

11. SEA BASSES

Overview of the Fishery

Three species of the sea bass family Serranidae are common in southern California waters: the barred sand bass, *Paralabrax nebulifer*; the kelp bass, *Paralabrax clathratus*; and the spotted sand bass, *Paralabrax maculatofasciatus*¹. In the California Department of Fish and Game's (DFG) historic records of commercial and recreational fisheries, these three sea basses' landings were often combined and reported as "rock bass".

A small commercial fishery existed for these species until 1953, when the commercial take of sea basses was prohibited. Commercially-caught sea basses were sold fresh and primarily consisted of kelp bass and barred sand bass. Sea basses were caught using a wide variety of gear including rod-and-reel, hand line, set line, gillnet, trap, and trawl, and were often taken incidentally by boats fishing for other species.

The commercial record for "rock bass" began in 1916 (Figure 11.1 and Table 11.1). As with many of California's commercial fisheries, landings remained relatively high during World War I because of the increased demand for food, and then declined following the war. Landings rose again during the mid- to late 1920s, and then generally declined until the close of the fishery in 1953. The declines in commercial landings may not have been the result of reduced availability, but rather reduced effort. Effort was not consistent over the time period because few commercial fishermen fished full-time for sea basses. In addition, it was common for recreational anglers to sell their

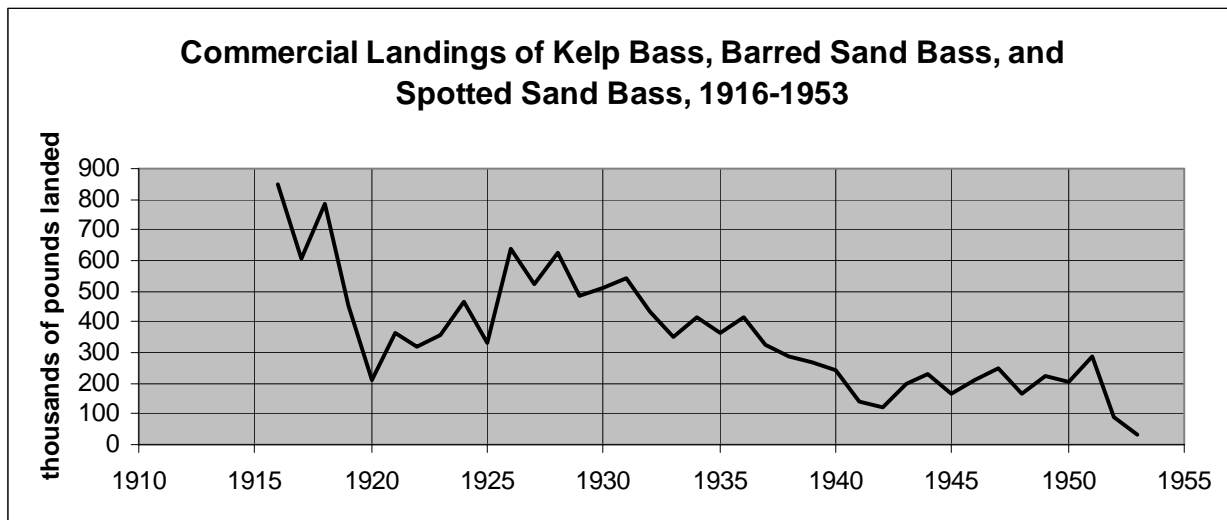


Figure 11.1. Annual commercial landings (pounds) of sea basses (combined landings of kelp bass, barred sand bass, and spotted sand bass) from 1916 to 1953. The commercial fishery was closed in 1953. Data sources are DFG Catch Bulletins.

¹ The white sea bass, *Atractoscion nobilis*, and the giant sea bass, *Stereolepis gigas*, are not in the family Serranidae, and are not covered here.

excess catch of sea basses until 1947, when a law was passed that prohibited the sale of sport-caught fish.

The catch data for the recreational fishery come from two sources: commercial passenger fishing vessel (CPFV) logbooks, and the Marine Recreational Fishery Statistics Survey (MRFSS). The MRFSS was conducted in California from 1980 through 1989 and from 1993 through the present, and estimates the catch of each of the sea bass species by fishing mode: man-made structure, beach and bank, CPFV, and private or rental boat. It also provides an overall estimate of recreational catch in terms of total weight and number of fish. Since 1936, CPFV operators in southern California have been required to keep daily records of the number and type of fish caught from their boats in logbooks provided by DFG. From 1936 through 1974, logbooks asked for only the combined catch catches of all three sea bass species. Logbook information was not collected from 1941 through 1946 (during World War II). In 1975, DFG modified the logbook to list barred sand bass and kelp bass separately. To date, a separate category for spotted sand bass has not been added.

According to CPFV logbooks, an average of 737,000 sea basses have been caught annually from 1947 through 2001 (Figure 11.2 and Table 11.2). The largest CPFV catches occurred from 1963 through 1969 when over one million sea basses were caught annually.

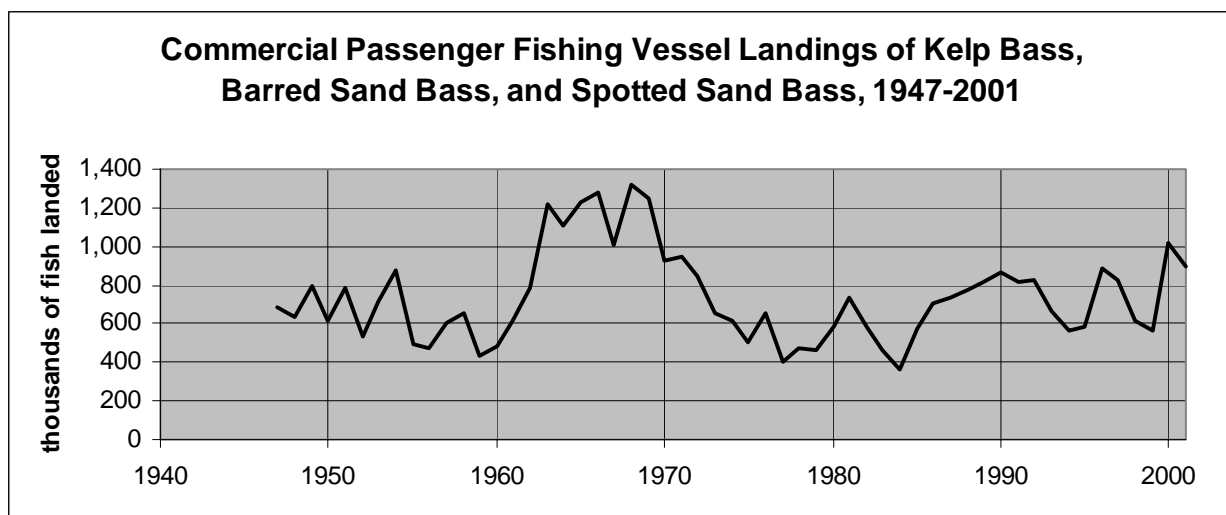


Figure 11.2. Recreational commercial passenger fishing vessel (CPFV) landings (number of fish) as reported on CPFV Logbooks for kelp bass, barred sand bass, and spotted sand bass from 1947 to 2001. Data sources are DFG Catch Bulletins (1947-1978) and DFG Annual Reports of Statewide Fish Landings by the Commercial Passenger Fishing Vessels (CPFV) Fleet (1979-2001).

MRFSS estimates show that the overall recreational catch of sea basses was relatively steady between 1993 and 1995, and then experienced four years of decline (Figure 11.3). Catches rose sharply in 2000 and remained relatively high in 2001.

The sea bass landings for the recreational fishery have generally been larger than those for the commercial fishery. Between 1936 and 1940, the DFG gathered landings data by weight for the CPFV fishery and the commercial fishery. During that time period, CPFV landings were on average almost three times larger than commercial landings. According to MRFSS estimates, the total annual recreational catch of sea

basses during the last two decades has ranged from a low of 1,153,000 lb in 1999 to a high of 4,103,000 lb in 1988 (Figure 11.3). Even the lowest recreational catch during the last two decades surpasses the highest commercial landings (852,000 lb in 1916) on record.

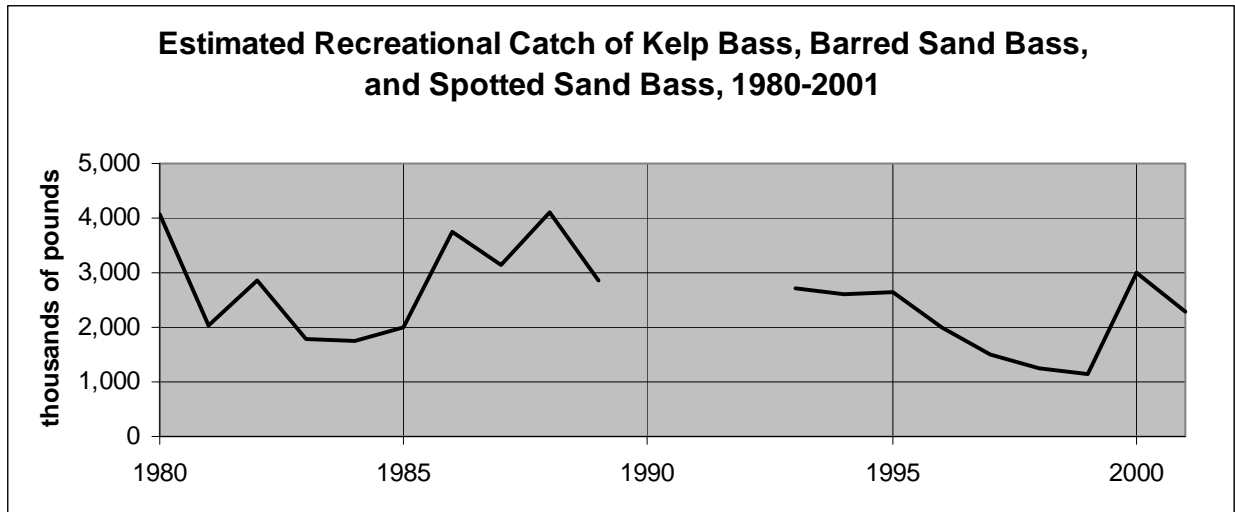


Figure 11.3. Estimated recreational catch (pounds) of kelp bass, barred sand bass, and spotted sand bass from 1980 to 1989 and 1993 to 2001. Catch estimates do not include fish that were caught and released alive. Data source is the MRFSS.

In the early 1950s sport fishermen and fishery managers became concerned about the sea basses resource. Data from life history studies conducted during the 1950s were used to formulate several conservation measures, including:

- Prohibiting the commercial take of all three sea bass species in California waters (established in 1953)
- Imposing a minimum size limit of 10.5 in. for all three species (established in 1953). The size limit was periodically increased between 1953 and 1959, when a 12-in. minimum size limit was adopted that remains in effect today
- Establishing a bag limit of 10 sea bass (any combination of barred sand bass, kelp bass and spotted sand bass) (established in 1959)

Barred Sand Bass

The barred sand bass is a relatively easy fish for marine anglers to catch. Although the sand bass was not considered a quality game fish during the 1930s and early 1940s, it became tremendously popular by the mid-1950s. Since the late 1970s, this species has consistently ranked among the top ten species in the southern California marine sport fish catch.

Barred sand bass are very susceptible to hook-and-line gear and are somewhat easier to catch than kelp bass. When CPFV skippers target schools of barred sand bass, they usually produce substantial catches for their passengers, even when the passengers are novice anglers possessing minimal fishing skills.

Most barred sand bass are caught from boats. Over the last two decades, a little more than half of the landings have been from CPFVs, a little less than half from private or rental boats, and less than 2% from shore (Table 11.3 and Table 11.4). MRFSS estimates of annual barred sand bass landings from all sport fishing modes (shore, pier, private boat, CPFVs, etc.) have averaged about 846,000 fish per year since 1980, with a peak landing of 2.1 million fish in 1988 (Table 11.3). CPFV logbook data indicates that the catch of barred sand bass generally increased from 1975 through 2001, expanding more than five-fold with a peak of 738,000 fish in 2000 (Table 11.2).

Barred sand bass landings now rival kelp bass landings in the nearshore recreational fishery off southern California. In 1985, barred sand bass became the leading bass species in the CPFV catch, exceeding kelp bass landings for the first time since landings for these two species were reported separately. Since 1985, the barred sand bass catch has exceeded the kelp bass catch 75% of the time (Table 11.2).

The major barred sand bass fishing sites include Silver Strand Beach, Del Mar, San Onofre, and the Huntington Flats area in Orange County, the inshore portion of northern Santa Monica Bay off Pacific Palisades and Santa Monica in Los Angeles County, and the Ventura Flats area in Ventura County.

Kelp Bass

Kelp bass, popularly referred to as calico bass, are one of the most important nearshore recreational species off southern California. This species has been targeted by southern California anglers since the early 1900s. Based on recent information, it is very likely that kelp bass comprised most of the "rock bass" category during the early years of the fishery. Sport anglers catch kelp bass using light hook-and-line tackle while fishing from piers, beaches, private boats, and CPFVs.

In the early 1900s, sport anglers considered small kelp bass to be a nuisance fish; only the largest "bull bass" were sought. Perceptions of kelp bass as a sport fish changed, and by the 1930s it had become a popular sport fish. In 1939, the first management attempt to prevent depletion of sport fishes limited the recreational catch to 15 total fish per day (multiple species). Intense fishing immediately after World War II may have caused a progressive decrease in the size of kelp bass, and deterioration of the popular kelp bass fishery. In 1950, DFG began comprehensive life history studies of kelp bass and sand bass. The resulting data were used to create new size and bag limits for sport-caught kelp bass and sand bass. The new size limit, 10.5 in., was increased several times over the years until 1959, when the current 12-in. limit was instated.

CPFV landings of kelp bass typically peak in the late spring and early fall. The catch of kelp bass, as reported in the CPFV logbooks, averaged approximately 328,000 fish per year between 1975 and 2001 (Table 11.2). The catch reached a record low of about 129,000 fish in 1999, but rebounded to previous average levels in 2000 and 2001.

The MRFSS data indicate that nearly all kelp bass are caught from CPFVs, private boats, and rental boats (Table 11.5 and Table 11.6). The MRFSS catch estimates show trends similar to those obtained from CPFV logbook data: declining catches through most of the 1990s with a low in 1999, and then a landings rebound in 2000 and 2001.

The most productive fishing areas for kelp bass in recent years have been off the Coronado Islands in Baja California, Mexico, Point Loma and La Jolla in San Diego County, Dana Point and Huntington Beach in Orange County, Horseshoe Kelp in Los Angeles County, and around the Channel Islands.

Spotted Sand Bass

The distribution of spotted sand bass is limited to a few bay, estuary and harbor habitats. Newport Bay (Orange County), and Mission and San Diego bays (San Diego County) are primary spotted sand bass fishing sites in southern California.

The annual catch of spotted sand bass over the last two decades has been considerably lower than the catches of kelp bass and barred sand bass (Table 11.7 and Table 11.8). During this time period, the average annual catch of spotted sand bass has been about 82,000 fish (Table 11.7), while the average annual catch of kelp bass was over nine times greater (753,000 fish) and the average annual catch of barred sand bass was over ten times greater (846,000 fish). However, the spotted sand bass has recently gained popularity with nearshore anglers for its aggressive behavior and fighting ability, and some angling tournaments exclusively target spotted sand bass. In addition, the accessibility to spotted sand bass habitat has increased dramatically with the introduction of float-tube technology and the increased popularity of fishing from ocean kayaks. This increased accessibility has generated interest in the spotted sand bass as a challenging sport fish.

Although spotted sand bass are not landed in great numbers, they are regionally important to anglers who fish from shore or from small boats. MRFSS estimates that most recreationally-caught spotted sand bass are caught from private or rental boats, while only 8% are caught from shore, and about 3% from CPFVs. The CPFV fleet does not target spotted sand bass since this species occurs in shallow areas where it is difficult to navigate large vessels.

DFG surveys between 1976 and 1981 indicate the annual catch of spotted sand bass in southern California waters by skiff fishermen ranged from about 13,000 to 24,000 fish. The MRFSS estimates of the total sport catch, including boat and shore fishing effort, ranged from 53,000 to 170,000 spotted sand bass per year from 1980 to 1989 and from 17,000 to 95,000 per year from 1994 to 1999 (Table 11.7).

Status of Biological Knowledge

Barred Sand Bass

Barred sand bass range from Santa Cruz (Santa Cruz County) south to Bahia Magdalena, Baja California, Mexico. They are rare north of Point Conception (Santa Barbara County). Barred sand bass chiefly inhabit shallow waters near the southern California mainland. They have been captured at depths of around 600 ft, but the greatest concentrations are found in less than 90 ft. Young barred sand bass are abundant in very shallow water (5 to 30 ft). The name "sand bass" is somewhat unfortunate since they are usually closely associated with sand/rock interfaces of deep reefs and artificial structures, and are rarely found over sandy expanses except when breeding.

Barred sand bass feed mainly on small fishes (including anchovies, sardines, and midshipman), and invertebrates such as crabs, clams, and squid. The largest barred sand bass on record measured 26 in. long, and the heaviest weighed 11.1 lb. Like kelp bass, barred sand bass are also relatively slow growing. A juvenile barred sand bass is approximately 6 in. long after 1 year, and reaches sexual maturity at 3 to 5 years at a length of 7 to 10.5 in. The oldest known barred sand bass was determined to be 24 years old.

Barred sand bass gather to breed over sandy bottoms at depths of 60 to 120 ft in the late spring and summer months. Spawning occurs from April through November, usually peaking in July. Male spawning colors are usually a gray-and-white, high-contrast pattern with large, golden-yellow crescents under the eyes. Barred sand bass produce numerous small, free-drifting eggs that enter the plankton in coastal waters. Young-of-the-year barred sand bass begin appearing in shallow, nearshore waters by early fall.

DFG tagging studies revealed that barred sand bass can move from 5 to 40 mi. from their tagging locations. In the early 1970s, evidence was presented that tumors, deformities, and other anomalies found in barred sand bass may have been linked to industrial and domestic wastes discharged into the nearshore environment. Reports of such abnormalities have decreased over the past two decades.

Kelp Bass

Kelp bass have historically ranged as far north as the mouth of the Columbia River in Washington and south to Bahia Magdalena, Baja California, Mexico; however, they are rare north of Point Conception (Santa Barbara County). Kelp bass are abundant in southern California waters including the Channel Islands, and are typically found in shallow water (surface to 150 ft) closely associated with high-relief structure and kelp. They range throughout the water column, but can be found in the greatest numbers between 8 and 70 ft. In general, kelp bass live solitary lives, assembling only to spawn and to feed on small, schooling fishes. Early tagging studies showed little movement for the majority of kelp bass and concluded that movement, if any, was to nearby rocky reefs or over short distances to gather for breeding. More recently, tagging studies in the northern portion of the Southern California Bight, from Point Conception south to the northern Channel Islands, have indicated that kelp bass are actually quite mobile in this area, with some fish traveling as far as 50 mi.

Kelp bass have the broad diet of a generalized carnivore. They eat small fishes (including anchovies, sardines, surfperch, and queenfish), squids, octopuses, crabs, shrimps, and amphipods. Kelp bass forage primarily in mid-water, but occasionally feed on the bottom. Young kelp bass feed on small crabs, copepods, and plankton. Kelp bass feed lightly in the winter and more heavily from May through September.

Kelp bass mature at about three to five years of age. When mature, they typically measure between 7 and 10.5 in. long. Mature individuals usually gather to breed in deeper water near kelp beds and rocky headlands, in depths of up to 150 ft. Several hundred adults may aggregate in a small area during spawning. Spawning males usually develop high-contrast, black-and-white breeding colors with yellow-orange snouts, while females exhibit golden hues with yellow chins and jaws.

Spawning occurs primarily around the full moon from April through November, peaking in the summer months.

Kelp bass produce free-drifting eggs which enter the plankton in coastal waters. Larvae remain in the plankton for 28 to 30 days, after which they settle into shallow water habitats that have attached algae and drift algae, including kelp. During the first 90 days of life, young kelp bass grow to a length of about 2 in. Juvenile kelp bass can grow to lengths of 5 or 6 in. by the end of their first year, and are about 12 in. (sport-legal size) at five years of age. The average 10-year-old kelp bass is about 18 in. long.

As with most fishes, growth is highly variable, with the largest fish not necessarily being the oldest. For example, the world-record kelp bass (14.5 lb) caught off Newport Beach in 1995 was 27 years old, while a 9.5 lb fish caught at San Clemente Island in 1993 was 34 years old. Kelp bass are known to grow to 28.5 in. and 14.5 lb; the oldest known kelp bass was 34 years old and 25 in. long.

Spotted Sand Bass

The spotted sand bass has a historic range from Monterey (Monterey County) to Mazatlan, Mexico. However, this species is rarely seen north of Santa Monica Bay (Los Angeles County). Included within that range are substantial populations in the Gulf of California. Southern California populations are typically restricted to sand or mud habitat within shallow bays, harbors, and coastal lagoons containing eelgrass, surfgrass and rock relief. These areas act as warm-water refuges for this generally sub-tropical species.

Spotted sand bass grow rapidly during their first two years. Some specimens may grow to 8.8 in. long by the end of their first year. There is no significant difference in growth rates between males and females.

Spotted sand bass spawn in the warm summer months, from late May to early September. The presence of multiple-sized, immature eggs in egg-bearing females indicates that this species may spawn multiple times during a season. During the spawning season, spotted sand bass gather to breed at or near the entrances of bays in southern California. Observations of spawning in the wild indicate that females initiate spawning by leaving the bottom and entering the water column to release eggs. At the time of release, multiple males may dart in to fertilize the eggs. The observed episodes were extremely brief and, once completed, the fish returned to the bottom.

Spotted sand bass eggs and larvae are free-floating and enter the plankton in coastal waters, settling out of the water column at 25 to 31 days. Juvenile spotted sand bass (greater than 2 in.) have several dark stripes running length-wise along their sides, making them similar in appearance to juvenile barred sand bass. Juvenile spotted sand bass occupy eelgrass beds and can share these nursery environments with juvenile barred sand bass and kelp bass. Adults usually occupy a depth of 2 to 30 ft; however, specimens have been taken from waters as deep as 200 ft in the Gulf of California.

The spotted sand bass appears to have a complex mating system. Individual populations within southern California display varied patterns of reproduction. In San Diego Bay, individual fish start their lives as females and after a period of time change into males (a reproductive strategy called "protogynous hermaphroditism"). In Anaheim and Newport Bays, spotted sand bass do not exhibit this reproductive strategy, and have an essentially equal distribution of males and females throughout the age and size

classes in the population. During the spawning season, male and female spotted sand bass exhibit different color patterns: males display a whitish chin color and overall high-contrast body coloration, while females display a yellow chin and a darker body. Male spotted sand bass mature at about 1.4 years and 7.8 in., and females mature at about 1 year and 6.7 in. The impact of potential sex change, if any, on these values is unknown.

In California waters, adult spotted sand bass diets consist primarily of crabs and clams, with fishes forming a relatively small component of their overall food complement. The crab component consists of brachyuran crabs, and the dominant bivalve in the diet is the jackknife clam.

While spotted sand bass can reach 14 years of age, most have a maximum life span of about 10 years. The current world record spotted sand bass is an individual caught in 1995, which was 10 years old, 23 in. long, and weighed 6.7 lb.

Significant physical and genetic differentiation has occurred among spotted sand bass populations throughout their geographic range. The Gulf of California populations appear to be distinct from those on the Pacific coast. Those populations in southern California also appear to be genetically distinct from those on the mid-Baja Pacific coast. This sub-population structure indicates that spotted sand bass do not travel far from their respective habitats.

Status of Populations

There are no current population estimates for any of the three sea bass species.

Barred Sand Bass

Several factors seem to account for the upward trend in CPFV landings of barred sand bass (Table 11.2). CPFVs and private boats have increasingly targeted summer spawning schools, with CPFVs taking most of the catch. Barred sand bass are easier to find during the summer spawning period when the fish are concentrated in well-defined areas along the coast. New barred sand bass spawning sites discovered over the last 20 years are now being exploited by CPFVs and private boats. As fishing effort targeting barred sand bass has increased, there has been concern that the stock may become over-exploited. More information must be collected before the effects of this intense fishing effort can be determined.

Kelp Bass

Low kelp bass landings in the mid-1970s and early 1980s may be attributed to El Niño events, which provide anglers with alternative species to catch. Peak landings of kelp bass have followed each El Niño event. DFG surveys of the CPFV industry in the 1970s and 1980s indicated that a stable spawning population was being maintained, because a large number of age-classes were being caught by anglers. Approximately 85% of the kelp bass kept by CPFV anglers measured between 11.4 and 15.9 in., which represented up to seven age-classes.

Spotted Sand Bass

Southern California populations of spotted sand bass are limited, and genetically distinct. The restrictive, limited environment inhabited by this species tends to amplify the adverse effects of environmental change and recreational fishing pressure.

Complicating matters further, recruitment (the point at which fishes attain sufficient size to enter the fishery) for this species is sporadic, and environmental conditions such as sea surface water temperatures may influence recruitment. Spotted sand bass have substantial recruitment success after El Niño episodes, when nearshore sea surface temperatures are elevated. In other years, recruitment has been poor. This sporadic recruitment pattern may have adverse effects on a population that is being subjected to increased angling pressure.

The effects of increased waterfront development on spotted sand bass populations are unknown. This development may permanently alter nursery habitat and water quality, and may cause downward trends in recruitment, resulting in negative impacts on certain populations.

Management Considerations

The Master Plan for the Marine Life Management Act identified barred sand bass and kelp bass as species in need of fishery management plans. The following management issues could be considered prior to the development of a fishery management plan for sea basses, however:

- Most barred sand bass are caught in the summer months when the fish are aggregated to spawn. Thus, this species may be a good candidate for the establishment of harvest refugia in some areas during peak spawning times.
- Under the current 12 in. minimum size restrictions, kelp bass populations appear to be self-sustaining. However, trophy-sized fish are rare. New conservation measures such as increasing the size limit, imposing minimum and maximum size limits (slot fishing), and/or promoting catch-and-release fishing could be explored.
- The available habitat for spotted sand bass is restricted in southern California. Studies indicate that most of the spotted sand bass caught by recreational anglers are released. Since they are not specifically targeted as a food fish and are mostly caught by recreational anglers for sport, adopting a catch-and-release policy might prove beneficial to this species.

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Revised May 2002

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Further Reading

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Table 11.1. Commercial landings (pounds) of sea basses (kelp bass, barred sand bass, and spotted sand bass), 1916-1953

Year	Pounds	Year	Pounds	Year	Pounds	Year	Pounds
1916	852,059	1926	636,335	1936	416,145	1946	207,548
1917	607,734	1927	525,840	1937	325,000	1947	251,413
1918	783,864	1928	626,239	1938	286,087	1948	164,289
1919	450,229	1929	482,536	1939	266,153	1949	220,579
1920	210,380	1930	509,125	1940	245,559	1950	205,367
1921	363,856	1931	544,879	1941	141,977	1951	288,572
1922	316,051	1932	436,575	1942	122,812	1952	86,745
1923	357,269	1933	348,392	1943	198,132	1953	34,115
1924	466,208	1934	412,371	1944	229,032		
1925	330,285	1935	364,554	1945	163,846		

1. Data source: DFG Catch Bulletins where the combined landings of the three sea bass species are reported as rock bass.
2. Landings consist of fish caught in California or Mexican waters and landed in California, and fish caught in Mexican waters and shipped fresh to California.
3. Landings primarily consist of kelp bass and barred sand bass, with kelp bass comprising a larger proportion of the landings than barred sand bass.
4. Commercial take of sea basses (barred sand bass, kelp bass, and spotted sand bass) was prohibited in 1953.

Table 11.2. Recreational commercial passenger fishing vessel (CPFV) landings (number of fish) as reported on CPFV Logbooks for kelp bass, barred sand bass, and spotted sand bass, 1947-2001

Year	Unspecified kelp and sand basses	Kelp bass	Barred sand bass	Spotted sand bass	Total
1947	682,789	-----	-----	-----	682,789
1948	630,223	-----	-----	-----	630,223
1949	796,959	-----	-----	-----	796,959
1950	619,397	-----	-----	-----	619,397
1951	781,609	-----	-----	-----	781,609
1952	536,075	-----	-----	-----	536,075
1953	711,395	-----	-----	-----	711,395
1954	876,667	-----	-----	-----	876,667
1955	497,343	-----	-----	-----	497,343
1956	470,362	-----	-----	-----	470,362
1957	609,071	-----	-----	-----	609,071
1958	653,671	-----	-----	-----	653,671
1959	428,426	-----	-----	-----	428,426
1960	478,656	-----	-----	-----	478,656
1961	613,604	-----	-----	-----	613,604
1962	789,149	-----	-----	-----	789,149
1963	1,219,344	-----	-----	-----	1,219,344
1964	1,103,394	-----	-----	-----	1,103,394
1965	1,230,313	-----	-----	-----	1,230,313
1966	1,278,939	-----	-----	-----	1,278,939
1967	1,003,914	-----	-----	-----	1,003,914
1968	1,317,963	-----	-----	-----	1,317,963
1969	1,246,175	-----	-----	-----	1,246,175
1970	922,260	-----	-----	-----	922,260
1971	948,121	-----	-----	-----	948,121
1972	842,681	-----	-----	-----	842,681
1973	656,195	-----	-----	-----	656,195
1974	618,034	-----	-----	-----	618,034
1975	39,424	353,463	106,804	-----	499,691
1976	14,485	485,280	156,056	-----	655,821
1977	6,844	272,705	118,545	-----	398,094
1978	6,328	360,277	110,377	-----	476,982
1979	3,195	290,448	169,337	-----	462,980
1980	375	355,950	229,107	-----	585,432
1981	551	501,927	237,084	-----	739,562
1982	630	312,891	273,828	-----	587,349
1983	272	304,645	158,353	-----	463,270
1984	530	222,771	136,612	-----	359,913
1985	169	273,299	299,152	-----	572,620
1986	72	435,516	265,014	-----	700,602
1987	3	325,685	408,635	-----	734,323
1988	26	319,629	451,125	-----	770,780
1989	63	393,892	421,110	-----	815,065

Table 11.2. Recreational commercial passenger fishing vessel (CPFV) landings (number of fish) as reported on CPFV Logbooks for kelp bass, barred sand bass, and spotted sand bass, 1947-2001

Year	Unspecified kelp and sand basses	Kelp bass	Barred sand bass	Spotted sand bass	Total
1990	56	439,701	423,885	-----	863,642
1991	4	321,926	495,784	-----	817,714
1992	153	463,673	363,304	-----	827,130
1993	85	355,088	313,390	-----	668,563
1994	-----	276,087	286,444	-----	562,531
1995	-----	231,687	350,540	-----	582,227
1996	-----	282,673	604,132	-----	886,805
1997	-----	335,127	490,048	-----	825,175
1998	-----	233,591	377,890	-----	611,481
1999	-----	129,475	435,778	-----	565,253
2000	-----	277,191	737,950	-----	1,015,141
2001	-----	304,002	597,274	-----	901,276

----- Landings data not available.

1. Data sources: DFG Catch Bulletins (1947-1978) and DFG Annual Reports of Statewide Fish Landings By The CPFV Fleet (1979-2001).

2. Logbooks have been required for southern California, including fish taken in Mexican waters and landed in California, for the entire time period reported here. Logbooks were required for central and northern California from 1957 to present.

3. The data are number of fish reported on logbooks submitted to DFG.

4. Spotted sand bass has never been listed as a separate reporting category on CPFV logbooks. From 1947 to 1974, an unspecified kelp and sand basses reporting category was used. By 1975, kelp bass and barred sand bass were being recorded separately. By 1994, only low numbers of fish were recorded under unspecified kelp and sand basses.

Table 11.3. Estimated catch (number of fish) by recreational anglers of barred sand bass by fishing mode, 1980-2001

Year	Man-made structures	Beach and bank	Shore	Commercial passenger fishing vessels (CPFV)	Private or rental boats	Total
1980	9,745	33,984	-----	321,554	421,791	787,073
1981	5,163	-----	-----	162,653	206,774	374,591
1982	4,682	3,551	-----	935,544	215,027	1,158,804
1983	4,155	2,572	-----	232,914	187,377	427,018
1984	6,326	4,170	-----	186,832	213,963	411,291
1985	6,893	3,183	-----	532,639	251,785	794,499
1986	-----	-----	12,343	537,661	398,208	948,213
1987	-----	-----	17,258	500,371	718,514	1,236,142
1988	-----	-----	39,859	1,272,073	809,830	2,121,762
1989	-----	-----	5,090	769,884	520,799	1,295,773
1990	-----	-----	-----	-----	-----	-----
1991	-----	-----	-----	-----	-----	-----
1992	-----	-----	-----	-----	-----	-----
1993	2,591	835	-----	411,951	315,808	731,185
1994	3,891	11,337	-----	383,379	292,141	690,748
1995	9,627	4,854	-----	511,364	275,668	801,513
1996	5,565	860	-----	502,879	234,502	743,806
1997	6,640	3,680	-----	189,799	262,854	462,972
1998	3,067	1,218	-----	155,849	257,498	417,632
1999	2,403	749	-----	214,208	271,382	488,742
2000	6,711	3,255	-----	774,009	475,316	1,259,292
2001	3,549	885	-----	355,628	567,245	927,308

----- Estimates not available.

1. Data source: MRFSS; data obtained from the Pacific States Marine Fisheries Commission website.
2. No estimates are available from 1990 through 1992 or for January and February of 1995. Estimates for 2001 are preliminary. Northern California CPFVs were not fully sampled because of refusals.
3. Catch estimates do not include fish that were caught and released alive; they only include fish that were harvested.
4. From 1986 to 1989, individual catch estimates were not made for the man-made structures mode or the beach and bank mode. Instead, a single estimate was made for these shore modes.

Table 11.4. Estimated catch (pounds) by recreational anglers of barred sand bass by fishing mode, 1980-2001

Year	Man-made structures	Beach and bank	Shore	Commercial passenger fishing vessels (CPFV)	Private or rental boats	Total
1980	11,339	28,842	-----	775,866	896,530	1,712,577
1981	4,900	-----	-----	246,782	300,011	551,693
1982	1,507	3,753	-----	1,340,897	312,977	1,659,134
1983	4,277	1,238	-----	356,741	270,540	632,796
1984	4,586	3,704	-----	294,782	321,242	624,314
1985	5,173	705	-----	740,899	342,806	1,089,583
1986	-----	-----	12,236	781,410	615,016	1,408,662
1987	-----	-----	15,748	662,610	1,060,748	1,739,106
1988	-----	-----	26,144	1,568,702	1,174,013	2,768,859
1989	-----	-----	3,563	1,075,505	863,453	1,942,520
1990	-----	-----	-----	-----	-----	-----
1991	-----	-----	-----	-----	-----	-----
1992	-----	-----	-----	-----	-----	-----
1993	3,128	692	-----	552,154	518,025	1,073,999
1994	2,303	12,459	-----	565,696	512,602	1,093,060
1995	6,631	9,146	-----	872,879	512,893	1,401,549
1996	4,808	969	-----	789,970	378,872	1,174,620
1997	9,354	3,091	-----	279,326	409,161	700,932
1998	4,165	1,505	-----	243,874	448,885	698,429
1999	1,576	1,071	-----	281,291	448,850	732,788
2000	6,386	3,255	-----	1,059,986	784,980	1,854,607
2001	5,143	1,164	-----	556,122	968,704	1,531,134

----- Estimates not available.

1. Data source: MRFSS; data obtained from the Pacific States Marine Fisheries Commission website.
2. No estimates are available from 1990 through 1992 or for January and February of 1995. Estimates for 2001 are preliminary. Northern California CPFVs were not fully sampled because of refusals.
3. Catch estimates do not include fish that were caught and released alive; they only include fish that were harvested.
4. From 1986 to 1989, individual catch estimates were not made for the man-made structures mode or the beach and bank mode. Instead, a single estimate was made for these shore modes.

Table 11.5. Estimated catch (number of fish) by recreational anglers of kelp bass by fishing mode, 1980-2001

Year	Man-made structures	Beach and bank	Shore	Commercial passenger fishing vessels (CPFV)	Private or rental boats	Total
1980	40,911	81,926	-----	664,263	541,106	1,328,206
1981	9,671	16,482	-----	588,060	313,161	927,374
1982	7,933	4,836	-----	628,139	183,731	824,639
1983	11,700	10,950	-----	476,843	247,929	747,421
1984	6,523	4,556	-----	339,206	286,628	636,912
1985	5,155	2,796	-----	542,308	166,575	716,835
1986	-----	-----	17,026	1,147,160	420,515	1,584,701
1987	-----	-----	20,924	261,035	548,399	830,359
1988	-----	-----	25,556	233,062	564,430	823,049
1989	-----	-----	15,197	389,964	237,517	642,679
1990	-----	-----	-----	-----	-----	-----
1991	-----	-----	-----	-----	-----	-----
1992	-----	-----	-----	-----	-----	-----
1993	10,794	5,370	-----	556,579	357,651	930,393
1994	5,720	15,462	-----	585,301	289,010	895,493
1995	2,989	9,590	-----	456,298	218,510	687,388
1996	7,337	1,494	-----	324,312	201,994	535,136
1997	2,692	2,573	-----	250,744	211,718	467,727
1998	5,688	1,103	-----	139,362	184,088	330,241
1999	3,051	614	-----	95,722	149,447	248,833
2000	1,214	-----	-----	363,551	292,346	657,111
2001	1,736	-----	-----	187,795	301,019	490,550

----- Estimates not available.

1. Data source: MRFSS; data obtained from the Pacific States Marine Fisheries Commission website.
2. No estimates are available from 1990 through 1992 or for January and February of 1995. Estimates for 2001 are preliminary. Northern California CPFVs were not fully sampled because of refusals.
3. Catch estimates do not include fish that were caught and released alive; they only include fish that were harvested.
4. From 1986 to 1989, individual catch estimates were not made for the man-made structures mode or the beach and bank mode. Instead, a single estimate was made for these shore modes.

Table 11.6. Estimated catch (pounds) by recreational anglers of kelp bass by fishing mode, 1980-2001

Year	Man-made structures	Beach and bank	Shore	Commercial passenger fishing vessels (CPFV)	Private or rental boats	Total
1980	29,858	37,179	-----	1,332,027	827,341	2,226,404
1981	11,216	14,737	-----	849,176	496,125	1,371,255
1982	5,165	5,537	-----	774,459	324,131	1,109,292
1983	7,046	10,994	-----	628,547	400,025	1,046,612
1984	3,351	5,819	-----	461,787	542,508	1,013,464
1985	3,204	3,569	-----	605,223	230,601	842,597
1986	-----	-----	16,326	1,484,317	659,544	2,160,187
1987	-----	-----	48,303	346,158	856,723	1,251,184
1988	-----	-----	24,760	281,721	861,350	1,167,831
1989	-----	-----	11,355	456,606	377,594	845,555
1990	-----	-----	-----	-----	-----	-----
1991	-----	-----	-----	-----	-----	-----
1992	-----	-----	-----	-----	-----	-----
1993	15,899	7,076	-----	767,946	747,238	1,538,158
1994	6,165	23,377	-----	861,114	541,081	1,431,737
1995	3,510	17,021	-----	658,132	445,843	1,124,506
1996	8,834	2,294	-----	419,536	338,703	769,366
1997	2,590	5,084	-----	376,780	350,237	734,690
1998	4,464	1,298	-----	185,860	328,307	519,929
1999	2,323	931	-----	125,184	247,207	375,646
2000	1,184	-----	-----	481,854	546,693	1,029,731
2001	1,357	-----	-----	234,972	452,779	689,109

----- Estimates not available.

1. Data source: the Marine Recreational Fisheries Statistics Survey (MRFSS); data obtained from the Pacific States Marine Fisheries Commission website.
2. No estimates are available from 1990 through 1992 or for January and February of 1995. Estimates for 2001 are preliminary. Northern California CPFVs were not fully sampled because of refusals.
3. Catch estimates do not include fish that were caught and released alive; they only include fish that were harvested.
4. From 1986 to 1989, individual catch estimates were not made for the man-made structures mode or the beach and bank mode. Instead, a single estimate was made for these shore modes.

Table 11.7. Estimated catch (number of fish) by recreational anglers of spotted sand bass by fishing mode, 1980-2001

Year	Man-made structures	Beach and bank	Shore	Commercial passenger fishing vessels (CPFV)	Private or rental boats	Total
1980	5,811	14,701	-----	3,104	115,925	139,541
1981	749	6,513	-----	-----	84,168	91,429
1982	285	1,834	-----	-----	61,698	63,817
1983	1,507	141	-----	987	72,418	75,053
1984	5,998	2,877	-----	863	89,771	99,509
1985	791	1,501	-----	-----	66,615	68,906
1986	-----	-----	3,697	4,624	161,782	170,103
1987	-----	-----	2,567	673	137,637	140,877
1988	-----	-----	20,690	9,436	121,107	151,232
1989	-----	-----	4,509	926	48,059	53,494
1990	-----	-----	-----	-----	-----	-----
1991	-----	-----	-----	-----	-----	-----
1992	-----	-----	-----	-----	-----	-----
1993	1,866	5,323	-----	4,636	82,880	94,705
1994	3,771	3,938	-----	1,622	68,734	78,064
1995	3,489	2,093	-----	10,818	37,526	53,927
1996	2,073	4,790	-----	1,153	40,544	48,559
1997	1,019	2,257	-----	1,525	45,334	50,134
1998	187	2,446	-----	480	14,061	17,174
1999	-----	527	-----	195	34,867	35,589
2000	2,523	3,758	-----	356	71,217	77,854
2001	-----	2,232	-----	-----	48,071	50,303

----- Estimates not available.

1. Data source: the Marine Recreational Fisheries Statistics Survey (MRFSS); data obtained from the Pacific States Marine Fisheries Commission website.
2. No estimates are available from 1990 through 1992 or for January and February of 1995. Estimates for 2001 are preliminary. Northern California CPFVs were not fully sampled because of refusals.
3. Catch estimates do not include fish that were caught and released alive; they only include fish that were harvested.
4. From 1986 to 1989, individual catch estimates were not made for the man-made structures mode or the beach and bank mode. Instead, a single estimate was made for these shore modes.

Table 11.8. Estimated catch (pounds) by recreational anglers of spotted sand bass by fishing mode, 1980-2001

Year	Man-made structures	Beach and bank	Shore	Commercial passenger fishing vessels (CPFV)	Private or rental boats	Total
1980	4,907	15,007	-----	7,645	121,522	149,082
1981	572	2,976	-----	-----	95,454	99,002
1982	126	1,573	-----	-----	75,195	76,894
1983	812	155	-----	1,568	87,272	89,806
1984	3,591	2,827	-----	951	98,282	105,651
1985	700	970	-----	-----	67,286	68,956
1986	-----	-----	3,295	5,765	177,556	186,616
1987	-----	-----	2,802	538	145,252	148,592
1988	-----	-----	21,910	9,016	135,865	166,791
1989	-----	-----	5,570	1,289	57,168	64,026
1990	-----	-----	-----	-----	-----	-----
1991	-----	-----	-----	-----	-----	-----
1992	-----	-----	-----	-----	-----	-----
1993	1,954	5,478	-----	8,855	98,841	115,129
1994	4,607	5,012	-----	1,301	85,729	96,649
1995	4,442	2,155	-----	33,672	64,166	104,435
1996	2,456	5,490	-----	1,460	51,702	61,108
1997	1,024	2,498	-----	1,617	55,815	60,954
1998	173	3,075	-----	616	19,013	22,877
1999	-----	453	-----	266	43,957	44,677
2000	2,701	4,820	-----	449	89,905	97,875
2001	-----	3,024	-----	-----	71,162	74,186

----- Estimates not available.

1. Data source: the Marine Recreational Fisheries Statistics Survey (MRFSS); data obtained from the Pacific States Marine Fisheries Commission website.
2. No estimates are available from 1990 through 1992 or for January and February of 1995. Estimates for 2001 are preliminary. Northern California CPFVs were not fully sampled because of refusals.
3. Catch estimates do not include fish that were caught and released alive; they only include fish that were harvested.
4. From 1986 to 1989, individual catch estimates were not made for the man-made structures mode or the beach and bank mode. Instead, a single estimate was made for these shore modes.