

7.0 MANAGEMENT PROGRAM

7.1 MANAGEMENT MEASURES

7.1.1 ALLOWABLE HARVEST LEVELS

7.1.1.1 FISHING YEAR AND THE INITIAL YEAR OF REGULATIONS

The fishing year is January 1 through December 31. Except for the mako minimum size limit, all management measures will be implemented on the effective date of the final rule. Comments on the revised bag limits and commercial quotas will be accepted for the time period in the interim final rule. Following implementation, a 60-day period will be allowed for fishermen to obtain a Federal permit.

7.1.1.2 COMMERCIAL QUOTA

During the public comment periods held on the proposed FMP and on the proposed rule, significant new fishery information was received from fishermen, fish dealers/processors, and several state fishery management agencies. This new information included: (1) data showing higher fishery removals in recent years than those used as a basis for determining MSY and stock conditions in the NMFS 1990 shark stock assessment; (2) records on the size and frequency of shark species caught in commercial fisheries; and (3) information on the commercial fishing fleet. NMFS reviewed this new information and determined that it could result in significantly revised conclusions about the abundance, productivity, and condition of the managed shark species from those in the proposed FMP that were based on NMFS' 1990 stock assessment for Atlantic coast sharks (see Parrack, M.L., A Study of Shark Exploitation in U.S. Atlantic Coastal Waters during 1986-1989, 1990).

To ensure that all final FMP management measures are based upon the best scientific information available, NMFS undertook and completed a revised assessment of the condition of the large coastal species group using the above new/corrected information provided by the states and fishermen. The revised assessment was subjected to a peer review by a Review Committee consisting of both outside scientific experts and other NMFS stock assessment biologists; the Committee issued its final report on November 23, 1992 (see Appendix II, Report of the Atlantic Coastal Shark Fishery Analysis Review, November 23, 1992).

The Committee Report concludes, among several things, that the large coastal species group is overfished (overfishing occurred in all years from 1986 through 1992 except for 1987 and 1990) and that calendar year 1993 landings for the large coastal species group should be reduced below the calendar year 1991 landings level of 4,319 mt dressed weight (see Appendix II). The

Committee Report sets forth three options for establishing calendar year 1993 fishery landings (recreational and commercial combined) for the large coastal species group that are all below the 1991 landings level; each option provides varying degrees of conservation and economic benefits (see Appendix II).

7.1.1.2.1 DETERMINATION OF COMMERCIAL QUOTAS AND RECREATIONAL LANDINGS

Based on the Committee Report, NMFS estimates that the MSY for the large coastal species group is 3,787 mt dressed weight (rounded to 3,800 mt); this represents the average stock production during the period 1986 through 1991 (see Section 4.1 for a discussion of MSY determination and Table 4.1). The average stock size (biomass) during the same 1986-1991 period was about 14,900 mt dressed weight.

Under the Committee's first option for the 1993 calendar year, total landings (3,520 mt dressed weight) for the large coastal stock would not rebuild to the MSY level (14,900 mt). To ensure that the large coastal group is rebuilt to the MSY level, NMFS has selected the Committee's recommended second option (Option 2--see Table 4 of the Committee Report) establishing 1993 total landings of 2,900 mt dressed weight (a 34 percent reduction from the 1991 landings; a 29 percent reduction from the 1986-91 annual average landings). Under this option, stock abundance will rebuild 5 percent each year back to the MSY level (estimated by NMFS to be 14,900 mt dressed weight) by 1995. The Review Committee's rebuilding schedule shows that annual fishery yields would increase about 5 percent each year, but would not equal MSY until 1999. Option 3 of the Committee Report requires a 1993 landings limit of 2,311 mt (a 50 percent reduction from the 1991 level; a 44 percent reduction from the 1986-91 annual average). This option achieves a 10 percent annual increase in stock abundance until the MSY level is reached. NMFS determined that this option would cause unacceptable short-term costs in lost fishery revenues, and is not necessary to achieve stock rebuilding in a reasonable time period. While NMFS adopted option 2 for stock rebuilding and will implement the recommended calendar year total landings (and derived calendar year commercial quotas) from 1993 to 1995, NMFS determined that the large coastal species group will be rebuilt by 1995 and at that point the stock size should be sufficient to provide MSY. NMFS does not agree with the Committee Report's conclusion that MSY yields will not occur under its rebuilding schedule until 1999.

The commercial quota for calendar year 1993 for the large coastal species group is determined based on the historical commercial average annual share (percent of average total annual landings) for the period 1986 through 1991 (see Table 4.7); this same approach was used in the proposed FMP. The recreational share of the total 1993 landings will also be based on the historical

average annual percentage share from 1986 through 1991 (see Table 4.7). The bag limits for large coastal species and pelagic species groups have been changed to ensure that 1993 commercial and recreational landings are each reduced by about the same percentage over their recent annual averages (each reduced about 29 percent).

The commercial quota for the pelagic species group is changed from the quota in the proposed FMP based on revised landings statistics and on several years' additional data; the 1993 calendar year commercial fishery quota is established at 580 mt dressed weight. Combining this commercial quota with the estimated recreational fishery share (under the bag limits) of 980 mt dressed weight, the total 1993 landings for the pelagic species group should be about 1,560 mt dressed weight.

7.1.1.2.2 COMMERCIAL QUOTA -- FIRST TWO YEARS OF IMPLEMENTATION

The Southeast Fisheries Science Center (SEC) has advised that retention of the proposed fishing year of July 1 through June 30 (with associated fishing year commercial quotas) could: (1) encourage rapid expansion of a new shark fishery in the previously unfished area off the northeastern states and, as such, be potentially destructive to already overfished shark resources--a growing new fishery on an overexploited resource in a previously unfished area, and (2) damage the historic fishery off the southern states by allowing the new northern fishery to take an unfair share of the annual quota. Also, it is noted that the Review Committee's stock rebuilding schedule and NMFS' collection of fishery statistics are both based on a calendar year. Implementing calendar year quotas while retaining a July 1 through June 30 fishing season poses several problems that are difficult to resolve.

For these reasons, NMFS decided to establish calendar year commercial quotas divided into two equal halves that would apply respectively to two fishing periods (January 1 through June 30; July 1 through December 31). This approach to applying the commercial quotas should spread the commercial fisheries in both southern and northern areas reasonably equally throughout the year, as well as addressing the SEC's specific concerns. Also, this approach should not eliminate the historic peak months of the established southern fisheries while ensuring an open season and a new, unfished quota for the peak fishing months of a new, expanding fishery in the northeast.

Specific commercial quotas for 1993 and 1994 are derived from the Review Committee's rebuilding schedule which provides total annual landings (recreational and commercial combined) for these years. The annual commercial quota is divided into two equal parts assigned respectively to the fishing periods January 1 through June 30 and July 1 through December 31.

Large Coastal Group

The Review Committee's report recommended total landings of 2,900 mt, dressed weight, under the second option for stock conservation. Based on the historical shares of recreational and commercial landings during the period 1986-1991, the commercial quota for the large coastal group is 84 percent of 2,900 mt or 2,436 mt. For the period from January 1, 1993, through June 30, 1993, the commercial quota for the large coastal group is established at 50 percent of this amount or 1,218 mt dressed weight. When this amount is taken or projected to be taken prior to June 30, 1993, the large coastal fishery will be closed until the beginning of the next fishing period on July 1, 1993. A possible late spring closure would serve to protect female sharks during the spawning season. The commercial quota for the second fishing year period beginning July 1, 1993, and ending December 31, 1993, will consist of 1,218 mt adjusted for any quota overages or underages during the first half of 1993.

The Review Committee's recommended total landings for calendar year 1994 are 3,062 mt dressed weight. The commercial quota is 84 percent of this or 2,572 mt dressed weight. Therefore, each of the quotas for the two half-year fishing periods is 1,286 mt. Again, the second half year quota will be adjusted to reflect any quota overruns or underages during the first half of the year. Such adjustments will be implemented through in-season notice action.

The above method of establishing fishing season quotas will continue for subsequent years, unless modified by the Assistant Administrator under the framework regulatory adjustment procedure, and will closely follow the Review Committee Report. The Operations Team will review this method and the Committee's recommended rebuilding program and make appropriate recommendations for changes.

Pelagic Group

The same approach used for implementing the large coastal quota will be used for implementing the quotas for the pelagic group during 1993 and 1994. The Review Committee Report did not contain any recommendations for this species group since this resource is not considered to be overfished.

The table below illustrates the implementation of 1993 and 1994 quotas.

Table 7.1

Calendar Year 1993 and 1994 Commercial Quotas
Six Month Fishing Period Quotas¹
Large Coastal and Pelagic Species Groups
(Metric Tons Dressed Weight)

<u>Calendar Year</u> <u>Fishing Period</u>	<u>Large Coastal</u>	<u>Pelagic</u>
1/1/93--6/30/93	1,218	290
7/1/93--12/31/93	<u>1,218</u>	<u>290</u>
1993 Total	2,436	580
1/1/94--6/30/94	1,285	290
7/1/94--12/31/94	<u>1,285</u>	<u>290</u>
1994 Total	2,570	580

¹ Overruns or unused portions of the quota for any given 6 month fishing period will be compensated for adjustments to the quota for the following 6 month period.

7.1.1.3 RECREATIONAL BAG LIMIT

The EEZ recreational bag limit for the combined large coastal and pelagic species groups is four sharks per boat per trip. There is a daily five-shark per person bag limit for sharks in the small coastal species group.

7.1.2 HARVEST RESTRICTIONS

7.1.2.1 FINNING

The practice of finning is prohibited. Fins may be sold, traded, or bartered, but only in proper proportion to carcasses sold, traded, or bartered, with a maximum of 5 percent fins per dressed carcass weight. This percentage is based on the ratio of wet fin weight to dressed carcass weight for the sandbar shark (see Table 7.2). Fins may not be stored aboard the vessel after associated carcasses are sold, traded, or bartered. All fins and carcasses must be weighed and sold at the point of first landing.

7.1.2.2 RELEASE CONDITION

Sharks that are caught, unless retained as part of the commercial quota or as part of the recreational bag limit, must be released uninjured by cutting the line near the hook, with the shark in the water, or, for net-caught sharks, by returning the shark to the water quickly in a manner that minimizes injury.

7.1.2.3 MAKO MINIMUM SIZE

The mako minimum size was dropped from the final FMP and reserved because of inadequate supporting biological information. There is no clear evidence that significant conservation benefits would accrue and NMFS's proposed application of the measure differently to the recreational and commercial fisheries raised many public objections that could not overcome with demonstrable (tangible) stock conservation benefits. NMFS will ask the Operations Team to review this measure, as well as possible minimum sizes for other species, and provide NMFS with its recommendations regarding the implementation of and benefits from shark minimum sizes.

7.1.2.4 NO SALE OF RECREATIONAL CATCH

Fishermen may not sell shark or shark products taken from the EEZ without a Federal permit.

7.1.2.5 CHARTER VESSEL AND HEADBOAT SALE OF CATCH

The owner or operator of a charter vessel or headboat may sell sharks, including fins, if: (a) the vessel has a Federal shark

fishing permit; and (b) the commercial fishery is open; i.e., the applicable quota has not been reached. The operator or owner of a vessel under charter, or operating as a headboat, may sell sharks, not to exceed the cumulative bag limits.

7.1.3 ADMINISTRATIVE REQUIREMENTS

7.1.3.1 COMMERCIAL PERMITS

The owner or operator of a vessel that sells sharks caught in the EEZ must have an annual Federal permit. The permit application form is available from the SEO. A fee (approximately \$53) will be charged to cover administrative costs of processing the application. To be eligible for a Federal commercial permit, the owner or operator (including charter vessel and headboat owners/operators who intend to sell their catch) must show proof that at least 50 percent of earned income has been derived from sale of the fish or fish products or charter vessel and headboat operations, or at least \$20,000 from the sale of fish during one of three years preceding the year for which the permit is requested. The recipient of a Federal permit must agree that the vessel's fishing, catch, and gear will be subject to Federal shark fishing regulations regardless of where the fishing occurs (i.e., in state, Federal, or international waters) with the exception that if a permitted vessel fishes only in state waters on a given trip, the vessel's fishing, catch, or gear may be subject to the more restrictive state requirements for that trip. A permit remains valid and binding for the period for which it is issued and may not be surrendered during that period. Permits are not assignable or transferable to another person, entity, or vessel.

Effective management of the shark fishery requires the receipt of timely catch and effort data from participants in the fishery. NMFS considers these reports to be of such importance to management that the renewal of a permit will be conditioned on the applicant's submission of all required reports that provide catch and effort data on sharks. Such reports include those specified in Section 7.1.3.2, below, and will include reports in other fisheries when a standard logbook form is implemented. An applicant for renewal of a permit who is deficient in a required report will so be informed and given an opportunity to correct the deficiency. NMFS believes that a person who refuses to provide the required information should not be allowed to continue to participate in the fishery.

Table 7.2

Percentages of Fin Weight¹ to Whole (Round) Weight and Dressed (Carcass) Weight for Atlantic Sharks

<u>Species</u>	<u>N</u>	<u>TFW²/DW³</u>	<u>N</u>	<u>TFW/WW⁴</u>	<u>N</u>	<u>DFW⁵/DW</u>	<u>N</u>	<u>DFW/WW</u>
Sandbar	12	5.07	36	2.46	9	2.28	15	1.09
Blue	8	3.74	52	2.06	8	1.07	28	0.60
Dusky	1	4.58	1	2.08	1	2.08	1	0.95
Blacktip	4	2.86	5	1.59	4	1.40	5	0.75
Spinner	11	3.32	11	1.73	0	N/A	0	N/A
Silky	0	N/A	1	1.62	0	N/A	1	0.78
Shortfin Mako	5	4.22	28	1.68	4	1.01	17	0.70
Portbeagle	0	N/A	1	2.19	0	N/A	0	N/A
Sand Tiger	0	N/A	1	1.34	0	N/A	0	N/A
Bonnethead	2	4.69	2	2.56	0	N/A	0	N/A
Hammerhead								
Great	0	N/A	1	2.03	0	N/A	1	0.87
Scalloped	9	2.39	24	1.58	8	1.08	21	0.66
Smooth	0	N/A	1	1.49	0	N/A	1	0.74
Atlantic Sharpnose	0	N/A	1	1.47	0	N/A	0	N/A
Blacknose	6	3.40	6	1.55	0	N/A	0	N/A
Tiger	3	2.90	17	1.27	1	1.22	11	0.61
Lemon	0	N/A	1	2.30	0	N/A	1	1.09
Common Thresher	0	N/A	5	2.06	0	N/A	0	N/A
Night	2	2.64	2	1.30	2	1.15	2	0.57
Bignose	1	4.16	5	1.79	1	1.18	5	0.64
<u>Caribbean Reef</u>	<u>0</u>	<u>N/A</u>	<u>2</u>	<u>1.37</u>	<u>0</u>	<u>N/A</u>	<u>2</u>	<u>0.67</u>
<u>Weighted Average</u>	<u>64</u>	<u>3.65</u>	<u>203</u>	<u>1.69</u>	<u>38</u>	<u>1.42</u>	<u>111</u>	<u>0.71</u>

¹ Fin weight consists of first dorsal, pectorals, and lower caudal fins.

² TFW means total wet fin weight.

³ DW means dressed (carcass) weight.

⁴ WW means whole (round) weight.

⁵ DFW means Total dry fin weight.

Source: Jack Casey, NMFS, Northeast Fisheries Science Center, Narragansett Laboratory, 1992

7.1.3.2 COMMERCIAL VESSEL OWNER AND OPERATOR REPORTING REQUIREMENTS

Owners or operators of vessels in the shark fishery, if selected by the Science Director, must maintain and submit required information to NMFS on logbook forms provided by NMFS Southeast Fisheries Science Center (SEC). Information to be provided includes: kind and amount of gear used; time fished; number of each species caught, landed, and discarded; and location fished. A copy of the sales weigh-out sheet (i.e., any settlement sheet showing individual carcass species, weight, and exvessel value) received from the dealer for each trip must accompany the corresponding logbook submissions to NMFS. Any owner or operator of a Federally permitted commercial fishing vessel must make catches available for examination by designated officials.

Foreign data reporting requirements are contained in Section 7.10. The amount of allowable foreign fishing is limited in Section 7.10.2.

7.1.3.3 TOURNAMENT REPORTING REQUIREMENTS

If selected by NMFS (SEC), any person conducting a shark tournament must maintain and submit a fishing record on forms available from the SEC (Section 9.4.1).

7.1.3.4 OBSERVERS ON VESSELS

If selected by NMFS (SEC), operators of Federally permitted vessels must accommodate an observer.

7.1.4 FRAMEWORK REGULATORY ADJUSTMENT PROCEDURE

The framework regulatory adjustment procedure provides for timely annual changes to the management measures in the regulations in response to new information about the fishery.

7.1.4.1 OPERATIONS TEAM AND FMP MONITORING

The Assistant Administrator will be responsible for implementing, monitoring, and amending the FMP and regulations. The Assistant Administrator will establish an Operations Team (OT) and headed by his designee, to monitor the shark fishery and effectiveness of the FMP, and to recommend necessary adjustments to the management measures through the framework regulatory adjustment procedure. The OT will include representatives from the NMFS Northeast and Southeast Regional Offices, and the Washington Office; a staff person and/or member from each of the five Councils; and, if appropriate, scientists from NMFS Southeast and Northeast Fisheries Centers.

7.1.4.2 PROCEDURE FOR ADJUSTING THE MANAGEMENT MEASURES

The OT will meet as determined by the Assistant Administrator to evaluate the management measures relative to the objectives of the Shark FMP. In addition, NMFS will prepare an annual shark Stock Assessment and Fishery Evaluation (SAFE) report by March 15 that includes, to the extent possible: (a) landings and discard information; (b) present stock condition; (c) MSY; (d) information to base OY, and TAC; (e) social and economic issues; and (f) other pertinent data and statistics. Copies of the SAFE report may be obtained from the NMFS Washington Office. The OT may consider other sources of documented information, besides the SAFE report, to decide if adjustments are warranted. Such sources include Food and Agricultural Organization (FAO), foreign countries, states, Councils, fishermen, and academia. The OT will summarize its findings in a written report to the Assistant Administrator.

The goal for implementing regulatory changes is the start of the new fishing year. If the OT determines that adjusting the management measures is necessary, it will include in the written report to the Assistant Administrator specified ranges (acceptable biological catch) of the TAC for individual species, species groups, or all species as appropriate. Recommendations may include changes in: (a) commercial quotas; (b) commercial trip limits; (c) recreational bag limits; (d) MSYs; (e) species size limits; (f) management unit; (g) permitting and reporting requirements; (h) composition of the species groups; and (i) fishing year or season. The biological, environmental, social, and economic impacts of each recommendation will be included in the report. In formulating its recommendations, the OT will consult with the Assistant Administrator, Regional Directors, Northeast and Southeast Regions (NEO and SEO), NMFS, and the Councils, and may hold public hearings as appropriate.

If the Assistant Administrator concurs with the OT's recommendations, he/she will prepare the regulatory package and file within 30 days a proposed rule and a request for public comment with the Office of the Federal Register. The regulatory package will include a discussion of the need for action; the proposed adjustments to the management measures; analyses as required by applicable law of the social, economic, environmental, and biological impacts of the proposed measures; and the proposed rule. From 15 to 30 days will be provided for public comment, consistent with the magnitude of the action.

After reviewing public comments and additional information or data that may be available, the Assistant Administrator will, after consultation with the OT, if appropriate, make final determinations regarding consistency of the proposed conservation and management measures with the objectives of the FMP, the national standards, and other applicable law. Within 30 days of

the close of the public comment period on the proposed rule, the Assistant Administrator will publish a final rule in the Federal Register.

The Assistant Administrator may take action independent of the recommendations of the OT, if he/she finds that based on the best available scientific information on the biological condition of the shark resources or economic conditions of the fishery, that adjustments in the management measures are required. In this situation, the Assistant Administrator would follow the same procedure that the OT would follow in preparing recommendations for regulatory changes. The Assistant Administrator would consult with the OT, as appropriate.

7.2 IMPACTS OF ADOPTED MEASURES

7.2.1 ECOLOGICAL IMPACT

The proposed measures will not have any significant negative ecological impact. They are designed to prevent overfishing and promote conservation. The management measures will not affect habitats necessary to maintain the stocks.

7.2.2 FISHING YEAR

The fishing year of January 1-December 31 is not expected to have an adverse impact on the different user groups. This alternative represents an attempt to allow equal access to all user groups. See Section 9.3.5.1 for more information.

7.2.3 COMMERCIAL FISHERY IMPACT, QUOTAS, AND REBUILDING PROGRAM OPTIONS

During the public comment periods held on the proposed FMP and on the proposed rule, significant new fishery information was received from fishermen, fish dealers/processors, and several state fishery management agencies. This new information included (1) data showing higher fishery removals in recent years than those used as a basis for determining MSY and stock conditions in the NMFS 1990 shark stock assessment, (2) records on the size and frequency of shark species caught in commercial fisheries, and (3) information on the commercial fishing fleet. NMFS reviewed this new information and determined that it could result in significantly revised conclusions about the abundance, productivity, and condition of the managed shark species from those in the proposed FMP that were based on the NMFS 1990 stock assessment for Atlantic coast sharks (see Parrack, M.L., A Study of Shark Exploitation in U.S. Atlantic Coastal Waters during 1986-1989, 1990).

To ensure that all final FMP management measures are based upon the best scientific information available, NMFS undertook and

completed a revised assessment of the condition of the large coastal shark species group using the above new/corrected information provided by the states and fishermen. The revised assessment was subjected to a peer review by a Review Committee consisting of both outside scientific experts and other NMFS stock assessment biologists; the Committee issued its final report on November 23, 1992 (see Appendix II, Report of the Atlantic Coastal Shark Fishery Analysis Review, November 23, 1992).

The Committee Report concludes, among several things, that the large coastal species group is overfished (overfishing occurred in all years from 1986 through 1992 except for 1987 and 1990) and that calendar year 1993 landings for the large coastal species should be reduced below the calendar year 1991 landings level of 4,319 mt dressed weight (see Appendix II). The Committee Report sets forth three options for establishing calendar year 1993 fishery landings (recreational and commercial combined) for the large coastal species group that are all below the 1991 landings level; each option provides varying degrees of conservation benefits (see Appendix II).

Based on the Committee Report, NMFS estimates that the MSY for the large coastal species group is 3,787 mt dressed weight (rounded to 3,800 mt); this represents the average stock production during the period 1986 through 1991 (see section 4.1 for a discussion of MSY determination). The average stock size (biomass) during the same 1986-1991 period was about 14,900 mt dressed weight.

Under the Committee's first option for 1993 calendar year total landings (3,520 mt dressed weight), the stock would not rebuild to a level capable of producing MSY. In order to ensure that the biomass of the large coastal species group is rebuilt to the MSY producing level, NMFS has selected the Committee's recommended second option which would establish 1993 total landings of 2,916 mt dressed weight (rounded to 2,900 mt). Under this second option, the 2,900 mt would represent a 34 percent reduction from the 1991 landings level or a 29 percent reduction from the 1986-1991 average annual landings. If the Committee Report's recommended rebuilding schedule under the second option is followed (see Table 4 of Committee Report), the stock abundance level will rebuild approximately 5 percent each year back to the MSY producing level by 1995. The rebuilding schedule shows that annual fishery yields would increase each year and would return to the MSY level by 1999. Option 3 of the Committee Report recommends total 1993 landings of 2,311 mt (50 percent reduction from the 1991 level or a 44 percent reduction from the 1986-1991 average annual landings) that, along with a 10 percent annual increase in stock abundance under a specified rebuilding program, would achieve a significantly higher stock abundance level by 1999. NMFS determined that this option would involve

unacceptable short term costs in lost fishery revenues, and is not necessary to achieve stock rebuilding in a reasonable time period.

The commercial quota for calendar year 1993 for the large coastal species group is determined based on the historical commercial average annual share (percent of average total annual landings) for the period 1986 through 1991 (see Table 4.7); this same approach was used in the proposed FMP. The recreational share of the total 1993 landings will also be based on the historical average annual percentage share from 1986 through 1991 (see Table 4.7). The bag limits for large coastal species and species group have been changed to ensure that 1993 commercial and recreational landings are each reduced by about the same percentage over their recent annual averages (each reduced about 29 percent).

The commercial quota for the pelagic species group is changed from the quota in the proposed FMP based on revised landings statistics and on several years' additional data; the 1993 calendar year commercial fishery quota is established at 580 mt dressed weight. Combining this commercial quota with the estimated recreational fishery share (under the bag limits) of 980 mt dressed weight, the total 1993 landings for the pelagic species group should be about 1,560 mt dressed weight.

7.2.4 COMMERCIAL PERMITS

The earned income for commercial permit requirement is designed to prevent recreational and part-time commercial fishermen from selling their catch. Consequently, these groups would be adversely impacted by this measure to the extent that they sell their catch.

7.2.5 COMMERCIAL REPORTING

This measure consists of two parts. First, all permitted fishermen are required to supply a copy of the weigh sheet. This requirement is not expected to have a significant impact on these full-time fishermen. Second, if selected, the permit holder would supply the catch-and-effort information via logbook report to the Director, SEC. This requirement is not expected to have a significant impact on these fishermen since NMFS pays for the mailing and most of the other costs. All fishermen should benefit from the knowledge gained through better and more effective management measures. Failure of the permittee to provide this information could lead to fines (i.e., up to the statutory limit of \$100,000 per violation), loss of permit, and other sanctions identified in the Magnuson Act.

7.2.6 IMPACT OF COMMERCIAL MANAGEMENT MEASURES ON MORTALITY

The cumulative effect of the management measures cannot be accurately forecast, but mortality levels should decrease substantially. Between the mandatory release provision, commercial quotas, the finning prohibition, and the requirement to land the fins and carcasses at the point of first landing (i.e., 5 percent fins per dressed carcass weight), the directed shark fisheries should land the carcasses and fins. Addition of the carcasses should fill the holds and terminate the trip sooner. The required use of TEDs in the shrimp fishery should significantly reduce discard mortality of small coastal species sharks and juvenile large coastal species. Some estimates as high as 80 percent reduction have been suggested. However, reduction estimates are uncertain because TEDs are not used at all times in all areas. Juveniles of small coastal species may continue to be taken even while pulling TEDs; they may not be expelled from the net by the TED deflector bars due to their small size. Mortality reduction in the species group species group is uncertain, but could be significant. Between the mandatory release provision, the finning prohibition, and the requirement to land the fins and carcasses at the point of first landing (i.e., 5 percent fins per dressed carcass weight), the swordfish and tuna fisheries may choose not to land their shark bycatch. However, it is hoped that sharks retrieved dead from longlines will be brought to market rather than wasted.

7.2.7 RECREATIONAL BAG LIMITS, MUST-RELEASE, AND NO-SALE PROVISIONS

The EEZ recreational bag limit for the combined large coastal and pelagic species groups is four sharks per boat per trip. There is a daily five-shark per person bag limit for sharks in the small coastal species group. These bag limits should meet the needs of most recreational fishermen for home meat consumption. Some fishermen may resent the bag limit and the requirement to release uninjured all sharks caught over the bag limit. This may be tempered by the fact that they can catch and release as many sharks as they want, and the knowledge that the recreational fishery will ultimately benefit from the enforcement of conservation measures.

The available data on the distribution of shark catches among anglers are very limited and is summarized in Table 7.3. The first data set is MRFSS data of catch by angler-trip for those angler-trips in which large sharks are caught, pooled over all years and fishing modes of the data set. The category "large sharks" may include some pelagic sharks, as well. A four-fish per boat trip limit should not affect 89 percent of the trips, but is projected to reduce catch approximately 28 percent from unrestricted trips. The Table 7.3 data set includes charter boat trips, but it is dominated by private/rental boats.

Table 7.3

**MRFSS Boat-Trip Limit Analysis
for Large Coastal and Pelagic sharks**

Alternative Limit Per Boat-Trip Limit	# Boat-Trips Per Sample Size	% Reduction Landings Per Boat-Trip Limit	% Trips Unaffected By Boat-Trip
1	71	58	63
2	17	43	79
3	9	34	87
4	3	28	89
5	1	24	90
6	4	19	93
7	3	17	94
8	1	15	96
12	1	11	97
23	1	3	98
30	1	--	100

Source: NMFS, Marine Recreational Fishery Statistics Survey, Atlantic and Gulf Coasts, 1979-1989.

As noted in Section 4.6, it is likely that the recreational bag limit will have a significant impact on actual landings with respect to large coastal species. Based on recent trends, even without bag limits, landings are expected to be below the 464-mt allocation to the recreational sector.

The daily bag limit of five coastal species sharks per person will provide fishermen with sufficient meat for the table and should not diminish enjoyment of the sport. There is no biological basis for a bag limit since these species are not over exploited at present. The bag limit does promote a conservation ethic, thus is a benefit to society.

The must-release and prohibition on the sale of shark or shark products by recreational fishermen are not expected to have any significant economic impact. Presently, approximately 10 percent of recreational-caught sharks are sold (Parrack, 1990). Reductions in shark mortality are expected in shark fishing tournaments as sponsors of such events move toward catch-and-release tournaments and impose other restrictions and bag limits.

7.2.8 TOURNAMENT REPORTING

This measure is not expected to have any significant impact. Tournament holders are expected to benefit from the knowledge gained from the overall reporting.

7.2.9 FINNING

It is believed that the prohibition of finning, especially the requirement to land carcasses, will reduce mortality because those fishermen interested only in fins will prefer to save their freezer space for more valuable carcasses, such as swordfish and tuna. The regulation to land no more than 5 percent fins per dressed carcass weight may cause these fishermen and others who fish only for fins to drop out of the fishery entirely, thus further reducing commercial fishing mortality. The 5 percent weight of fin to dressed carcass weight provision and the prohibition on storing fins aboard a vessel beyond the first point of landing will inconvenience commercial fishermen who mainly target sharks. However, they will ultimately benefit by the withdrawal from the fishery of those fishermen interested only in landing fins.

7.2.10 RELEASE CONDITION

The requirement to release uninjured those sharks not harvested as part of the commercial and recreational fishery, and the prohibitions on finning and landing fins separately, are expected to reduce mortality by approximately 50 percent from the 1979-1988 average bycatch. Data on the EEZ Japanese longline fishery from 1978 to 1981 indicate that 80 percent of sharks hooked were

alive when cut off. Two NMFS tagging cruises off the U.S. East Coast, involving inshore and southern species, yielded tagging rates (i.e., live sharks expected to survive) in excess of 60 percent on one trip and 80 percent on the other (Casey, 1990). However, these cruises involved short longline sets and thus higher survival rates than could be expected from commercial longline operations. Survival rates for sharks released from longlines may be higher than 50 percent, but the more conservative figure is used until additional data become available.

7.2.11 MAKO SIZE LIMIT

The mako minimum size limit was reserved from the final FMP because of inadequate supporting biological information. No clear evidence was developed that significant conservation benefits would accrue. NMFS's proposed application of the measure differently to the recreational and commercial fisheries raised too many public objections that NMFS could not overcome with demonstrable (tangible) stock conservation benefits. NMFS will ask the Operations Team to review this measure, as well as possible minimum sizes for other species, and provide NMFS with its recommendations regarding the implementation of, and benefits from, shark minimum sizes.

7.2.12 PUBLIC EDUCATION

The public perception of sharks is changing as sharks become better known. The Shark FMP will contribute substantially to development of a sound conservation ethic through documented, advertised public hearings, and comments associated with the NMFS management process. Also, NOAA is expected to actively emphasize, at all levels of public education, conservation goals for this and other living marine resources. These factors should contribute to reducing shark mortality.

7.2.13 TURTLE EXCLUDER DEVICES

Use of TEDs in the shrimp trawl fishery is now mandatory. Currently, there are seven types of Federally-approved TEDs and all will reduce shark bycatch in shrimp trawls (Oravetz, 1991).

Most TEDs release sharks longer than 60 cm (some may release smaller sharks), thereby decreasing by an estimated 80 percent, or 2,240 mt, the shark mortality attributed to shrimp trawls. However, soft TEDs may not reduce the mortality of small sharks due to gilling in the separator net (Seidel, 1990).

7.3 MANAGEMENT MEASURES CONSIDERED AND REJECTED

7.3.1 NO-ACTION ALTERNATIVE

The option of taking no conservation and management action was considered and rejected. Some shark resources may become overfished soon. The rapid increase in commercial shark landings in U.S. waters, the perceived waste from finning, and the unique biology of sharks (low number of births and slow sexual maturation) dictate a need for management. The five Councils responsible for developing FMPs in the Atlantic Ocean recognized the potential danger of overfishing sharks and requested the Secretary (through NMFS) to develop a Shark FMP as soon as possible. Without management, there is a distinct potential for long-term damage, or worse, collapse of the shark stock complex or targeted species.

7.3.2 ADDRESS THE FINNING PROBLEM UNDER EMERGENCY ACTION

The practice of finning was, in part, a driving force for bringing sharks under management. A considerable and vocal U.S. public sector is strongly against this practice and is calling for action to prohibit it. The Secretary has the authority to take emergency action under the Magnuson Act; however, the law limits such action to 90 days, with a possible extension of another 90 days. The emergency action alternative was rejected because the finning issue is just one of the problems facing the fishery, and a 180-day period of protection was perceived as merely a stop-gap measure that would expire before any long-term measures could be implemented. Long-term resolution of this problem is required.

7.3.3 HARVESTING MALE SHARKS ONLY

This option was considered because it offers some potential for reducing mortality of females and enhancing reproduction potential. Male sharks have claspers that can be identified during fishing operations. Thus, male sharks could be kept and females released. This option was rejected for two major reasons. First, fishing gear, whether gillnets or longlines, is not selective and discard mortality of females may be unacceptably high. Second, enforcement would be difficult as gender of the shark can be identified only if claspers are left intact.

7.3.4 ALLOCATION OF COMMERCIAL QUOTAS

Consideration was given to allocating the available commercial shark quota by geographical region; i.e., Gulf of Mexico, Caribbean, South Atlantic, Mid-Atlantic, and North Atlantic. This option was rejected for the present, but may become a necessary management measure in the future. Among the reasons for rejection is a lack of data on migratory patterns of the important shark species. Equitable allocation among regions (so that one region does not take the entire quota), while ensuring that vulnerable shark species are not adversely impacted,

requires an understanding of distribution and movement patterns. A geographic and/or species-specific allocation scheme based on average catches over several years is being considered for future application (Section 7.4.1).

7.3.5 CLOSURE OF THE COMMERCIAL FISHERY FOR LARGE COASTAL SHARKS UPON PLAN IMPLEMENTATION UNTIL THE START OF THE NEW FISHING YEAR

Consideration was given to closing the commercial fishery for large coastal sharks upon implementation of the FMP until the start of the new fishing year, July 1, 1993. NMFS rejected this measure as unnecessary. The large coastal species resource was not as overfished as previously believed. During the public comment periods held on the proposed FMP and on the proposed rule, significant new fishery information was received from fishermen, fish dealers/processors, and several state fishery management agencies. This new information included (1) data showing higher fishery removals in recent years than those used as a basis for determining MSY and stock conditions in the NMFS 1990 shark stock assessment, (2) records on the size and frequency of shark species caught in commercial fisheries, and (3) information on the commercial fishing fleet. NMFS reviewed this new information and determined that it could result in significantly revised conclusions about the abundance, productivity, and condition of the managed shark species from those in the proposed FMP that were based on NMFS's 1990 stock assessment for Atlantic coast sharks (see Parrack, M.L., A Study of Shark Exploitation in U.S. Atlantic Coastal Waters during 1986-1989, 1990).

To ensure that all final FMP management measures are based upon the best scientific information available, NMFS undertook and completed a revised assessment of the condition of the large coastal species group using the above new/corrected information provided by the states and fishermen. The revised assessment was subjected to a peer review by a Review Committee consisting of both outside scientific experts and other NMFS stock assessment biologists; the Review Committee issued its final report on November 23, 1992 (see Appendix II, Report of the Atlantic Coastal Shark Fishery Analysis Review, November 23, 1992).

The Committee Report concludes, among several things, that the large coastal species group is overfished (overfishing occurred in all years from 1986 through 1992 except for 1987 and 1990) and that calendar year 1993 landings for the large coastal species should be reduced below the calendar year 1991 landings level of 4,319 mt dressed weight (see Appendix II). The Committee Report sets forth three options for establishing calendar year 1993 fishery landings (recreational and commercial combined) for the large coastal species group that are all below the 1991 landings

level; each option provides varying degrees of conservation and economic benefits (see Appendix II).

Based on the Committee Report, NMFS estimates that the MSY for the large coastal species group is 3,787 mt dressed weight (rounded to 3,800 mt); this represents the average stock production during the period 1986 through 1991 (see Section 4.1 for a discussion of MSY determination). The average stock size (biomass) during the same 1986-1991 period was about 14,900 mt dressed weight.

Under the Committee's first option for the 1993 calendar year total landings (3,520 mt dressed weight), the large coastal stock would not rebuild to the MSY level (14,900 mt). To ensure that the large coastal group is rebuilt to the MSY level, NMFS has selected the Committee's recommended second option (Option 2--see Table 4 of the Committee Report) establishing 1993 total landings of 2,900 mt dressed weight (a 34 percent reduction from the 1991 landings; a 29 percent reduction from the 1986-91 annual average landings). Under this option, stock abundance will rebuild 5 percent each year back to the MSY level (estimated by NMFS to be 14,900 mt dressed weight) by 1995. The Review Committee's rebuilding schedule shows that annual fishery yields would increase about 5 percent each year but would not equal MSY until 1999. Option 3 of the Committee Report requires a 1993 landings limit of 2,311 mt (a 50 percent reduction from the 1991 level; a 44 percent reduction from the 1986-91 annual average). This option achieves a 10 percent annual increase in stock abundance until the MSY level is reached. NMFS determined that this option would cause unacceptable short-term costs in lost fishery revenues, and is not necessary to achieve stock rebuilding in a reasonable time period.

While NMFS adopted option 2 for stock rebuilding and will implement the recommended calendar year total landings (and derived calendar year commercial quotas) from 1993 to 1995, NMFS believes that the large coastal species group will be rebuilt by 1995 and at that point the stock size should be sufficient to provide MSY. NMFS does not agree with the Committee Report's conclusion that MSY yields will not occur under its rebuilding schedule until 1999.

The commercial quota for calendar year 1993 for the large coastal species group is determined based on the historical commercial average annual share (percent of average total annual landings) for the period 1986 through 1991 (see Table 4.7); this same approach was used in the proposed FMP. The recreational share of the total 1993 landings will also be based on the historical average annual percentage share from 1986 through 1991 (see Table 4.7). The bag limits for large coastal species and species group have been changed to ensure that 1993 commercial and recreational

landings are each reduced by about the same percentage over their recent annual averages (each reduced about 29 percent).

7.3.6 CLOSURE OF THE DIRECTED COMMERCIAL FISHERIES FOR SHARKS

Consideration was given to closing the directed commercial fisheries for sharks until the large coastal species resource recovered from overfishing. NMFS rejected this alternative in the FMP (dated October 28, 1991) since alternative strategies would have achieved the same goals over a longer period of time without the draconian impacts on the user groups.

7.3.7 CLOSING NURSERY AREAS TO FISHING

Closing shark nursery areas to fishing would reduce mortality. This option was rejected because of insufficient knowledge of specific nursery areas and the adverse effect closures would have on other fisheries, such as the shrimp trawl fishery. Further, this action would preempt state authority where nursery areas are in state waters.

7.3.8 ALTERNATIVE RECREATIONAL BAG LIMITS

The EEZ recreational bag limit for the combined large coastal and pelagic species groups of two sharks per boat per trip was rejected since this measure would reduce recreational landings by 43 percent. The proposed bag limits for large coastal and species group of four sharks per trip ensure that 1993 commercial and recreational landings are each reduced by about the same percentage over their recent annual averages (each reduced about 29 percent).

A recreational bag limit of one-shark per person per day in the EEZ was considered and rejected. Results of public comment indicate that a one-shark per person per day bag limit would not be restrictive enough to have sufficient conservation effect. A one-shark per person per day limit was considered too restrictive for Atlantic and Caribbean sharpnose sharks because of the abundance and size of these species.

7.3.9 ALTERNATIVE WAYS TO CONTROL FINNING

Six alternative ways of controlling finning were considered and rejected. Two management measures would have allowed the owner or operator of permitted vessels to land up to four or five fins per carcass. One measure would have required the owner or operator of permitted vessels to land all sharks with the fins attached to the carcasses. These measures were criticized by the commercial fishing sector as too restrictive; they suggested that all fins of a shark were valuable and fishermen should be allowed to harvest and sell all of them (up to eight). Also, this would allow fishermen to salvage the fins off dead sharks whose meat

had spoiled. It must be noted that the smaller secondary fins are of such low value that few fishermen bother with them.

Commercial fishermen wanted to control finning through either a 6 percent or 10 percent ratio of wet fins per dressed carcass weight. These alternatives were rejected since they would allow fishermen too much latitude in retaining fins and discarding undesirable carcasses.

A final option considered and rejected was requiring that fins be landed attached to the carcass except for the caudal fin. This drew criticism from commercial fishermen because of the extra hold space required, lowered product quality, and on shore disposal problems of the flaps between the carcass and fins that are of limited value.

7.3.10 CLOSURE OF RECREATIONAL FISHERIES

Consideration was given to closing recreational fisheries for sharks. This measure was rejected since this sector has experiencing a declining share of the harvest. Also, the commercial permit requirement, the live-release, and other related measures should further reduce the catch to acceptable levels without the need for a closure.

7.3.11 SIZE LIMITS FOR SHARKS OTHER THAN MAKOS

Imposing size limits for species other than makos would reduce mortality in those species. However, this option was rejected because available data are insufficient to estimate the expected short-term reduction in commercial and recreational landings, or the possible long-term increase in landings.

7.3.12 CLOSING FISHERIES THAT KILL SHARKS AS BYCATCH

Pelagic sharks are taken on longlines as bycatch in the swordfish and tuna fisheries. When sharks come up dead on the longline, it is presumed that fins of valuable species are retained for sale and that carcasses are discarded at sea. It is unknown how many sharks are released alive and how many are finned. Generally, hold space is reserved for the valuable targeted species. Consideration was given to evaluating the feasibility of closing the swordfish and/or tuna fishery to protect sharks, but was rejected because of the importance of these fisheries and the fact that some management measures will reduce shark discards; i.e., the quota on the pelagic species group, the prohibition of finning, and the "must release" provision. The level of mortality reduction will not be known until the proposed reporting system is operational and possibly not until onboard observers are used to document fishery activities.

The shrimp trawl fishery results in shark discards estimated at 2,800 mt yearly, consisting mostly of sharpnose sharks in the Gulf of Mexico. Consideration was given to closing or restricting the shrimp fishery, but was rejected because of the importance of the fishery, and the fact that the mandatory use of TEDs will greatly reduce shark mortality. Also, it is expected that, beginning in 1994, fish excluder devices and/or other measures may be required to protect red snapper stocks. Such action may further reduce shark mortality.

7.3.13 PROHIBITING SHARK GILLNETS TO PROTECT MARINE MAMMALS AND SPECIES LISTED AS THREATENED OR ENDANGERED

Approximately 15 of the 100+ vessels that seasonally target sharks use drift gillnets near shore, primarily for blacktip sharks, in the late summer and early autumn. Some of these boats are less than 30 feet in length. The degree of turtle or dolphin loss is unknown. Florida, whose state waters yield the majority of blacktip landings, has passed emergency legislation to reduce the number of listed species taken by limiting the lengths and numbers of gillnets that can be used in commercial fishing operations on the east coast, and requires that nets be tended. The State is presently considering limitations on gillnet mesh size. If adopted, it is expected that losses of listed species will be reduced. Consideration was given to imposing a prohibition on the use of gillnets in Federal waters, but was rejected because of inadequate information on their impact on listed species. A provision in the Shark FMP is for the OT to assess gear restrictions, including the use of observers to verify impacts of gillnet gear. Gillnets are an efficient gear for harvesting schooling blacktip sharks and insufficient evidence presently exists to warrant prohibiting their use.

7.3.14 REQUIRE ANNUAL DEALER PERMITS

The option of requiring annual dealer permits was considered as a means of identifying the dealers that purchased shark products from commercial fishermen. Statisticians planned on using this information to design efficient data collection systems. Agents planned on using this information to design efficient enforcement activities.

Requiring annual dealer permits was rejected since the scientists could obtain the necessary catch and information directly from fishermen via logbooks and weigh-out slips and other existing collection systems. Law enforcement agents could use other sources of information such as informants on specific cases to design efficient enforcement activities. This issue, as well as mandatory dealer reporting, may be revisited by the OT if problems develop in the data collection effort.

7.3.15 MANDATORY DEALER REPORTING

The option of requiring mandatory dealer reporting was considered as a means of obtaining necessary information such as the individual size, species, and other information from recalcitrant dealers that purchased shark products from commercial fishermen. Mandatory dealer reporting was rejected since the scientists could obtain the necessary catch and information directly from fishermen via logbooks and weigh-out slips and other existing collection systems.

7.4 FUTURE MANAGEMENT CONSIDERATIONS

7.4.1 POSSIBLE FUTURE MANAGEMENT MEASURES SUITABLE FOR FRAMEWORKING

Several management measures were identified during development of this Shark FMP that may be suitable for the framework regulatory adjustment procedure. These were not included in this Shark FMP because of insufficient data. However, information collected under the Shark FMP will be reviewed by the OT and, if determined appropriate, these measures may be added by an amendment to the Shark FMP later to the list of approved measures that may be taken modified under the framework regulatory adjustment procedure. These measures include: (a) commercial quota allocation by geographical area; (b) allocations between directed and incidental fisheries; (c) gear restrictions; (d) area closures (e.g., nursery areas); and (e) commercial trip limits.

7.4.2 FUTURE MANAGEMENT ACTIONS

Besides possible framework regulatory adjustment actions, the FMP Development Team and the Intercouncil Shark Committee identified other potential management measures that are not suitable for this procedure, either because of the expected extent of their regulatory impact, or because they are not appropriate for periodic management adjustments. These measures include: (a) limiting harvest to bycatch only; (b) restricting imports of shark meat; (c) fisheries closures (i.e., spawning season closures) except when the quota is reached; (d) establishing bycatch limits; and (e) limiting entry into the fishery including establishment of a control date for possible use in determining historical participation in the shark fishery. Such measures also would require one or more amendments to the Shark FMP.

7.5 DATA COLLECTION AND RESEARCH REQUIREMENTS

The Development Team considers that, based on the management measures set forth in Section 7.1, the following data collection activities and the Mid-Atlantic Fishery Management Council's data collection plan are necessary to generate the information needed to regulate shark exploitation:

7.5.1 DATA COLLECTION

1. A trip-ticket system that records the numbers of each species landed on all trips.
2. A port sampling system to obtain size samples of landed sharks by species on most (50 percent or more) shark directed trips.
3. Logbooks from all vessel trips directing at sharks that record the numbers of each species caught, those discarded, the amount of gear set and length of time the gear was fished, and location fished on each longline or gillnet set.
4. Shark tournament logs reporting similar data for selected tournaments.
5. At-sea observers should be used to verify logbook information and gather pertinent data on shark discards and interactions with protected marine mammals and turtles.

7.5.2 MID-ATLANTIC FISHERY MANAGEMENT COUNCIL DATA COLLECTION PLAN

During January 1989, the Mid-Atlantic Fishery Management Council had submitted a request under § 303(e)(2) of the Magnuson Act to the Secretary to collect information on the Western North Atlantic shark fishery. The data were to be used in the preparation of a shark FMP. This request was denied because of the high annual cost, and the belief that not all requested information was necessary to manage shark resources.

The data collection request contained the following additional information needs:

Biological

1. Mapping the inshore pupping and nursery grounds to define recruitment relationships.
2. Determining age and growth information on each species through a variety of analytical methods: seasonal growth ring formation on vertebrae or spines; size frequency; aquarium observations; oxytetracycline marking; and tag-and-recapture experiments.
3. Delineating age-related and sex-related distribution and migrations of such species as the sandbar, which has nurseries in the Mid-Atlantic, but large concentrations of males off Mexico.
4. Determining the reproductive potential for each species.

5. Separating genetically distinct stocks of some species; for example, blacktip sharks in Florida and the Carolinas may belong to a different stock than those from the Caribbean, whereas others, such as dusky sharks, may have only one population throughout the Western North Atlantic.

Fisheries

A statistically-valid sample to describe the catch by species is critical. Managers must know how many sharks of each species are killed annually (landed or discarded), and where their entire range, where appropriate, must be represented. The total catch from both commercial and recreational fishermen, and fishing effort (catch per unit effort, or CPUE), must be determined for each nation fishing the resource. As well, fishery sampling data (length, weight, sex, age, and maturity) must be obtained for reliable stock assessments.

Tagging studies are also important to provide information on stock identity, migrations, growth, and fishing mortality of key species. However, training is needed for port samplers and scientific personnel involved in such studies, as well as in dockside sampling, to avoid misidentification that affects statistical reliability. Tagging efforts must be coordinated, and data centralized, to provide maximum data availability to researchers.

Assessment/Management

Fishery-independent indices of population abundance over time are another critical information need. Longline and trawl survey data from NMFS, foreign longline fisheries, and other sources should be examined for long-term trends in abundance and distribution. Such surveys are also valuable sources of information on size and sex composition, ecological relationships, and habitat requirements.

Social and Economic

An organized effort to collect social and economic information on the recreational and commercial fisheries is needed. The number of persons fishing, fishing sites, income spent on fishing, number of processors and their employees, and information on the economic dependence of the user groups on the fisheries (e.g., amount of income derived from shark fishing or processing) are important to managers, both on a national and foreign scale, also at the community level.

7.6 SPECIAL RECOMMENDATIONS TO STATES

7.6.1 COMPATIBLE REGULATIONS

It is a basic premise and goal of the Shark FMP that management of shark resources be carried out throughout their range. Since determinations of MSY, OY, the commercial quotas, and overfishing are based on estimates of the total biomass of sharks in all U.S. waters (EEZ and state waters), it is recommended that coastal states, Puerto Rico, and the Virgin Islands adopt regulations

consistent with this FMP. From 1979-1988, 14 percent (by weight) of commercial shark landings, and 64 percent (by number) of recreational shark catch, occurred in state waters. State cooperation is therefore essential for effective management. Specifically, it is recommended that states:

1. Apply bag limits to recreational fishermen regardless of where sharks are caught.
2. Adopt the specified Federal quotas.
3. Prohibit finning and adopt other measures that govern how and when fins may be landed.
4. Prohibit the sale of recreational caught sharks and shark products.
5. Cooperate with NMFS to ensure consistent and integrated permitting and data collection systems.

7.6.2 HABITAT CONSIDERATIONS

The shark fishery contributes to the food supply, economy, recreation, and health of the Nation, through recreational and commercial fishing opportunities. The fishery is dependent upon the health of the shark resource, which in turn depends upon wise management of all aspects of the fishery, including habitat. Accordingly, activities that adversely affect habitat must be regulated by government actions. Maintaining the productivity of stocks is impossible without habitat protection, effective implementation of existing conservation regulations, and aggressive pursuit of the Nation's "no net habitat loss" policy. Federal and state regulatory agencies should act to:

1. Maintain the current quantity and productive capacity of habitats supporting important commercial and recreational fisheries, including their food base. This objective may be met through a policy that curbs wetlands loss and reef pollution and alteration ("no net loss").
2. Restore the productive capacity of currently degraded habitats.
3. Create and oversee the development of new habitats where increased fishery productivity will benefit society.

The five Councils are expected to use existing authorities to support state and Federal environmental agencies' habitat conservation and mitigation efforts. The five Councils will work directly with regulatory agencies on actions that may significantly affect habitat. This may include commenting on specific actions, policies, or regulations that affect the

habitat of sharks being managed. Public hearings and the building of administrative records also may be conducted to ensure adequate disclosure of facts, and public participation, in proposed actions that adversely affect habitat.

The OT will encourage state and territorial governments along the Atlantic Ocean, Gulf of Mexico, and Caribbean to intensify efforts to protect and enhance habitats used by sharks. The OT, with NMFS, must develop research to identify shark nursery areas and to recommend management measures involving area closures. As knowledge about shark habitats, nursery areas, and pupping seasons is obtained, public attention can be focused and interest created in the conservation of habitat and the protection of juveniles.

7.6.3 STATE RESEARCH

It is recommended that states actively participate in acquiring pertinent information and data as specified in Section 7.5. Effective, coordinated management will require the combined efforts of the states and the Federal Government, and will benefit from the expertise and facilities of the broad scientific community, including universities and private research.

7.7 PUBLIC EDUCATION AND AWARENESS

Sharks have been viewed by many people as inferior or undesirable species in the ocean. For years they have been generally perceived as vicious man-eaters that should be destroyed, and their flesh was thought to be unpalatable. Attitudes are changing, however, about their food value and many species are pursued by sport fishermen. The growing environmental conscience has focused public awareness on the important role of sharks in maintaining ecological balance. It is proper, therefore, for government entities, industry, consumer groups, and the environmental community to promote wise use and conservation of shark resources.

Several actions should be undertaken by NMFS and/or the five Councils to heighten public awareness for shark conservation. Distributing a suitable brochure(s) describing the life, biology, and ecological importance of sharks; the need for shark management and how regulatory measures benefit the resource; and ways of ensuring the survival of released sharks, would help conserve the resource. Sending the brochure to all tournament directors, conservation organizations, sport fishing clubs, and commercial shark fishermen in both directed and non-directed fisheries, with a letter requesting their cooperation and assistance, will promote shark conservation. State, Federal, and university shark experts should coordinate development of public education efforts. Useful activities might include a portable

shark exhibit to be deployed at major conservation or environmental events.

7.8 TOURNAMENT CONSERVATION SUGGESTIONS

Shark fishing tournaments are popular despite the fact that numbers and weights of sharks landed is declining. These well-attended events offer additional opportunities for promoting conservation awareness and research. Agencies and organizations are encouraged to develop materials that promote effective conservation: using degradable metal hooks (non-stainless steel); setting the hook before it is swallowed; avoiding double hooks; not "overfighting" the fish; and leaving the shark in the water when release is intended, including treating the fish gently, cutting the leader, and not removing the hook. Tagging tournaments also should be considered as an aid to resource conservation. Finally, tournament directors should consider establishing limits that would promote conservation of sharks and reduce waste. Suggested measures are weight and size minima of species caught at the tournament and limits of one shark per boat.

7.9 INTERNATIONAL CONSIDERATIONS

Many species of sharks migrate beyond U.S. waters and are harvested by foreign nations. It is therefore necessary that the management regime consider transboundary distribution. For example, in 1988, Cuba landed about 3,500 mt of sharks, Mexico harvested 12,000 mt of sharks in the Gulf of Mexico, and the total U.S. commercial catch was 5,276 mt. Tagging results show that at least some commercially important sandbar sharks move south from the U.S. into Mexican waters and are pursued by fishermen of both nations. To effectively manage sharks throughout their range, cooperation, particularly with Mexico, should be sought through existing conventions and agreements, such as MEXUS-Gulf, International Convention for the Conservation of Atlantic Tunas, and others.

Since 1977, the U.S. and Mexico have conducted research cooperatively under the MEXUS-Gulf program. Shark research is expected to become more important in the program, with emphasis on defining harvest levels, migratory routes, and size/sex distribution of transboundary species.

7.10 SHARK CONSERVATION AND MANAGEMENT MEASURES APPLICABLE TO FOREIGN FISHERIES IN THE ATLANTIC EEZ

The conservation and management measures applicable to the foreign fisheries that operate within the Atlantic EEZ and impact shark resources are described below.

7.10.1 FOREIGN FISHERY REPORTING REQUIREMENTS

Each foreign vessel fishing in the EEZ is required to maintain a daily fishing log that records: name and identification number of vessel; date; midday fishing location (within 0.1 degree latitude and longitude); number of hooks per set; number of each species of shark caught and thrown back dead; and number of each species of shark released alive. This log, which must be submitted to NMFS quarterly, will provide information on bycatch mortality by foreign fishermen for use in estimating MSY and optimum yield. As well, each foreign nation that catches shark incidentally must submit to NMFS a weekly report listing receipts of U.S. harvested fish (JVP) and any incidental catch or receipt of marine mammals.

These reports provide timely submission of catch and effort data needed to monitor stocks and manage foreign fishing effort. Such information has been required since the Preliminary Management Plan for Atlantic Billfishes and Sharks was implemented in 1978.

The PMP regulations governing the presence of U.S. observers on foreign fishing vessels remain unchanged in the FMP.

7.10.2 TALFF, DAH, AND OY

Since the Domestic Annual Harvest (DAH) capacity (7,060 mt dressed weight) equals OY (7,060 mt dressed weight), the directed or incidental taking of sharks by foreign fishing vessels is prohibited throughout the year in the Atlantic EEZ. The Total Allowable Level of Foreign Fishing (TALFF) for the species of shark managed under this FMP, equal to 1,150 mt in the PMP, is reduced to zero under the present FMP. For the sharks that are included in the FMP for data collection purposes, the TALFF is covered under the Preliminary Fishery Management Plan for the Foreign Trawl Fisheries of the Northwest Atlantic.

Sharks captured as bycatch must be released in such a manner that will ensure maximum probability of survival. For hooked sharks, the line must be as close to the hook as possible, without removing the animal from the water. For net-caught sharks, the animal must be released as quickly and gently as possible.