

13. WHITE SEABASS

Review of the Fishery

White seabass, *Atractoscion nobilis*, have been taken by California anglers for at least a century. Coastal Indian middens have yielded many white seabass otoliths (ear bones) suggesting this species was highly regarded for food and possibly used for ceremonial purposes.

There was a commercial fishery in the San Francisco area from the late 1800s to the mid-1920s. Before 1982, California commercial fishermen landed thousands of pounds of white seabass taken in Mexico. Often these landings comprised more than 80 percent of the annual catch. Since then, the Mexican government has denied access permits to United States fishermen, and the fishery is concentrated in southern California (Figure 13.1). Although the frequency of white seabass caught north of Point Conception has increased, these landings still represent less than 20 percent of the total California catch. An exception occurred in 2001, when 36 percent of commercial white seabass landings occurred north of Point Conception.

Commercial landings of white seabass have fluctuated widely over the past 90 years of record keeping. Since 1959, when 3.5 million pounds (1,588 metric tons) were landed, the trend has been one of general decline. However, landings since 1999 have exceeded 200,000 pounds (91 metric tons) annually (Figure 13.1), which is a modest increase over the period of 1983-1998.

The minimum legal size for a recreationally caught white seabass is 28-inches (71-centimeters) total length, which corresponds to a weight of about 7-pounds (3-kilograms). The average commercially caught white seabass is nearly 40-inches (102-centimeters) and weighs 20-pounds (9-kilograms).

White seabass has always commanded relatively high prices because of consumer demand. In 2006, commercial fishermen typically received \$3.00 per pound for whole fish. At the retail level the fish are sold fresh, primarily as fillets and steaks. Fishing revenue from the 2006 commercial harvest of white seabass was about \$796,000 (ex-vessel 2006 dollars). The contribution to total business output, for the State from this 2006 commercial harvest is estimated to be \$822,000. Likewise, total employment and wages from white seabass is estimated to be the equivalent of 27 jobs and \$706,000 respectively.

During the early years of the fishery, commercial catches were made using gillnets, hook-and-line, and round haul nets such as lamparas and purse seines. Purse seining was curtailed in the late 1920s because decreasing catches made it uneconomical. Since the take of white seabass by round haul nets was prohibited in the early 1940s, gillnets have been the major commercial fishing gear. Set gillnet fishing for white seabass within state waters was prohibited beginning in 1994. Today, drift gillnetting is the primary fishing method used. Some commercial hook-

and-line fishing takes place during the early spring in southern California when large white seabass are available.

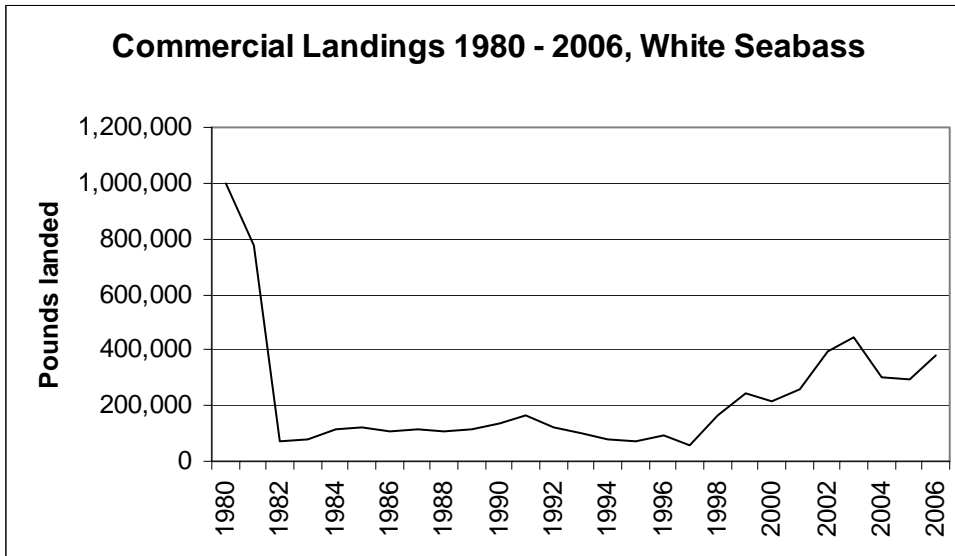


Figure 13.1. California commercial landings (pounds) of white seabass from 1980 through 2006. Prior to 1982 white seabass harvested in Mexico made up the majority of California's landings. Data source: CDFG commercial landing receipts.

Recreational fishing for white seabass began around the turn of the twentieth century. Because of their size and elusive nature, white seabass are popular with anglers. Historical records show anglers on commercial passenger fishing vessels (CPFVs), fishing in California waters, landed an average of 33,400 white seabass annually from 1947 through 1959. The average annual catch steadily declined to 10,400 fish in the 1960s, was 3,400 fish in the 1970s, and 1,200 fish in the 1980s, and then increased to 3,000 fish in the 1990s. From 2000 through 2006 an annual average of 8,200 fish were caught, most likely a result of stronger recruitment of young white seabass in 1997 and 1998 (Figure 13.2). White seabass are also caught by anglers aboard private boats, but accurate estimates of total catch by private boat anglers are difficult to obtain.

While the 28-inch (71-centimeter) minimum size also applies to recreational anglers, most of the white seabass caught prior to the 1990s (kept and released) were between 20- and 24-inches (51- and 61-centimeters). In a survey of private boaters at launch ramp facilities from 1978 through 1982, biologists found only 6 to 16 percent of the white seabass kept were of legal size. In a similar survey aboard CPFVs from 1985 through 1987, biologists reported 16 to 25 percent of the seabass caught were legal. However, this has changed dramatically with the apparent increase in the abundance of legal-sized white seabass. During the period from 1995 through 1999, data collected from private boat anglers revealed 77 percent of the white seabass were legal size, while data from CPFV anglers showed 80 percent of the white seabass were legal size. In more recent years, 2000 through

2006, 80 percent of the observed catch from private boat anglers were legal size and 95 percent of the observed catch from CPFV anglers were legal size.

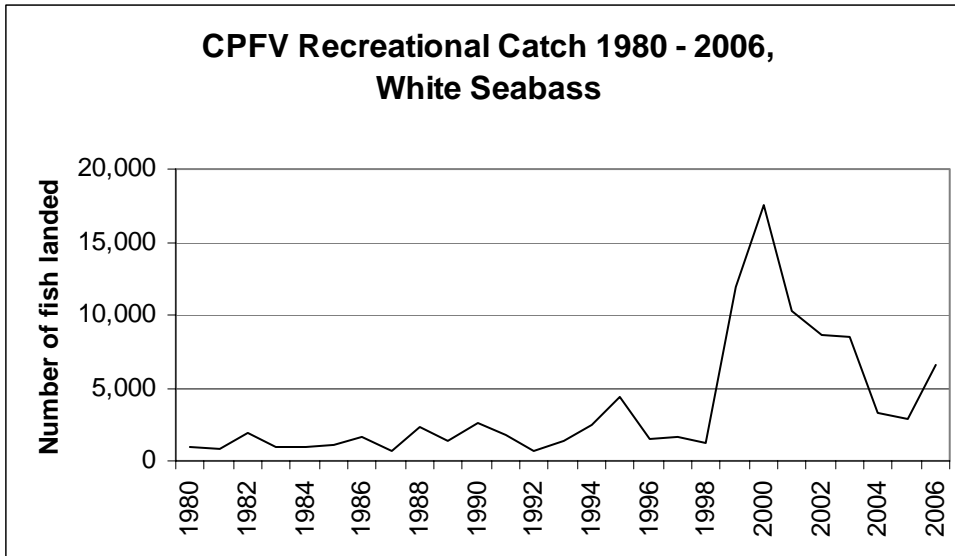


Figure 13.2. The California CPFV recreational catch (numbers of fish) of white seabass from 1980 through 2006. Data source: Commercial Passenger Fishing Vessel (CPFV) log data.

White seabass are captured more often with live bait than with dead bait or lures, but all are effective when the fish are actively feeding. White seabass can sometimes be brought to the surface by heavy chumming with live bait. Anglers fishing around Santa Catalina Island have reported consistently good catches using live market squid, *Loligo opalescens*, and Pacific sardine, *Sardinops sagax*, as bait. Spearfishing for large white seabass by free divers (i.e. without scuba) may be successful in kelp beds.

The California Fish and Game Commission (Commission) established a fishing season of September 1 through August 31 of the following year for both the commercial and recreational fisheries. The Commission also adopted an optimum yield (OY), based on a maximum sustainable yield proxy of the unfished biomass, and is currently set at 1.2 million pounds (544 metric tons). In the 2006/07 season, the total recreational and commercial harvest was 519,600 pounds (235 metric tons), less than half of the allowable catch.

Total catch of white seabass increased from the late 1990s to 2001, peaking in 2001/02 at 1.07 million pounds (485 metric tons) (Table 13.1), just below the 1.2 million pound (544 metric ton) OY. The 2006/07 season marked the third consecutive season of an increase in total catch; the recreational catch increased 58 percent and the commercial catch increased 7 percent compared to the previous season. Estimates of recreational take for the last three and a half fishing seasons are from an improved recreational fishing survey (implemented January 2004) and

thus the total estimates from the 2003/04 to 2006/07 seasons may not be directly comparable to estimates from previous seasons due to changes in methodologies in calculating the estimates.

Season	Recreational	Commercial	Total
1997/98	155,909	134,306	290,215
1998/99	410,607	263,439	674,046
1999/00	588,760	218,842	807,602
2000/01	245,835	215,692	461,527
2001/02	663,651	402,537	1,066,188
2002/03	556,684	483,410	1,040,094
2003/04	98,656	304,939	403,595
2004/05	116,734	288,547	405,281
2005/06	65,168	389,873	455,141
2006/07	103,131	416,420	519,551

Source: CDFG commercial landing receipts. The 2004 - 2007 recreational data are from CRFSS, and the previous years of recreational data are from MRFSS.

White seabass regulations have been in effect since 1931, and have included a minimum size limit, closed seasons, bag limits, and fishing gear restrictions. These regulations are still in effect today, with slight variations.

The Commission adopted the White Seabass Fishery Management Plan (WSFMP) in June 2002. To view the plan, please go to this Department of Fish and Game (DFG) web site link: <http://www.dfg.ca.gov/marine/wsfmp/index.asp>. The WSFMP includes a provision for annual monitoring and assessment of the white seabass commercial and recreational fisheries. The White Seabass Scientific and Constituent Advisory Panel (WSSCAP) was established to assist DFG and the Commission with the review of the fishery assessments, management proposals, and plan amendments. The annual review includes fishery-dependent data (e.g., commercial and recreational landings and length frequencies), and fishery-independent data (e.g., recruitment information), as well as documented changes within the social and economic structure of the recreational and commercial industries that utilize the white seabass resource within California. The review also includes information, when available, on the harvest of white seabass from Mexican waters and other relevant data. Based on the results of the annual review, in cooperation with the WSSCAP, DFG will provide management recommendations, if needed, to the Commission.

Status of Biological Knowledge

The white seabass is the largest member of the croaker family (Sciaenidae) in California. Fish weighing nearly 90-pounds (41-kilograms) with lengths of 5 feet (1.5 meters) have been recorded, but individuals larger than 60- pounds (27- kilograms) are seldom seen. White seabass range from Magdalena Bay, Baja California, Mexico to the San Francisco area. They are also found in the northern Gulf of California. During the strong El Niño of 1957-1959, white seabass were reported as far north as Juneau, Alaska and British Columbia, Canada.

The center of the white seabass population appears to be off central Baja California. Genetic research on white seabass populations shows that some mixing of fish from California and Mexico occurs. However, there may be local subpopulations of fish that do not mix regularly. While the question of population continuity remains unresolved, there is evidence that each summer the fish move northward with warming ocean temperatures (as demonstrated by catches). Biologists believe the movement is probably spawning-related.

Spawning occurs from April to August, with a peak in the late spring to early summer. Fecundity (egg productivity) for this species has not been determined, but a maturity study in the late 1920s reported females begin maturing when 4-years old (nearly 24-inches (61-centimeters) in length), and some males matured at 3-years (nearly 20-inches (51-centimeters) in length). All white seabass have probably spawned at least once by age 6 (nearly 32-inches (81-centimeters) in length).

The eggs, which are the largest of any croaker on the west coast (approximately 0.05-inch (1.3-millimeters) in diameter), are planktonic. The larvae, which are darkly colored, have been collected from Santa Rosa Island, California to Magdalena Bay, Baja California, Mexico. Most are found in the inshore areas of Sebastian Viscaïno and San Juanico Bays, Baja California, Mexico, indicating major spawning occurs off central Baja California.

Young-of-the-year white seabass, ranging in length from 0.25- to 2.25-inches (6- to 57-millimeters), inhabit the open coast in waters 12 to 30 feet (4 to 9 meters) deep. They associate with drifting macroalgae in areas of sandy ocean bottom. Sometime between the ages of 1 and 3 years old, some juveniles may move into protected bays where they utilize eelgrass communities for cover and forage. Older juveniles are caught off piers and jetties and around beds of giant kelp. Adult white seabass occupy a wide range of habitats including kelp beds, reefs, offshore banks, and the open ocean. Adult white seabass eat Pacific mackerel, *Scomber japonicus*; Pacific sardines; market squid; pelagic red crabs, *Pleuroncodes planipes*; and Pacific herring, *Clupea pallasii*.

Laboratory spawning of white seabass was first induced in 1982. Beginning in 1983, the CDFG initiated the Ocean Resources Enhancement and Hatchery Program (OREHP) to test the feasibility of raising white seabass for population enhancement. That goal was achieved in the first 10 years of the program and program goals have been expanded to test the feasibility of enhancing marine fish populations through the stocking of cultured fish. By 2006, more than 1,143,000

juvenile white seabass had been released off southern California after spending time in one of 13 growout facilities located throughout the mainland coast and at Santa Catalina Island. Additionally, valuable life history information has been gathered during this program through ecological surveys, tagging, and genetic studies. However, more work is necessary to determine if artificial propagation is successful in enhancing the white seabass population.

Status of the Population

The range of the white seabass population has contracted since the early part of the twentieth century, and few are found regularly north of Point Conception. Limited data are available concerning the status of white seabass in Mexico.

Population estimates have not been made. Fishery biologists have been concerned about the decline in landings since the late 1920s when almost 3 million pounds (1,350 metric tons) were reported landed. Today, this concern still exists within the scientific community, commercial fishing industry, and with the angling public. However, in the last five years ending with 2006, total annual commercial catch averaged approximately twice that of the previous five years.

Human-induced changes, such as pollution, overfishing, and habitat destruction, have probably contributed to this long-term population decline. However, natural environmental changes can also influence the population. The warm ocean water period beginning with the 1982-1983 El Niño helped to increase the survival of young fish. Young fish surveys conducted in southern California, as part of OREHP, showed a dramatic increase in the number of white seabass taken in research gillnet sets during the past decade. During research work in 1997, over 600 juvenile white seabass were captured; in 1998 approximately 700 juvenile fish were taken; in 1999 slightly over 1,300 juveniles were captured, and in 2004, the latest year for which there are complete data, 1,200 juvenile fish were captured. Anecdotal evidence from commercial fishermen and recreational anglers confirms this increase in juvenile white seabass. It is unknown whether this increase in juveniles will subsequently enhance the adult spawning population.

To assist the Commission in determining if management measures need to be modified or added, the WSFMP framework includes points of concern criteria to help determine when management measures are needed to address resource issues. The points of concern are:

1. catch is expected to exceed the current harvest guideline or quota;
2. any adverse or significant change in the biological characteristics of white seabass (age composition, size composition, age at maturity or recruitment) is discovered;
3. an overfishing condition exists or is imminent;

4. any adverse or significant change in the availability of a managed species' forage for dependent species or in the status of a dependent species is discovered;
5. new information on the status of white seabass;
6. an error in data or stock assessment is detected that significantly changes estimates of impacts due to current management.

The 2007 report to the Commission indicated none of the points of concern criteria were met, and thus no management changes for the white seabass fisheries are recommended at this time.

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Updated June 2006

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Further Reading

- Allen, L.G. and M.P. Franklin. 1988. Distribution and abundance of young-of-the-year white seabass, *Atractoscion nobilis*, in the vicinity of Long Beach Harbor, California in 1984-1987. Calif. Fish and Game 74:245-248.
- California Department of Fish and Game, Marine Region. 2007. White Seabass Fishery Management Plan 2005-2006 Annual Review. Unpublished report to the Fish and Game Commission. 11 pages.
- Clark, F.N. 1930. Size at first maturity of the white seabass (*Cynoscion nobilis*). Calif. Fish and Game 16:319-323.
- Moser H.G., D.A. Ambrose, M.S. Busby, J.L. Butler, E.M. Sandknop, B.Y. Sumida, and E.G. Stevens. 1983. Description of early stages of white seabass, *Atractoscion nobilis*, with notes on distribution. Calif. Coop. Oceanic Fish. Invest. Rep. 24:182-193.
- Skogsberg, T. 1939. The fishes of the family Sciaenidae (croakers) of California. Calif. Div. Fish and Game, Fish Bull. 54. 62 p.
- Thomas, J.C. 1968. Management of the white seabass (*Cynoscion nobilis*) in California waters. Calif. Dept. Fish and Game, Fish Bull. 142. 34 p.
- Vojkovich, M. and R.J. Reed. 1983. White seabass, *Atractoscion nobilis*, in California-Mexican waters: status of the fishery. Calif. Coop. Oceanic Fish. Invest. Rep. 24:79-83.