# Atlantic Shark Fisheries

Unit 6

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## INTRODUCTION

Sharks have been managed under a Federal fisheries management plan (FMP) developed by the National Marine Fisheries Service for the Secretary of Commerce since 1993 (NMFS, 1993, 1996). Since then, management activities for shark species have escalated and currently include annual shark evaluation workshops and meetings of the Highly Migratory Species Advisory Panel. A draft Fishery Management Plan for tunas, sharks, and swordfish was proposed in 1998, and will be finalized in 1999 (NMFS, 1998). This new framework will replace the 1993 shark FMP.

### Species and Status

Currently, Atlantic shark fisheries are divided into three management groups: 1) Large coastal sharks, which include tiger, lemon, smooth hammerhead, scalloped hammerhead, great hammerhead, blacktip, sandbar, dusky, spinner, silky, bull, bignose, Caribbean reef, Galapagos, night, narrowtooth, and nurse; 2) small coastal sharks, which include Atlantic and Caribbean sharpnose, finetooth, blacknose, bonnethead, smalltail and Atlantic angel; and 3) pelagic sharks, which include longfin and shortfin mako, blue, porbeagle, thresher, bigeye thresher, oceanic whitetip, sevengill, sixgill, and bigeye sixgill.

Of these three management groups, species in the large coastal group are overutilized and, consequently, they are the subject of more intense management attention than the other two groups. In 1997, possession of five additional species of large pelagic sharks was prohibited (i.e. whale, basking, sand tiger, bigeye sand tiger, and white sharks). Species in the pelagic and small coastal groups are considered to be fully utilized. Rough indications of the status of these three management groups are presented in Table 6-1.

Determining the quantity of sharks that are landed in weight measurements is difficult for two reasons. First, weight estimates for recreational catches are highly variable because a relatively small number of animals are measured and weighed by the biologists that collect recreational statistics. Second, a significant amount of the commercial catch is only reported under the general category of "sharks," and the species identification either cannot be or is not reported. As a result, these landings are assigned to one of the management groups analytically for statistical purposes.

Thus, another set of estimated mean weights per fish for recreational catches or another set of assumptions regarding the allocation of the unidentified commercial shark landings is likely to produce different total weights for the recent average yield (RAY). To help minimize some of the effects of these two factors, the landings and catch statistics used in the stock assessments are compiled in numbers of animals instead of weight measurements. Thus, the estimates of long-term potential yield (LTPY) in Table 6.1 are presented as ranges in numbers of fish.

The numbers that were reported landed or discarded for sharks in the large coastal management group for 1988 through 1997 are presented in Figure 6-1. Although fishery statistics for sharks were collected prior to 1988, these earlier statistics are not considered as suitable for assessment and management purposes. The decreasing trend in these data is apparent beginning in 1992; however, estimates of the numbers of sharks that are discarded by commercial fishing were not available prior to 1993. Also, the data for 1997 are preliminary and likely to change as the final reviews are completed on these data.

**Table 6-1**
Productivity in metric tons and status of Atlantic shark fisheries.

| Species and Area | Recent average yield (RAY)[1] | Current potential yield (CPY) | Long-term potential yield (LTPY) | Fishery utilization level | Stock level relative to LTPY |
|---|---|---|---|---|---|
| Large coastal sharks[2] | 5,216 | 4,253 | n/a[3] | Over | Below |
| Small coastal sharks[4] | 685 | n/a | n/a | Full | Above |
| Pelagic sharks[5] | 1,492 | Unknown | Unknown | Unknown | Unknown |
| Totals | 7,393 | 6,430 | 6,430 | | |

[1]1994–96 average.
[2]Includes sandbar, Caribbean reef, blacktip, dusky, spinner, silky, bull, bignose, Galapagos, night, tiger, lemon, nurse, narrowtooth, scalloped, smooth and great hammerhead sharks.
[3]The LTPY for large coastal shark species by number of individuals is 143–149.
[4]Includes Atlantic and Caribbean sharpnose, finetooth, blacknose, bonnethead, smalltail, and Atlantic angel sharks.
[5]Includes longfin and shortfin mako, blue, porbeagle, thresher, bigeye thresher, oceanic whitetip, sevengill, sixgill, and bigeye six-gill sharks.

The 1996 Shark Evaluation Workshop report (SEFSC, 1996) concluded that catch rates of many of the species and species groups declined by about 50–75% from the early 1970's to the mid 1980's. However, the rapid rate of decline in the catch rates that characterized the stocks in the early 1980's had slowed significantly in the 1990's. Partly based on results from the 1996 workshop (SEFSC, 1996), a 50% reduction in catches of large coastal species (i.e. relative to 1995) was targeted. This reduction was to be achieved by a 50% reduction in the commercial quota for the large coastal management group and a reduction of the recreational bag limit to two fish (the previously established recreational bag limit was four fish per boat per day). During the 1998 Shark Evaluation Workshop (SEFSC, 1998), preliminary data for 1997 were presented and reviewed, and the indications are that commercial catches, in numbers of animals, were reduced from 1995 by more than 50%, but recreational catches were reduced by only 12%.

Two important points were recognized at the 1998 workshop (SEFSC, 1998). First, to continue to improve shark stock assessments, it is critical to 1) continue to improve species- and size-specific catch (landed and discarded animals) and effort data and 2) improve fishery-independent measures of shark abundance and productivity. Second, it was recognized that every effort should be made to manage shark species separately. New analyses indicate that individual species are responding differently to exploitation. Thus, management of large coastal aggregates can result in excessive regulation on some species and excessive risk of overfishing on others. The draft highly migratory species FMP (NMFS, 1998) includes a number of proposed measures for sharks, including the following: the addition of fifteen Atlantic sharks to the prohibited species list, the separation of the large coastal shark management group into ridgeback[1] and non-ridgeback species, a minimum size for ridgeback sharks, a quota reduction for non-ridgeback sharks, a quota reduction for small coastal sharks, and catch-and-release only for small coastal sharks and large coastal sharks. The final FMP is slated to be published in 1999.

## ISSUES

### Scientific Information and Adequacy of Assessments

The lack of extensive time series and species-specific landings and effort data continues to be a problem for stock assessments. Without reliable species-defined data and stock assessments, management measures will necessarily continue to be based on species aggregates (e.g. 22 species of large coastal sharks), and they may be more broad-

[1]A number of species in the large coastal shark management unit are characterized by a mid-dorsal ridge that is easily identified even after the fish has been gutted and finned. This mid-dorsal ridge is useful as diagnostic characteristic for management and enforcement purposes. Ridgeback sharks include sandbar, dusky, silky, night, and bignose sharks. Non-ridgeback sharks include blacktip, spinner, bull, tiger, nurse, lemon, narrowtooth, and hammerhead sharks.

brushed and restrictive than otherwise might be possible.

### Management Concerns

Recreational and commercial fishermen have both voiced concern about declining shark populations. As shark stocks declined before the 1993 FMP was implemented, derby-style fishing conditions developed in the commercial fisheries ("the race for fish"), and recreational fisheries experienced reduced fishing opportunities. Such conditions often result in fishermen fishing further inshore than they might otherwise in order to minimize transit time from fishing grounds to off-loading sites. Fishing in inshore areas where immature sharks predominate can have several negative ecological ramifications, including higher fishing effort and higher catches of immature fish with associated higher effective fishing mortality rates, because more small fish than large fish must be caught to reach the same weight-based quota. Additionally, concerns about high fishing mortality of juvenile sharks in recreational fisheries were raised at the 1998 Shark Evaluation Workshop. In both commercial and recreational fisheries, species identification problems continue and may only be remedied through extensive public outreach and educational programs.

### Progress

Considerable progress has been made since the original 1993 Atlantic shark FMP. Since that time (when 98% of commercial landings was reported as "sharks"), mandatory commercial permitting and reporting has increased the level of fishery-dependent species-specific information such that less than 17% of landings are now reported as "sharks." The National Marine Fisheries Service has also funded an observer program since 1994 in the directed shark fishery that has provided extensive information on species and size composition of catches, disposition of catches, fishing effort and distribution, and bycatch in these fisheries. Additionally, several fishery-independent nursery area and tagging studies in the Atlantic and Gulf of Mexico have been expanded and incorporated into stock assessments. Population modeling on several species has also contributed substantially to stock assessments.

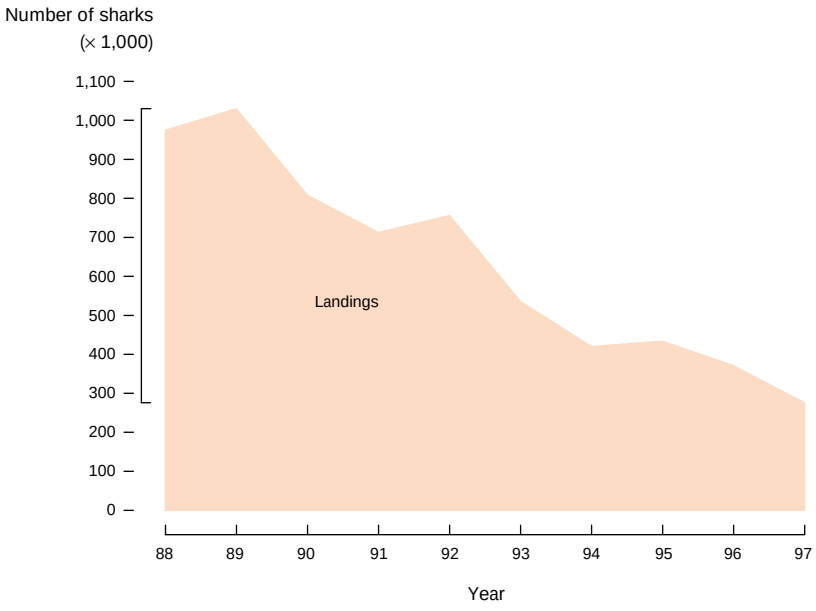


**Figure 6-1**
Landings of large coastal sharks, 1988–97.

Progress has also been made in both domestic and international management. In the United States, the National Marine Fisheries Services' Highly Migratory Species Management Division is responsible for developing management measures consistent with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act. To that end, a Highly Migratory Species Advisory Panel was formed and is preparing a Highly Migratory Species FMP for Atlantic Tunas, Swordfish, and Sharks, which will amend the original 1993 shark FMP. The new FMP will establish rebuilding programs for the overfished large coastal sharks, prevent overfishing on the fully fished pelagic and small coastal sharks, and limit access to the commercial shark fishery. Internationally, the United States continues to play a key role in the United Nations Food and Agriculture Organization's Consultation on Shark Conservation and Management. This consultation will culminate in a plan of action to guide national, regional, and international science and management under the precautionary approach.

## LITERATURE CITED

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