0
Lesser electric eel	1	0.0	100.0	0.0
Black drum	1	0.0	100.0	0.0
Atlantic bonito	1	100.0	0.0	0.0
Atlantic moonfish	1	0.0	0.0	100.0

Species	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)
Atlantic angel shark	1	0.0	100.0	0.0
Longbill spearfish	1	0.0	0.0	100.0
Unidentified teloest	1	0.0	0.0	100.0

Interactions with 23 sea turtles and marine mammals occurred in 13 separate drift gillnet sets (Carlson, 2001). Fourteen leatherback turtles, one loggerhead turtle, and one hawksbill turtle and three Atlantic spotted and four bottlenose dolphins were encountered in 62 drift gillnet sets (Table 4.5.11). Mortalities were observed for four Atlantic bottlenose dolphin, two leatherback turtles, and one Atlantic spotted dolphin; two leatherback turtles were released condition unknown and one hawksbill turtle was released comatose (Carlson, 2001). Observers also noted high densities of jellyfish, a prey source for leatherback turtles, in the area.

Due to the high number of interactions with leatherback sea turtles, NMFS implemented a temporary 30-day rule that prohibited shark gillnet fishing (strikenetting was allowed) between Savannah, Georgia, and West Palm Beach, Florida (66 FR 15045, March 15, 2001). The prohibition was effective from March 9 through April 9, 2001.

Garrison (2001) estimated the mortality of the Atlantic bottlenose dolphin in the directed shark gillnet fishery of Florida and Georgia. Based on observed bycatch rates and effort from logbooks, annual mortality of bottlenose dolphin in the Central Florida management unit is estimated to range from 43 animals (11- 167 95 percent confidence interval) in 1999 to 4 animals (1-21 95 percent confidence interval) in 2000. Because catch rates are relatively low, the total number of trips largely determines the magnitude of annual mortality estimates. This fishery has also been included in the newly formed Bottlenose Dolphin Take Reduction Team because of interactions with bottlenose dolphin.

Table 4.5.11 Protected Species Interactions in Drift Gillnet Sets During Right Whale Calving Season, 2001. Source: Carlson, 2001.

Species	Total Number Caught	Released Alive	Discarded Dead	
Leatherback turtle	14	10	2	2
Loggerhead turtle	1	1	0	0
Hawksbill turtle	1	0	0	1

Bottlenose dolphin	4	4	0	0
Spotted dolphin	3	2	1	0

During the 2001 right whale calving season, observed strikenet sets caught 3 species of teleosts and rays and no sea turtles or marine mammals (Tables 4.5.12) (Carlson 2001). One nurse shark was released alive. Of the non-shark catch, only the great barracuda was retained, with all remaining bycatch discarded alive (Carlson, 2001).

Table 4.5.12 Total Bycatch in NMFS Observed Strikenet Sets During 2001 Right Whale Season. Source: Carlson 2001

Species	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)
Great barracuda	2	100.0	0.0	0.0
Atlantic guitarfish	1	0.0	100.0	0.0
Gray triggerfish	1	0.0	100.0	0.0

Outside of right whale calving season, observed drift gillnet catch consisted of 25 species of teleosts and rays and 1 loggerhead turtle, which was released alive (Tables 4.5.13). Five species of teleosts and one species of ray made up 94.7 percent by number of the overall non-shark catch. Little tunny (48.9 percent), king mackerel (25.1 percent), barracuda (10.3 percent), blue runner (5.3 percent), and cownose ray (5.1 percent) dominated the bycatch (Table 4.5.13) (Carlson and Baremore, 2001). During drift gillnet fishing, the highest proportion of species discarded dead (for species with greater than 10 individuals) was for Atlantic moonfish (100 percent), Atlantic sailfish (100 percent), lookdown (100 percent), king mackerel (83.7 percent), and remora (42.9 percent). Cownose rays and remoras had the highest proportion of discarded alive with 78.7 percent and 57.1 percent, respectively (Table 4.5.13) (Carlson and Baremore, 2001).

Table 4.5.13 Total Bycatch in NMFS Observed Drift Gillnet Sets Outside of 2000 and 2001 Right Whale Calving Seasons. Source: Carlson 2001

Species	Total Number Caught	Kept (%)	Discard Alive (%)	
Little tunny	2,066	88.4	0.0	11.6
King mackerel	1,059	16.3	0.0	83.7
Barracuda	436	100.0	0.0	0.0
Blue runner	223	100.0	0.0	0.0
Cownose ray	216	1.4	78.7	19.9
Cobia	61	60.6	6.6	32.8
Remora	35	0.0	57.1	42.9
Atlantic moonfish	24	0.0	0.0	100.0
Crevalle jack	23	60.9	0.0	39.1
Atlantic sailfish	13	0.0	0.0	100.0
Lookdown	12	0.0	0.0	100.0
Snapper	6	100.0	0.0	0.0
Blackfin tuna	6	100.0	0.0	0.0
Spotted eagle ray	5	0.0	100.0	0.0
Manta ray	5	20.0	40.0	40.0
Wahoo	4	100.0	0.0	0.0
African pompano	4	100.0	0.0	0.0
Rays	4	50.0	50.0	0.0
Tarpon	3	0.0	100.0	0.0
Spadefish	2	50.0	0.0	50.0
Weakfish	2	0.0	0.0	100.0
Tripletail	2	100.0	0.0	0.0
Spanish mackerel	2	100.0	0.0	0.0
Bluefish	1	100.0	0.0	0.0
Almaco jack	1	0.0	0.0	100.0
Bigeye tuna	1	100.0	0.0	0.0
Florida pompano	1	100.0	0.0	0.0

Species	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)
Loggerhead turtle	1	0.0	100.0	0.0

Observed catch in strikenet sets outside of right whale calving season consisted of two cownose rays (0.01 percent), one of which was kept and the other released alive (Carlson and Baremore, 2001). No sea turtles or marine mammals were observed caught. During strikenet fishing, 36.5 percent of sharks were discarded (Table 4.5.5) because of large coastal shark fishing season closures (Carlson and Baremore, 2001).

4.6 Fishery Data: LANDINGS BY SPECIES

The following tables are taken from the 2001 National Report of the United States to ICCAT (NMFS 2001b). 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).

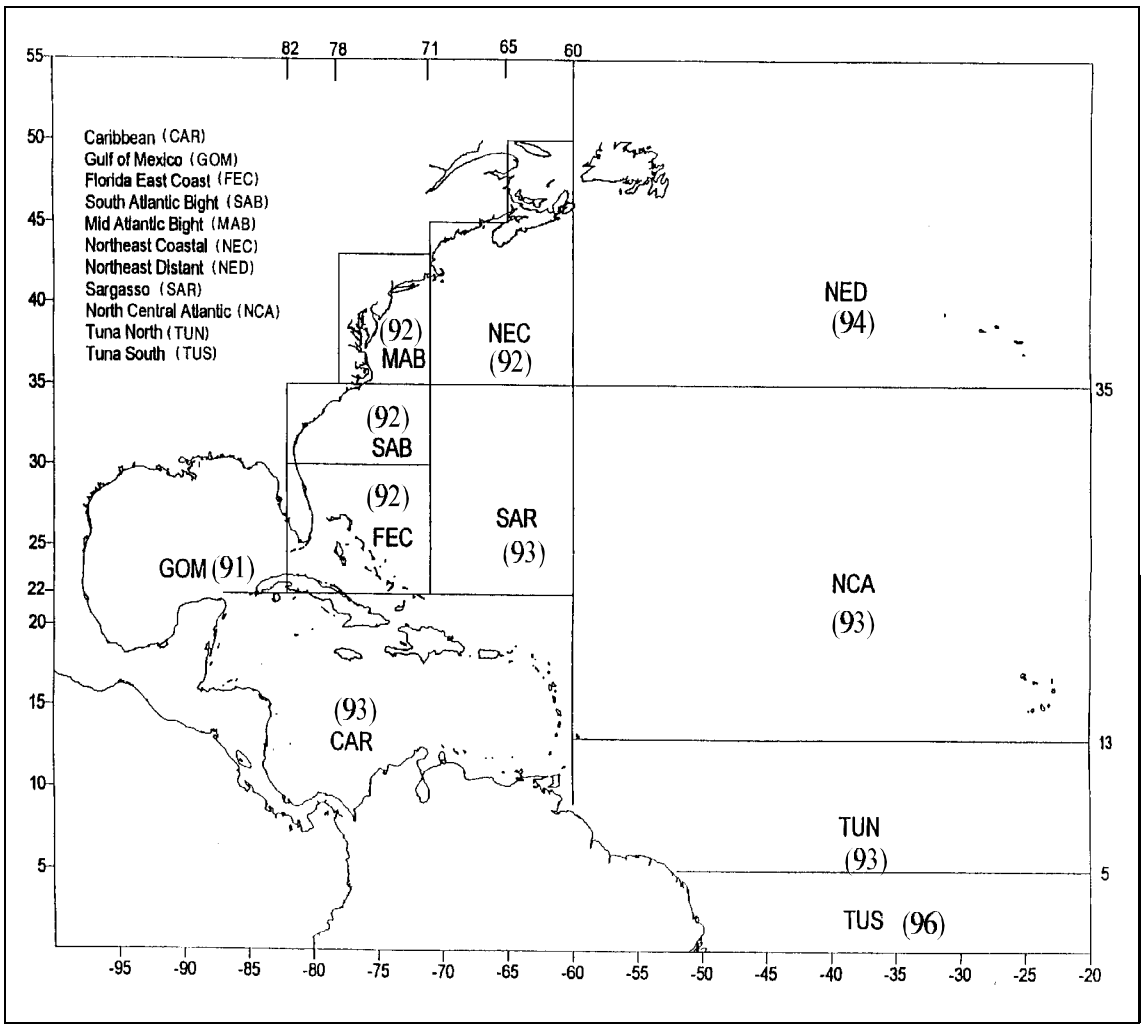

Caribbean (CAR)
Gulf of Mexico (GOM)
Florida East Coast (FEC)
South Atlantic Bight (SAB)
Mid Atlantic Bight (MAB)
Northeast Coastal (NEC)
Northeast Distant (NED)
Sargasso (SAR)
North Central Atlantic (NCA)
Tuna North (TUN)
Tuna South (TUS)
82 78 71 65 60
55 50 45 40 35 30 25 22 20 15 10 5
35 13 5
-95 -90 -85 -80 -75 -70 -65 -60 -55 -50 -45 -40 -35 -30 -25 -20
(92) MAB
NEC (92)
NED (94)
(92) SAB
(92) FEC
SAR (93)
GOM (91)
NCA (93)
(93) CAR
TUN (93)
TUS (96)

Table 4.6.1. U.S. Landings (mt) of Bluefin Tuna by Gear and Area for 1996 to 2000.

Area	Gear	1996	1997	1998	1999	2000
NW Atlantic	Longline	31.7	26.0	30.5	25.1	22.8
	Handline	32.5	17.4	29.2	15.5	3.2
	Purse Seine	245.0	249.7	248.6	247.9	275.2
	Harpoon	95.7	97.5	133.1	115.8	184.2
	*Rod and reel (>145 cm LJFL)	588.5	752.6	610.4	657.5	632.8
	*Rod and reel (<145 cm LJFL)	251.7	178.9	166.3	103.0	49.5
	Unclassified	2.8	2.2	0.6	0.1	0.2
Gulf of Mexico	Longline	36.2	23.8	18.3	48.4	43.3
	*Rod and reel	0.0	0.0	0.0	0.4	0.9
	All Gears	1284.1	1348.1	1237	1213.7	1212.1

* 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 2000.

Area	Gear	1996	1997	1998	1999	2000
NW Atlantic	Longline	728.3	838.9	464.9	581.3	734.45
	Rod and reel*	4484.8	3560.9	2845.7	3818.2	3809.47
	Troll	371.0	218	177.5	0	0
	Purse seine	6.8	0	0	0	0
	Gillnet	13.2	1.3	1.7	0.2	0.21
	Trawl	7.3	1.9	0.7	4.1	1.76
	Harpoon	0	0	0	0	0
	Handline	37.2	34.3	0	192	235.7
	Trap	0	**	0.1	0.8	0.53
	Unclassified	0.4	0	0	2.1	1.31
Gulf of Mexico	Longline	2164.8	2571.3	1864.5	2736.6	2133
	Rod and reel*	13.2	7.7	80.9	149.4	52.26
	Handline	47.0	55.6	60.8	12.7	28.57
	Gillnet	0	0	0	**	0
	Uncl	19.6	0	0	0	0
Caribbean	Longline	34.2	135.4	58.6	24.4	11.77
	Troll	0	19.6	0	0	0
	Handline	0	.7	3.9	14.5	19.41
	Gillnet	0	**	0	0	0.09
	Trap	0	.1	0	0.1	0.28
NC Area 94a	Longline	319.3	6.1	4.6	0.2	2.11
SW Atlantic	Longline	38.4	221.9	55.3	32.4	19.76
All Gears		8285.5	7673.7	5619.2	7569	7050.68

** $\underline{<}$= 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 2000.

Area	Gear	1996	1997	1998	1999	2000
NW Atlantic	Longline	.1	1.0	0.7	0.3	0
	Rod and reel*	48.1	42.0	49.5	63.6	13.12
	Troll	.9	.6	0.4	0	0
	Purse seine	.7	0	0	0	0
	Gillnet	18.5	8.9	16.9	26.5	1.86
	Trawl	0	0	0.2	1.0	0.04
	Handline	0.3	.1	0	0.2	0.23
	Trap	15.2	0	0	17.5	0
	Pound	0	0	0	0	0
	uncl	**	0	0	0	0
Gulf of Mexico	Longline	.2	1.3	0.6	0.4	0.23
	Rod and reel*	36.4	21.7	37.0	34.8	16.67
	Handline	0.1	0	0	0.4	0.65
	Trap	0	0	0	0	0
	Uncl					0.04
Caribbean	Longline	0	1.2	0	1.3	1.62
	Gillnet	0	.2	0	0.4	0.59
	Harpoon	0	0	0	0	0
	Handline	0	0	0	5.8	8.8
	Trap	0	**	0	0.1	0.28
	Troll	**	7.3	0	0	0
	uncl	0	0	0	0	0
SW Atlantic	Longline	0	**	0	0	0
All Gears		120.5	84.3	105.3	152	44.13

** $\leq$ 0.05 mt

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.

Table 4.6.4. U.S. Landings (mt) of Bigeye Tuna by Area and Gear for 1996-2000.

Area	Gear	1996	1997	1998	1999	2000
NW Atlantic	Longline	333.0	476.3	544.3	737.8	333.2
	Rod and reel*	108.2	333.5	228.0	316.1	34.4
	Troll	4.1	3.9	4.0	0	0
	Gillnet	4.2	**	0.4	0.2	0
	Handline	16.4	2.7	0	11.9	4.1
	Pairtrawl	0	0	0	0	0
	Trawl	1.4	1.0	0.5	1.2	1.7
	Harpoon	0	0	0	0	0
	Haul Seine	0	0	0	0	0
	Uncl	0.1	.5	0	0.9	0
Gulf of Mexico	Longline	30.9	33.9	25.6	54.6	44.5
	Rod and reel*	0	0	0	1.8	0
	Handline	0.9	**	0.1	0.2	0.1
Caribbean	Longline	32.8	50.0	48.5	23.2	13.7
	Handline	0	0	0	0.2	1.5
NC Area 94a	Longline	228.9	91.8	48.4	35.3	63.1
SW Atlantic	Longline	34.9	142.8	28.5	78.2	77.4
All Gears		795.8	1136.4	928.3	1261.6	573.6

** $\leq$= 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 2000.

Area	Gear	1996	1997	1998	1999	2000
NW Atlantic	Longline	63.6	140.0	155.4	179.5	130.52
	Gillnet	30.7	42.8	40.1	27.0	0.78
	Handline	3.7	4.8	0	0.6	2.93
	Trawl	1.7	2.6	2.4	0.4	0.03
	Troll	2.7	1.6	5.8	0	0
	Rod and reel*	277.8	220.2	601.1	90.1	250.75
	Pair Trawl	0	0	0	0	0
	Pound	3.5	1.3	0.9	0.4	0
	Uncl	21.1	0.2	0	0	0.12
Gulf of Mexico	Longline	5.7	16.9	3.9	3.8	4.13
	Rod and reel*	61.7	49.3	0	0	0
	Handline	0.1	0	0	**	0
Caribbean	Longline	6.6	16.1	17.8	8.3	9.24
	Troll	0	3.6	0	0	0
	Gillnet	0	**	0	0.2	0.13
	Trap	0	**	0	**	0.22
	Handline	0	0	0	3.8	5.01
NC Area 94a	Longline	32.4	11.4	1.6	1.5	2.6
SW Atlantic	Longline	1.1	4.7	1.4	1.4	0.89
All Gears		512.4	515.5	830.4	317	407.35

** $\leq$= 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 2000.

Area	Gear	1996	1997	1998	1999	2000
NW Atlantic	* Longline	1310.4	1262.2	1624.1	1872.3	1547.6
	Gillnet	77.8	.4	36.3	0	0
	Pair Trawl	0	0	0	0	0
	Handline	.1	1.3	0	5.0	7.7
	Trawl	19.8	8.0	5.9	7.5	10.9
	Troll	7.3	0.4	0.7	0	0
	* unclassified	25.8	11.9	9.1	3.8	1.4
	Harpoon	.5	.7	1.5	0	0.6
	** Rod and Reel	5.92	10.91	4.71	21.32	15.6
	Trap	0	0	0.1	**	0
Gulf of Mexico	* Longline	896.3	759.9	633.1	579.6	631.7
	Handline	0	0	0	**	1.2
Caribbean	* Longline	1180.0	688.9	516.0	260.5	331.9
	Trap					0.3
NC Atlantic	* Longline	629.4	688.2	658.6	650.0	804.6
SW Atlantic	* Longline	172.6	417.9	170.1	185.2	143.8
All Gears		4325.92	3850.71	3660.21	3585	3497.1

* 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 1997-2000.

		Blue Marlin				White Marlin				Sailfish			
Area	**Gear**	**1997**	**1998**	**1999**	**2000**	**1997**	**1998**	**1999**	**2000**	**1997**	**1998**	**1999**	**2000**
NW Atlantic	Longline*	18.7	23.3	22.0	28.8	11.2	15.3	18.6	10.3	9.2	6.4	13.7	11.2
	Unclassified*		0.62		0.1		0.7	0.06	0.0		0.06		0.0
	Rod and reel**	25.0	34.1	24.8	13.75	0.9	2.4	1.5	0.23	0.0	0.1	0.07	1.75
Gulf of Mexico	Longline*	51.0	18.5	55.2	29.6	15.4	11.8	31.5	29.9	13.3	17.0	57.4	33.9
	Rod and reel**	11.5	4.5	7.5	4.7	0.9	0.2	0.1	0.0	0.4	1.0	0.6	0.24
Caribbean	Longline*	24.6	2.3	1.6	0.5	6.6	1.3	5.04	0.5	3.3	0.2	0.46	0.1
	Rod and reel**	8.6	10.6	4.6	5.7	0.0	0.02	0.0	0.0	0.2	0.05	0.0	0.06
	Other	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0
Unknown & NC Area 94a	Longline*	2.3	6.1	1.6	0.7	0.5	2.8	1.08	0.1	0.0	0.8	0.02	0.1
SW Atlantic	Longline*	41.5	1.6	1.7		37.1	0.9	0.45	0.0	31.9	2.7	0.02	0.1
All Gears		183.2	101.6	119.0	83.7	72.6	35.4	58.3	41.0	58.3	28.3	72.3	47.3

* 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).

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5. ECONOMIC STATUS OF HMS FISHERIES

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.

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.

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 2002 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.

The review of each rule and of HMS fisheries as a whole is facilitated when there is a baseline against which the rule or fishery may be evaluated. In this report, as in the 2001 SAFE report, NMFS 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, NMFS began to collect economic information voluntarily for vessels using the pelagic logbook, and regarding HMS specifically, no rules were implemented in 1996 that were classified as significant under RFA. Additionally, while the HMS FMP and the Billfish Amendment 1 were finalized in 1999, scoping for these two major documents and its final rule began in 1997. It is possible that anticipation of these documents and any potential changes in their implementing regulations could have begun to impact the decisions made by HMS fishermen and any associated businesses. Where noted, NMFS converted 2000 dollars to 1996 dollars using the consumer price index in order to help comparisons between years.

5.1 Commercial Fisheries

5.1.1 Economics of Commercial Fisheries across the United States in General[3]

In 2000, the total commercial landings at ports in the 50 states by U.S. fishermen were 9.1 billion pounds and were valued at $3.5 billion. While this was a three percent decrease from 1999 in terms of landings, the overall value increased by $82.4 million. Compared to 1996, this was an increase of $62.8 million from the estimated 1996 value. The 2000 ex-vessel price index indicated that 13 species of the 33 species tracked had increasing ex-vessel prices and 16 species had decreasing ex-vessel prices.

The estimated value of the 2000 domestic production of all fishery products was $7.2 billion. This is $95.2 million less than the estimated value in 1999. The estimated value of domestic production in 1996 was $7.4 billion. The total import value of fishery products was $19.0 billion in 2000. This is an increase of $2.0 billion from 1999. The total import value in 1996 was $13.1 billion. The total export value of fishery products was $10.9 billion in 2000. This is an increase of $892.1 million from 1999. The total export value in 1996 was $8.7 billion.

Consumers spent an estimated $54.4 billion for fishery products in 2000 including $38.0 billion at food service establishments, $16.1 billion for home consumption, and $317.8 million for industrial fish products. The commercial marine fishing industry contributed $27.8 billion to the U.S. Gross National Product in 2000. 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 2000, 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 2000. The value of all HMS species (both Atlantic and Pacific) constituted 9.5 percent and 9.1 percent in 1996 and 2000, 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.

[3] All the information and data presented in this section were obtained from NMFS 1997a and NMFS 2001a. None of the 2000 prices in this section were converted to 1996 prices.

Table 5.1 **The top five states in the United States as ranked by value of commercial landings.** Source: NMFS, 1997a; NMFS, 2001a. 2000 dollars are not converted to 1996 dollars.

Rank in value of commercial landings	1996		2000	
	State	Value	State	Value
1	Alaska	$1.2 billion	Alaska	$957.0 million
2	Louisiana	$267.3 million	Louisiana	$401.1 million
3	Massachusetts	$231.4 million	Massachusetts	$288.3 million
4	Florida	$205.2 million	Maine	$275.1 million
5	Maine	$200.9 million	Texas	$232.4 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, 2001a. 2000 dollars are not converted to 1996 dollars.

Species		1996	
Sharks	Dogfish	11,804	4,853
	Other	10,824	6,303
	Total	22,628	11,156
Swordfish		36,494	37,981
Tunas	Albacore	30,157	20,630
	Bigeye	23,673	24,862
	Bluefin	21,857	18,954
	Little (Tunny)	--	113
	Skipjack	7,084	2,551
	Yellowfin	27,060	27,651
	Unknown	425	416
	Total	110,256	95,176
Total value all HMS		169,378	144,313
Total value all finfish species		1,790,966	1,594,815

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, 2001a. 2000 dollars are not converted to 1996 dollars.

Product	Species		1996	2000
Fresh and Frozen Fillets	Shark		5,992	1,925
	Swordfish		34,277	29,284
	Tuna		62,456	54,741
	Total HMS		102,725	85,950
Fresh and Frozen Steaks	Shark		27	-
	Swordfish		12,725	11,301
	Tuna		14,669	12,457
	Total HMS		27,421	23,758
Total Fillets and Steaks, all finfish			885,665	829,534
Canned products	Tuna	Albacore	362,690	392,881
		Lightmeat	594,234	462,554
		Total	956,924	855,435
	Total, all finfish		1,298,489	1,194,085

5.1.2 Ex-Vessel Prices of Atlantic HMS

The average ex-vessel prices per lb dw for 1996 and 2000 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 2000 by species and area are summarized in Table 5.5. For both of these tables, 2000 dollars are converted to 1996 dollars using the consumer price index conversion factor of 0.911. 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 across all regions. The gears used also influenced the average price of bigeye tuna

with longline-caught fish bringing the highest average value in 2000 in the Gulf of Mexico and South Atlantic while trawl-caught bigeye tuna received the highest average value in the mid-Atlantic. The mid-Atlantic region is the only region that had consistent uses of gear types in both 1996 and 2000. This region also showed a switch from high average values for handgear- and trawl-caught bigeye tuna to high average values for net- and trawl-caught bigeye tuna.

Average ex-vessel prices for bluefin tuna have generally declined in all regions (Tables 5.4 and 5.5). This is contrary to the ex-vessel value of bluefin tuna across the United States (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 and North Atlantic, bluefin tuna caught with handgear had the highest average ex-vessel price in 2000. 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 2000. Ex-vessel prices in 2000 were higher than in 1997, 1998, or 1999.

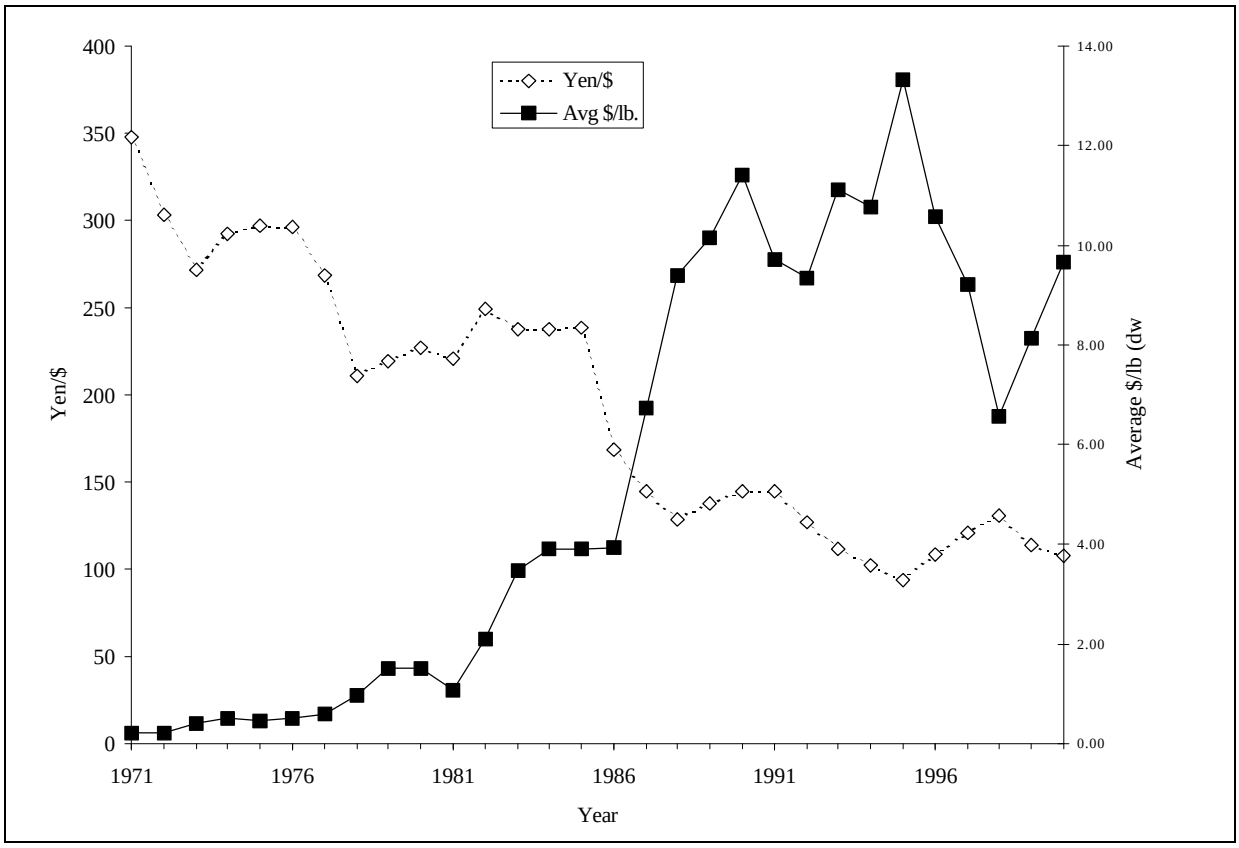
The average ex-vessel prices for yellowfin tuna have increased slightly in the South Atlantic and North Atlantic and have decreased in the mid-Atlantic (Table 5.5). No data was available from 1996 in the Gulf of Mexico region. In the United States, even though the ex-vessel price has increased since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

The average ex-vessel prices for other tunas have generally decreased in all regions except the Gulf of Mexico where it increased. (Table 5.5). The average price of other tunas is the lowest in the Gulf of Mexico compared to the other regions. 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 discernable pattern (Table 5.4).

The average ex-vessel price for large coastal sharks (LCS) increased in the Gulf of Mexico and North Atlantic regions and decreased slightly in the South and mid-Atlantic regions (Table 5.5). Average prices changed across regions and gear-type (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).

Figure 5.1 **Average Annual Yen/$ Exchange Rate and Average U.S. BFT Ex-vessel $/lb (dw) for all gears: 1971-2000**. Source: Federal Reserve Bank (www.stls.frb.org) and Northeast Regional Office.

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. Data was spotty in other regions, except the South Atlantic (Table 5.4).

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

Table 5.7 summarizes the average value of the fishery based on average ex-vessel prices and the weight reported landed as reported in the United States National Report (NMFS 2001b), the 1997 and 2000 Shark Evaluation Reports (NMFS, 1997b; Cortes, 2000), information given to ICCAT (Cortes, 2001), 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 increased 3.7 percent from approximately $68.1 million in 1996 to approximately $70.6 million in 2000. The bigeye tuna, bluefin tuna, yellowfin tuna, other tunas, and small coastal shark fisheries were the only Atlantic HMS fisheries that increased in value (by 1 percent, 8 percent, 97 percent, 77 percent, and 145 percent respectively). The value of the pelagic shark fishery decreased the most (71 percent) followed by the fisheries for swordfish (43 percent) and large coastal shark (33 percent).

Table 5.4 **Average ex-vessel prices per lb. dw for Atlantic HMS by gear and area.** 2000 dollars are converted to 1996 dollars using the consumer price index conversion factor of 0.911. 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	2000	1996	2000	1996	2000	1996	
Bigeye tuna	HND	$0.68	$1.67	$1.30	$0.93	$5.74	$4.05	$3.69	$3.84
	PLL	-	$2.57	$1.33	$2.07	$3.51	$3.92	$3.36	$4.00
	BLL	-	$2.10	$1.30	$1.70	$2.61	$3.14	$2.15	-
	NET	-	-	$1.30	-	$3.87	$5.06	$3.31	$0.38
	TWL	-	-	-	-	$4.68	$5.17	$8.00	$3.53
Bluefin tuna	HND	-	$1.69	-	$7.28	$14.70	$6.01	$10.73	$9.13
	PLL	$5.83	-	$4.62	$4.88	$6.12	$5.22	$5.56	$5.15
	NET	-	-	-	-	$15.71	-	-	-
	P. Seine	-	-	-	-	-	-	$11.05	$7.11

Species	Gear	Gulf of Mexico		S. Atlantic		Mid-Atlantic			
		1996	2000	1996	2000	1996	2000	1996	
Yellowfin tuna	HND	-	$2.26	$1.55	$1.42	$2.49	$1.95	$2.50	$2.42
	PLL	-	$3.10	$1.63	$2.03	$2.51	$2.11	$2.14	$2.52
	BLL	-	$3.35	$1.41	$2.09	$3.28	$1.69	$2.03	$2.11
	NET	-	-	$1.07	-	$2.03	$1.61	$2.43	-
	TWL	-	-	-	-	$2.40	$1.42	$2.67	$2.10
Other tunas	HND	$0.28	$0.69	$0.75	$0.54	$1.34	$0.86	$1.90	$1.45
	PLL	-	$0.66	$0.79	$1.19	$1.84	$0.94	$0.98	$1.03
	BLL	-	$0.77	$0.87	$1.36	-	$1.07	$1.50	$0.46
	NET	$0.38	$0.53	$0.35	$0.18	$0.45	$0.40	$0.73	$0.46
	TWL	-	$0.56	$0.31	$0.23	$0.45	$0.64	$1.08	$0.20
Swordfish	HND	-	$3.56	$2.48	$3.57	$3.61	$2.96	$5.20	$7.29
	PLL	-	$3.03	$2.88	$2.84	$4.31	$3.27	$4.01	$3.34
	BLL	-	$2.82	$2.46	$3.12	$4.88	$2.65	$3.07	$1.82
	NET	-	-	-	-	$4.63	-	$5.62	-
	TWL	-	-	-	-	$4.56	$3.59	$3.08	$3.69
Large Coastal Sharks	HND	$0.23	$0.54	$0.72	$0.54	$0.74	$0.46	-	-
	PLL	-	$0.44	$1.54	$1.10	$0.58	$0.41	$1.03	$0.91
	BLL	$0.60	$0.39	$0.73	$0.71	$0.54	$0.37	$0.99	$0.59
	NET	$0.38	$0.44	$1.30	$0.83	$0.45	$0.48	$0.83	$0.97
	TWL	$0.15	$0.14	$0.86	$0.45	$0.47	$0.66	$0.80	$0.98
Pelagic sharks	HND	-	$1.26	$0.82	$0.71	$1.47	$1.28	$1.60	-
	PLL	-	$1.16	$0.68	$0.87	$1.25	$1.32	$1.26	$1.26
	BLL	-	$1.19	$0.59	$0.82	$1.47	$1.13	$1.85	$1.37
	NET	-	-	$0.33	$0.32	$0.99	$0.93	$1.12	$0.75
	TWL	-	-	-	$0.18	$1.00	$0.82	$0.96	$0.88
Small Coastal sharks	HND	-	$0.85	$0.25	$0.36	-	$0.35	-	-
	PLL	-	$0.43	-	$0.52	$0.25	$0.18	-	-
	BLL	-	$0.37	-	$0.51	-	-	-	-
	NET	-	-	$0.25	$0.44	-	$0.36	-	-
	TWL	-	-	-	$0.21	-	-	-	-
Shark fins	HND	-	$19.65	$14.00	$10.86	$2.74	$5.62	-	-

Species	Gear	Gulf of Mexico		S. Atlantic		Mid-Atlantic			
		1996	2000	1996	2000	1996	2000	1996	
	PLL	-	$14.26	-	$9.42	$7.79	$7.81	$4.25	$5.05
	BLL	-	$14.48	$14.00	$16.01	$8.00	-	$3.00	$22.95
	NET	-	$14.12	-	$6.33	$4.77	$3.08	$1.96	$2.20
	TWL	-	$8.35	$9.11	-	$1.99	$1.34	$2.32	$2.73

Table 5.5 **Average ex-vessel prices per lb. for Atlantic HMS by area.** 2000 dollars are converted to 1996 dollars using the consumer price index conversion factor of 0.911.

Species	Gulf of Mexico		S. Atlantic		Mid-Atlantic			
	1996	2000	1996	2000	1996	2000	1996	
Bigeye tuna	$0.68	$2.06	$1.32	$1.80	$3.99	$4.00	$3.59	$3.75
Bluefin tuna	$5.83	$1.69	$4.62	$6.22	$9.48	$5.45	$10.78	$8.14
Yellowfin tuna	-	$2.93	$1.56	$1.71	$2.43	$1.93	$2.35	$2.41
Other tunas	$0.29	$0.67	$0.62	$0.53	$1.10	$0.69	$1.31	$0.85
Swordfish	-	$2.96	$2.79	$2.95	$4.43	$3.34	$4.09	$3.53
Large coastal sharks	$0.21	$0.39	$1.02	$0.71	$0.55	$0.48	$0.88	$0.92
Pelagic sharks	-	$1.19	$0.62	$0.69	$1.21	$1.09	$1.31	$1.00
Small coastal sharks	-	$0.47	$0.25	$0.44	$0.25	$0.35	-	-
Shark fins	-	$14.57	$10.74	$12.90	$4.60	$4.46	$2.69	$6.22

Table 5.6 **Indices of ex-vessel prices for HMS, except sharks, by years 1993-2000.** 1982 is the base year and has a value of 100. 1996 and 2000 are in bold for easier referencing. Note: Indices based on Atlantic and Pacific ex-vessel prices. Source: NMFS, 2001a.

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

Year	Swordfish	Albacore	Bluefin	Skipjack	Yellowfin	Other Tuna
1999	76	125	736	63	88	94
2000	**78**	**134**	**760**	**52**	**122**	**109**

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. 2000 prices are converted to 1996 dollars using a conversion factor of .911. Sources: NMFS, 1997b; NMFS, 2001b; Cortes, 2000; Cortes, 2001; Cortes, 2001, pers. communication; and bluefin tuna dealer reports from the Northeast Regional Office.

Species	1996					
	Ex-vessel price ($/lb dw)	Weight (lb dw)	Fishery Value	Ex-vessel price ($/lb dw)	Weight (lb dw)	
Bigeye tuna	$2.40	1,212,706	$2,904,432	$2.90	1,012,352	$2,935,821
Bluefin tuna	$10.58	1,652,989	$17,488,624	$8.80	2,137,580	$18,810,704
Yellowfin tuna	$2.11	6,679,938	$14,116,936	$2.24	12,435,708	$27,855,986
Other tunas	$0.83	368,433	$305,799	$0.68	795,243	$540,765
Total tuna	--	--	$34,815,791	--	--	$50,143,276
Swordfish	$3.77	7,170,619	$27,033,234	$3.20	4,832,384	$15,463,629
Large coastal sharks	$0.67	5,262,314	$3,499,439	$0.62	3,762,000	$2,332,440
Pelagic sharks	$1.05	695,531	$727,989	$0.99	215,005	$212,855
Small coastal sharks	$0.25	460,667	$115,167	$0.42	672,245*	$282,343
Shark fins (weight = 5% of all sharks landed)	$6.01	320,926	$1,928,763	$9.54	232,462	$2,217,687

Total sharks	--	--	$6,271,358	--	--	$5,045,325
Total HMS	--	--	$68,120,382	--	--	$70,652,230

*1999 data used. 2000 data not available.

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, as reported by the Fulton Fish Market, of HMS sold in Atlantic and Gulf of Mexico states decreased by approximately 21 percent from 1996 to 2000. The wholesale price of swordfish weighing between 26 and 49 lbs decreased the most (40.7 percent), followed by the wholesale price of swordfish weighing between 50 and 99 lbs (28.6 percent) and the wholesale price of thresher sharks (25.0 percent). The wholesale price of mako sharks was the only increase (4.7 percent). The wholesale price of blacktip sharks decreased the least (9.5 percent). 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: 2000 dollars are converted to 1996 dollars using the conversion factor 0.911. "0.00" means that some information was provided for that year and species. " - " means that no information was provided for that year and species.

State	Species	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
FL	Blacktip	96	0.00	1.00	0.00	1.25	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		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
		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
		00	-	-	-	-	-	-	-	-	-	-	-	-

State	Species	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
		00	1.14	1.14	0.99	0.91	0.00	0.00	0.58	0.62	0.00	0.00	0.00	0.00
	Mako	96	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		00	3.19	2.73	3.19	2.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thresher	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.91
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
		00	-	-	-	-	-	-	-	-	-	-	-	-
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
		00	1.14	0.00	0.00	0.91	0.00	0.00	0.00	1.14	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
		00	-	-	-	-	-	-	-	-	-	-	-	-
	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
		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: 2000 dollars are converted to 1996 dollars using the conversion factor 0.911. "0.00" means that some information was provided for that year and species. " - " means that no information was provided for that year and species.

State	Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
CT	Cuts	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	0.00	0.00	0.00	0.00	0.00	5.92	0.00	5.92	0.00	0.00	4.55	0.00
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
		00	4.87	4.52	4.94	4.94	4.86	5.40	4.71	5.01	5.92	0.00	3.87	4.25
	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
		00	4.78	4.00	4.38	4.17	3.80	4.61	4.10	0.00	5.01	0.00	3.19	3.19
	26-49#	96	0.00	0.00	5.75	6.00	6.00	6.00	6.00	0.00	0.00	0.00	5.50	0.00
		00	3.64	3.64	3.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cuts	96	0.00	7.38	7.50	8.17	7.88	8.00	8.50	8.50	7.50	0.00	8.75	0.00
		00	6.28	5.37	6.27	6.08	5.99	6.38	5.47	6.38	0.00	0.00	5.01	5.24
LA	100# Up	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.73	0.00

State	Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Cuts	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.56	0.00
MA	100# Up	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25	0.00	0.00	5.50	0.00
		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
		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
		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
		00	0.00	0.00	5.24	5.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.24
	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
		00	0.00	0.00	5.01	5.69	5.01	0.00	0.00	0.00	0.00	0.00	0.00	4.56
	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
		00	0.00	0.00	0.00	0.00	3.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cuts	96	0.00	6.88	0.00	8.13	7.50	0.00	0.00	0.00	0.00	7.13	7.13	6.50
		00	0.00	0.00	6.72	6.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.50
NJ	100# Up	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	4.78	5.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.24	0.00	0.00
	50-99#	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	0.00	5.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cuts	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	6.38	6.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.38	0.00	0.00
NY	100# Up	96	0.00	0.00	0.00	0.00	0.00	0.00	7.38	6.50	6.00	6.38	6.00	0.00
		00	0.00	0.00	0.00	0.00	0.00	0.00	4.45	5.05	5.62	5.13	3.64	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
		00	0.00	0.00	0.00	0.00	0.00	0.00	4.10	4.06	4.78	4.10	3.19	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
		00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.26	0.00	0.00	0.00	0.00
	Cuts	96	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	7.50	7.50	7.50	0.00
		00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.09	6.38	0.00	4.56	0.00
SC	100# Up	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	0.00	0.00	4.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

State	Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	50-99#	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	0.00	0.00	3.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	26-49#	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	0.00	0.00	2.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5.10 **Average fresh wholesale price per lb of yellowfin tuna (Y) sold in Atlantic and Gulf of Mexico states as reported by the Fulton Fish Market**. Note: 2000 dollars are converted to 1996 dollars using the conversion factor 0.911. #'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
		00	3.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.64	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
		00	5.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.47	0.00	0.00	0.00
LA	Y#1BTF	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	0.00	0.00	0.00	0.00	5.24	0.00	5.13	0.00	0.00	0.00	0.00	0.00
	Y#1cut	96	-	-	-	-	-	-	-	-	-	-	-	-
		00	0.00	0.00	0.00	0.00	7.52	0.00	7.06	0.00	0.00	0.00	0.00	0.00
	Y#2BTF	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.75	0.00	0.00	5.00
		00	0.00	0.00	0.00	0.00	3.94	0.00	3.78	3.87	4.55	0.00	0.00	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
		00	0.00	0.00	0.00	0.00	5.77	0.00	5.51	5.69	6.38	0.00	0.00	0.00
NC	Y#2BTF	96	0.00	4.75	0.00	6.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.55
	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
		00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.38
	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
		00	-	-	-	-	-	-	-	-	-	-	-	-
	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
		00	-	-	-	-	-	-	-	-	-	-	-	-
	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
		00	-	-	-	-	-	-	-	-	-	-	-	-

State	Species and Size	Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
		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
		00	-	-	-	-	-	-	-	-	-	-	-	-
	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
		00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.55	0.00	0.00
	Y#2cut	96	0.00	0.00	0.00	7.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		00	-	-	-	-	-	-	-	-	-	-	-	-
NY	Y#1BTF	96	0.00	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		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
		00	-	-	-	-	-	-	-	-	-	-	-	-
	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
		00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.64	0.00	0.00	0.00
	Y#2cut	96	0.00	7.00	0.00	7.50	0.00	5.88	6.38	5.60	5.56	5.25	5.13	0.00
		00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.01	0.00	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
		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
		00	-	-	-	-	-	-	-	-	-	-	-	-
	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
		00	-	-	-	-	-	-	-	-	-	-	-	-
	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
		00	-	-	-	-	-	-	-	-	-	-	-	-
	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
		00	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.11 **The overall average wholesale price per lb of fresh HMS sold in Atlantic and Gulf of Mexico states as reported by the Fulton Fish Market.** Note: 1999 dollars are converted to 1996 dollars using the conversion factor 0.94. 2000 dollars are converted to 1996 dollars using the conversion factor 0.911. #'s indicate quality (1 is highest, 3 is lowest); BTF is by the fish. No data reported in 1996 or 2000 for bigeye tuna or #3 yellowfin tuna.

Species	Description	1996 Price/lb	1999 Price/lb	2000 Price/lb	Percent Change 1996 to 2000
Blacktip	--	$1.05	$0.98	$0.95	-9.5%
Mako	--	$2.77	$2.58	$2.90	4.7%
Thresher	--	$1.00	$0.86	$0.75	-25.0%
Swordfish	100# and up	$6.28	$4.94	$4.79	-23.7%
	50-99#	$6.02	$4.27	$4.30	-28.6%
	26-49#	$5.50	$3.16	$3.26	-40.7%
	Cuts	$7.74	$6.16	$5.96	-23.0%
Yellowfin tuna	#1: BTF	$7.00	$5.61	$5.18	-26.0%
	#1: Cuts	$9.38	$7.74	$7.29	-22.3%
	#2: BTF	$5.00	$3.99	$3.97	-20.6%
	#2: Cuts	$6.52	$5.85	$5.65	-13.3%
	#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

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

In general, a vessel owner will need to pay for a number of supplies for each fishing trip (e.g. hooks, bait, light sticks, 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

The amount of data available for this gear type is increasing although current information is needed. Since 1996, NMFS has been collecting economic information on a per trip basis through submission of voluntary forms in the pelagic logbook maintained in the Southeast Fisheries Science Center. 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 now a few studies that have examined this voluntary data (Larkin *et al*.,1998; Ward and Hanson,1999; Larkin *et al*., 2000; and Larkin *et al*., in press). Additionally, in 1998, Porter *et al*., 2001, conducted a survey of pelagic longline vessel fishing operations in 1997. Because Larkin *et al*. (1998) and Ward and Hanson (1999) were discussed in last year's SAFE report, those studies will not be discussed in this SAFE report.

Larkin *et al.* (2000) examined 1996 logbooks and the 1996 voluntary forms and found that net returns to a vessel owner varied substantially depending on the vessel size and the fishing behavior (i.e. sets per trip, fishing location, season, target species). They found that out of 3,255 pelagic longline trips reported, 642 pelagic longline trips provided the voluntary economic information. From all trips, four species (swordfish, yellowfin tuna, dolphin fish, and sandbar sharks) comprised 77 percent of all species landed and accounted for 84 percent of the total gross revenues for the fleet. Larkin *et al*.(2000) suggest using median values (half of the fleet is less than this value and half is above) instead of mean values (the average of all vessels) given the high degree of skewness to the data. For example, the mean owner's share of a trip is $4,412 while the median is $2,242. Larkin *et al*. (2000) suggest that the median values identify the characteristics of the majority of the fleet better than the mean which can be influenced by outliers (a few vessels that may not be similar to the rest of the fleet). A summary of the trip characteristics can be found in Table 5.13. Generally, vessels that were between 46 and 64 feet in length, had between 10 and 21 sets per trip, fished in the second quarter, fished in the Caribbean, or had more than 75 percent of their gross revenues from swordfish had the highest net return to the owner (ranging from $3,187 to $13,097 per trip). Vessels that were less than 45 feet in length, had between one and three sets per trip, fished in the first quarter, fished between North Carolina and Miami, FL, or had between 25 and 50 percent of their gross revenues from swordfish had the lowest net return to the owner (ranging from $642 to $1,885 per trip).

Larkin *et al*. (in press) used the above data in a cost function model to determine if and how captains decide on levels of effort in order to minimize variable costs per trip. They found

that on average increasing the price of bait increased the demand from light sticks (i.e. these inputs are complements); changing the price of fuel did not affect any purchase decisions; and for every additional 10 feet in length, vessel operators demanded an additional 149 light sticks, 319 pounds of bait, and 540 gallons of fuel per trip. They also found that on average increasing swordfish landings required additional light sticks, bait and fuel. Increasing tuna landings reduced the demand for light sticks while increasing the demand for bait and fuel. Additionally, some inputs (i.e. light sticks, bait demand, and fuel demand) varied significantly with region, quarter, number of sets, and target species. They also found that if the price of light sticks or bait increases, the quantity demanded falls, particularly for light sticks (i.e. own-price elasticities are negative). However, elasticities could also change depending on region, target species, or number of trips but did not change between seasons.

Porter *et al*. (2001) conducted a survey of 147 vessels along the Atlantic and Gulf of Mexico (110 surveys were completed) in 1998 regarding 1997 operations. The survey consisted of 55 questions divided into five categories (vessel characteristics, fishing and targeting strategies, demographics, comments about regulations, and economic information of variable and fixed costs). The vessels interviewed were diverse in vessel size and target species (swordfish, tuna, mixed). Information was also used from trip tickets and logbooks. They found that on average, the average vessel received approximately $250,000 annual gross revenues, annual variable costs were approximately $190,000, and annual fixed costs were approximately $50,000. Thus, vessels were left with approximately $8,000 to cover depreciation on the vessel and the vessel owner lost approximately $3,500 per year. On a per trip level, gross revenues averaged $22,000 and trip expenses, including labor, were $16,000. Labor cost the owner the most (43 %) followed by gear. Generally trip returns were divided so the vessel owner received 43% and the captain and crew 57%. Along with other studies, Porter *et al*. (2001) noted differences between region, vessel size, and target species (Table 5.14). Porter *et al*. (2001) also noted that 1997 was probably a financially poor year due to a reduction in swordfish quota and a subsequent closure of the fishery.

In all, the new studies are consistent with Larkin *et al*. (1998) and Hanson and Ward (1999) in that characteristics of fishing trips can influence the success of the trip and that pelagic longline fishermen do not have large profits.

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 **Characteristics of a 1996 pelagic longline trip.** Numbers are the median, not the mean. A median gross revenues of $0 means half the fleet earned $0 from that species and half the fleet earned more than $0 for that species. Not all characteristics studied are summarized. Source: Larkin *et al*., 2000.

Variable	All trips	Vessel length (feet)			Number of sets per trip				Quarter				Region			
		<=45	46-64	65-86	1-3	4-6	7-9	10-21	Jan. - Mar.	Apr. - June	Jul. - Sep.	Oct. - Dec.	ME-VA	NC-FL	TX-FL	Carib - bean
Number of trips	642	192	234	216	194	197	153	98	195	184	175	88	86	189	319	47
Number of crew	4	2	3	5	2	4	4	4	4	4	3	4	3	2	4	4
Swordfish gross revenues	$2,157	$2,157	$1,232	$3,081	$616	$1,849	$4,314	$9,089	$4,005	$2,003	$616	$3,697	$462	$2,157	$1,849	$2,2184
BAYS tunas gross revenues	$1,917	$0	$1,590	$6,282	$0	$2,296	$4,794	$8,242	$883	$2,561	$3,179	$2,128	$3,961	$0	$3,179	$2,447
LCS gross revenues	$0	$48	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Pelagic sharks gross revenues	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$192	$0	$0	$24
Other species gross revenues	$306	$91	$378	$474	$0	$365	$711	$735	$108	$1,023	$397	$187	$91	$183	$412	$227
Total Gross Revenues	$8,916	$4,168	$9,506	$12,831	$2,507	$8,395	$14,173	$24,779	$6,761	$11,027	$7,395	$9,378	$7,060	$4,826	$9,387	$26,227
Fuel costs	$1,031	$251	$980	$1,866	$219	$1,095	$1,294	$2,406	$988	$1,058	$760	$1,417	$753	$410	$1,266	$1,970
Bait costs	$960	$258	$900	$2,250	$258	$960	$1,500	$2,685	$1,079	$1,035	$712	$1,037	$965	$590	$1,000	$2,705
Ice costs	$256	$90	$300	$400	$96	$280	$300	$386	$225	$262	$260	$300	$185	$150	$330	$300
Light sticks	$360	$198	$186	$827	$99	$560	$667	$1,597	$560	$421	$132	$631	$94	$198	$597	$1,295
Miscellaneous costs	$305	$57	$417	$1,405	$43	$526	$1,009	$1,591	$471	$363	$190	$87	$171	$42	$821	$1,560
Total costs	$3,666	$1,158	$3,352	$8,410	$981	$3,588	$4,264	$9,117	$4,188	$3,861	$2,817	$5,309	$2,831	$1,928	$5,230	$10,100

Variable	All trips	Vessel length (feet)			Number of sets per trip				Quarter				MD-VA
		<=45	46-64	65-86	1-3	4-6	7-9	10-21	Jan. - Mar.	Apr. - Jun.	Jul. - Sep.	Oct. - Dec.	
Net return to owner	$2,242	$1,771	$3,187	$2,643	$642	$2,804	$5,291	$13,097	$1,472	$3,449	$2,097	$3,227	$2,(

Table 5.14 **Average Characteristics of a 1997 pelagic longline trip.** Not all of the characteristics studied are summarized here. Source: Porter *et al*. (2001)

Variable	All vessels	Region							
		New England	Mid-Atlantic	South Atlantic	Gulf of Mexico	Caribbean	<=50	51 to 95	
Length of trip	13	36	12	8	14	28	7	14	24
Gross revenues	$22,364	$81,569	$20,151	$11,242	$16,437	$67,440	$8,739	$25,076	$47,184
Fuel costs	$2,071	$9,209	$2,154	$717	$1,703	$5,601	$483	$1,713	$6,244
Ice costs	$297	$378	$252	$191	$469	$372	$232	$323	$391
Bait costs	$1,559	$4,779	$1,488	$882	$1,406	$3,771	$708	$1,694	$3,173
Light sticks	$738	$3,129	$635	$392	$490	$2,164	$318	$656	$1,815
Food costs	$897	$2,943	$817	$438	$881	$2,270	$349	$984	$1,939
Gear costs	$2,336	$6,800	$2,147	$1,381	$2,067	$5,808	$1,136	$2,608	$4,462
Other costs	$442	$1,687	$414	$206	$342	$1,293	$183	$413	$1,067
Total variable costs (not labor)	$9,634	$34,725	$8,839	$5,007	$7,867	$25,880	$3,916	$10,027	$21,468
Total labor costs	$7,173	$26,071	$6,558	$3,670	$4,727	$22,620	$2,693	$8,457	$14,591
Net return	$5,556	$20,772	$4,753	$2,565	$3,843	$18,940	$2,130	$6,593	$11,125

Bottom Longline

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

Purse Seine

NMFS is continuing its efforts to collect economic data on the Atlantic tunas purse seine fishery. A voluntary survey has been distributed to the owners of the five Atlantic tuna purse seine vessels. The study is still in the data collection and compilation stage, and NMFS plans to collect additional data from the purse seine vessels in order have preliminary results available for next year's SAFE report. 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.

Handgear

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

on harvest practices; and 3) to combine the results from the hedonic model and production model estimates to find quota allocations that could result in the highest payoffs to the industry.

Gillnets

In 1999, the use of pelagic driftnets was prohibited in both the swordfish and Atlantic tunas fisheries. Currently the only fishermen allowed to use this gear are fishermen targeting sharks. NMFS knows of six vessels that actively participated in this fishery in recent years. 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 light sticks. Other costs may be incurred as the holes in the gear will need to be repaired regularly. NMFS estimates based on recent landings and average ex-vessel prices that most drift gillnet vessel has a gross revenues per trip of $380 to $9,000 with an average of $3,700.

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

5.1.5 Costs and Revenues for Atlantic Dealers

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 5.15 provides a summary of available information. Recent trends indicate that while the number of plants have decreased, the number of employees have increased. As in 1998, 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 5.16. In both 1996 and 1999, the mark up was over 90 percent; however, in 2000 the mark-up decreased to 76 percent.

Table 5.15 The number of plants and employees for Atlantic processors and wholesalers , by State, in 1996 and 1999. Source: NMFS, 1998; NMFS, 2001a. 2000 data is not yet available.

State	1996			
	Number of plants	Number of employees	Number of plants	
Maine	267	3,353	278	3,350
New Hampshire	37	455	36	531
Massachusetts	374	4,964	369	4,988
Rhode Island	82	793	71	843
Connecticut	44	339	42	378
New York	339	2,622	355	2,748
New Jersey	150	2,090	16	1,168
Pennsylvania	68	2,017	71	2,796
Delaware	-	-	-	-
District of Columbia	7	73	6	94
Maryland	126	1,889	106	1,615
Virginia	129	2,115	116	2,187
N. Carolina	145	2,064	137	2,127
S. Carolina	37	337	35	265

State	1996			
	Number of plants	Number of employees	Number of plants	
Georgia	66	1,649	64	1,694
Florida	504	5,794	462	6,465
Alabama	144	2,425	128	2,144
Mississippi	64	1,142	72	2,956
Louisiana	311	4,280	283	3,862
Texas	136	2,384	139	2,603
Total	3,030	40,785	2,786	42,814

Table 5.16 **Summary of the mark-up and consumer expenditure for the primary wholesale and processing of domestic commercial marine fishery products: 1996 and 2000.** Source: NMFS, 1997a and NMFS, 2001a.

	1996	2000
Purchase of Fishery inputs	$5,377,442	$6,726,179
Percent mark-up of fishery inputs	96.6%	76.4%
Total mark-up	$5,192,619	$5,138,583
Total value of fishery inputs	$10,570,061	$11,864,762

5.2 Recreational Fisheries

5.2.1 Economics of Recreational Fisheries across the United States in General[4]

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

[4] Unless stated otherwise, all the information and data presented in this section is from NMFS 1997a and NMFS 2001a.

U.S. Fish and Wildlife Service[5] 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 was expected 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 2000. In 1996, over 8 million people made 64 million recreational fishing trips in the United States and caught over 313 million fish (over 50 percent were released alive). In the Atlantic and Gulf of Mexico alone, 8.8 marine recreational fishing participants took 56 million trips and caught a total of 280 million fish. The most commonly caught species by number overall were spotted seatrout, summer flounder, Atlantic croaker, black sea bass, bluefish, and striped bass. Thirteen percent of the total recreational harvest came from the Atlantic and Gulf of Mexico EEZ. The most common caught species caught in federal managed waters were black sea bass, Atlantic mackerel, dolphin, red snapper, and bluefish.

In 2000, over 9 million people made 76 million recreational fishing trips in the United States and caught over 429 million fish (over 57 percent were released alive). Along the Atlantic and Gulf of Mexico, 8.1 million participants took 66.9 million trips and caught a total of 401.6 million fish. Of the trips that occurred in the Atlantic, 24 percent were made in east Florida, 14 percent in New Jersey, and 13 percent in North Carolina. The most commonly caught species by number in the Atlantic were Atlantic croaker, summer flounder, striped bass, black sea bass, and bluefish. The top five most commonly caught fish by weight included yellowfin tuna, the only

[5] This survey interviewed 22,578 anglers.

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HMS in that list. The most commonly caught species in federally managed waters were black sea bass, Atlantic croaker, summer flounder, dolphin, bluefish, and Atlantic mackerel. Of the trips that occurred in the Gulf of Mexico, 72 percent were made in west Florida, 18 percent in Louisiana, and five percent in both Alabama and Mississippi. The most commonly caught species by number were spotted and sand seatrouts, red drum, white grunt, Atlantic croaker, and red and gray snappers. No HMS made the top five list for most commonly caught species by weight in the Gulf of Mexico. The most commonly caught species by number in federally managed waters were 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

In general, the most recent economic information associated with HMS tournaments can be found in the HMS FMP and the Billfish Amendment. A recent search for HMS tournaments on the web found a number of tournaments targeting HMS. This search found that HMS tournaments charge large fees for a team ($395 to $5000). This entry fee would pay for a maximum of two to six anglers per team during the course of the tournament. Additional anglers could join the team at a reduced rate of between $50-$450. The team entry fee did not appear to be directly proportional to the number of anglers per team but rather with the amount of money available for prizes and, possibly, the species being targeted. For example, in 2000 and 2001, Bisbee's Black and Blue Marlin Jackport Tournament had a $5,000 entry fee for teams consisting of a maximum of four anglers. This tournament awarded a total of $2.4 million and $1.7 million in 2000 and 2001, respectively. Conversely, the $15,000 New Jersey Shark tournament has an entry fee of $395 for a team with a maximum of five anglers. This tournament awarded a total of $15,000 in prizes with a possibility of a $50,000 bonus if a state record is landed. The number of vessels and participants at each tournament is also diverse. The smallest tournament found on the web had 18 vessels and 58 anglers participating. Some of the larger tournaments had between 250 and 400 vessels and over 1,300 anglers participating.

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

Most tournaments also have a type of betting called a "calcutta" where anglers pay between $200 to $5,000 to win more money than the advertised tournament prizes for a particular fish. Tournament participants do not have to enter calcuttas. Tournaments with calcuttas generally offer different levels depending on the amount of money an angler is willing to put down. Calcutta prize money is distributed based on the percentage of the total amount entered into that calcutta. Therefore, first place winner of a low level calcutta (entry fee ~$200) could win a lot less than a last place winner in a high level calcutta (entry fee~$1000). On the web pages, it was not always clear if the total amount of prizes distributed by the tournament included prize money from the calcuttas or the estimated price of any equipment. In other words, the range of prizes discussed above, could be a combination of fish prize money, calcutta prize money, and equipment/trophies.

Tournaments can bring in a lot of money for the surrounding communities and local businesses. Besides the entry fee to the tournament and possibly the calcutta, anglers also pay for

marina space and gas (if they have their own vessel), vessel rental (if they do not have their own vessel), meals and awards dinners (if not covered by the entry fee), hotel, fishing equipment, travel costs to and from the tournament, camera equipment, and other miscellaneous expenses. Fisher and Ditton (1992b) found that the average angler who attended a billfish tournament spent $2,147 per trip and that billfish tournament anglers spent an estimated $180 million in 1989. Ditton and Clark (1994) estimated that the total annual net economic benefits of billfish tournaments in Puerto Rico was $18 million. These estimates have likely increased.

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. The information below was also reported in the 2001 SAFE report. In 2001, HMS required all charter/headboat vessels fishing for Atlantic HMS to have a permit. This information indicates that a few thousand vessels either target, or feel they could catch, Atlantic HMS.

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

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

Holland *et al*. (1999) conducted a similar study on charter (boats that carry six or less passengers and charge for the entire boat) and headboats (boats that carry 10 or more passengers and charge by the person) in Florida, Georgia, South Carolina, and North Carolina. The survey interviewed 403 charter operators (24 percent of the estimated number of charter boats) and 52 head boat operators (35 percent of the estimated number of headboats). The average fees for charter and headboats are listed in Table 5.19. 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 5.20. Table 5.21 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 5.17 The percent of charter boat operators in Alabama, Louisiana, Mississippi, and Texas who reported targeting HMS at least once. Source: Sutton *et al*., 1999.

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

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

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

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

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

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

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

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

		Charter boats			
		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

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

5.2.5 Other Recreational Fishing Costs Information

Besides willingness to pay and charterboat fees, recreational anglers can have other costs associated with fishing. These can include the cost of owning and outfitting their own vessel. A 1983 study found that a fully-outfitted (for tuna and marlin fishing) vessel in the mid-Atlantic region cost approximately $90,000 (Figley and Preim, 1983). This study estimated that the total value of the mid-Atlantic offshore sportfishing fleet was $202 million and that offshore boat owners in the mid-Atlantic spent $40 million to go tuna and marlin fishing (Figley and Preim, 1983). Each vessel at that time had approximately $5,000 worth of rods, reels, lines, and lures onboard (Figley and Preim, 1983). A similar study off New Jersey, found that the 1983 recreational shark fishery had a total value of outfitted vessels of approximately $88.6 million (NJDEP, 1984). These estimates have probably increased over time.

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

A list of final regulations that were found significant under RFA or E.O. 12866[6] and were implemented by NMFS regarding HMS since 1996 can be found in Table 5.22.

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

[6] 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.

Rule	Date published	FR cite	Action	
1.	4/7/97	62 FR 16648	Atlantic shark fisheries; Quotas, bag limits, prohibitions, and requirements and large coastal shark species: Final rule that reduced large coastal shark quota and the recreational bag limits and prohibited 5 shark species	Not significant under RFA or E. O. 12866. On 05/20/98, 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	Date published	FR cite	Action	Classification
6.	12/12/00	65 FR 77523	Atlantic highly migratory species fisheries; Implementation of ICCAT recommendations: Final rule that implemented swordfish quotas through 2002, established a dead discard allowance for the swordfish fishery through 2002, and took several actions regarding import restrictions.	Could have a significant economic impact on a substantial number of small entities. Not significant under E. O. 12866

Rule 1 in Table 5.22 reduced the LCS commercial quota by 50 percent, reduced the recreational bag limit for all shark species by 50 percent, established a commercial quota for SCS, prohibited the retention of five species of sharks, and prohibited the filleting of sharks at sea. The intent of the rule was to reduce effective fishing mortality, stabilize the LCS population, facilitate enforcement, and improve management of the Atlantic sharks. The economic analyses conducted for this rule concluded that because the shark fisheries are so diversified and because there were alternative fisheries for fishermen to enter, that the reduction in the commercial quota and recreational bag limit would not have a significant economic impact. Similarly, the analyses found that the prohibited species regulations were similar to status quo and the prohibition of filleting at sea would have minimal impacts on fishing costs. In May 1997, a number of commercial fishermen and dealers sued 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 5.22 prohibited the use of driftnet gear in the North Atlantic swordfish fishery. The intent of this regulation was to reduce the bycatch of protected resources in a manner that maximizes the benefit to the Nation. The economic analyses for this rule found that the 17 fishermen who used this gear type could: 1) transfer fishing effort into the longline/harpoon category and continue fishing for swordfish; 2) fish for other species with other gears; 3) use driftnet for other HMS including Pacific species; and 4) exit the fishery. In general, the analyses found that the rule would have a significant economic impact on a substantial number of small entities.

Rule 3 in Table 5.22 changed a number of regulations and fishing operations in the Atlantic HMS fisheries including tunas, swordfish, sharks, and billfish. These changes included, but are not limited to, limited access for shark, swordfish, and tuna longline fishermen, a time/area

closure for pelagic longline fishermen in the month of June, reduction in the bluefin tuna quota, establishing a recreational bag limit for yellowfin tuna, changing the shark commercial quota and recreational bag limit, and requiring VMS for all vessels with pelagic longline onboard. The intent of the regulations were to meet the new requirements of the Magnuson-Stevens Act, implement the recommendations of ICCAT, consolidate the HMS regulations into one part of the Code of Federal Regulations, and re-implement all previous regulations that were still necessary. The specific regulations were intended to meet a number of objectives, including but not limited to: prevent or end overfishing of Atlantic tuna, swordfish, sharks, and billfish and adopt the precautionary approach to fishery management; rebuild overfished fisheries in as short a time as possible and control all components of fishing mortality to ensure the long-term sustainability of the stocks; minimize economic displacement during the transition from overfished fisheries to healthy ones; and, minimize bycatch of living marine resources and the mortality of such bycatch. The economic analyses conducted for these regulations found that even though HMS fishermen fish for other species in addition to HMS, including mackerel, snapper-grouper, reef fish, dolphin, and oilfish, overall the final actions will have a significant economic impact on fishermen and related industries such as processors and suppliers. Soon after the regulations were published in the Federal Register, a number of different 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 2000. With approximately 1.5 years of data, a few economic impacts can be examined and are discussed in this document.

Rule 4 in Table 5.22 prohibited fishing with pelagic longline in a number of different times and areas within the Atlantic EEZ and prohibited the use of live bait in the Gulf of Mexico. The intent of the regulation was to reduce bycatch and incidental catch of overfished and protected species by pelagic longline fishermen who target HMS. The economic analyses found there were 450 commercial fishermen, 125 dealers, and a number of recreational businesses that might be affected by these regulations; that the average annual gross revenues for commercial fishermen might decrease by about 5 percent; that 14 percent of the vessels could experience a 50 percent decrease in gross revenues; and, that a number of dealers may also experience a decrease in the average weight of fish handled of at least 5 percent. Overall, the regulation was found to have a significant economic impact on a substantial number of small entities. NMFS has also been sued on this regulation by three different organizations. Because this rule was not be fully implemented until March 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 5.22 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 all data during this closure will not be available for any subsequent analyses until mid-2002, the actual economic impacts of this regulation are unknown and will not be discussed in this document.

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

5.3.3 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 5.22 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 2000, the ex-vessel price of LCS and pelagic sharks stayed approximately the same, the SCS and fin prices increased. This indicates that the commercial quota reduction may not have impacted the price of LCS or pelagic meat and may have positively impacted the price of SCS meat and shark fins. This increase could be due, in part, to the substitution of SCS meat during an LCS closure (the SCS fishery has not closed to date while the LCS season is generally open on a few months during the year). Except for mako sharks, wholesale prices of shark meat have declined since 1996 (Table 5.11). While this reduction could be due to the reduction in LCS shark meat available, the wholesale price of thresher sharks (a pelagic shark) 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 directly related to HMS and the fact that the recreational bag limit was further reduced in July 1999. However, given the fact that most anglers do not target HMS in general, or sharks specifically, relative to the total salt water angler population, NMFS does not feel that the 1997 bag limit reduction had a significant impact on the recreational fishery.

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

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

Rules 4, 5, and 6 of Table 5.22 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 5.22) 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, that included a requirement for a peer review of the 1998 SEW. NMFS received the results of the peer review in October 2001 and recently published emergency regulations to maintain the 1997 quota levels until a new SEW can be conducted (66 FR 67118, December 28, 2001). Thus, despite the potential economic costs of the 1997 rulemaking, this Rule is still needed until a new rebuilding plan can be implemented.

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 6 in Table 5.22 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, a commercial driftnet fisherman sued NMFS on a takings claim for Rule 2, seven different groups of plaintiffs composed of recreational, commercial, and environmental interest groups sued NMFS on different aspects of Rule 3 in Table 5.22[7], 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

[7] 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.

comply with RFA and various National Standards. NMFS is working with lawyers, plaintiffs, and constituents to ensure that all concerns are considered.

In 2000 and 2001, 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 5.22 and a buy-back program for a number of vessels and permits; a bill to prohibit shark finning and monitor the trade of shark fins; and a bill to prohibit the use of spotter planes in the bluefin tuna fishery. Many of these bills originated because certain parties felt that 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. In some cases Congress has passed and the President has signed bills that require NMFS to promulgate regulations (e.g. the Shark Finning Prohibition Act of 2000).

Outside of litigation and legislation, NMFS continues to receive comments during public comment periods on certain regulations and restrictions, at AP meetings, and during public comment periods of advanced notice of proposed rulemakings. NMFS is currently considering many of the comments received; some of the ideas NMFS is considering are outlined throughout this document.

5.3.6 Complexity of Each Rule

Neither Rule 1 nor Rule 2 on Table 5.22 were particularly complex. In the case of Rule 1, the regulations related to the recreational bag limits were simplified. The regulations in Rule 3 are complex and complicated because they involve all the regulations for all HMS: sharks, swordfish, tunas, and billfish. However, because this rule consolidated the regulations and removed duplicative text, this rule actually simplified the process of finding the regulations for Atlantic HMS. In general, many of the regulations in Rule 3 remained unchanged or similar to earlier regulations so individual fisherman should be able to understand the regulations relatively easily. The parts of the regulations that were new and also complex generated many phone calls. These parts included the qualifications and application process for limited access permits and the VMS requirement for pelagic longline fishermen (also complicated by repeated delays and finally a court remand). Other regulations that are not new but that still generate a substantial number of comments include the BFT catch limits for pelagic longline fishermen and effort controls in the BFT fishery. Rules 4 and 5 on Table 5.22 are not particularly complex in that they close areas and times to pelagic longline fishing, prohibit the use of live bait in the Gulf of Mexico, and require the use of line clippers and dipnets. These regulations do not include any additional reporting requirements. Rule 6 was not particularly complex in that it established a set landings quota for three years and determined the dead discard allowance for each year. Fishermen did not have to change their activities in order to comply with this regulation.

Overall, the complexity of the regulations have increased over time as loopholes in the regulations are fixed and new restrictions are added. 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. Additionally, in 2001 NMFS implemented Fishnews, an electronic summary of current events and changes to regulations across the country. Any fisherman or interested constituent with access to email can sign up for this free service. The HMS Management Division often has major events announced on Fishnews.

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 5.22 were evaluated in 1999 HMS FMP or after and again in the 2001 SAFE report. Because it has been so short of a time period, there has not been a great deal of change in technology, economic conditions, or other factors that would have affected fishing communities on the Atlantic.

5.3.9 Conclusion

If ex-vessel and wholesale prices are a good indicator, the economic health of Atlantic HMS commercial fisheries has declined slightly since 1996 (Tables 5.7 and 5.11). At this point, it is unknown to what degree the economic health of the recreational fisheries has changed since 1996 although these fisheries appear to be relatively healthy. 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 section 102(2)(a)]. Moreover, agencies need to address the aesthetic, historic, cultural, economic, social, or health effects which may be direct, indirect, or cumulative. Consideration of social impacts is a growing concern as fisheries experience increased participation and/or declines in stocks. With an increasing need for management action, the consequence of such changes need to be examined in order to mitigate the negative impacts experienced by the populations concerned.

Social impacts are generally the consequences to human populations that follow from some type of public or private action. Those consequences may include alterations to the ways in which people live, work or play, relate to one another, and organize to meet their needs. In addition, cultural impacts which may involve changes in values and beliefs which affect people's way of identifying themselves within their occupation, communities, and society in general are included under this interpretation. Social impact analyses help determine the consequences of policy action in advance by comparing the Status Quo with the projected impacts. Although public hearings and scoping meetings provide input from those concerned with a particular action, they do not constitute a full overview of the fishery.

While geographic location is an important component of a fishing community, the transient nature of HMS may necessitate permitted fishermen to shift location in an attempt to

follow the fish. Because of this characteristic, management measures for HMS often have the most identifiable impacts on fishing fleets that use specific gear types. The geographic concentrations of HMS fisheries may also vary from year to year as the behavior of these migratory fish is unpredictable. The relationship between these fleets, gear types, and geographic fishing communities is not always a direct one; however, they are important variables for understanding social and cultural impacts. As a result, the inclusion of typical community profiles in HMS management decisions is somewhat difficult as geographic factors and the use of a specific gear type have to be considered.

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. Their study considered 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, the existence of other community studies, and inputs from the Advisory Panels for HMS and Billfish. Complete descriptions of the study results can be found in Chapter 9 of the HMS FMP and Chapter 7 of the Billfish Amendment.

6.2 Social Impacts of Selected 2001 Regulatory Actions

Emergency Rule to Adopt and Implement the Terms of the Settlement Agreement Regarding Commercial Atlantic Large Coastal and Small Coastal Shark Fisheries (March 6, 2001; 66 FR 13441)

This measure adopted and implemented the terms of the settlement agreement reached between the NMFS and the Southern Offshore Fishing Association and other plaintiffs in December 2000. The terms of the settlement 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 (1,285 mt dw and 1,769 mt dw respectively). In the settlement agreement, NMFS agreed not to implement the lower large coastal and small coastal shark quotas (816 mt dw and 329 mt dw, respectively) forestalling the anticipated social and economic impacts described in the HMS FMP. The independent reviews completed in October 2001 found that the scientific conclusions and management recommendations from the 1998 stock assessment were not based on scientifically reasonable uses of appropriate fisheries stock assessment techniques and the best available information. Thus, in 2002, the large coastal and small coastal shark quotas will be maintained at the 1997 level pending the completion of new assessments, consistent with the best available science and court-approved settlement agreement.

Interim Final Rule Requiring Vessels in the Atlantic Pelagic Longline Fishery to Possess and Use Dipnets and Line Clippers and Modifying the Level of Observer Coverage in the Atlantic Shark Drift Gillnet Fishery (March 30, 2001; 66 FR 17370)

A Biological Opinion issued on June 30, 2000, found that the continued operation of the Atlantic pelagic longline fishery is likely to jeopardize the continued existence of the loggerhead and leatherback sea turtle. An emergency rule that became effective on October 10, 2000 (65 FR 60889), implemented measures to reduce the mortality of incidentally captured sea turtles while NMFS reinitiated consultation on the pelagic longline fishery. This interim final rule served to implement the dipnet and line clipper requirement from the emergency rule to reduce the post-release mortality of sea turtles taken in the pelagic longline fishery. Also, it modified the definition of pelagic longline gear and reduced the observer coverage necessary for the shark drift gillnet fishery outside of right whale calving season.

The implementation of a requirement for pelagic longline vessels to carry onboard and use dipnets and line clippers is expected to have minimal economic and social impacts on fishing practices, costs, and revenues. The dipnet and line clipper standards allow fishermen to fabricate the devices from materials they already have or can easily obtain (as opposed to requiring use of a specific device they would have to purchase), as long as they meet NMFS design and performance standards. The design specifications from the Hawaii pelagic longline fishery, from which the dipnet and line clipper standards were taken, were estimated to cost approximately $250 for both devices (65 FR 16346, March 28, 2000). The affected permit holders should already possess this equipment because it was required by the October 10, 2000, emergency rule. To the extent that use of dipnets will require more time during gear haulbacks to bring turtles on board, fishing costs may increase. However, the time required to bring small turtles on board and any resulting increases in fishing costs are expected to be minimal.

Modifying the pelagic longline definition will have no measurable economic or social impact on the pelagic longline fishery. The change in definition serves to clarify the intent of NMFS in implementing time and area closures. The economic and social impacts associated with the area closures were previously considered and are discussed in detail in the HMS FMP and Final Supplemental Environmental Impact Statement issued for the August 1, 2000, final rule.

Modifying the requirement for 100 percent observer coverage in the shark drift gillnet fishery to a statistically significant level of coverage will decrease the economic and social impacts for both the agency and the participants in the fishery. By implementing a reduced level of observer coverage, NMFS will reduce administrative and enforcement costs. The participants in the shark drift gillnet fishery will have reduced costs by potentially gaining storage space on their vessel, being able to add a crew member to increasing fishing capacity, and/or by not having to provide food for the observer during trips that are not covered.

Emergency Rule to Reduce Sea Turtle Bycatch and Bycatch Mortality in the Atlantic Pelagic Longline Fishery (July 13, 2001; 66 FR 36711)

On June 14, 2001, NMFS completed the consultation on the HMS pelagic longline fishery and issued a Biological Opinion (BiOp) which concluded that the continued operation of the pelagic longline fishery is likely to jeopardize the continued existence of the loggerhead and leatherback sea turtle. The BiOp required the implementation of several elements of a reasonable and prudent alternative (RPA) to reduce the levels of sea turtle bycatch and bycatch mortality. On July 13, 2001, NMFS issued an emergency rule that closed the northeast distant statistical reporting (NED) area and implemented gear requirements which will reduce sea turtle takes and associated mortality. Following the promulgation of this regulation, NMFS established an experimental pelagic longline fishery in the NED area to test measures that could be adopted by domestic and international longline fleets to reduce incidental sea turtle captures.

Depending on the course of action taken by individual vessels, this action could have large economic impacts on the vessels that normally fish in the NED area (10 vessels in 1999; Cramer and Adams 2001). The vessels that volunteer to participate in the experimental fishery would be able to continue fishing in the NED area, pursuant to the terms of the experimental fishery, and could receive some monetary compensation to offset lost revenues attributable to gear modifications. Thus, participating vessels should not be significantly affected by this action. Affected vessels could also decide to fish in the open areas either near shore (compared to the NED area) or farther away from their current homeports (e.g., the Caribbean). Those vessels that stay near shore would probably have fewer variable costs and could spend time usually spent transiting on fishing. However, none of the ex-vessel gross revenues from these other areas are, on average, as large as those expected from fishing in the NED area. These impacts of increased costs and decreased revenues may be enough to put some of the vessels out of business. Vessels could also reflag to another country. NMFS is unsure what net economic costs or benefits might arise for the individual vessel under this circumstance. As 20 percent of all landed U.S. swordfish is caught in the NED area, dealers may be impacted by the closed area pending the success of the experimental fishery. Thus, the closure could have a noticeable impact on the communities that depend on the vessels that fish in the NED area, pending the course of action taken by each individual vessel.

One of the gear requirement measures requires gangions to be moved two gangion lengths away from floatlines. NMFS believes that this action would have minimal economic impacts on fishermen or communities. Fishermen may decide to buy additional monofilament to extend the length of the mainline if they decide to keep the same spacing of hooks between floatlines. However, NMFS expects that many fishermen will decide to set hooks closer together, thus minimizing the need for any additional gear. NMFS does not expect this action to affect the catch rates of target catch. Thus, ex-vessel gross revenues and variable costs would not change as a result of this action.

The second gear modification requires gangion length to be 110 percent of the floatline length in sets with a hook depth of 100 meters or less. NMFS does not expect this action to have large impacts on fishermen or their communities. To comply with this regulation, fishermen could lengthen their gangions. This option would require fishermen to buy additional monofilament and cause an increase in labor in the short term to replace existing gangions. Alternatively, they could shorten their floatlines. The second option would not require any additional monofilament but would require labor to adjust the length of the existing floatlines. While either alternative could affect the number of target fish caught, NMFS does not expect a significant reduction.

Finally, NMFS is requiring all bottom and pelagic longline vessels to post the sea turtle guidelines for safe handling in longline interactions inside the wheelhouse. This action should have no economic or social impacts to fishermen or communities because NMFS is supplying copies of the guidelines.

6.3 Summary of New Social and Economic Data Available

6.3.1 Social Science Publications

In an effort to improve the understanding of the social impacts upon HMS fishermen, their families, and the related communities, NMFS synthesized recent scientific publications examining social science topics.

Hall-Arber, M. 2000. Who Talks the Talk? The Voice of Community in Two New England Fishing Ports. Pages 45-55 in S. Hanna and M. Hall-Arber, editors. Change and Resilience in Fishing. Oregon Sea Grant, Corvallis, Oregon.

Communities represent an important factor in the success of fisheries management. Based on this assertion, the author of this study examines the similarities and differences between the organizational response to change in Gloucester, MA and New Bedford, MA with regard to the groundfish fishery. The level of complexity or the structure of a community can impact its effectiveness. For example, homogeneous communities are more successful than heterogeneous ones (communities based on similar gear type or fishery style versus those based on geography). The term "community" (e.g. comprised of fishermen, dealers, marina owners, etc.) implies a greater degree of complexity than an "organization" (e.g. comprised of longliners). However, the interests of the organization are usually better represented in fisheries management due to their defined leadership and the aligned interests of the members. When comparing Gloucester to New Bedford, Gloucester is better organized (with local groups and political support) and has a stronger perception of itself as a fishing community. These factors greatly contribute to more active participation by members of the community and a greater impact on management decisions. To maintain an accurate perception of a specific community or of participants in a particular fishery, managers need to talk with a variety of organizations and stakeholders.

Harms, J. and G. Sylvia. 2001. A Comparison of Conservation Perspectives Between Scientists, Managers, and Industry in the West Coast Groundfish Fishery. Fisheries 26(10):6-15.

Each stakeholder in a fishery has assumptions regarding other stakeholders and themselves. These assumptions can provide insight into the effectiveness of the whole management process. This study examines the survey responses of scientists (including managers) and industry members involved in the west coast groundfish fishery to determine the attitudes towards conservation and resource use, the perception of each others beliefs, and the implications for the management of the fishery. The authors reported that both scientists and industry respondents rated the conservation ethic of the scientists and managers highly. Individual members of the fishing industry expressed that their personal conservation ethic was strong, but that the problem must reside with other

sectors of the fishery, which they rated as moderate. Generally, the industry members with a higher conservation ethic tended to be more involved in the management process or planned to have a longer anticipated participation in the the fishery. The scientists and managers felt the industry conservation ethic was moderate; however, several respondents noted that existing management measures could influence industry behavior (e.g. discards).

When the authors examined the responses concerning the present state of the fish stocks and the impact of uncertainty on quotas, the industry and scientist perspectives yielded differing opinions. Industry members felt that scientific uncertainty is reducing harvest quotas rather than an actual decline in the fish stocks. Scientists disagreed with this statement. The authors point out that industry perspectives are formed through observed abundance which may not be typical throughout the entire range of the species while scientists rely on the analysis of stock assessment data, the validity of which is frequently questioned. The different perspectives of scientists and managers with regard to conservation ethic may damage the working relationship between the stakeholders. This may lead to the development of management plans implementing measures not deemed necessary by the industry which could lead to compliance problems. The authors recommend that both scientists and industry members improve the working relationship and information sharing between the two groups.

Jacob, S. and M. Jepson. 2000. Defining and Identifying Fishing-Dependent Communities in Florida. Urban Anthropology 29(3): 221-253.

National Standard 8 of the Magnuson-Stevens Act requires fishery management plans to identify and consider social and economic impacts on fishing communities. The authors feel that implementing this requirement has proven difficult as a universal definition of community has not been developed. Three necessary elements for a community have been described: a locality, a local society, and a process of locality-oriented collective actions. When employing these criteria as a model, it is difficult to find a community within a pre-existing category (for example counties are not a community for they usually possess several locales and societies).

The authors utilized central place theory (central places are where a variety of needs are met for residents of that central place and those in nearby areas) to develop a protocol to identify fishing communities. Federal and state fishing permit data was coupled with census employment data and applied to zip codes to determine “central places” dependent upon fishing in the state of Florida. Key informant interviews were conducted to validate and assess the usefulness of the procedure.

Determining the level of community reliance upon natural resources (in this case, fisheries) is another factor in this study. One approach is called “incrementalism” which assumes what natural resource extraction is the initial step in a community’s economy. This will then lead to the creation of “backward” linkages with other businesses (for example bait and tackle shops,

marinas, boat building) that support the resource utilization. Eventually, "forward" linkages are created that improve the value of the resource (for example wholesalers, restaurants, exporters). The authors feel that the technique they utilized to isolate each community involves defining a large geographic area that represents that particular regional economic base. Because of the size of the selected regions, it is important to examine the economic linkages of the relevant fisheries to assess their importance to each community and assess the level of community dependence.

Kitner, K.R. 2001. Ethnographic Tracing of an Interesting Social Network of South Atlantic Commercial Fishermen. Bureau of the Census and National Marine Fisheries Service. 27pp. DRAFT

Commercial fishermen exhibit a high degree of mobility which makes this population not easily enumerated by current census methods. This report describes field research conducted to examine the characteristics contributing to residential mobility in a southeastern U.S. fishing community. As some level of mobility is usually necessary to pursue fish stocks, this study focuses on the social factors that contribute to this behavior. An understanding of these factors should assist the Census Bureau in improving the coverage of "highly mobile" people which are often cited as undercounted.

A common hypothesis concerning the mobility of fishermen is that they move to follow the fish. However, due to the lack of information on this topic, it is difficult to assess the extent or cause of this behavior. Federal or state regulations may close areas or fisheries necessitating a move to a different area. Weather, market conditions, vessel conditions, and social ties contributed to some residential mobility as well. While captains and vessel owners would tend to own or rent a permanent home to stay when the vessel was in port, the crew would stay on the boat, with friends , or in transient quarters and not establish a base location, thus remaining more mobile.

In examining the census, many of the study participants (35 of 45) were not recorded. The Census Bureau refers to residence as where that person lives and sleeps most of the time. As fishermen spend much of their time on vessels either at sea or tied to a dock, they have no official residence. While the fish house at the dock was the focal point of most activities, the fishermen in this survey displayed a high degree of residential mobility thus were not enumerated in the 2000 Census.

Mederer, H.J. and C. Barker. 2000. Reconstructing Identities, Families, Communities, and Futures in the Wake of Fisheries Regulation. Pages 69-81 in S. Hanna and M. Hall-Arber, editors. Change and Resilience in Fishing. Oregon Sea Grant, Corvallis, Oregon.

To gain a better understanding of the impact of fisheries regulations, it is necessary to examine the social consequences of management actions. In a social context, regulatory impacts are felt in three areas: the self (identity), family, and community. This study examines 23 families in Point Judith, Rhode Island from 1992 to 1997 who were dependent upon the groundfish fishery for most of their family income. In 1994, Amendment 5 of the NEFMC groundfish plan decreased effort, restricted mesh size, and implemented several other regulations to eliminate overfishing. In 1996, Amendment 7 closed a large area of Georges Bank, made more restrictive quotas, increased mesh size, and further decreased effort to augment Amendment 5. About 80 percent of the respondents were boat owners and 90 percent of the sample of families suffered a decline in income as the study progressed.

The role of identity is very important to fishermen who take pride in their occupation and generally feel they would not be comfortable in another profession. Amendments 5 and 7 threatened the occupational identity of many of the participants in this fishery by challenging the characteristics the industry members value (for example independence, self-determination, control, etc.). In addition, the regulations extend the short-term unpredictability and uncertainty normally associated with fishing to the ability of fishing families to make an acceptable living.

The amendment regulations also impacted the family life of the effected fishermen. The effort reduction measures caused the husbands and/or fathers to be home more often than usual which necessitated a renegotiation of prior roles and duties in the household. This disruption, along with decreased income, increased the amount of stress already present within the family unit, testing the resiliency of many families.

The impacts of regulations on fishing communities can vary depending on the strength of community ties. In general, the increased prevalence of regulatory actions negatively impacts fishing communities through a sense of lack of involvement. While public hearings were held, fishermen felt that their comments were not incorporated which resulted in some measures that are wasteful and inconsistent. Despite the regulatory impacts, several core components of the community still exist which help provide some measure of support for local fishermen.

Amendments 5 and 7 have created harmful impacts on individuals, families, and the community of Point Judith. Because of these impacts, it is important to assess the social dimensions of the regulatory effects.

6.3.2 2000 Census Data

The Census Bureau completed the decennial census last year and released the results for public review. Table 6.1 includes a small amount of the data provided by the census to give an idea of what information is available and what is applicable. The data are difficult to apply to

HMS fisheries due to the lack of detail in the census categories. For example, it is not possible to determine how many fishermen are in a particular state or county from the census information. However, the data can be utilized to examine social trends on a larger scale, such as population flux in coastal counties. As census data continues to be released, NMFS hopes to continue its examination of the updated findings.

Table 6.1 Sampling of Data from 2000 Census. Source: Census Bureau

State	Total Population	Population 16+ years	Employed	Unemployed	Farming, Fishing, and Forestry Occupations	
Alabama	4,332,379	3,347,012	1,945,685	132,812	19,249	33,193
Connecticut	3,297,626	2,544,195	1,638,358	77,906	3,316	53,108
Delaware	759,017	588,404	374,911	17,207	2,328	47,629
Florida	15,593,435	12,370,441	7,148,012	396,484	47,546	37,346
Georgia	7,952,628	6,037,192	3,850,413	198,994	15,301	40,827
Louisiana	4,333,010	3,268,885	1,847,657	145,434	16,987	31,034
Maine	1,240,011	978,564	618,998	27,275	10,274	36,400
Maryland	5,162,430	3,959,750	2,638,231	141,494	6,275	52,436
Massachusetts	6,127,881	4,791,580	3,149,307	116,119	9,630	49,505
Mississippi	2,749,243	2,060,004	1,223,937	102,206	13,894	31,955
New Hampshire	1,200,247	932,582	653,380	23,251	2,290	49,509
New Jersey	8,219,529	6,371,881	3,986,760	227,047	2,254	54,226
New York	18,395,994	14,219,392	8,488,590	503,692	23,299	43,640
North Carolina	7,795,432	6,041,750	3,786,403	194,700	40,942	37,847
Rhode Island	1,009,503	788,813	497,190	23,288	1,395	43,185
South Carolina	3,876,975	2,984,921	1,796,252	94,491	10,643	36,385
Texas	20,290,713	15,061,939	9,422,318	570,512	63,412	39,120
Virginia	6,847,117	5,305,429	3,402,344	154,840	13,083	46,693

6.4 Evaluation of Current Level of Social Data

As was mentioned previously, there are not many current social science studies addressing the HMS fisheries. From a management perspective, this makes it difficult to assess the impact of promulgated regulations on the individual fishermen, their families, and the community. While NMFS can assume the economic effect of a specific regulation will create a negative impact in the social arena, the only venue available to receive constituent feedback is public hearings. Because these are only scheduled as a result of promulgated regulations, it is difficult to receive comments concerning the social environment of HMS fisheries.

To improve the assessments of the social impacts upon HMS communities, continued research needs to be conducted to update current knowledge. Ideally, the work will specifically target HMS fisheries and assess the impacts of the existing regulations, particularly determining the accuracy of the social impacts assessments. To increase the level of social knowledge, NMFS needs to increase its demographic data. The raw census data exist, but the information is not in a format conducive to examining the importance of one particular fishery to a community. Also, to improve the understanding of fishing behavior, NMFS should improve its knowledge of use patterns (for example who fishes, with what gear, how frequently, and where in the ocean). This would assist NMFS in determining the overall social impacts of fishing regulations. Until these areas are addressed, NMFS must utilize the current available information.

6.5 Conclusion

Social impact analyses should continue to be conducted and refined in terms of the techniques employed and how they can best be incorporated into management measures. 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 fishers' knowledge of fishing and the environment to be usefully incorporated into fisheries management.

Chapter 6 References

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7. FISH PROCESSING, INDUSTRY, AND TRADE

Over the past several 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).

Because there are "missing links" surrounding the harvest, processing, and trade of Atlantic HMS, NMFS cannot re-create information about stock production based on trade data. Nevertheless, trade data is used to update information on international and domestic activities related to these fisheries and to question compliance with ICCAT management measures. Sharks are not included in ICCAT recommendations, however, in December 2000, a bill was signed that 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 2001. 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. In July 2001, the United States hosted an ICCAT Technical Workshop.

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 was hosted by the United States in July 2001 to resolve issues relating to the implementation of the programs. The technical experts meeting forwarded a report to the Commission that included specific draft Recommendations and forms for consideration at the 2001 Commission meeting. These Recommendations and forms were adopted, with some modifications, at the 2001 Commission meeting, and implementation of the programs is expected to begin in late 2002 and early 2003. 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, 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 (mt dw) of Bluefin Tuna (Atlantic and Pacific). As reported through the Bluefin Tuna Statistical Document Program, 1996 - 2000.** U.S. BSD Program, NMFS NERO.

	Commercial Landings of Atlantic BFT	Exports of Atlantic BFT	Exports of Pacific BFT	Total U.S. Exports of BFT
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
2000	903.9	758.0	75.6	833.6

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

Information on exports of bluefin tuna for the first half (January through June) of 2001 is also available. Preliminary data indicate that 12.0 mt of west Atlantic bluefin tuna, and 0.6 mt of Pacific bluefin tuna were exported from the United States during this time period. These figures are lower than in 2000 in the same time period possibly due to lower catches of BFT by U.S. harpoon fishermen, whose season began June 1, 2001. 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 1996-2000 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$)		Total for all Products (kg, US$)	
1996	NA	NA	640,677	1,342,273	358,000	969,955	998,677	2,312,228
1997	NA	NA	459,542	920,887	439,992	884,588	899,534	1,805,475
1998	141,149	1,264,077	524,249	814,319	102,939	250,107	768,337	2,328,503
1999	106,723	911,671	270,343	487,610	155,275	461,362	532,341	1,860,643
2000	365,146	3,512,863	430,725	784,704	345,942	814,456	1,141,813	5,112,023

* 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 all export categories of shark increased substantially in 2000 over 1999 values. The weight of exported shark fins in 2000 was over three times that which was exported in 1999. The average price quoted for exports of fresh shark remained relatively constant from 1999-2000 ($1.82/kg in 2000), but decreased slightly for frozen product ($2.35/kg in 2000). Shark fin exports increased substantially; shark meat products also increased, albeit by a lesser proportion. This trend was apparently not affected by state restrictions in the Pacific or Federal regulations in the Atlantic Ocean which bans the practice of finning and requires fishermen to land weight of fins no more than 10 percent of shark meat landed. In 2000, the weight of exported fins was approximately 50% of the weight of landed shark meat (assuming fresh and frozen shark product is meat and not skins, etc). In 1999, fins were approximately 25% by weight of the meat landed. The average price for exported shark fins was $9.62/kg in 2000, up slightly from the 1999 average price.

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.

Consistent with the directives of Section 5 of the Shark Finning Prohibition Act, the Department of Commerce and the Department of State have initiated an ongoing consultation regarding the development of international agreements consistent with the Act. Discussions have focused on possible bilateral, multilateral and regional agreements with other nations. The law calls for us to pursue an international ban on shark finning, but also to push for improved data collection (including biological data, stock abundance and bycatch levels, and information on the nature and extent of shark finning and trade). Determining the nature and extent of shark finning is the first step toward reaching agreements that will decrease the incidence of finning worldwide.

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, 2000*, 1,437 mt ww of bluefin tuna were landed in the United States in 2000 from all oceans. This represents a 20 percent increase from the previous year, but is still less than half of the annual average for 1995-1999. This decrease is due to lower landings of Pacific bluefin, as landings of Atlantic bluefin have remained relatively stable. Comparing total 2000 U.S. landings of bluefin with data from U.S. BSD program, after applying a 1.25 multiplier to Atlantic exports to estimate ww (most Pacific exports were already in whole form), it appears that roughly 72 percent of bluefin tuna landed in the Unites States were exported. For Atlantic bluefin tuna only, about 84 percent of landings were exported, which is consistent with recent levels.

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 2000, 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 relative to other currencies. 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 2000 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 - 2000, in metric tons.

	U.S. BSD Program		
	Imports	**Re-exports**	
1996	1.9	1.3	N/A

1997	5.3	0.4	109.5
1998	99.9	1.9	225.6
1999	367.0	11.1	558.6
2000	417.6	32.8	453.4

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

Information on imports and re-exports of bluefin tuna for the first half (January through June) of 2001 is also available through the BSD program. Preliminary data indicate that 302.2 mt were imported into the United States, and an additional 5.7 mt were re-exported during this period.

Bigeye Tuna Imports

As mentioned above, ICCAT adopted a recommendation at its 2001 meeting to implement a statistical document program for bigeye tuna. ICCAT members are required to implement the bigeye statistical document program by July 1, 2002, or as soon as possible thereafter. Similar to when the bluefin statistical program was first implemented, the bigeye statistical document will only be required to accompany shipments of frozen bigeye. The statistical document program will likely be expanded to fresh bigeye at some later date.

Since January 2001, the U.S. Customs Service has been collecting species specific import information for bigeye tuna. Previously, bigeye tuna had been included under general tuna imports. From January through September 2001, the United States imported 3,438 mt of bigeye tuna, over 98 percent of which was fresh product. The leading exporting countries were Trinidad and Tobago, Brazil, and Costa Rica, together accounting for over 66 percent of U.S. imports.

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 2000 calendar year.

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

	Ocean of Origin			
Flag of Harvesting Vessel	**Atlantic**	**Pacific**	**Indian**	**Total**
Australia	0.00	220.71	27.00	247.71
Barbados	5.58	0.00	0.00	5.58
Brazil	1,287.04	1.76	0.00	1288.81
Canada	240.48	0.00	0.00	240.48
Chile	0.00	771.16	0.00	771.16
Costa Rica	0.00	319.34	0.00	319.34
Dutch Antilles	0.00	0.00	0.00	0.00
Ecuador	0.03	230.63	0.00	230.67
El Salvador	0.00	38.28	0.00	38.28
Fiji Islands	0.00	49.13	0.00	49.13
Grenada	28.94	0.00	0.00	28.94
Indonesia	0.00	0.00	41.83	41.83
Japan	0.00	116.47	32.59	149.06
Mexico	0.00	284.76	0.00	284.76
Namibia	18.44	0.00	0.00	18.44
New Zealand	0.00	217.65	0.00	217.65
Panama	0.71	1.16	0.00	1.87
Peru	0.00	0.00	0.00	0.00
Philippines	18.24	14.16	0.00	32.40
Samoa	0.00	2.13	0.00	2.13
Singapore	0.00	0.00	0.00	0.00
South Africa	535.73	0.00	1.97	537.70
St. Vincent	15.04	0.00	0.00	15.04
Taiwan	245.05	28.56	3,249.14	3522.75
Trinidad & Tobago	15.54	0.00	0.00	15.54
United States	2.02	0.00	0.00	2.02
Uruguay	187.95	0.00	0.00	187.95
Venezuela	11.36	0.00	0.00	11.36
Vietnam	0.00	33.69	0.00	33.69
Not Provided	0.00	0.00	1.69	
TOTAL	2,612.15	2,329.59	3,354.22	8295.96
% of total swordfish imports	31.00	28.00	40.00	

It should be noted that implementation of such a broad monitoring program such as the swordfish Certificate of Eligibility program takes time. This program has been in place since June 1999.

Table 7.5 Swordfish Products imported: 1995-2000. Bureau of Census data.

Year	**Frozen (kg)**			**Fresh (kg)**			
	Fillets	**Steaks**	**Other**	**Steaks**	**Other**	**kg**	
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
2000	4,833,867	524,148	167,441	161,763	8,626,856	14,314,075	85,579,449

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

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

On March 15, 2001 a bill was introduced into the Senate entitled “Mercury-Safe Seafood Act of 2001". The bill would lower the tolerance for mercury in seafood potentially as low as 0.2 ppm. If such a bill were signed into law, implementing regulations could be very costly to the seafood industry. That bill has been referred to committee and has not progressed through the legislative system.

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 1996-2000 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$
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
2000	66,107	2,355,575	1,066,144	1,859,203	90,166	575,226	1,222,417	4,790,004

In 2000, imported shark fins averaged $35/kg while fresh shark averaged $1.74/kg, and frozen shark product averaged $6.37. These prices are consistent with the previous year's data. The Shark Finning Prohibition Act was not passed until December of 2000, therefore, decreases in shark fin trade is not expected until 2001.

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.

Imports of shark products overall slightly exceed exports, however, the value of exports is higher. The United States imports twice the amount of exports of fresh shark, but exports almost four times the amount of frozen product that is imported. Exports of shark fins are five times the weight of imported fins. Prices of imported shark fin products averaged $35/kg while exported fins averaged only $9.62/kg. In 2000, a minor amount of shark fins were re-exported from the United States (404 kg). A minor amount of frozen shark product was also re-exported (18,184 kg). In the past small amounts of both fins and frozen shark have been re-exported.

7.2 The Use of Trade Data for Conservation Purposes

When appropriate, the SCRS uses trade data on bluefin tuna, swordfish, bigeye tuna, and yellowfin tuna that are submitted to ICCAT as an indication of 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 prohibited the importation of bluefin tuna from Equatorial Guinea and swordfish from Belize and Honduras, consistent with 1999 recommendations from the International Commission for the Conservation of Atlantic Tunas (ICCAT). NMFS also removed a prohibition on the importation of Atlantic bluefin tuna from Panama. NMFS also proposed in 2001 (November 15, 2001; 66 FR 57409), to prohibit the importation of Atlantic bigeye tuna from Belize, Honduras (delayed effective date), Equatorial Guinea, Cambodia, and St. Vincent and the Grenadines, consistent with a 2000 ICCAT recommendation. Data obtained by monitoring international trade in highly migratory species was instrumental in making the decision at ICCAT to impose trade restrictions. The role of trade data in assisting in the identification of problem fishing will likely increase in importance in the future.

7.3 Conclusions and Future Plans

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

NMFS took several steps to reduce bycatch in 2001, in addition to the steps towards reducing bycatch in the pelagic longline fishery through closure of large areas and gear modifications in 2000 through Regulatory Amendment One to the HMS FMP. NMFS closed the Northeast Distant (NED) Area to pelagic longline fishing and conducted an experiment with commercial fishing vessels to test fishery-specific gear modifications to reduce sea turtle bycatch and mortality. In addition, NMFS required all longline fishing vessels (pelagic and bottom longline) to post sea turtle handling and release guidelines in the wheelhouse to educate fishermen on ways to reduce post-release mortality.

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 seabirds and marine mammals are considered "incidental catch." As bycatch tends to occur in fisheries that operate across jurisdictional boundaries, governing bodies, and legal statutes, bycatch reduction often becomes a complex issue.

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, in Regulatory Amendment One to the HMS FMP (NMFS, 2000), and in the Environmental Assessment and Regulatory Impact Review for an Emergency Rule to Reduce Sea Turtle Bycatch and Bycatch Mortality in the Atlantic Pelagic Longline Fishery (NMFS, 2001a).

Bycatch Reporting Methodology

NMFS utilizes self-reported data (pelagic logbook program and the new supplemental discard report form in the reef fish, snapper-grouper, king and Spanish mackerel, and shark logbook programs), at-sea observer data, and survey data (recreational fishery dockside and telephone surveys) to produce bycatch estimates. These data are collected with respect to fishing gear type and have been presented by gear type in this report in prior sections. The number and location of discarded fish are recorded, as is the disposition of the fish, i.e., released alive vs. released dead. Post-release mortality of HMS is accounted for in stock assessments to the extent that the data allow.

Effective August 1, 2001, selected Federal permit holders in the Gulf of Mexico reef fish, South Atlantic snapper-grouper, king and Spanish mackerel, and shark fisheries must report all species and quantities of discarded (alive and dead) sea turtles, marine mammals, birds, and finfish on a supplemental discard form. A randomly selected sample of 20 percent of the vessels with active permits in the above fisheries during 2000 was selected in 2001; a different group of vessels will be selected in subsequent years. The selection process was stratified across geography (Gulf of Mexico and South Atlantic), gear (handline, longline, troll, gillnet, and trap), and number of fishing trips (ten or less trips and more than 11 trips). Of the 2,676 vessels with Federal permits in these fisheries, a total of 454 vessels were selected to report.

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. Many of the vessels permitted in these categories already complete Federal and/or state logbooks (e.g., the NMFS Northeast Region Vessel Trip Report (VTR) Program), in which they are required to report all fishing information, including that for HMS. NMFS is currently evaluating various alternatives to increase logbook coverage of vessels fishing for HMS, such as selecting additional HMS vessels to participate in NMFS VTR Program, and is investigating alternatives for electronic reporting.

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 dockside surveys (the Large Pelagic Survey and the Marine Recreational Fishery Statistics Survey) for the rod and reel fishery and uses these data to estimate dead discards. However, bluefin and yellowfin tuna are currently the only species for which expanded estimates are currently made. Statistical problems associated with small sample size remain an obstacle to estimating bycatch in the rod and reel fishery. New survey methodologies are being developed, however, especially for the Charter/Headboat sector of the rod and reel fishery, which should help to address some of the problems in estimating bycatch for this fishery. In addition, selecting rod and reel vessels for logbook reporting (as discussed above) would provide bycatch information for this gear type.

Marine Mammals

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 2000 stock assessment reports and draft 2001 reports are available and can be obtained from Emily Hanson Menashes at (301) 713-2322 or on the web at: http://www.nmfs.noaa.gov/prot_res/PR2/Stock_Assessment_Program/sars.html#Overview.

The final 2001 MMPA List of Fisheries published on August 15, 2001 (66 FR 42780). On January 17, 2002 (67 FR 2410), NMFS published a notice that the 2001 List of Fisheries remains in effect for 2002. The Atlantic Ocean, Caribbean, and Gulf of Mexico large pelagics longline fishery is classified as Category I (frequent serious injuries and mortalities incidental to commercial fishing) and the southeastern Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities). The following fisheries are classified as Category III (remote likelihood or no known serious injuries or mortalities): Atlantic tuna purse seine; Gulf of Maine and mid Atlantic tuna, swordfish, and shark hook-and-line/harpoon, southeastern mid Atlantic and Gulf of Mexico shark bottom longline, and mid Atlantic, southeastern Atlantic, and Gulf of Mexico pelagic pelagic hook-and-line/harpoon fisheries. For additional information on the fisheries categories and how fisheries are classified, see http://www.nmfs.noaa.gov/prot_res/PR2/Fisheries_Interactions/list_of_fisheries.html.

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

Sea Turtles

NMFS took several steps in 2001 to reduce sea turtle bycatch and bycatch mortality in domestic longline fisheries. On March 30, 2001, NMFS implemented via interim final rule requirements for U.S. flagged vessel with pelagic longline gear on board to have line clippers and dipnets to remove gear on incidentally captured sea turtles (66 FR 17370). The requirements to carry and to use the line clippers and dipnets have been in place since October 13, 2000 (65 FR 60889). Specific handling and release guidelines designed to minimize injury to sea turtles were also implemented.

A new BiOp was completed on June 14, 2001, that found that the actions of the pelagic longline fishery jeopardized the continued existence of the loggerhead and leatherback sea turtles. This document reported that the pelagic longline fishery interacted with an estimated 991 loggerhead and 1012 leatherback sea turtles in 1999. The estimated take levels for 2000 are 1256 loggerhead and 769 leatherback sea turtles (Yeung 2001).

On July 13, 2001 (66 FR 36711), NMFS closed the NED to pelagic longline fishing (effective July 15, 2001), modified how pelagic longline gear may be deployed effective (August 1, 2001), and required that all longline vessels (pelagic and bottom) post safe handling guidelines for sea turtles in the wheelhouse (effective September 15, 2001). Specifically, while pelagic longline gear is deployed, gangions may not be attached to floatlines nor to the mainline except at a distance from the attachment point of the floatline to the mainline of at least twice the length of the average gangion length in the set. NMFS projects that this measure will reduce loggerhead

turtle interactions by 22 percent and leatherback turtle interactions by 24 percent. Additionally, for pelagic longline sets in which the combined depth of the floatline and the gangion is 100 meters or less, the length of the gangion must be at least 10 percent longer than the length of the floatline. The intent of this requirement is to ensure that hooked or entangled turtles have sufficient slack line to reach the surface and avoid drowning.

On December 13, 2001 (66 FR 64378), NMFS extended the emergency rule for 180 days (through July 8, 2002). NMFS is currently working on developing a proposed and final rule to implement these measures on a long-term basis.

In 2001, an experimental program was initiated in cooperation with the U.S. pelagic longline fleet with a history of fishing for swordfish on the Grand Banks fishing grounds, to develop gear modifications that might prove useful in reducing the rate of interaction and limit severity of injury to marine turtles incidentally captured by the gear while at the same time minimizing loss of targeted catch. The gear modifications tested in 2001 included the type of bait used as well as the positioning of gangions relative to surface floats. Other gear modifications will be tested in the future. These technologies may be of application in other longline fleets. In this experiment, there is 100% observer coverage of the vessels. The experiments undertaken are being coordinated and are, to some degree, based on provisional results obtained from experiments conducted on Azorean longline vessels operating in the northeastern Atlantic.

Internationally, the United States is also pursuing sea turtle conservation through international, regional, and bilateral organizations such as ICCAT, the Asia Pacific Fisheries Commission, and FAO Committee on Fisheries (COFI). The United States intends to provide a summary report to FAO for distribution to its members on bycatch of sea turtles in U.S. longline fisheries and the research findings as well as recommendations to address the issue. At the 24th session of COFI, the United States distributed a concept paper for an international technical experts meeting to evaluate existing information on turtle bycatch, to facilitate and standardize collection of data, to exchange information on research, and to identify and consider solutions to reduce turtle bycatch. COFI agreed that an international technical meeting could be useful despite the lack of agreement on the specific scope of that meeting. The United States has developed a prospectus for a technical workshop to address sea turtle bycatch in longline fisheries as a first step. Other gear-specific international workshops may be considered in the future.

Seabirds

The National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries was released in February 2001. The NPOA for Seabirds calls for detailed assessments of longline fisheries, and, if a problem is found to exist within a longline fishery, for measures to reduce seabird bycatch within 2 years. NMFS, in collaboration with the appropriate Councils and in consultation with the U.S. Fish and Wildlife Service, will prepare an annual report on the status of seabird mortality for each longline fishery. The United States is committed to pursuing international cooperation, through the Department of State, NMFS, and U.S. Fish and Wildlife

Service, to advocate the development of National Plans of Action within relevant international fora. The HMS Division intends to meet with longline fishery participants and other members of the public in the future to discuss possibilities for complying with the intent of the plan of action. Because takes appear to be relatively low in Atlantic HMS longline fisheries, adoption of immediate measures is unlikely. For additional information on the NPOA for Seabirds as well as the assessment of Atlantic HMS longline fisheries, see Appendix B.

8.2 Bycatch of Highly Migratory Species in Other Fisheries

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, using mid-water gear, landed 14.43 mt ww of yellowfin tuna, skipjack tuna, albacore tuna, bigeye tuna, and swordfish in 2000 (Table 8.1) incidental to the squid, mackerel, and butterfish trawl fishery (NMFS, 2001b). Landings decreased from 1999 for yellowfin, skipjack, and albacore tunas but increased for bigeye tuna and swordfish. Landings of bigeye tuna and swordfish have increased each year since 1998. Landed fish are counted through the dealer report program and by using information collected from tally sheets. In addition, squid trawl fishermen are required to report landings in the Large Pelagic Logbook or in the Multi-species Logbook. Bycatch of HMS in this fishery is not well-documented and observer funding for this fishery to document bycatch rates of HMS was provided in 2001 and is scheduled to be provided in 2002. A retention limit of five swordfish per trip allows squid trawl fishermen with swordfish limited access permits to land some of the swordfish that are encountered, although regulatory discards still occur. NMFS continues to work with squid fishermen through the existing observer program to reduce bycatch.

Table 8.1 **Atlantic HMS Landed (mt ww) Incidental to Squid Trawl Fishing Operations in 1998-2000.** Data based on tally sheets submitted to NMFS (NMFS, 2001b).

Species	1998	1999	2000
Yellowfin tuna	0.7	4.1	1.76
Skipjack Tuna	0.2	1.0	0.04
Bigeye Tuna	0.5	1.2	1.7
Albacore	2.4	0.4	0.03
Swordfish	5.9	7.5	10.9
Total	**9.7**	**14.2**	**14.43**

Menhaden Purse Seine

In the menhaden purse seine fishery, sharks were caught incidentally in approximately 30 percent of the purse seine sets (deSilva et al., 2001). Ten species of sharks were identified with blacktip sharks being the most common species. Approximately 20 percent of sharks were not identified to species. An estimated 30,000 sharks were taken in this fishery annually in 1994 and 1995. At the time of release, 75 percent of sharks were dead, 12 percent were disoriented, and 8 percent were healthy. The odds of observing shark bycatch was highest in April and May. Stomach analyses of sharks suggest that their occurrence in the fishery is probably the result of sharks preying on gulf menhaden (deSilva et al., 2001).

Industry workers in this fishery employ a fish excluder device to reduce the retention of sharks and other large species (Rester and Condrey, 1999). In addition, a recently introduced hose cage modification may prove to be effective in reducing shark bycatch. These devices vary in effectiveness and no standards exist for such bycatch reduction measures in this fishery. In addition, there are currently no reporting requirements for takes of sharks in the menhaden purse seine fishery.

Shrimp Trawl Fishery

Shark bycatch in the shrimp trawl fishery consists mainly of sharks too small to be highly valued in the commercial market. As a result, few sharks are retained. Bycatch estimates of LCS in this fishery have been generated and may considered in the next LCS assessment, as appropriate. Cortes (2001a) estimated bycatch in the south Atlantic shrimp trawl fishery (North Carolina, South Carolina, Georgia, and Florida) for Atlantic sharpnose, bonnethead, and finetooth sharks based on expansion by fishing effort. From 1992 to 1997, annual estimates of bycatch range from zero to almost six million sharks (Table 8.2) (Cortes, 2001a). The upcoming SCS assessment, to be completed in 2002, will include estimates of SCS bycatch because they are likely to exceed in importance the landings for those species (Cortes, 2001a). In general,

however, requirements for turtle excluder devices in this fishery have probably resulted in less bycatch because sharks are physically excluded from entering the gear.

Table 8.2. Expanded estimates of bycatch of bonnethead, Atlantic sharpnose, and finetooth sharks in the U.S. south Atlantic shrimp trawl fishery based on within-stratum expansion by effort as trips by fishing year. Source: Cortes, 2001a.

Year	Number of trips	Bonnethead	Atlantic sharpnose	Finetooth
1992-1993	20,181	53,674	1,753,829	0
1993-1994	20,445	0	5,873,333	447,495
1995-1996	23,333	34,378	0	0
1996-1997	19,320	38,517	358,457	0

Summary

Although bycatch of swordfish and tunas in the squid trawl fishery is substantial, Atlantic shark bycatch in non-HMS fisheries remains a greater concern. Approximately nine percent (approximately 25,100) of the LCS coastal sharks were bycatch in the menhaden fishery alone and bycatch of SCS in the shrimp trawl fishery alone is expected to exceed landings. NMFS will consider options for minimizing bycatch of LCS and SCS in other fisheries after the 2002 assessments are completed. Although the HMS FMP requires counting dead discards against Atlantic shark quotas, this management measure is currently not in force per an emergency rule implementing a settlement agreement.

8.3 Evaluation of Bycatch Reduction Measures

The following section provides a review of current management measures:

- Reduce length of longline to increase survival of marine mammals and turtles:
  The effectiveness of this measure has not been analyzed. However, NMFS intends to conduct an analysis of this measure to increase the survival of marine mammals and sea turtles in 2002.

- 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 8.3 and Table 8.4) 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 8.3, 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 8.3 demonstrates that the June closure was effective at reducing dead discards of bluefin tuna. These data do not indicate that the closed area outside of June is problematic because the higher estimates of dead discards in 1999 and 2000 seem to occur in the remaining open areas (i.e., expanding the closed area to include other months does not appear warranted at this time).

Table 8.3. 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	2000	1997	1998	1999	2000	1997	1998	1999	
Jan	Closed	0	0	0	0	0	0	0	0	0	0	0	0
	Open	18	9	19	23	5	15	3	2	5	35	8	1
Feb	Closed	0	0	0	0	0	0	0	0	0	0	0	0
	Open	10	10	24	27	1	11	7	30	12	14	9	18
Mar	Closed	0	0	0	0	0	0	0	0	0	0	0	0
	Open	23	17	31	37	4	14	13	106	9	51	27	37
Apr	Closed	0	0	0	0	0	0	0	0	0	0	0	0
	Open	4	14	39	41	2	6	50	90	6	17	39	21
May	Closed	1	1	1	0	2	1	2	0	4	1	20	0
	Open	21	23	25	39	18	21	42	19	26	33	94	17
June	Closed	14	10	0	0	144	156	0	0	159	278	0	
	Open	29	25	29	15	56	182	87	18	42	194	124	23
July	Closed	3	13	7	0	3	32	2	6	15	53	6	6
	Open	35	30	11	12	32	20	5	33	57	35	12	9
Aug	Closed	0	0	2	0	0	0	0	0	0	0	0	0
	Open	23	6	9	4	1	2	1	3	5	2	0	0
Sept	Closed	0	0	0	1	0	0	1	0	0	0	0	0

	Open	12	4	0	8	0	1	0	1	0	4	0	2
Oct	Closed	0	7	6	7	0	9	0	16	1	30	2	68
	Open	9	25	12	5	0	0	0	7	0	1	0	131
Nov	Closed	7	10	2	5	7	14	1	0	6	20	0	15
	Open	5	11	9	3	0	11	1	9	7	33	1	9
Dec	Closed	10	1	2	1	22	3	1	2	39	0	0	9
	Open	10	16	15	1	14	4	5	10	11	6	45	16
Total		234	232			311	502			404	807		

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 8.4 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 8.4. Number of bluefin tuna, swordfish, sharks, billfish, and turtles kept and discarded inside and outside of the June, Northeast/Mid-Atlantic Bight.

Species	Closed area				Open area			
	1997	1998	1999	2000	1997	1998	1999	2000
BFT kept	35	42	20	14	199	190	223	215
BFT discarded	402	597	35	122	313	712	573	612
Swordfish kept	2,075	3,315	1,329	3,730	67,000	66,000	63,000	56,138
Swordfish discarded	1,089	1,469	874	1,169	19,810	21,175	19,308	15,490
Pelagic sharks kept	401	368	271	373	4,834	3,388	2,543	2,552
Pelagic sharks discarded	16,672	12,486	4,858	4,749	66,108	32,126	24,082	21,492
LCS kept	1,734	816	1,030	610	25,500	11,492	12,024	7,108
LCS discarded	82	58	77	115	8,300	6,047	6,193	6,679
Billfish discarded	333	96	388	88	7,385	3,670	4,400	3,670
Turtle interactions	12	23	35	9	255	898	593	169

Based on reported data, Table 8.4 demonstrates that bluefin tuna discards in the closed area have been reduced considerably due to the June closure. Tables 8.3 and 8.4 also illustrate that, while annual landings of bluefin tuna from the closed area have been reduced, annual overall landings of bluefin tuna have not been reduced. These data indicate that the June closure is effective at reducing bluefin discards while not impacting bluefin tuna landings. These data also

indicate that discards of pelagic sharks, billfish, and turtles from the closed area have been reduced considerably, although discards of pelagic sharks from open areas have declined as well.

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

  Observers were placed on shark drift gillnet vessels during right whale calving season (November 15- March 31, 2001) off the East Coast of Florida between Fort Pierce and West Palm Beach and covered 12 strikenet and 70 drift gillnet sets (Carlson, 2001). Four Atlantic bottlenose dolphin and one Atlantic spotted dolphin were observed caught and discarded dead; two Atlantic spotted dolphin were released alive. No large whales were encountered by this gear during right whale calving season.

- Atlantic Bottlenose Dolphin Take Reduction Team:

  Due to the observed takes of Atlantic bottlenose dolphin in the shark drift gillnet fishery, representatives of the fishery have been included in the newly formed Atlantic Bottlenose Dolphin Take Reduction Team. The second meeting of the team was held in January 2002.

- MMPA List of Fisheries Update/Stock Assessment:

  NMFS continues to update the MMPA List of Fisheries and the 2002 final list is now available. Final 2000 stock assessment reports and draft 2001 reports are also available. See section 8.1 for information on obtaining these reports.

- Atlantic Offshore Cetacean Take Reduction Team (AOCTRT):

  NMFS Office of Protected Resources has disbanded the AOCTRT due to the fact that two of the three fisheries addressed by the AOCTRT were closed by fishery management actions, leaving only the pelagic longline fishery, which has also been the subject of recent fishery management actions and increased observer coverage related to bycatch. NMFS intends to review the fishery and any marine mammal interactions in the future to determine if additional take reduction measures are necessary at that time.

- Observer coverage of shark drift gillnet fleet:

  On March 30, 2001, NMFS reduced the level of observer coverage required in the shark drift gillnet fishery from 100 percent year-round to 100 percent during right whale calving season and a statistically significant level during the rest of the year. Recent scientific analyses indicate that a 53 percent level of coverage is statistically significant and adequate to provide reasonable estimates of sea turtle and marine mammal takes outside of the right whale calving season. The level of observer coverage necessary will be re-evaluated annually and adjusted accordingly. Reduced observer coverage will reduce industry and administrative costs. Due to

the high costs of these observer programs and limited funding, NMFS is considering requiring VMS in the shark drift gillnet fishery.

- Vessel monitoring systems in the pelagic longline fishery

  NMFS adopted fleet-wide VMS requirements in the Atlantic pelagic longline fishery in May 1999, but was subsequently sued by an industry group. By order dated September 25, 2000, the U.S. District Court for the District of Columbia prevented any immediate implementation of VMS in the Atlantic pelagic longline fishery, and instructed to "undertake further consideration of the scope of the [VMS] requirements in light of any attendant relevant conservation benefits."

  On January 10, 2001 (66 FR 1907), pursuant to that order, NMFS published a request for comments on options for implementing VMS requirements in the Atlantic HMS pelagic longline fishery. The agency received and considered seven comments from vessel owners and their fishing organization, environmental advocacy groups, a fishery management council member, and a VMS distributor. NMFS also examined monitoring and enforcement in the fishery, the limits of conventional methods, and the applications of VMS. NMFS conducted an analysis of HMS pelagic longline vessels to determine whether the VMS requirement could be restricted to a subset of HMS pelagic longline vessels. This information has been submitted to the court, and NMFS is awaiting further direction regarding its ability to implement a VMS program.

- Live vs Dead Bait in the Gulf of Mexico

  Analysis of the effectiveness of the live bait prohibition in the Gulf of Mexico pelagic longline fishery is not possible at this time because the data from 2001 (the first full year that the prohibition was effective) are not ready for analysis.

- Time and Area Closures in the Charleston Bump, Florida East Coast, and DeSoto Canyon

  Analyses of the effectiveness of the time and area closures to pelagic longlining in the Charleston Bump, Florida East Coast, and DeSoto Canyon are not possible at this time because the data from 2001 (the first year that the closures were effective) are not ready for analysis.

- Time and Area Closure in Northeast Distant Area

  Analysis of the effectiveness of the time and area closure to pelagic longlining in the Northeast Distant Area is not possible at this time because the data from 2001 (the first full year that the closure was effective) are not ready for analysis.

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 8.5 lists the recommendations and actions taken by NMFS thus far to address these issues.

Table 8.5. Recommendations for Addressing Bycatch Mortality in HMS Fisheries and Actions Planned or Taken to Address These Recommendations.

Recommendation	1999 Actions	2000 Actions	2001 Actions	
Reduce bycatch and bycatch mortality of undersized swordfish and tunas.	Proposed closure of critical swordfish nursery areas	Closed critical swordfish nursery areas to pelagic longline fishing (Am. 1 to HMS FMP)	Held educational workshop for recreational fishermen at Miami International Boat Show in Feb. 2001.	Rulemaking on Atlantic bluefin tuna incidental catch limits. Promote use of circle hooks in swordfish recreational fisheries through an outreach program
Improve data on the character and magnitude of bycatch to allow quantitative estimates of discards in the fisheries for use in stock assessments and making management decisions.	Pursued submission of bycatch data by ICCAT countries for analyses to develop measures to reduce small swordfish bycatch stock-wide.	Researched estimating discard rates and volumes based on direct observations by scientific fishery observers.	Conducted independent review of methodology used to estimate bluefin tuna dead discards. Started collection of discard data in snapper-grouper/reef fish/shark logbook program. Conducted year one of Northeast Distant Area experiment.	Conduct year two of Northeast Distant Area experiment. Increase observer coverage in pelagic and bottom longline and shark drift gillnet fisheries.

Recommendation	1999 Actions	2000 Actions	2001 Actions	
Improve gear-handling techniques to reduce mortality.	Held educational workshops for recreational and commercial fishermen.	Distributed handling protocols for marine mammals and sea turtles	Held pelagic longline gear workshop in January. Required line clippers and dipnets on pelagic longline vessels. Required posting of turtle handling/release guidelines in wheelhouse of all longline vessels.	Conduct year two of Northeast Distant Area experiment. Investigate de-hooking devices.
Conduct research on gear-deployment methods that will reduce interactions between and mortality of protected species that encounter fishing gear.	Transferred funding for gear development to NSIL	Funded a circle hook study in the Azores Developed a dipnet and line cutter that would decrease injuries to turtles; these devices required as of Nov. 2000 on all pelagic longline vessels Development of revised design of lightsticks that do not attract turtles, other gear modifications (NSIL, 2000)	Held pelagic longline gear workshop in January. Conducted year one of Northeast Distant Area experiment.	Conduct year two of Northeast Distant Area experiment.

Recommendation	1999 Actions	2000 Actions	2001 Actions	
Work cooperatively with the fishing industry to transfer new knowledge and techniques between fishermen and researchers.		Held educational workshops include research results on the agenda. Conducted cooperative research with pelagic longline industry members to explore lightstick color and design effects on turtle hooking rates	Held pelagic longline gear workshop in January. Conducted year one of Northeast Distant Area experiment.	Conduct year two of Northeast Distant Area experiment. Pursue other cooperative research funds and programs.
Improve knowledge of (1) basic biology and stock status of shark species in the Northwest Atlantic and (2) the effects of bycatch mortality on shark populations.	Funded the following research: - Center for shark research at Mote Marine Lab: shark biology - Univ of MI: shark nursery grounds - Gulf and South Atlantic Fishery Development Foundation/University of Florida: observer program and biology - COASTSPAN Participated in pelagic shark assessment in February, 2000.	Developed draft National Plan of Action for Sharks. Continued shark research programs ICCAT Bycatch sub-committee recommended that SCRS conduct shark assessments in 2002.	Final Shark NPOA published commensurate with the FAO International Plan of Action for Sharks to assess direct and indirect shark fisheries, stock status, and promote more effective and sustainable shark management. Continued shark research programs ICCAT Bycatch sub-committee data preparatory meeting on pelagic sharks; ICCAT recommends blue and shortfin mako assessments be conducted in 2004. SCS data preparatory meeting for assessment	LCS Assessment SCS Assessment Continue shark research programs

Recommendation	1999 Actions	2000 Actions	2001 Actions	
Increase research on the role of apex predators in structuring marine ecosystems, and assess the effects of bycatch of these stocks.	Funded COASTSPAN, a study to identify shark nursery areas.	Continued COASTSPAN program.	Continued COASTSPAN program Resource partitioning study underway. Post-release mortality study on sharks.	Continue COASTSPAN program. Continue resource partitioning study. Include bycatch data in SCS assessment
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; encouraged the voluntary use of circle hooks; live bait prohibition in Gulf of Mexico; funded circle hook research in longline fishery (Falterman and Graves, 2000); conducted recreational circle hook research by NMFS scientists (Prince, Venizelos, and Ortiz, 2000)	Post-release mortality study on marlin.	
Determine the status of sailfish populations.			Preliminary assessment of sailfish conducted by ICCAT SCRS	

Recommendation	1999 Actions	2000 Actions	2001 Actions	Expected Actions in 2002
Conduct research on post-release mortality of recreationally-caught billfish, tunas, and sharks.	Funded research on: - MA Div. Marine Fisheries: Effects of Hook Design - Bluefin tuna tagging Sponsored Catch and Release Conference in Nov. 1999 to share data on this topic, identify further research needs	Continued NMFS-funded tagging programs.	Post-release mortality study on sharks and marlin. Continued NMFS-funded tagging programs.	Continue 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	Proposed rule for new monitoring system for recreational billfish and swordfish landings	Rulemaking on monitoring of 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 8.6 summarizes the total percentage of mortality attributed to bycatch for Atlantic HMS.

Table 8.6. Percent of Stock-Wide Mortality Attributed to U.S. Bycatch for HMS Stocks in 1998-2000 by weight (unless stated otherwise; Reported discards/total landings + discards).[1] Sources: SCRS, 2001.

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

[1] Based on the landings and discards reported to ICCAT for stocks fished on by U.S. fishermen. It should be noted that discards of BAYS tunas to ICCAT are generally not reported.

[2] There is no international estimate of total landings or discards of sharks, the percentages therefore reflect the U.S. mortality due to bycatch.

[3] Cortes, 2000; E. Cortes, pers. comm. 2001

[4] Recreational landings estimates from Cortes 2000; commercial estimates from Cortes 2000 and Cramer 1999 and 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.

[5] Cortes, 2001b

[6] Stock assessments for LCS and SCS will be conducted in 2002, which will include bycatch estimates.

In Table 3.47 of the HMS FMP, NMFS identified the significance of bycatch of certain species in various HMS fisheries. Table 8.7 below indicates action NMFS has taken to address those issues and reduce bycatch.

Table 8.7. Addressing Significant Bycatch Concerns in HMS Fisheries

Gear	Significant Bycatch Species	
Pelagic Longline	• bluefin tuna • undersized target species • mammals • sea turtles	• Closed areas in Mid-Atlantic Bight in June; South Atlantic Bight area year-round, Charleston Bump Feb-April; DeSoto Canyon year-round; NED area • Gear modifications (gangion length and placement, line clippers and dipnets, handling and release guidelines for turtles) • Northeast Distant Area experiment • Educational workshops • Move after one entanglement • Modify target catch requirements for bluefin tuna retention in 2002
Bottom Longline	• undersized target species • prohibited shark species	• Review prohibited shark species and minimum sizes at 2002 shark stock assessments **Note**: Due to an emergency rule implementing the terms of a settlement agreement, minimum sizes are not in effect in the commercial fishery.
Shark Gillnet	• undersized target species • protected species • prohibited shark species	• Observer coverage to collect necessary data • Consider VMS requirement during right whale season • Closed area to drift gillnets (strikenets only) • Temporary closure (30 days) due to leatherback interactions

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 worldwide is overcapitalization or "too many fishermen chasing too few fish". Limited access and permitting mechanisms are ways of addressing this dilemma. Overcapitalization, which often occurs in open access fisheries, is 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.

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 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 report assessing capacity levels in commercial U.S. fisheries is still under development, but should be completed in late 2001/early 2002. Preliminary results in the Atlantic HMS fisheries indicate that the potential production of the commercial fleet is in excess of the actual level of production which suggests that excess capacity exists. Once the final report is available, NMFS will begin to discuss with industry options for reducing or, if appropriate, maintaining the capacity in Atlantic HMS fisheries.

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) and for the Atlantic tunas fisheries (September 1, 1994). In 1995 and 1996, NMFS held a number of workshops to discuss limited access in the Atlantic HMS 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.

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

9.2.1 History of the Program Established in the HMS FMP

The HMS FMP outlined several objectives of a program that would limit access to the swordfish, shark, and tuna longline fisheries. These objectives included:

- Minimize, to the extent practicable, economic displacement and other adverse impacts on fishing communities during the transition from overfished fisheries to healthy ones.

- Consistent with other objectives of this FMP, manage Atlantic HMS fisheries for continuing optimum yield so as to provide the greatest overall benefit to the Nation, particularly with respect to food production, providing recreational opportunities, preserving traditional fisheries, and taking into account the protection of marine ecosystems.

- Reduce latent effort and overcapitalization in HMS commercial fisheries.

- Develop eligibility criteria for participation in the commercial shark and swordfish fisheries based on historical participation, including access for traditional swordfish handgear fishermen to participate fully as the stock recovers.

- Create a management system to make fleet capacity commensurate with resource status so as to achieve the dual goals of economic efficiency and biological conservation.

This program was designed to reduce latent effort without significantly affecting the livelihoods of those who are substantially dependent on the fisheries (in other words, to prevent further overcapitalization). Because this program did not directly reduce the capacity in these fisheries, this program was meant to be the first step towards reducing capacity in the Atlantic swordfish, shark, and tuna longline fisheries.

The program implemented in the HMS FMP set up six different permit types: directed swordfish, incidental swordfish, swordfish handgear, directed shark, incidental shark, and tuna longline. To reduce bycatch concerns in the pelagic longline fishery, these permits were designed so that the swordfish directed and incidental permits are valid only if the permit holder also holds both a tuna longline and a shark permit. Similarly, the tuna longline permit is valid only if the

permit holder also holds both a swordfish (directed or incidental, not handgear) and a shark permit. Swordfish handgear and shark permits are valid without another limited access permit.

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.

9.2.2 Status of the Program Established in the HMS FMP

Number of Permits

Between the permits issued in May, 1999, and successful applications/appeals, a total of 982 permit holders received limited access permit by October 2000. However, in the past year, the number of permit holders has decreased by 23% to 752 and the number of limited access permits has decreased by 26% to 1275 (Table 9.1). While the number of permit holders in all categories decreased, the largest reductions came in the incidental swordfish permit category which decreased 45 percent (203 to 112 permit holders) and the incidental shark permit category which decreased 33 percent (585 to 390 permit holders). Interestingly, this reduction occurred across all states and not just states adjacent to the time/area closures implemented in 2000 and 2001. There are a few possible explanations for the large decrease:

- a number of permit holders have not yet renewed their permits;
- a number of vessel owners did not renew their permits within a year and have lost their permits through attrition;
- the implementation of some regulations (for example the recent time/area closures for pelagic longline fishermen) forced permit holders out of these fisheries;
- permit holders tried to sell their permits when they left the fishery but could not find buyers due to the upgrading restrictions (although incidental permits are not subject to upgrading restrictions);
- incidental permit holders wanted to change gear types or use a different gear in the tuna fishery (e.g. they would rather have a charter/headboat permit than a tuna longline permit) and let their permits lapse; or
- some combination of the above.

NMFS is surprised by large reduction in the number of permits and will continue to monitor the program to try to determine the reason(s) for this reduction.

Transfers

In 2001, there were approximately 130 shark and swordfish permit transfers. NMFS has examined the information received at the time of the transfer and has obtained some estimates as to the costs of buying a limited access permit. It appears that a number of permits are sold to family members for one dollar or are given away free. Prices for permits (swordfish directed, swordfish incidental, shark directed, and shark incidental) ranged from $1.00 to $5,000.00. There did not appear to be any difference in price between permit types.

Implementation problems and corrections

In the past year, NMFS has continued to hear from vessel owners who recently found out about limited access or recently realized they were issued an incidental limited access permit when they feel they should have been given a directed limited access permit. When requested in writing, NMFS considers these cases on an individual basis to determine if a NMFS made an error in the original determination of eligibility in May 1999.

During the original application and appeal phase of this program both the permit office in the Southeast Regional Office and the HMS Management Division were changing the permit holder database as transfers were made and applications and appeals were approved or denied. After the application and appeal phase was complete, NMFS became aware of a number of permit holders who had erroneously been issued a permit or had not been mailed a renewal notice. In the case of the permit renewals, NMFS gave permit holders who had not received a renewal notice on time a one-time exemption to the one year renewal time frame. In the cases where NMFS erroneously issued a permit, NMFS revoked the permit and allowed the vessel owner a chance to prove eligibility for the fishery by following a reconsideration and appeal process similar to the one designed for the original issuance of limited access permits.

Additionally, NMFS has recently noted that a number of tuna longline permit holders do not hold valid swordfish and shark limited access permits and a number of swordfish directed or incidental permit holders do not hold valid tuna longline or shark permits. NMFS is trying to determine the best method to handle these cases. In some instances, vessel owners who hold one permit but not the others may find that NMFS has revoked their permit until the vessel owner provides information proving they hold the other required permits. In these cases, similar to the application and appeals format of the implementation of the limited access program, NMFS has provided for two separate decision levels for permit holders: reconsideration and appeal. In cases where a tuna permit is revoked, NMFS may consider changing the permit category if requested.

Table 9.1 **Distribution of Shark, Swordfish, and Tuna longline Limited Access Permits as of October, 2001.** The actual number of permit holders in each category and state is subject to change as permits are renewed or expire.

State	# Directed Swordfish	# Incidental Swordfish	# Swordfish Handgear	# Directed Shark	# Incidental Shark	# Tuna Longline	
ME	1	3	7	1	11	3	20/26
NH	-	1	1	1	3	-	5/6
MA	11	3	22	2	14	3	37/55
RI	6	3	27	1	12	6	37/55
CT	-	-	1	-	-	-	1/1
NY	18	6	11	9	17	16	36/77
NJ	32	19	12	32	35	33	81/163
DE	2	-	-	1	2	1	3/6
MD	7	1	-	3	6	8	10/25
VA	1	3	-	4	3	4	10/15
NC	8	14	3	20	23	11	46/79
SC	4	-	-	7	13	5	20/28
GA	-	-	-	2	2	-	4/4
FL	78	36	16	156	172	66	346/525
AL	1	2	-	2	3	3	6/11
MS	-	2	-	1	8	1	9/12
LA	32	10	-	4	45	40	52/131
TX	5	9	-	6	19	10	26/49
CA	1	-	-	-	1	1	1/3
VI	1	-	-	-	1	2	2/4
TOTAL	**208**	**112**	**100**	**252**	**390**	**213**	**752/1275**
Total: October 2000	**240**	**203**	**125**	**287**	**585**	**292**	**982/1732**
Total: December 1999	**243**	**208**	**114**	**279**	**599**	**451**	**976/1892**

9.2.3 Possible Next Steps

As noted in the HMS FMP, the current limited access system was designed to be the first step in addressing overcapitalization. Both the 2000 and 2001 SAFE reports noted that possible future management measures could include:

- Attrition/Use or lose - reduce the number of permits based on lack of landings;
- Two-for-One entry - require entrants to the fishery to transfer two permits in order to obtain one limited access permit;
- Non-transferable Individual Fishing Quotas (IFQs);
- Individual Transferable Quota (ITQ) systems including landings based, auction, and/or lottery allocation;
- Permit buybacks; and,
- Changing the current species-based permits to a more gear-based permitting system.

Before making any changes, NMFS must analyze the success of the current program and regulations to determine if future steps are needed and to find out the reason for the recent decrease in limited access permits. Thus, NMFS will continue to monitor the number of permit holders and will ensure that the public has ample time to comment before any additional steps are taken.

At the April 2001 AP meeting and in Chapter 10 of the 2001 SAFE report, NMFS presented a number of options to reduce the confusion of having multiple permits. These options included:

- allowing for conversion from swordfish directed permits to swordfish handgear permits;
- allowing any tuna permit category to be acceptable with a swordfish directed or incidental permit, not just the tuna longline category;
- eliminating the need for squid trawlers who occasionally catch swordfish to hold a tuna longline category permit; and,
- changing the permit structure to issue permits by gear type, not species.

At the AP meeting, NMFS heard that a number of AP members would prefer the permitting system to be streamlined. Some suggestions included:

- NMFS should have only two types of permits, commercial and recreational;
- a single limited access permit type is preferable to the three permits currently needed to use pelagic longline gear; and,

- gear-based permits are acceptable as long as vessels can be issued more than one type of permit.

Additionally, some AP members expressed concern about the one year renewal time period. NMFS is considering these options and hopes to begin the rulemaking process for limited access permitting issues in 2002/2003.

Also at the April 2001 AP meeting, NMFS and AP members heard from a Caribbean fishery representative who stated that fishermen in Puerto Rico and the U.S. Virgin Islands did not know about limited access and that something should be done to accommodate these fishermen and to ensure that their catches are accurately reported. Generally, AP members expressed concern and sympathy for these fishermen but felt that opening the limited access permitting process for those fishermen could create problems. After the meeting, the representative wrote to NMFS with some suggestions on how to address this issue including:

- allow the incidental take of swordfish and shark on the Atlantic tunas handline permit in the Caribbean EEZ only;
- require vessels to be registered in Puerto Rico or the U.S. Virgin Islands for commercial fishing;
- restrict vessels to two swordfish and two sharks per trip;
- restrict vessels to 30 feet in length; and,
- restructure data collection contracts with Puerto Rico and Virgin Island Governments to include an HMS component with swordfish, sharks, tunas, wahoo, and dolphin.

Not all of the above suggestions are possible given the National Standards, particularly National Standard 4 that states management measures should not discriminate against residents of different states, some of them are not enforceable, and some of them are already in effect (e.g. vessels must have either state registration or Coast Guard documentation in order to fish commercially for HMS). Additionally, all states, including Puerto Rico and the Virgin Islands, are asked to provide representatives for the HMS and Billfish APs in order to ensure our regulations are consistent with and consider state regulations and fishermen. However, NMFS would appreciate comments on this issue, particularly from fishermen in Puerto Rico and the U.S. Virgin Islands, and may consider different options to address this issue in the upcoming rulemaking on limited access permitting issues.

9.2.4 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 in 1999 due to the lack of standard measurements of vessel hold capacity as well as the lack of consistent collection of this information for HMS commercial vessels as part of existing vessel registration systems. In Chapter 10 of the 2001 SAFE report, NMFS mentioned other possible options including eliminating upgrading restrictions; limiting hold capacity instead of, or in addition to, the current restrictions; and allowing a greater percentage increase; creating vessel categories. NMFS heard similar comments as those above from the AP in April 2001. NMFS is considering these options, and, as with any potential changes in the permitting system, will ensure adequate public comment during the rulemaking process before making any changes to 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 for the fishing year 2001 are valid from the date of issuance through May 31, 2002. The Atlantic tunas permit are renewable on an annual (fishing year) basis.

The Atlantic tunas permits are the only HMS permits at this time that have categories based on gear type. The number of Atlantic tunas permit holders in each category is listed in Table 9.2. The number of permits in the longline, angling, trap, and general categories has decreased while the number of permits in the harpoon category has increased slightly (Table 9.2). In previous years, charter/headboat vessels fishing for HMS only needed a charter/headboat permit if they were fishing for Atlantic tunas. However, in July 2001, HMS implemented a charter/headboat permit for all vessels fishing for Atlantic HMS. For more information on this permit, please see section 9.4 below.

Table 9.2 **The number of Atlantic tunas permit holders in each category.** The actual number of permit holders in each category are subject to change.

Category	As of October 2000	As of October 2001
Longline	292	213
Angling	14,908	12,685
Harpoon	44	53
Trap	4	1
General	6,705	6,072
Purse Seine	5	5
Charter/headboat	2,728	No longer a tuna-only permit
Total	24,686	19,029

9.4 HMS Charter/Headboat Permits

The HMS FMP established a new requirement that owners of charter boats or headboats that are used to fish for, take, retain, or possess Atlantic tunas, sharks, swordfish, or billfish must obtain a Highly Migratory Species Charter/Headboat permit. This new permit replaced the Atlantic tunas Charter/Headboat permit. In late 2000, NMFS received approval for these permits under the Paperwork Reduction Act and implemented this program on June 1, 2001. To alleviate confusion between the different permit types, NMFS is in the process of articulating the full range of alternatives to address the new charter/headboat requirements. A proposed rule for the different options is expected late 2001/early 2002.

As of October 2001, there were 3,260 Atlantic HMS charter/headboat permit holders. This is a 19.5 % increase over the number of tuna charter/headboat category permits issued in 2000 (Table 9.2). This increase could be due to the implementation in June 2001 of the regulations established in the HMS FMP.

9.5 Dealer Permits

Dealer permits are required for commercial receipt of Atlantic tuna, swordfish, and sharks, and are detailed in Section 2.6.1 of the HMS FMP. Additionally, the appropriate dealer permit is necessary for those importing bluefin tuna and/or swordfish from any ocean, the specifics of which are discussed in Section 7 of this report. All dealer permit holders are required to submit

reports detailing the nature of their business. For swordfish and shark permit holders (including those who *only* import swordfish), dealers must submit bi-weekly dealer reports on all HMS they purchase. Tuna dealers must submit, within 24 hours of the receipt of a bluefin tuna, a landing report for each bluefin purchased from a U.S. fishermen. Dealers must also submit bi-weekly reports that include additional information on tunas they purchase. 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 continues to automate and improve its permitting and dealer reporting systems and plans to make additional permit applications and renewals available online in the near future. For instance, NMFS is considering mandatory negative reporting for BAYS tunas dealers.

The number of dealer permits issued by state and species is listed in Table 9.3. Unlike the number of limited access vessel permits, the number of dealer permits did not decrease substantially from the numbers in 2000.

Table 9.3 **Number of dealer permits issued in each state as of October, 2001.** 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	-	2	4	6
CA	40	36	7	83
CT	8	-	-	8
DE	3	-	-	3
FL	24	90	97	211
GA	-	1	1	2
GU	1	-	-	1
HI	5	9	4	18
IL	1	1	1	3
KY	-	-	-	0
LA	17	17	17	51
MA	120	22	12	154
MD	9	6	5	20
ME	39	3	3	45
MO	-	-	1	1

State	Atlantic tunas	Atlantic swordfish	Atlantic sharks	# of permits
MS	-	-	1	1
NC	32	13	18	63
NH	7	-	2	9
NJ	47	16	14	77
NY	69	23	13	105
OR	1	-	-	1
PA	2	4	1	7
PR	7	-	-	7
RI	33	13	10	56
SC	9	10	15	34
TX	4	8	12	24
VA	19	4	5	28
VI	23	1	1	25
WA	2	7	7	16
Canada	-	13	4	17
Chile	-	1	-	1
New Zealand	-	1	-	1
Uruguay	-	1	-	1
TOTAL OCTOBER 2001	**522**	**302**	**249**	**1073**
TOTAL OCTOBER 2000	**544**	**312**	**251**	**1107**

9.6 Exempted Fishing Permits (EFPs) and Scientific Research Permits (SRPs)

EFPs and SRPs are requested and issued under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.) and/or the Atlantic Tunas Convention Act (16 U.S.C. 971 et seq.). Regulations at 50 CFR 600.745 and 50 CFR 635.32 govern scientific research activity, exempted fishing, and exempted educational activity with respect to Atlantic highly migratory species.

Issuance of EFPs and/or SRPs may be necessary because possession of certain shark species is prohibited, possession of billfishes on board commercial fishing vessels is prohibited, and because the commercial fisheries for bluefin tuna, swordfish and large coastal sharks may be closed for extended periods during which collection of live animals and/or biological samples would otherwise be prohibited. 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.

The number of EFPs and SRPs issued in 2000 and 2001 are listed in Table 9.4 below. Year-end reports for permits issued for 2001 are required, and are expected to be submitted to NMFS in early 2002.

Table 9.4 Number of EFPs and SRPs issued.

Permit type		2000	
Exempted Fishing Permit	Sharks for display	14	9
	Tunas for display	1	1
	Tuna fishing	0	4
	Observers for sharks	0	1
	Observers for HMS (multispecies)	0	1
	Shark research on a non-scientific vessel	2	4
	Tuna research on a non-scientific vessel	1	4
	Billfish research on a non-scientific vessel	1	3
	Swordfish research on a non-scientific vessel	0	1
Scientific Research Permit	Shark research	0	2
	Tuna research	4	1
	Billfish research	2	1
	HMS (multispecies) research	0	1

10. SUMMARY: ANALYSIS, ISSUES FOR CONSIDERATION, AND OUTLOOK

The HMS Management Division witnessed another eventful year in 2001. Management measures stemming from ICCAT recommendations, the BiOp, as well as the from the HMS FMP and the Billfish Amendment were implemented. The swordfish, tuna, shark and billfish fisheries were also monitored during the year. Some of 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 analysis of current management actions, as well as an outlook on the future of HMS fisheries management strategies is both valuable and necessary.

10.1 Analysis of Management Measures *(For an economic impact analysis of management measures, please refer to Section 5; for a social impact analysis, please refer to Section 6)*

The following details major management HMS actions implemented or ongoing in 2001. Unfortunately, for many of these actions it is not possible to provide a current assessment due to the lack of elapsed time since implementation. For some of these actions, in particular the closed areas, it is expected that it may take several years to accrue conservation benefits.

10.1.1 Swordfish

Catch limits: In 2000, U.S. fishermen were limited to a 2,951 mt catch limit and a 320 mt dead discard allowance for North Atlantic swordfish and a 384 mt catch limit for South Atlantic swordfish. The reported landings for U.S. fishermen for 2000 was 2864.3 mt and 488.9 mt dead discards for the North Atlantic fishery, resulting in an underharvest of 87 mt, but a overage in the dead discard allowance of 168 mt. Reported landings from U.S. fishermen in the South Atlantic fishery was 51 mt, resulting in a 333 mt underharvest.

Minimum size limit: Calculations to evaluate compliance with the swordfish minimum size limit were not made by SCRS in 2000 or 2001. However, based on estimates made for 1998 fishing activities, SCRS could calculate that the percentage of landings less than 125 cm LJFL would be about 23 percent.

The Swordfish Certificate of Eligibility program was implemented to support enforcement of the U.S. minimum size requirement. That program requires that all imported swordfish be accompanied by a document stating that the fish meets the minimum size requirement, or that if it does not, it was harvested from other than the Atlantic Ocean. Importers must submit copies of

all COEs on a bi-weekly basis which are then compared to dealer reports on purchased fish, and U.S. Customs data.

Stock structure: NMFS is concerned about the uncertainties in the stock structure of Atlantic swordfish and its management implications. Note that evaluation of international management measures on a stock-wide basis can only occur based on *reported* landings and discards. A significant problem exists internationally with the underreporting of fishing activities. Therefore, overfishing of North Atlantic swordfish continues to occur, likely at a rate higher than estimated.

10.1.2 Billfish

Catch Limits: While some countries have already implemented the billfish catch limits, information is not yet available to evaluate the effects of regulations agreed to at ICCAT in 2000 (e.g., reduction in landings).

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

There are no management measures in place specifically for sailfish/spearfish, with the exception of a spearfish possession prohibition.

10.1.3 Sharks

LCS quota/SCS quota/prohibited species/division of LCS into ridgeback and non-ridgeback subgroups/counting dead discards and state landings after Federal closures against Federal quotas/minimum size for ridgeback LCS in commercial fisheries: these measures and others will be considered at the 2002 LCS stock assessment. For further information, see section 4.5.

LCS directed commercial trip limit of 4,000 lb dw: anecdotal information indicates that the commercial LCS trip limit resulted in the larger vessels in the fleet leaving the fishery because it was no longer profitable for them to target sharks. Now that the commercial fishery is under a limited access program with upgrading restrictions, NMFS intends to reevaluate the

appropriateness of the trip limit as part of the refinement of the limited access program. For further information, see chapter 9.

Scheduling commercial fishery openings and closings in advance: NMFS has received comments that some fishermen like scheduling the fishing seasons in advance so that they can develop markets and do not have to worry about unexpected closures (for LCS). However, NMFS has also received comments that other fishermen do not like scheduling the fishing seasons in advance and would prefer to return to closures being announced with 5 days advanced notice. NMFS intends to revisit this issue in upcoming rulemaking.

Recreational retention limit and minimum size limit: NMFS has not conducted a stock assessment on LCS, SCS, or pelagic sharks since the current recreational retention and minimum size limits were established in 1999. Harvest data for 2000 by species group (see Table 4.4.2) indicate that catches of LCS declined 23 percent from 1997 levels (the level from which the rebuilding plan for LCS was established). However, species-specific data on LCS recreational harvest are currently under review at this time so it is not possible to determine the species composition of the catch and whether catches of sandbar and blacktip individually were reduced. These data will be analyzed at the 2002 LCS SEW. Catches of pelagic sharks increased slightly and catches of SCS increased 42 percent from 1999 levels.

Observer coverage in the shark drift gillnet fishery: In 2001, NMFS modified the level of observer coverage required in the southeast shark drift gillnet fishery because new analyses indicated that a reduced level of coverage outside of right whale calving season would still provide statistically valid and reasonable estimates of protected species bycatch. The 2001 observer data will be analyzed with the 2001 logbook data to extrapolate take estimates when the logbook data are ready for analysis.

Prohibition of finning of deepwater and other sharks: NMFS had previously extended the ban on finning to the deepwater and other shark management group. The recently published final rule implementing the Shark Finning Prohibition Act effectively prohibits finning of all sharks by persons under U.S. jurisdiction in Federal waters or with Atlantic Federal shark limited access permits. While the final rule does not prohibit finning by persons in state waters without a Federal shark permit, most deepwater sharks occur primarily in Federal waters so that NMFS believes separate actions by states to ban finning for this management group are unnecessary.

Pelagic shark quotas (porbeagle, blue, other pelagics): NMFS established separate quotas for porbeagles (92 mt dw) and blue sharks (273 mt dw) in 1999 (the remaining pelagic shark quota was reduced to 488 mt dw when porbeagle sharks were broken out). In 2000, commercial landings of porbeagles and blue sharks were less than one percent of the available quotas and 19.8 percent of the pelagic shark quota was harvested (see Table 4.5.8).

10.1.4 Tunas

Catch limits: In 2000, U.S. fishermen were limited to a 1,387 mt landings quota and a 68 mt dead discard allowance for Western Atlantic bluefin tuna. The reported landings for U.S. fishermen for 2000 was 1212.1 mt, plus an estimated 67 mt of dead discards, resulting in an underharvest of 175 mt for the landings quota, and one mt under the dead discard allowance.

Minimum size limits: The United States has zero tolerance for landings of bluefin tuna less than the ICCAT minimum size of 6.4 kg, and no landings of undersized fish were reported in 2000. Bluefin tuna under 115 cm are limited to eight percent of the total U.S. landings quota, and, in 2000, U.S. vessels landed 34.6 mt of bluefin under 115 cm, accounting for 2.5 percent of the landings quota of 1,387 mt.

The United States has implemented a minimum size for bigeye and yellowfin tuna that corresponds to 6.4 kg (a higher minimum size than the 3.2 kg adopted by ICCAT). There is zero tolerance for bigeye and yellowfin tuna less than 6.4 kg in both the commercial and recreational U.S. fisheries.

Stock structure: NMFS is concerned about the uncertainties in the stock structure of North Atlantic bluefin tuna and its management implications. Recent scientific studies indicate that overfishing in the eastern management area could impact fisheries in the western management area. Note that evaluation of international management measures on a stock or ocean-wide basis can only occur based on *reported* landings and discards. A significant problem exists internationally with the underreporting of fishing activities and with continued overfishing in the eastern Atlantic and Mediterranean management areas.

Domestic Allocation: The HMS FMP set domestic quota allocation percentages for the U.S. bluefin tuna fishery. The HMS regulations allow for NMFS to 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. Over the past two seasons there has been large underharvests in several BFT quota categories, especially the Angling and Longline categories. There are several negative consequences to excessive carry-overs of underharvest. 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. Adjusting the target catch requirements in the Longline category and the retention limits in the Angling category may mitigate these

excessive under-harvests, but NMFS is continuing to investigate alternatives to limit excessive carry-overs from one year to the next and welcomes public input on this issue.

Retention Limits: Over the last several years, NMFS has attempted to establish "date-certain" periods of increased daily retention limits in the recreational bluefin tuna fishery. The date-certain retention limit adjustments allow recreational and for-hire fishermen to plan trips, and NMFS' actions in setting bluefin tuna retention limits have been received well by the recreational and for-hire fishing community.

10.1.5 Bycatch

Reduction in length of longline to increase survival of marine mammals and turtles: the effectiveness of this measure has not been analyzed. However, NMFS intends to conduct an analysis of this measure to increase the survival of marine mammals and sea turtles in 2002.

Closed 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. Tables 8.3 and 8.4 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.

Based on reported data, Table 8.4 demonstrates that bluefin tuna discards in the closed area have been reduced considerably due to the June closure. Tables 8.3 and 8.4 also illustrate that, while annual landings of bluefin tuna from the closed area have been reduced, annual overall landings of bluefin tuna have not been reduced. These data indicate that the June closure is effective at reducing bluefin discards while not impacting bluefin tuna landings. These data also indicate that discards of pelagic sharks, billfish, and turtles from the closed area have been reduced considerably, although discards of pelagic sharks from open areas have declined as well.

Atlantic Large Whale Take Reduction Plan (ALWTRP) regulations: observers were placed on shark drift gillnet vessels during right whale calving season (November 15- March 31, 2001) off the East Coast of Florida between Fort Pierce and West Palm Beach and covered 12 strikenet and 70 drift gillnet sets (Carlson, 2001). Four Atlantic bottlenose dolphin and one Atlantic spotted dolphin were observed caught and discarded dead; two Atlantic spotted dolphin were released alive. No large whales were encountered by this gear during right whale calving season.

Atlantic Bottlenose Dolphin Take Reduction Team: due to the observed takes of Atlantic bottlenose dolphin in the shark drift gillnet fishery, representatives of the fishery have been included in the newly formed Atlantic Bottlenose Dolphin Take Reduction Team. The second meeting of the team was held in January 2002.

MMPA List of Fisheries Update/Stock Assessment: NMFS continues to update the MMPA List of Fisheries and the 2002 final list is now available. Final 2000 stock assessment reports and draft 2001 reports are also available. See section 8.1 for information on obtaining these reports.

Atlantic Offshore Cetacean Take Reduction Team (AOCTRT): NMFS Office of Protected Resources has disbanded the AOCTRT due to the fact that two of the three fisheries addressed by the AOCTRT were closed by fishery management actions, leaving only the pelagic longline fishery, which has also been the subject of recent fishery management actions and increased observer coverage related to bycatch. NMFS intends to review the fishery and any marine mammal interactions in the future to determine if additional take reduction measures are necessary at that time.

Observer coverage of shark drift gillnet fleet: on March 30, 2001, NMFS reduced the level of observer coverage required in the shark drift gillnet fishery from 100 percent year-round to 100 percent during right whale calving season and a statistically significant level during the rest of the year. Recent scientific analyses indicate that a 53-percent level of coverage is statistically significant and adequate to provide reasonable estimates of sea turtle and marine mammal takes outside of the right whale calving season. The level of observer coverage necessary will be re-evaluated annually and adjusted accordingly. Reduced observer coverage will reduce industry and administrative costs. Due to the high costs of these observer programs and limited funding, NMFS is considering requiring VMS in the shark drift gillnet fishery.

Vessel monitoring systems in the pelagic longline fishery: NMFS adopted fleet-wide VMS requirements in the Atlantic pelagic longline fishery in May 1999, but was subsequently sued by an industry group. By order dated September 25, 2000, the U.S. District Court for the District of Columbia prevented any immediate implementation of VMS in the Atlantic pelagic longline fishery, and instructed to "undertake further consideration of the scope of the [VMS] requirements in light of any attendant relevant conservation benefits."

On January 10, 2001 (66 FR 1907), pursuant to that order, NMFS published a request for comments on options for implementing VMS requirements in the Atlantic HMS pelagic longline fishery. The agency received and considered seven comments from vessel owners and their fishing organization, environmental advocacy groups, a fishery management council member, and a VMS distributor. NMFS also examined monitoring and enforcement in the fishery, the limits of conventional methods, and the applications of VMS. NMFS conducted an analysis of HMS

pelagic longline vessels to determine whether the VMS requirement could be restricted to a subset of HMS pelagic longline vessels. This information has been submitted to the court, and NMFS is awaiting further direction regarding its ability to implement a VMS program.

Live vs Dead Bait in the Gulf of Mexico: analysis of the effectiveness of the live bait prohibition in the Gulf of Mexico pelagic longline fishery is not possible at this time because the data from 2001 (the first full year that the prohibition was effective) are not ready for analysis.

Time and Area Closures in the Charleston Bump, Florida East Coast, and DeSoto Canyon: analyses of the effectiveness of the time and area closures to pelagic longlining in the Charleston Bump, Florida East Coast, and DeSoto Canyon are not possible at this time because the data from 2001 (the first year that the closures were effective) are not ready for analysis.

Anecdotal information from recreational fishermen suggests that there has been an increase in encounters with juvenile swordfish off Florida. However, this may also be an artifact resulting from an increase in participation within the recreational swordfish fishery.

Time and Area Closure in Northeast Distant Area: analysis of the effectiveness of the time and area closure to pelagic longlining in the Northeast Distant Area is not possible at this time because the data from 2001 (the first full year that the closure was effective) are not ready for analysis.

10.2 Outlook by Species

10.2.1 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 in the pelagic longline fishery 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 2001 SAFE report, the recreational swordfish fishery experienced an additional growth in popularity during 2001, 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 2002 may necessitate expanded efforts to accurately monitor recreational landings. A proposed rule was published on December 26, 2001 (66 FR 66386), which outlined a mandatory toll-free call-in reporting system for all non-tournament billfish and swordfish recreational landings. Additional concerns regarding sale of recreational-caught swordfish and the number of fish landed will also be considered.

10.2.2 Tunas

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 2002. 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.

One of the issues on which the HMS Division and NMFS has received many phone calls and letters during 2001 has been the establishment of a commercial handgear fishery for bluefin tuna in the southern mid-Atlantic area, specifically North Carolina. Since the mid-1990's, large amounts of commercial-sized bluefin tuna have been available to fishermen in North Carolina during the winter and spring months when the General category is usually closed. Fishermen in North Carolina feel that they are unfairly excluded from the General category because of the start date of the fishery, June 1.

Establishing a commercial General category BFT fishery for North Carolina has been extensively discussed in recent years. In the final HMS FMP, NMFS took the position that allowing the development of new fisheries for BFT would not be consistent with the other measures adopted to rebuild the overfished BFT stock. Therefore, in the final regulations to implement the HMS FMP, the BFT General category fishing season was maintained at June 1 through December 31 of each year, with no separate quota reserved for North Carolina. However, NMFS intends to raise concerns again about commercial BFT fishing opportunities in North Carolina with the HMS AP at its 2002 meeting, and will consider its recommendations.

The current General category season does not preclude commercial landings by permitted vessels from North Carolina. All permitted vessel operators may seek BFT throughout their migratory range and many tuna fishermen travel to areas outside their home state. Additionally, if quota remains available and commercial size fish are present in North Carolina waters, BFT may be landed and sold in North Carolina throughout the summer and fall. In 2000, NMFS transferred 100 metric tons of BFT quota to the General category in October, of which about 50 metric tons was caught and landed in North Carolina during November and December. In 2001, NMFS transferred 93 metric tons to the General Category in November, and over 40 metric tons were caught and landed in North Carolina.

Of course, fishing activity in North Carolina is subject to variation from year to year as it is dependent on the migratory pattern of the fish and the catch rates in other fishing areas. Even if a portion of the General category quota were to be set aside for a specific fishing area or time period, there is no guarantee that a certain level of harvest will be attained. As described above, NMFS expects this issue will be discussed at the 2002 meeting of the HMS AP, and will consider the recommendations of the AP in future rulemaking.

10.2.3 Billfish

The 2000 ICCAT recommendation related to Atlantic blue and white marlin may require 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 in the recent proposed rule. NMFS is considering public comments as part of development the final rule in 2002. Improving the tournament registration and reporting process will also be examined in 2002. 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.

NMFS is currently conducting a status review of Atlantic white marlin in response to a petition to list the species under ESA. NMFS will review that petition in light of the upcoming SCRS stock assessment and will publish a finding of whether a proposal to list Atlantic white marlin as endangered or threatened under ESA is warranted by September 2002.

10.2.4 Sharks

NMFS will conduct two stock assessments for LCS and SCS in 2002. The LCS assessment will be peer reviewed following the same procedures as the 1998 LCS assessment, per the amended settlement agreement. Based on the results of the assessments, NMFS may conduct proposed and final rulemaking or, if warranted, may prepare an environmental impact statement and amend the HMS FMP.

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 released the Final National Plan of Action for Shark Conservation and Management, consistent with FAO guidelines and requirements in February 2001. Additionally, NMFS published the final rule implementing the Shark Finning Prohibition Act on February 11, 2002 (67 FR 6194) to prohibit finning of sharks in the United States. These actions should contribute to the general awareness of the need for long-term, rational domestic and international management of all sharks.

10.4 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. 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.

10.5 Permitting Issues

NMFS continues to consider refinements to the limited access system for commercial swordfish, shark, and tuna longline fisheries implemented in 1999. Detailed discussions of the issues and potential alternatives can be found in the 2001 SAFE Report and Chapter 9 of this report. NMFS encourages public comments on these issues and potential alternatives and intends to consider permitting issues in upcoming rulemaking.

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 2002, 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 2002 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.

APPENDIX A: FINAL NATIONAL PLAN OF ACTION (NPOA) FOR THE CONSERVATION AND MANAGEMENT OF SHARKS

Summary

Sharks, skates, rays (elasmobranchs) and the chimaeras together comprise the class Chondrichthyes, or cartilaginous fishes.[8] As a group, elasmobranchs present an array of problems for fisheries management and conservation. Elasmobranchs are primarily at the top of the food web, often top-level carnivores (Cortes, 1999), and their abundance is relatively small compared to groups situated in lower trophic levels. Thus, fishing elasmobranchs down to unsustainable levels may occur rapidly, and successful management of elasmobranch fisheries requires a stronger commitment to fishery monitoring, biological research, and proactive management than many teleost fisheries (Walker, 1998).

The life-history characteristics of many elasmobranchs, such as late age of maturity and relatively slow growth rates, make them more susceptible to overfishing than most bony fishes. These characteristics, together with their low fecundity, result in low productivity for most species (Bonfil, 1994; Smith *et al.*, 1998). Recovery of populations from severe depletions (caused either by natural phenomena or human-induced mortality) will probably take many years for most elasmobranch species.

Furthermore, the historically low economic value of shark and ray products compared to other fishes has resulted in research and conservation of these species being a lower priority than for traditionally high-value species. However, the growth in demand for some shark products, such as fins, continues to drive increased exploitation (Bonfil, 1994; Rose, 1996; Walker, 1998). Modern technology, greater access to distant markets, and the depleted status of many traditionally targeted species have also led to directed fishing effort on previously non-targeted species, including elasmobranchs (FAO, 1998). Increased elasmobranch catches in both directed and incidental fisheries have resulted in growing concern over the fate of some elasmobranch populations in several areas of the world's oceans (Bonfil, 1994; FAO, 1998; Musick, 1999). Many fishery managers must now assess and manage shark fisheries without the benefit of the long-term, high-quality databases available for more traditionally high-value species.

While a few countries (including Canada, New Zealand, Australia, South Africa, and the United States) have specific fishery management plans for certain shark fisheries, there are no

[8] The International Plan of Action for the Conservation and Management of Sharks considers the term "shark" to include all species of sharks, skates, rays, and chimaeras.

international management mechanisms effectively addressing the capture of sharks at present. However, a number of international bodies, e.g., the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Northwest Atlantic Fisheries Organization, and the Inter-American Tropical Tuna Commission, have initiated efforts to encourage member countries to collect information about shark catches and, in some cases, develop regional databases for the purpose of stock assessments. In addition, some countries already have laws that facilitate international management. For instance, U.S. participation in international management initiatives is guided by the Atlantic Tunas Convention Act and the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks.

The objective of the International Plan of Action for the Conservation and Management of Sharks (IPOA) is to ensure the conservation and management of sharks and their long-term sustainable use. In the IPOA, member nations have agreed voluntarily to develop, implement, and monitor a national plan of action if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries. As stated in paragraph 22 of the IPOA, shark plans should aim to:

1. Ensure that shark catches from directed and non-directed fisheries are sustainable;
2. Assess threats to shark populations, determine and protect critical habitats, and implement harvesting strategies consistent with the principles of biological sustainability and rational long term economic use;
3. Identify and provide special attention in particular to vulnerable or threatened shark stocks;
4. Improve and develop frameworks for establishing and coordinating effective consultation involving stakeholders in research, management, and educational initiatives within and between member Nations;
5. Minimize unutilized incidental catches of sharks;
6. Contribute to the protection of biodiversity and ecosystem structure and function;
7. Minimize waste and discards from shark catches in accordance with article 7.2.2. (g) of the *Code of Conduct for Responsible Fisheries* (for example, requiring the retention of sharks from which fins are removed);
8. Encourage full use of dead sharks;
9. Facilitate improved species-specific catch and landings data and monitoring of shark catches;
10. Facilitate the identification and reporting of species-specific biological and trade data.

Additionally, national plans of action are to be implemented by United Nations Food and Agriculture Organization (FAO) members in a manner consistent with the FAO (1995) *Code of Conduct for Responsible Fisheries* and any applicable rules of international law, and in conjunction with relevant international organizations.

Consistent with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and the IPOA, the NPOA further identifies the following management principles:

Adopt the Precautionary Approach: Management entities should initiate, continue, or improve research on elasmobranch catches in their fisheries, address the uniqueness of each fishery, identify key habitats and their impacts on populations, and implement necessary elasmobranch management measures before stock declines are evident.

Protect Vulnerable Life History Stages: Management entities should consider protecting juvenile, subadult, and early adult life history stages and habitat in order to rebuild overfished shark stocks and to prevent overfishing on other shark stocks. Potential measures to increase protection of sensitive life history stages include minimum sizes for retention, enhanced conservation of essential fish habitat, and time/area closures of nursery areas.

Protect Vulnerable Species: Management entities should consider additional, separate measures to protect species particularly vulnerable to overfishing. Potential measures to increase protection of vulnerable species may include prohibiting possession of that species (e.g., white sharks in California, numerous species in Atlantic Federal waters), time/area closures or marine reserves to protect important habitats or essential fish habitat, gear modifications, and precautionary limits on harvest levels.

Minimize Waste: Management entities should consider measures to minimize waste, discards, and unutilized incidental catches in shark fisheries, consistent with the Shark Finning Act and the IPOA.

Prioritize Limited Resources: Management entities should determine whether a particular species is overfished, which fisheries should be regulated in regard to shark catches, and determine which shark species have higher conservation needs and act appropriately.

Implementation of the NPOA in Atlantic Highly Migratory Species (HMS) Fisheries

The authority for implementing the U.S. NPOA in Atlantic HMS Fisheries comes from the U.S. participation and endorsement of the IPOA as well as through the Magnuson-Stevens Act. The Magnuson-Stevens Act defines Atlantic HMS as Atlantic tunas (bluefin, bigeye, albacore, yellowfin, and skipjack), Atlantic swordfish, Atlantic billfish (blue and white marlin, longbill spearfish, and sailfish), and oceanic sharks. The Magnuson-Stevens Act further designates the Secretary of Commerce with the authority to manage these species directly. Thus, NMFS, as the designee for the Secretary of Commerce, has jurisdiction of shark fisheries in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea in Federal waters.

The NPOA calls for data collection, population assessments, evaluation of the need for management measures, research and development of mitigation measures and methods, limitations on fishing capacity, outreach and education, and reporting and monitoring. In addition to the existing programs summarized in the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks as well as the NPOA, NMFS has taken several actions to implement the NPOA in Atlantic HMS fisheries.

1. *Data Collection: Data collection programs should collect reliable data to determine the directed and incidental catch, bycatch, and disposition of elasmobranchs by the various fisheries; the effectiveness of existing management measures; the locations and characteristics of nursery and wintering grounds; information on EFH or key habitat for all life stages; and the status of the stocks.*

Implementation in Atlantic HMS fisheries:

The University of Florida is continuing an observer program of the directed bottom longline commercial shark fishery in the Atlantic and Gulf of Mexico to enhance the reliability of management strategies for the shark fishery. Observers provide baseline characterization information, by region, on the species composition, relative abundance, and size composition within species for the large coastal and small coastal bottom longline shark fisheries. During the 2001 sampling season, a total of 36 shark trips were observed, representing 84 sets yielding 480,476 observed hook hours. Catches, catch rates, and disposition were documented for total of 3,937 LCS and 1,304 SCS. The biological data is being processed to identify catch patterns by species and region. Effective January 2002, observer coverage in the directed bottom longline shark fishery is mandatory, if selected.

NMFS continues to conduct an observer program in the southeast shark drift gillnet fishery. During right whale calving season (November 15 through March 31), 100 percent observer coverage of all shark trips is required. Outside of right whale calving season, a statistically significant level of observer coverage is required (currently approximately 53 percent

of all shark trips). During the 2001 right whale calving season, a total of 70 drift gillnet sets and 12 strikenet sets were observed (Carlson, 2001). Catches, catch rates, and disposition were documented for total of 17,849 sharks. Outside the right whale calving season (April 1 through November 14), a total of 37 drift gillnet sets were observed from April through October (15 in 2000 and 22 in 2001) and a total of eight strikenet sets were observed from August to September (three in 2000 and five in 2001) (Carlson and Baremore, 2001). Catches, catch rates, and disposition were documented for total of 10,324 sharks.

Effective August 1, 2001, selected Federal permit holders in the Gulf of Mexico reef fish, South Atlantic snapper-grouper, king and Spanish mackerel, and shark fisheries must report all species and quantities of discarded (alive and dead) sea turtles, marine mammals, birds, and finfish on a supplemental discard form. A randomly selected sample of 20 percent of the vessels with active permits in the above fisheries during 2000 was selected in 2001; a different group of vessels will be selected in subsequent years. The selection process was stratified across geography (Gulf of Mexico and South Atlantic), gear (handline, longline, troll, gillnet, and trap), and number of fishing trips (ten or less trips and more than 11 trips). Of the 2,676 vessels with Federal permits in these fisheries, a total of 454 vessels were selected to report.

In order to continue to delineate shark distributions and migratory patterns, the Cooperative Shark Tagging Program (CSTP) and Mote Marine Laboratory (MML) Center for Shark Research (CSR) continue to tag sharks. In 2001, approximately 6,000 sharks were tagged by the CSTP and 510 sharks were recaptured. To date, CSTP has tagged more than 165,700 sharks of 40 species and nearly 9,500 sharks of 32 species have been recaptured. To date, the CSR has tagged 9,741 sharks of 16 species and has received data on 355 recaptures.

NMFS conducted two fishery independent bottom longline surveys in 2001 to monitor the distribution, abundance, and species composition of sharks, tag sharks for migration studies, collect biological samples for age and growth, feeding ecology, and reproductive studies, and collect morphometric data. In April and May, the Northeast Fisheries Science Center (NEFSC) Apex Predators Program shark survey was conducted from Key West, Florida, to the Maryland/Delaware border. A total of 668 fish (652 sharks), representing 26 species (13 shark species) were caught on 85 sets. In June, the MEXUS-Gulf coastal shark survey was staged from Veracruz, Mexico, and was conducted in the Gulf of Mexico along the Yucatan peninsula coast of the Bay of Compeche, Mexico. The survey produced 37 sharks represented by 3 species caught in 38 sets.

The NEFSC also continued the Cooperative Atlantic States Shark Pupping and Nursery Survey (COASTSPAN). Researchers in each major coastal Atlantic state conducted a cooperative, comprehensive and standardized investigation of shark nursery areas to gauge the

relative importance of these areas and determine migration and distribution patterns of neonate and juvenile sharks. COASTSPAN cooperators sampled a total of 2,132 sharks in 2000. Seven hundred and fifty-five of the sharks sampled were tagged with fin tags and released.

The MML CSR has also conducted tagging studies with the cooperation of the Instituto Nacional de la Pesca in Mexico. In the six field trips to date (1995, 1996, 1997, 1998, 2000, 2001), a total of 390 gillnet sets have been made resulting in the capture and tagging of 1,160 juvenile blacktip sharks with Spanish/English dart tags.

2. *Assessment: Assessments of elasmobranchs subject to directed, incidental, or bycatch fishing mortality to determine the sustainable level of fishing mortality should be conducted following the completion of this NPOA by NMFS, the Councils, the Commissions, and appropriate States (management entities). The purpose of the assessment is to determine whether the level of total fishing mortality of shark, skate, and ray species is sustainable. To continue to improve upon existing elasmobranch assessments and help make future assessments more effective, the following items should be included for collection and analysis: Fishery-dependent data on catches, landings, bycatch, effort, and gears and areas fished; fishery-independent data on distribution and abundance; fishing fleet data; habitat data; market (utilization, price) and trade data (imports and exports); and monitoring of fisheries with directed and incidental catches and bycatch of elasmobranchs (e.g., observer programs).*

Implementation in Atlantic HMS fisheries:

No new stock assessments were conducted for Atlantic sharks in 2001, although assessments for large coastal and small coastal sharks had been scheduled for this year. These assessments are now rescheduled for 2002.

In addition to the NMFS assessment of small coastal sharks, MML and the Florida Museum of Natural History have been undertaking a project to assess the status of small coastal shark species in the Gulf of Mexico and western North Atlantic. This project is funded by Florida Sea Grant. Age-structured population models have been developed and are in their final testing phase. The final data for the models is being collated and model runs using the final data should be finished and the final report written by mid-2002.

The SCRS Subcommittee on Bycatch has recommended that ICCAT take the lead in conducting stock assessments for Atlantic blue, porbeagle and mako sharks. The subcommittee held a data preparatory meeting to review all available shark statistics in September, 2001.

Numerous papers on catches and catch rates as well as two papers on assessment methodologies were presented. The Commission is considering adoption of a resolution that the SCRS should conduct assessments for Atlantic shortfin mako and blue sharks in 2004, and hold an interim meeting in 2003, as SCRS considers necessary, to determine improvements in data collection.

NMFS solicited a status review for dusky sharks from the fishery-independent shark monitoring program at the Virginia Institute of Marine Science (VIMS) and Florida State Museum Commercial Shark Fishery Observer Program, which was completed in 2001. The dusky shark was listed on the Endangered Species Act Candidate Species List in 1997 due to its depleted stock status and concern for further stock declines. Observer program analyses indicate a distinct shift in catch composition from a widely scattered size distribution in 1994 to catches comprised primarily of sharks less than 110 cm FL (0-2 age classes) in 1999 (Romine et al. 2001). VIMS data show a decrease in relative abundance from 1980 to 1992, however recent years (1997-2000), have shown an increase in relative abundance. Observer catch rate data show an increase from 1974-1999, particularly for dusky sharks less than 110 cm FL, although catch rates of sharks greater than 170 cm FL declined over the period (Romine et al. 2001).

The NMFS Southeast Fisheries Science Center (SEFSC) conducted a study on demographic modeling of sharks under included estimation of natural mortality rates of sharks through indirect life history methods, and incorporated uncertainty in vital rates on demographic analyses of sharks. Monte Carlo simulation was used to incorporate uncertainty into life tables and matrix population models and estimate population statistics and elasticities for 41 shark populations. Correlation analysis was also used in concert with elasticity analysis to identify which vital rates explained most of the variation on population growth rates and provide advice for conservation and management. A publication detailing this study is expected to be available in the summer of 2002.

The SEFSC also studied the life history and population dynamics of the finetooth shark by determining age, growth, size-at-maturity, natural mortality, productivity, and elasticity of vital rates of the population. Results suggest the finetooth shark exhibits life-history traits and population parameters that fall between those of the blacktip shark and those of other small coastal species. Population analysis indicates management actions should focus preferentially on protection of juveniles and adults rather than age-0 individuals. A publication on this study is expected in the summer of 2002.

3. <u>*Need for Management Measures:*</u> *If the assessment concludes the stock is overfished, that overfishing is occurring, or that the stock is approaching an overfished state, appropriate management measures (e.g., reduce harvest levels or effort, use of alternative gears, reduce adverse effects on EFH or other habitats, implement minimum*

sizes, establish time-area closures) should be prescribed to end and/or prevent overfishing, to conserve necessary habitats, and to minimize waste, discards, and unutilized incidental catches of all elasmobranchs harvested.

Implementation in Atlantic HMS fisheries:

NMFS published an emergency rule on December 28, 2001 (66 FR 67118), that established the commercial large and small coastal shark quotas at 1997 levels and suspended regulations on several non-quota commercial management measures, pending new stock assessments for both species groups (to be conducted in 2002) and consistent with the terms of a settlement agreement reached with commercial shark fishermen and dealers. NMFS determined that the settlement agreement was appropriate because it will conserve Atlantic sharks while maintaining a sustainable fishery in the long-term; move the management process for Atlantic sharks forward through quality-controlled scientific assessment and appropriate rulemaking; and promote confidence in the management process and its underlying science. Upon completion of the new stock assessments, NMFS may enter into rulemaking to take appropriate action to conserve sharks while maintaining sustainable fisheries in the long-term.

NMFS is continuing to work with Atlantic States Marine Fisheries Commission in the issuance of exempted fishing permits for collection of sharks for public display. Issuance of exempted fishing permits may be necessary because possession of certain shark species is prohibited and because the commercial fisheries for large coastal sharks may be closed for extended periods during which collection of live animals and/or biological samples would otherwise be prohibited. NMFS is working with the Commission to improve tracking of sharks collected and enforcement of permit requirements.

4. *Research and Development of Mitigation Measures and Methods: Regardless of the determination of the assessment, management entities should invest in elasmobranch research, fishery monitoring, reduction of bycatch and bycatch mortality, minimization of waste, and enforcement.*

Implementation in Atlantic HMS fisheries:

For information on fishery monitoring, observer programs, and collection of bycatch information, see the discussion under data collection. For information on research on EFH and tagging programs, see the discussion under data collection.

To investigate post-release survivorship in support of bycatch mortality reduction, a two-phase study was undertaken on the relationship between exhaustive exercise and recovery rates in neonatal and juvenile sandbar sharks in 1999 utilizing sharks made available by the COASTSPAN Delaware Bay sampling program (Spargo et. al. 2001). Most metabolites returned to normal within 6-10 hours, indicating that sandbar sharks are able to physiologically recover after the exhaustive exercise associated with rod and reel angling. Therefore, catch and release fishing may not severely impact neonatal and juvenile sandbar sharks in important nursery areas (Spargo et. al. 2001).

NMFS took several steps in 2001 to reduce sea turtle bycatch and bycatch mortality in domestic longline fisheries, including the bottom longline shark fishery. On July 13, 2001 (66 FR 36711), NMFS closed the northeast distant statistical reporting area to pelagic longline fishing (effective July 15, 2001), modified how pelagic longline gear may be deployed effective (August 1, 2001), and required that all longline vessels (pelagic and bottom) post safe handling guidelines for sea turtles in the wheelhouse (effective September 15, 2001).

Due to a high number of interactions with leatherback sea turtles and other protected species (fourteen leatherback turtles, one loggerhead turtle, and one hawksbill turtle and three Atlantic spotted and four bottlenose dolphins were encountered in 62 drift gillnet sets), NMFS implemented a temporary 30-day rule that prohibited shark gillnet fishing (strikenetting was allowed) between Savannah, Georgia, and West Palm Beach, Florida (66 FR 15045, March 15, 2001). The prohibition was effective from March 9 through April 9, 2001. NMFS continues to monitor this fishery through the observer program described above.

5. *Limitation of Fishing Capacity: Limitation of capacity should be investigated as a method for increasing the sustainability of elasmobranch fisheries. The greater the number of fishing vessels participating, the more likely it is that individual fishing enterprises will become unprofitable or marginal. Combined with limited quotas, the resulting "race for the fish" or derby fishery produces market gluts, poor product quality, safety concerns, and high administrative costs.*

Implementation in Atlantic HMS fisheries:

Commercial fisheries for sharks are already regulated under a limited entry permit system implemented in 1999. NMFS continues to review the limited entry permit system and may consider additional limitations on fishing capacity in the future. Possible future management measures could include attrition/use or lose that would reduce the number of permits based on lack of landings; two-for-one entry that would require entrants to the fishery to transfer two permits in order to obtain one limited access permit; non-transferable individual fishing quotas;

individual transferable quota based on landings, auction, and/or lottery allocation; permit buybacks; and, changing the current species-based permits to a more gear-based permitting system.

6. *Outreach and Education: Each management entity should cooperatively or individually to develop and implement training tools and programs in elasmobranch identification, reduce bycatch mortality, and raise awareness about the ecological benefits from elasmobranch populations, detrimental effects of habitat destruction (e.g., coastal development, coastal pollution), and appropriate conservation measures to avoid, minimize or mitigate adverse effects on necessary habitats.*

Implementation in Atlantic HMS fisheries:

NMFS is developing an identification guide for Atlantic HMS, including sharks, that is scheduled for production in spring 2002. The guide is intended to facilitate species identification of fish by commercial and recreational fishermen. NMFS has also produced a brochure of regulations governing recreational shark fishing which is available on the internet at http://www.nmfs.noaa.gov/sfa/hmspg.html. NMFS intends to produce a similar brochure for commercial shark fishing.

7. *Reporting and Monitoring: Each management entity should prepare a biennial report on the status of sharks and shark fisheries under its jurisdiction so that NMFS can incorporate that information into biennial reports to COFI. For any fisheries that are under the authority of the Magnuson-Stevens Act and that are identified as overfished, the development of rebuilding programs must be consistent with Section 304(f) of the Magnuson-Stevens Act.*

Implementation in Atlantic HMS fisheries:

For information on fishery monitoring, observer programs, and collection of bycatch information, see the discussion under data collection. NMFS also produces an annual Stock Assessment and Fishery Evaluation report which discusses the status of sharks and shark fisheries.

Atlantic HMS Research and Management Needs

The NPOA identified several high priority research and management needs in commercial and recreational fisheries for Atlantic shark fisheries. The following table lists those research and management needs as well as the actions taken to address them.

Research and Management Need	
Commercic	
Improve species-specific identification of catches, landings, discards, and trade data	Production of HMS Identification Guide in 2002
Conduct stock assessments on small coastal and pelagic sharks and species-specific assessments on dusky and sand tiger sharks	Dusky shark status review, NMFS and MML/University of FL small coastal shark assessments in 2002, ICCAT blue and shortfin mako assessments in 2004
Continue participation in international research and management initiatives, particularly for pelagic sharks	NEFSC Apex Predator Investigation cooperative studies with Canada, MML studies in Mexico, participation in ICCAT
Determine and minimize bycatch mortality rates of sharks, particularly prohibited species and juvenile sharks	Bottom longline, drift gillnet, and pelagic longline observer programs
Continue research to determine nursery areas and spatial and temporal use of nursery areas for sharks by size/stage and species	COASTSPAN, MML studies in Mexico
Recreationc	
Improve species-specific identification of catches and landings data	Production of HMS Identification Guide in 2002, Recreational fishing brochure
Determine post-release mortality rates and ways to minimize that mortality	Post-release survivorship study on sandbar sharks
Conduct stock assessment on small coastal sharks and species-specific assessments on dusky and sand tiger sharks	Dusky shark status review, NMFS and MML/University of FL small coastal shark assessments in 2002
Continue participation in international research and management initiatives, particularly for pelagic sharks	NEFSC Apex Predator Investigation cooperative studies with Canada, MML studies in Mexico, participation in ICCAT

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APPENDIX B: FINAL NATIONAL PLAN OF ACTION FOR REDUCING THE INCIDENTAL CATCH OF SEABIRDS IN ATLANTIC TUNA, SWORDFISH, AND SHARK LONGLINE FISHERIES

NPOA-Seabird Executive Summary

Increased concerns have arisen about the incidental capture of non-target species in various fisheries throughout the world. Incidental capture can be economically wasteful, it impacts living marine resources, and the accidental killing of non-harvested animals may be aesthetically aversive. Incidental catch of non-target marine species such as marine mammals, sea turtles, and seabirds has generated growing concern over the long-term ecological effects of such bycatch in longline and other fisheries conducted in many areas of the world's oceans.

The United States has voluntarily developed the U.S. *National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries* (NPOA-S) to fulfill a national responsibility to address seabird bycatch in longline fisheries, as requested in the *International Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries* (IPOA-S). The IPOA-S applies to "States" (hereafter Countries) in whose waters longline fishing is being conducted by their own or foreign vessels, and to Countries that conduct longline fishing on the high seas and in the exclusive economic zones (EEZs) of other Countries. The IPOA-S is a voluntary measure that calls on Countries to: (1) assess the degree of seabird bycatch in their longline fisheries; (2) develop individual national plans of action to reduce seabird bycatch in longline fisheries that have a seabird bycatch problem; and (3) develop a course of future research and action to reduce seabird bycatch. The NPOA-S is to be implemented consistent with the FAO *Code of Conduct for Responsible Fisheries* and all applicable rules of international law, and in conjunction with relevant international organizations.

Development of the NPOA-S was a collaborative effort between the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (FWS) and the Department of State (DOS), carried out in large part by the Interagency Seabird Working Group (ISWG) consisting of representatives from those three agencies. This partnership approach recognizes the individual agency management authorities covering seabird interactions with longline fisheries. NMFS manages U.S. fisheries under the authority of the Magnuson-Stevens Fishery Conservation and Management Act and the High Seas Fishing Compliance Act. FWS manages birds predominately under the authority of the Endangered Species Act and the Migratory Bird Treaty Act. In addition, DOS has the lead role in international negotiations on fisheries conservation and management issues that should help promote IPOA implementation by encouraging other nations to develop NPOAs. Given each agency's responsibilities, the NPOA-S was developed collaboratively by NMFS and FWS. This collaborative effort has increased communication

between seabird specialists and fishery managers in FWS and NMFS. Maintaining this cooperation is a high priority for both agencies.

The NPOA-S contains the following themes:

1. Action Items: NMFS, with the assistance of the Regional Fishery Management Councils (Councils), the NMFS Regional Science Centers, and FWS, as appropriate, should conduct the following activities:

- Detailed assessments of its longline fisheries for seabird bycatch within 2 years of the adoption of the NPOA-S;
- If a problem is found to exist within a longline fishery, measures to reduce this seabird bycatch should be implemented within 2 years. These measures should include data collection, prescription of mitigation measures, research and development of mitigation measures and methods, and outreach, education, and training about seabird bycatch; and
- NMFS, in collaboration with the appropriate Councils and in consultation with FWS, will prepare an annual report on the status of seabird mortality for each longline fi shery, including assessment information, mitigation measures, and research efforts. FWS will also provide regionally-based seabird population status information that will be included in the annual reports.

2.) Interagency Cooperation: The continuation, wherever possible, of the ongoing cooperative efforts between NMFS and FWS on seabird bycatch issues and research.

3.) International Cooperation: The United States' commitment, through the DOS, NMFS and FWS, to advocate the development of National Plans of Action within relevant international fora. The development of the NPOA-S has emphasized that all U.S. longline fisheries have unique characteristics, and that the solution to seabird bycatch issues will likely require a multi-faceted approach requiring different fishing techniques, the use of mitigating equipment, and education within the affected fisheries. Therefore, the NPOA-S does not prescribe specific mitigation measures for each longline fishery. Rather, this NPOA-S provides a framework of actions that NMFS, FWS, and the Councils, as appropriate, should undertake for each longline fishery. By working cooperatively, fishermen, managers, scientists, and the public may use this national framework to achieve a balanced solution to the seabird bycatch problem and thereby promote sustainable use of our nation's marine resources.

Detailed assessments should address the following:

• Criteria used to evaluate the need for seabird bycatch mitigation and management measures

• Longline fishing fleet data (numbers and characteristics of vessels)

• Fishing techniques data (demersal, pelagic, and other pertinent technical information)

• Fishing areas (by season and geographic location)

• Fishing effort data (seasons, species, catch, number of sets, and number of hooks/year/fishery)

• Status of seabird populations in the fishing areas, if known

• Estimated total annual seabird species-specific catch and catch-per-unit-effort (number/1,000 hooks set/species/fishery)

• Existing area and species-specific seabird bycatch mitigation measures and their effectiveness in reducing seabird bycatch

• Efforts to monitor seabird bycatch (e.g., observer program and logbooks), and

• Statement of conclusions and decision to develop and implement mitigation measures as needed.

Bycatch of Seabirds in Atlantic Tuna, Swordfish, and Shark Longline Fisheries

Introduction

The Secretary of Commerce manages Atlantic tunas, swordfish, and sharks - collectively known as highly migratory species or HMS - under the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks. The HMS FMP includes five species of Atlantic tunas (bluefin, yellowfin, albacore, bigeye, skipjack), swordfish, and 39 species of sharks in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. Longline fisheries for these species include the pelagic longline fishery for Atlantic tunas and swordfish and the bottom longline fishery for sharks. The HMS Management Division assesses seabird bycatch annually in the Stock Assessment and Fishery Evaluation Report.

Seabird Bycatch Assessment.

Atlantic pelagic longline fishery

Observer data from 1992 through 2001 indicate that bycatch is relatively low (Table 1). Since 1992, a total of 92 seabird interactions have been observed, with 67 seabirds observed killed in the Atlantic pelagic longline fishery. No expanded estimates of seabird bycatch or catch rates are available for the pelagic longline fishery.

Observed bycatch has ranged from 1 to 18 seabirds observed dead per year and 0 to 15 seabirds observed released alive per year from 1992 through 2001. Approximately half of the seabirds observed have not been identified to species (n = 48). Of those seabirds identified, gulls represent the largest group (n = 22), followed by greater shearwaters (n = 15), and northern gannets (n = 7). Greater shearwaters experienced the highest mortality (100 percent), followed by gulls (86 percent), and unidentified seabirds (68 percent). Northern gannets had the lowest mortality rate (14 percent).

The Mid Atlantic Bight experienced the highest number of seabirds observed caught and killed (n = 42, 90 percent) (see Figure 1). The Northeast Coastal area had the second highest number observed (n = 34) but third highest bycatch mortality (47 percent) compared to the South Atlantic Bight, which had a lower number of seabirds observed caught (n = 16) but higher mortality (81 percent).

Table 1. **Seabird Bycatch in the Atlantic Pelagic Longline Fishery from 1992 to 2001.** Source: NMFS Pelagic longline fishery observer program.

Year	Month	Area	Type of Bird	Number observed	Status
1992	10	MAB	GULL	4	dead
1992	10	MAB	SHEARWATER GREATER	2	dead
1993	2	SAB	GANNET NORTHERN	2	alive
1993	2	MAB	GANNET NORTHERN	2	alive
1993	2	MAB	GULL BLACK BACKED	1	alive
1993	2	MAB	GULL BLACK BACKED	3	dead
1993	11	MAB	GULL	1	alive
1994	6	MAB	SHEARWATER GREATER	3	dead
1994	8	MAB	SHEARWATER GREATER	1	dead
1994	11	MAB	GULL	4	dead
1994	12	MAB	GULL HERRING	7	dead
1995	7	MAB	SEA BIRD	5	dead
1995	8	GOM	SEA BIRD	1	dead
1995	10	MAB	STORM PETREL	1	dead
1995	11	NEC	GANNET NORTHERN	2	alive
1995	11	NEC	GULL	1	alive
1997	6	SAB	SEA BIRD	11	dead
1997	7	MAB	SEA BIRD	1	dead
1997	7	NEC	SEA BIRD	15	alive
1997	7	NEC	SEA BIRD	6	dead
1998	2	MAB	SEA BIRD	7	dead
1998	7	NEC	SEA BIRD	1	dead
1999	6	SAB	SEA BIRD	1	dead
2000	6	SAB	GULL LAUGHING	1	alive
2000	11	NEC	GANNET NORTHERN	1	dead

2001	6	NEC	SHEARWATER GREATER	7	dead
2001	7	NEC	SHEARWATER GREATER	1	dead

MAB - Mid Atlantic Bight, SAB - South Atlantic Bight, NEC - Northeast Coastal, GOM - Gulf of Mexico

Atlantic bottom longline shark fishery

One pelican has been observed killed from 1994 through 2001. The pelican was caught in January 1995 off the Florida Gulf Coast (between 25 18.68 N, 81 35.47 W and 25 19.11 N, 81 23.83 W) (G. Burgess, University of Florida, Commercial Shark Fishery Observer Program, pers. comm., 2001). No expanded estimates of seabird bycatch or catch rates are available for the bottom longline fishery.

Description of Fisheries

Atlantic pelagic longline fishery

There are approximately 80 to 100 active pelagic longline vessels currently operating in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. Fishermen target either swordfish (at night) or yellowfin and bigeye tuna (during the day). The nighttime fishery utilizes frozen bait (mackerel or squid, predominantly) and lightsticks. The daytime fishery uses frozen bait predominantly along the east coast and live bait in the Gulf of Mexico. In 2000, NMFS prohibited the use of live bait on pelagic longline vessels in the Gulf of Mexico to minimize bycatch mortality of billfish. Additionally, NMFS prohibited pelagic longline fishing in the Florida East Coast, Charleston Bump, DeSoto Canyon, and Grand Banks areas in 2000 and 2001 to reduce bycatch of swordfish, billfish, and sea turtles.

NMFS attempts to achieve five percent observer coverage (by number of sets) and has achieved approximately three to five percent annually between 1992 and 2000. Increased sampling in 2001 is expected to increase the sampling fraction to about eight percent. Observers collect information about seabird bycatch by species and also take photographs of the birds. In addition, fishermen are required to submit logbooks for every trip made. Logbooks do not collect specific information about seabird bycatch at this time. Commercial pelagic longline fishing occurs throughout the North and South Atlantic, and the Gulf of Mexico. NMFS expects to estimate seabird bycatch from the pelagic longline observer program in the coming year (extrapolating reported effort with observed catch rates).

Atlantic bottom longline shark fishery

There are approximately 250 bottom longline shark vessels currently operating in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. The Atlantic bottom longline fishery targets large coastal sharks, with landings dominated by sandbar and blacktip sharks. Gear characteristics vary by region, but in general, a ten-mile long monofilament bottom longline, containing about 750 hooks is fished overnight. Skates, sharks, or various finfishes are used as bait. This fishery operates subject to a limited large coastal shark quota, with a typical two to three-month long season starting in January and July. Commercial shark bottom longline fishing is concentrated in the southeastern United States and Gulf of Mexico. Vessel owners must submit logbooks for each shark fishing trip and are subject to observer coverage.

NMFS attempts to achieve five percent observer coverage and has achieved approximately three percent annually between 1995 and 2001 by weight of sharks landed. Increased sampling in 2001 is expected to increase the sampling fraction. Observers collect information about seabird bycatch. Starting in 2001, 20 percent of shark fishermen will be selected to submit a supplemental discard form, which includes information on seabird bycatch, as part of their standard logbook submissions.

Current Seabird Mitigation Efforts

No management measures are currently in place for seabird protection in either of these fisheries. Time/area closures for the pelagic longline fishery are in place in the Gulf of Mexico, along the east coast of Florida, in the Charleston Bump, in the Northeast Distant area, and in the Mid-Atlantic Bight (Figure 2). Such closures may positively affect seabirds.

Conclusion

Bycatch of seabirds in Atlantic HMS pelagic and bottom longline fisheries is minimal and there does not appear to be a problem with seabird bycatch in these fisheries. Accordingly, no mitigation measures are necessary at this time. NMFS intends to continue to collect data on seabird bycatch through observer programs and supplemental logbooks programs and to increase the species-specific identification of seabirds observed. NMFS will reassess seabird bycatch in these fisheries as expanded bycatch estimates are generated and/or new information becomes available.

Figure 1. Geographic areas used in the Atlantic pelagic longline fishery observer program.

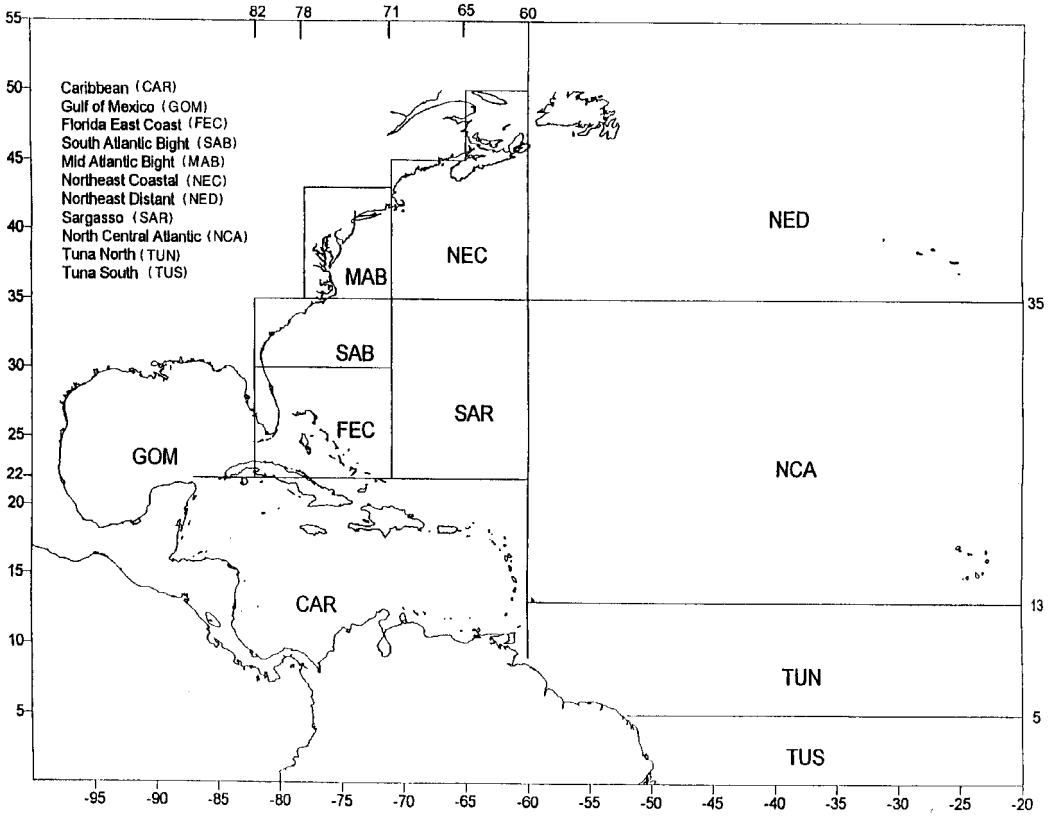

Figure 2. Map of closed areas for Atlantic pelagic longline fishermen.