

# Shortfin Mako Shark

## History of the Fishery

Since the late 1970s, the shortfin mako (*Isurus oxyrinchus*) has been taken incidentally in the commercial drift gillnet fisheries for thresher shark and swordfish. Up until 1987, there were no fisheries that specifically sought mako.

There are several reasons why mako sharks took so long to become a primary target of a commercial fishery. Although readily marketable, shortfin makos off southern California averaged only 34 pounds dressed, while threshers had an average dressed weight of about 150 pounds. As long as threshers were plentiful, fishermen paid little attention to mako sharks. This situation might have changed during the mid-1980s when the thresher population began to show signs of decline, but the drift gillnet fleet, which pursued the thresher, also took a more valuable species - swordfish. Swordfish had a commercial value of \$4 per pound, compared to \$1 per pound for most sharks, and they averaged nearly 200 pounds dressed. As a result, the drift gillnet fleet gave little regard to the mako shark resource.

It took the application of an entirely different fishing gear to create commercial interest in the mako. During 1988,

the California Fish and Game Commission established an experimental shark fishery for mako and blue sharks using drift longlines. This gear proved much more efficient than drift gillnets. By 1990, stringent regulations were implemented that included an annual quota, time-area closures, and a requirement to reduce the bycatch and waste of blue sharks by establishing a market. In 1992, the commission did not renew the longline permits and the experimental fishery ended. This was due to the inability of the fishermen to establish a market for the bycatch of blue sharks and a well organized opposition by the sport fishing industry to a directed commercial fishery for mako sharks.

Currently, mako sharks are taken by drift gillnets and hook-and-line. Most mako sharks, however, are taken in the drift gillnet fishery for thresher sharks and swordfish. Annual landings have fluctuated from over 600,000 pounds in 1987 to less than 100,000 pounds in 1999.

The shortfin mako shark is also taken by the high seas shark and swordfish drift longline fishery, which developed between 1991 and 1994. This fishery operates outside the 200-nautical-mile Exclusive Economic Zone in international waters. A small portion of the catch is landed in California ports with annual landings ranging from 128,116 to 9,523 pounds between 1991 and 1999.

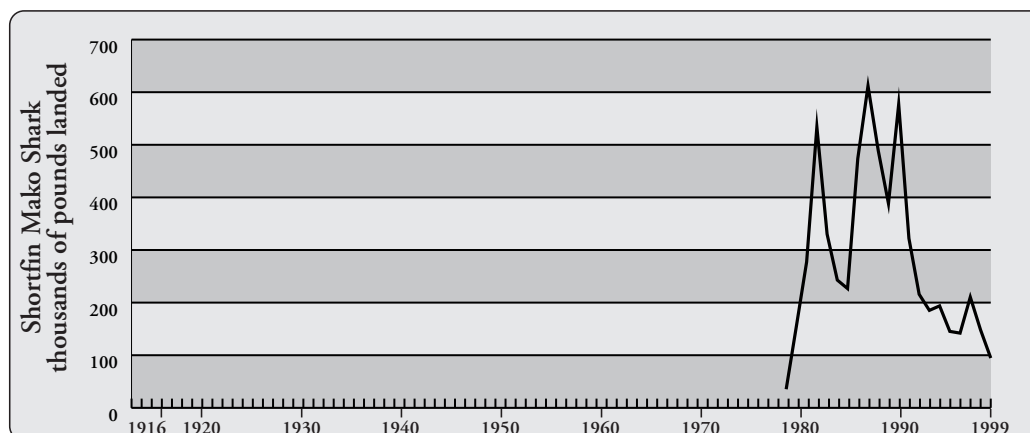
Makos have long been esteemed as prized game fish along the East Coast of the U.S. During the early-1980s, the mako captured the attention of the southern California sport fishing public. In the mid-to late-1980s, estimates of the number of California angler trips for sharks grew ten-fold from 41,000 to 410,000 annually. The principal target of these trips was the shortfin mako shark. After the increase during the 1980s, the sport fishery for mako sharks has stabilized at a relatively high level. Total annual landings (sport and commercial) peaked in 1987 at 464,308 pounds and again in 1994 at 394,792 pounds. In both cases, landings declined rapidly in the two years following the peaks. Currently, commercial passenger fishing vessels run fishing trips on a regular basis from nearly all ports in southern California.

## Status of Biological Knowledge

The shortfin mako shark is distributed in temperate and tropical seas worldwide. In the eastern Pacific, it is distributed from Chile to the Columbia River and can be found off the U.S. West Coast from southern California northward to Washington. However, it is most common off southern California and is seldom caught north of the Mendocino Escarpment. It is considered an oceanic species, occurring from the surface to at least 500 feet



Shortfin Mako Shark, *Isurus oxyrinchus*  
Credit: DFG



**Commercial Landings  
1916-1999,  
Shortfin Mako Shark**  
Data Source: DFG Catch  
Bulletins and commercial land-  
ing receipts. All shark landings  
were aggregated until 1977.

in depth, and is rarely found in areas where the water temperature falls below 61° F.

Evidence from size and mark-recapture data suggest that the Southern California Bight, which extends from Point Conception to the Mexican border, is an important pupping and nursery area for the shortfin mako shark. High recapture rates for tagged juveniles show that newly born makos remain in these waters for about two years, after which they appear to move offshore or to the south. Many fish tagged in the Southern California Bight have been recaptured locally, but others have been caught as far north as Point Arena, northern California; as far south as Acapulco, Mexico; and as far west as Hawaii in the central Pacific. Although some of the tagging data have not been subjected to formal analyses and no migratory pattern has become obvious, these documented movements suggest that the California-Mexico stock is wide-ranging and is not an isolated population.

There is an ongoing disagreement surrounding the proper aging of shortfin mako sharks, particularly in large size classes. Results differ among age-growth studies, which may be due to stock differences, different aging interpretations of the periodic deposition of vertebral rings, and the difficulty of interpreting growth rings, especially in older specimens. Young makos appear to grow fairly rapidly, reaching nearly five feet in total length (TL) by the age of two. After two years, however, growth rate is less defined. Males reportedly mature at six feet TL and as early as four years old, while females reach maturity at nine feet TL and not before seven or eight years old. Females either mature at a much later age than males, or the sexes grow at greatly differing rates. The maximum size of a mako shark is reported to be approximately 13 feet and possibly as old as 40 years.

Like the thresher shark, shortfin makos are ovoviviparous. The embryos have no umbilical attachment to the mother and receive all their intrauterine nourishment by eating

other eggs. It is estimated that females have from four to 30 pups. The gestation period is estimated to last from 12 to 19 months. At birth, pups are approximately 2.0 to 2.5 feet TL.

The shortfin mako is a top carnivore in the ocean food chain. It is known to prey upon many species of fish such as mackerel, sardine, anchovy, tuna, other sharks, and squid. Other items in the adult diet probably include several marine mammals. The mako, however, is an opportunistic feeder like many of its oceanic relatives. It may eat whatever is abundant in its surroundings.

## Status of the Population

The present status of the shortfin mako shark in state and federal waters off California is not known but is of concern. Adult mako sharks do not frequent California's coastal waters; therefore, they are not subject to local fisheries. The real threat to the mako population off California and in the eastern Pacific lies in the potential for over-development of fisheries within the coastal nursery. This threat is particularly insidious, as the effect of overfishing would not become apparent until the missing juveniles were of an age to become the spawning stock. Since a sudden population collapse could follow, efforts to monitor the shortfin mako shark are needed.

## Management Considerations

See the Management Considerations Appendix A for further information.

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## References

- Bedford, D. 1992. Mako shark. In W.S. Leet, C.M. Dewees, and C.W. Haugen, eds, California's living marine resources and their utilization. pp. 51-53. California Sea Grant Publication UCSGEP-92-12.
- California Department of Fish and Game. 1999. Ocean sport fishing regulations concerning mako shark. State of California Natural Resources Agency. 2:1-11.
- California Department of Fish and Game. Shark Tagging News. California Department of Fish and Game, Long Beach, California. (newsletter series).
- Calliet, G.M. and D.W. Bedford. 1983. The biology of three pelagic sharks from California waters, and their emerging fisheries: a review. California Cooperative Oceanic Fisheries Investigations Reports. 24:57-69
- Camhi, M. 1999. Sharks on the line II: An analysis of Pacific state shark fisheries. National Audubon Society, Living Oceans Program, Islip, N.Y. pp. 52
- Mollet, H.F., G. Cliff, H.L. Pratt, Jr., and J.D. Stevens. In press 1999. Reproductive parameters of female shortfin mako *Isurus oxyrinchu* (Rafinesque 1809). Fish Bulletin, U.S.
- Pratt, H.L. and J.G. Casey. 1983. Age and growth of the shortfin mako, *Isurus oxyrinchus*, using four methods. Canadian Journal of Fisheries and Aquatic Sciences. 40:1944-1957.