

REVIEW OF SOME CALIFORNIA FISHERIES FOR 2007: COASTAL PELAGIC FINFISH, MARKET SQUID, DUNGENESS CRAB, CALIFORNIA SPINY LOBSTER, HIGHLY MIGRATORY SPECIES, OCEAN SALMON, GROUND FISH, CALIFORNIA HALIBUT, HAGFISH, PACIFIC HERRING, AND RECREATIONAL

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SUMMARY

In 2007, commercial fisheries landed an estimated 172,125 metric tons (t) of fishes and invertebrates from California ocean waters (fig. 1). This represents an increase of over 13% from the 152,088 t landed in 2006, and a 32% decline from the peak landings of 252,568 t in 2000. The preliminary ex-vessel economic value of commercial landings in 2007 was nearly \$120 million, a decrease of 8% from the \$130 million in 2006.

Pacific sardine was by far the largest volume fishery in the state at nearly 81,000 t, but third in ex-vessel value at \$8.2 million. Market squid was second in landings at over 49,000 t, and was the highest valued fishery in the state at \$29.1 million. The other top-five volume fisheries included northern anchovy at 10,400 t, red sea urchin at 5,050 t, and Pacific mackerel at 5,018 t. The ex-vessel value of Dungeness crab dropped to second in 2007 at \$26.8 million, a decline of 85% from the record annual harvest in 2006. The other top-five valued fisheries include Pacific Chinook salmon at nearly \$7.8 million, California spiny lobster at nearly \$6.9 million, and red sea urchin at \$5.0 million.

Dungeness crab landings for 2007 dropped to less than 5,000 t, a 58% decline from the record landings for 2006. Historically, the fishery peaks in a ten-year cycle. Commercial landings for California spiny lobster also declined to 300 t, a 26% decline from 2006. Starting in 2008, recreational lobster fishermen will need to carry and complete a Spiny Lobster Report Card which will be used to track recreational catch and effort.

For highly migratory species, commercial and recreational landings of albacore in California increased over 300%, although landings along the entire West Coast were down in 2007. Landings of all other tuna species increased slightly with the exception of skipjack. Landings of swordfish increased 46% over 2006. In 2007, the California Fish and Game Commission (Commission) adopted bag limits for both albacore and bluefin tuna consistent with federal regulations.

In 2007, California ocean salmon fisheries were less constrained than in 2006 due to a higher forecasted abundance of Klamath River Fall Chinook (KRFC). Commercial fisheries had 141 more days open than in

2006. Estimated total commercial landings were 113,400 Chinook (686 t), which was the second lowest catch on record; however, this was still a 45% increase in weight compared to 2006 (lowest catch on record). Recreational fisheries had 90 more days open than in 2006. Estimated total recreational landings were 47,600 Chinook. This is the lowest catch on record and a 51% decrease compared to 2006. Estimated effort was 105,700 angler days, a 16% decrease from 2006. The catch per unit effort was 0.5 fish per angler, a 41% decrease from 2006.

California's commercial groundfish harvest for 2007 was over 10,000 t, a 13% decrease over 2006 landings. Pacific whiting, Dover sole, and sablefish continued to be the top species landed. The ex-vessel value of groundfish landings for 2007 was \$15.9 million, 8% higher than in 2006. The first stock assessment for blue rockfish was completed in 2007.

For California halibut, new regulations have closed portions of the traditional halibut trawl grounds and implemented a restricted access program which has resulted in a decrease in landings from a peak of 596 t in 1999 to a low of 174 t in 2007. Pacific hagfish landings in California increased ten-fold from 77 t in 2006 to 773 t in 2007, the result of increased demand in South Korean markets for human consumption. Pacific herring landings in California dropped to the second lowest level in the 35-year history of the fishery, thought to be the result of a decrease in length at age of the fish and increased competition from other herring fisheries world-wide.

Over 541,000 recreational anglers caught nearly 2.7 million fish and invertebrates aboard Commercial Passenger Fishing Vessels (CPFVs) in California in 2007, a 10% decline from the 3.0 million landed in 2006. Rockfishes (all species combined), kelp bass, and California scorpionfish, barred sandbass, and California barracuda were the top species landed.

In 2007, the Commission undertook 14 rule-making actions that address marine and anadromous species. The Commission adopted changes to albacore, bluefin tuna, salmon, groundfish, sea urchin, abalone, herring, and rock crab regulations and added the recreational Spiny Lobster Report Card. The Commission also established 15 marine protected areas (528 square kilometers, 204 square

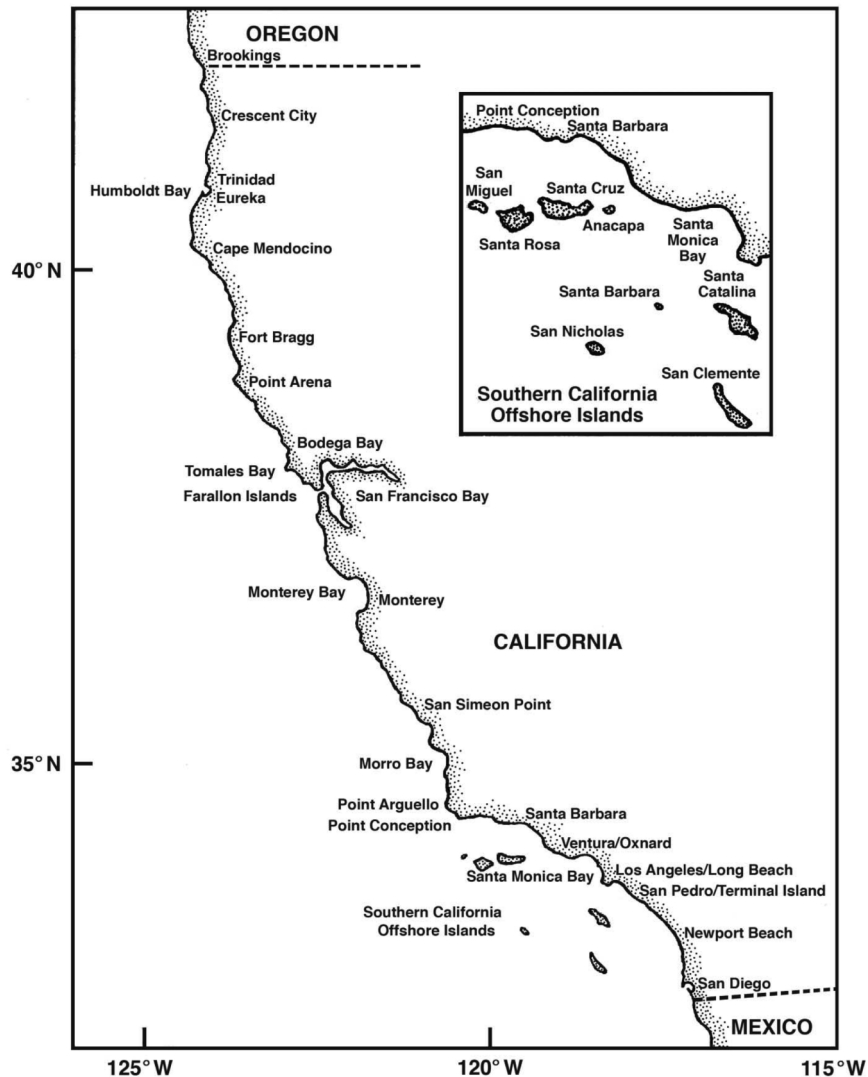


Figure 1. California ports and fishing areas.

miles) in central California from Pigeon Point in San Mateo County south to Point Conception in Santa Barbara County, and approved the establishment of federal marine protected areas adjacent to the previously established Channel Islands marine protected areas under the Marine Life Protection Act. In addition, the Commission was petitioned to increase protections for two anadromous Osmerids: to uplist the delta smelt from threatened to endangered and to list the longfin smelt as endangered.

Coastal Pelagic Finfish

Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*), and northern anchovy (*Engraulis mordax*) form a finfish complex known as coastal pelagic species (CPS). These species are jointly managed by the Pacific Fishery Man-

agement Council (PFMC) and NOAA's National Marine Fisheries Service (NMFS). In 2007, total commercial landings for these species equaled 96,990 t (tab. 1), and was valued at nearly \$10.3 million in ex-vessel revenue. Compared to landings in 2006, this represents a 46% and 40% increase in quantity and ex-vessel value, respectively. Once again, Pacific sardine ranked as the largest fishery among these four species, contributing 83% of the combined quantity and 80% of the combined ex-vessel value.

Pacific Sardine. In 2007, the total quantity of Pacific sardine landed (80,950 t) was 73% greater than in 2006 (46,762 t). This is the largest amount of Pacific sardine landed in California since the late 1960s and generated an ex-vessel value of more than \$8 million. Commercial landings of sardine averaged 50,236 t over the ten-year period from 1998–2007 (fig. 2). Nearly all (96%) of California's 2007 sardine catch was landed in Los Angeles

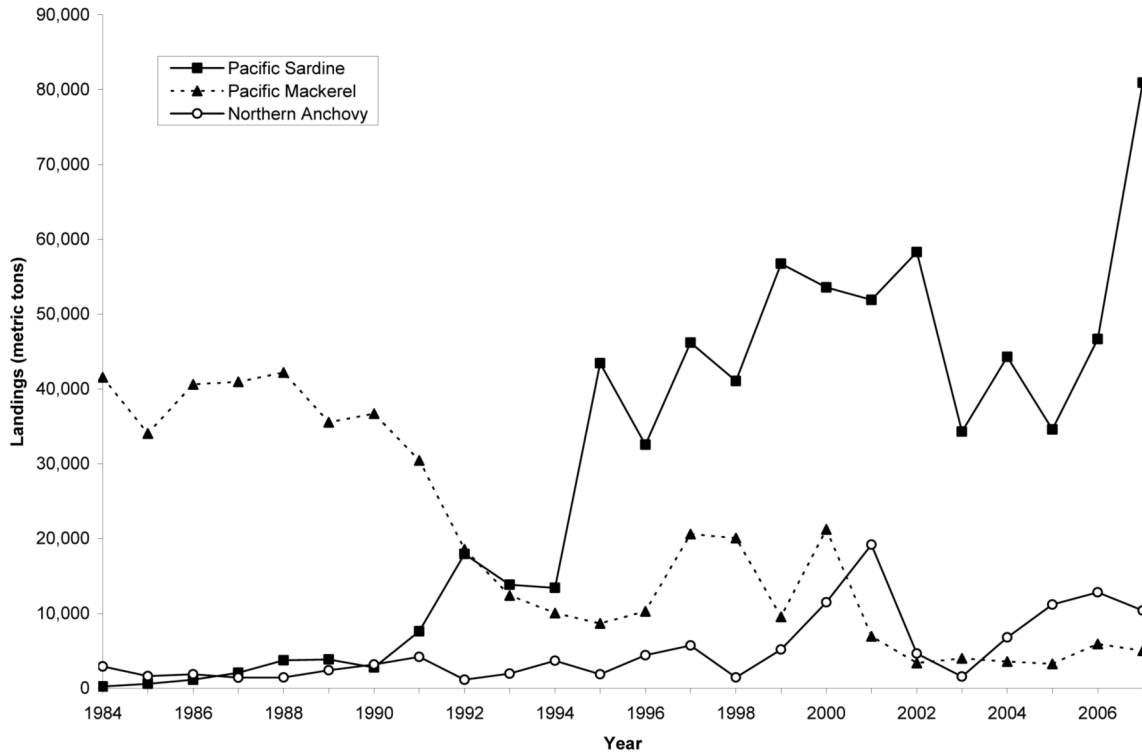


Figure 2. California commercial landings of Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus*), and northern anchovy (*Engraulis mordax*) 1984–2007.

TABLE 1
 Landings of Coastal Pelagic Species in California (metric tons).

Year	Pacific sardine	Northern anchovy	Pacific mackerel	Jack mackerel	Pacific herring	Market squid	Total
1977	5	99,504	5,333	44,775	5,200	12,811	167,628
1978	4	11,253	11,193	30,755	4,401	17,145	74,751
1979	16	48,094	27,198	16,335	4,189	19,690	115,542
1980	34	42,255	29,139	20,019	7,932	15,385	114,764
1981	28	51,466	38,304	13,990	5,865	23,510	133,163
1982	129	41,385	27,916	25,984	10,106	16,308	121,828
1983	346	4,231	32,028	18,095	7,881	1,824	64,405
1984	231	2,908	41,534	10,504	3,786	564	59,527
1985	583	1,600	34,053	9,210	7,856	10,275	63,577
1986	1,145	1,879	40,616	10,898	7,502	21,278	83,318
1987	2,061	1,424	40,961	11,653	8,264	19,984	84,347
1988	3,724	1,444	42,200	10,157	8,677	36,641	102,843
1989	3,845	2,410	35,548	19,477	9,046	40,893	111,219
1990	2,770	3,156	36,716	4,874	7,978	28,447	83,941
1991	7,625	4,184	30,459	1,667	7,345	37,388	88,668
1992	17,946	1,124	18,570	5,878	6,318	13,110	62,946
1993	13,843	1,954	12,391	1,614	3,882	42,708	76,392
1994	13,420	3,680	10,040	2,153	2,668	55,395	85,929
1995	43,450	1,881	8,667	2,640	4,475	70,278	131,391
1996	32,553	4,419	10,286	1,985	5,518	80,360	135,121
1997	46,196	5,718	20,615	1,161	11,541	70,257	155,488
1998	41,056	1,457	20,073	970	2,432	2,709	68,646
1999	56,747	5,179	9,527	963	2,207	90,322	164,945
2000	53,586	11,504	21,222	1,135	3,736	117,961	209,144
2001	51,811	19,187	6,924	3,615	2,715	85,828	170,080
2002	58,353	4,643	3,367	1,006	3,339	72,878	143,586
2003	34,292	1,547	3,999	155	1,780	44,965	88,741
2004	44,293	6,793	3,569	1,027	1,596	40,324	99,606
2005	34,599	11,178	3,243	199	219	55,407	104,845
2006	46,672	12,815	5,904	1,169	37	49,248	115,845
2007	80,950	10,390	5,018	632	597	49,438	147,025

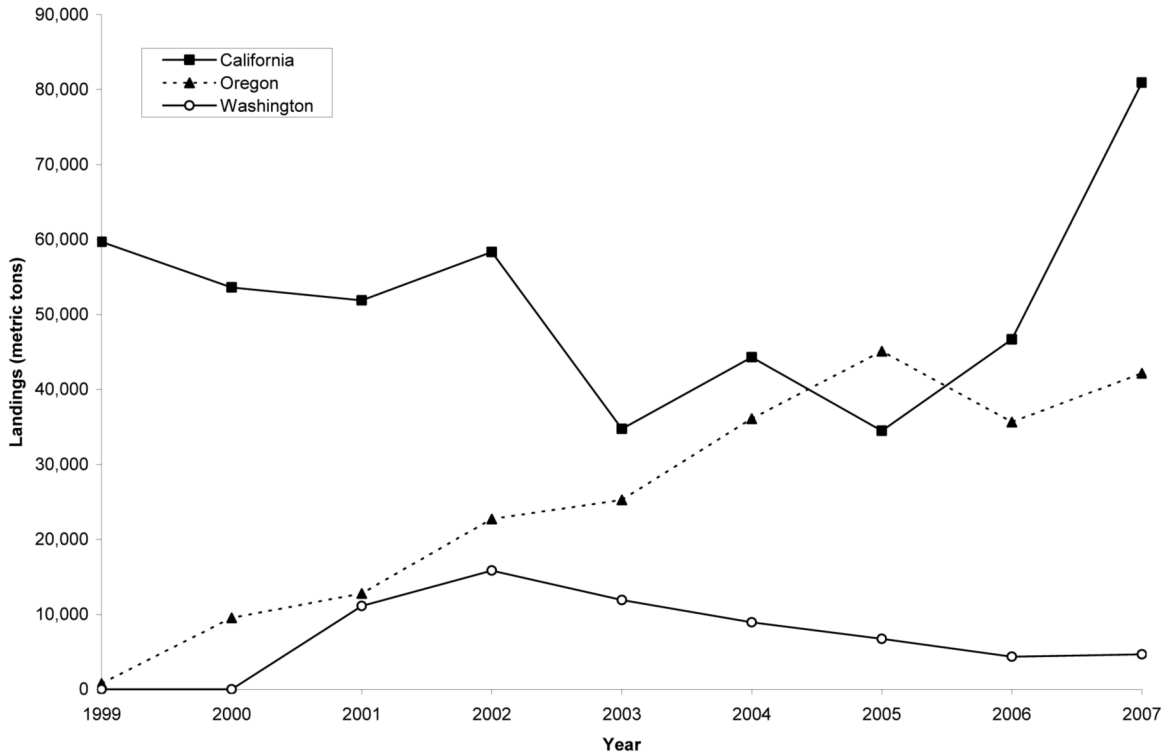


Figure 3. Commercial landings of Pacific sardine (*Sardinops sagax*) in California, Oregon, and Washington, 1999–2007.

TABLE 2
Landings (metric tons) of Pacific sardine (*Sardinops sagax*) and Pacific mackerel (*Scomber japonicus*) at California port areas in 2007.

Area	Pacific sardine		Pacific mackerel	
	Landings	% Total	Landings	% Total
Eureka	0	0	0	0
San Francisco	2	0	0	0
Monterey	34,756	43	123	2
Santa Barbara	3,208	4	9	0
Los Angeles	42,984	53	4,885	97
San Diego	0	0	0	0
Total	80,950	100	5,018	100

(53%, 42,966.2 t) and Monterey (43%, 34,755.8 t) port areas (tab. 2).

In keeping with the increased California landings for 2007, California exports of sardine increased by 43% over 2006 exports (46,762 t). A total of 66,896 t of sardine product was exported to 37 countries. The majority (83%) of this product was exported to Thailand (20,463 t), Australia (18,498 t), Brazil (9,632 t), and Japan (7,061 t). These four countries represent 80% of the total export value of nearly \$40.4 million.

The Pacific sardine fishery ranges from British Columbia, Canada, southward to Baja California, Mexico.

The majority of landings occur in southern California and northern Baja California. However, since the expansion of the sardine fishery in 1999, landings have steadily increased in the Pacific Northwest. The combined landings of Pacific sardine for California, Oregon, and Washington totaled 127,597 t, up 47% from the 86,682 t landed in 2006. The Pacific sardine harvest guideline (HG) for each calendar year is determined from the previous year's stock biomass estimate (≥ 1 -year-old fish on 1 July) in U.S. and Mexican waters. The recommended HG for the 2007 season was 152,564 t based on a biomass estimate of 1.3 million t. This was 28% higher than the HG for 2006. The Pacific sardine HG was apportioned coast-wide through the year with 35% allocated from 1 January through 30 June, 40% plus any portion not harvested allocated from 1 July through 15 September, and the last 25%, plus any portion not harvested from the first two allocations, released on 15 September. The U.S. West Coast fisheries harvested a greater proportion (84%) of the HG compared to 2006 (69%). PFMC and NMFS will formally review this allocation scheme in 2009.

The steady increase of sardines landed in Oregon since 1999 may have leveled off or slowed in the last three years (fig. 3). Oregon landings of sardine totaled 42,144 t in 2007, a slight increase over 2006 (35,648 t). In 2007, they exported 12,483 t of sardine product worth over

\$8.4 million. Brazil and Thailand received 70% of the exported sardines.

Washington landings of Pacific sardine have decreased to 4,665 t in 2007 since a peak in 2000 (15,832 t) (fig. 3). This is only slightly higher than 2006 (4,362 t). Washington exported more sardine than they landed (30,118 t), possibly product that was landed in Oregon or California.

The 2008 proposed HG is 89,093 t or 42% less than the HG for 2007. Because of the potential of the fishing industry to meet or exceed the HG, a 10% set aside for an incidental fishery was adopted. Should landings in the directed fishery exceed the allocation, Pacific sardines will be limited to 20% by weight when landing mixed loads of CPS. Should the incidental set aside for that allocation also be exceeded, the sardine fishery will be closed until the next allocation is released.

Pacific Mackerel. Pacific mackerel landings in California continue to be relatively low, with 5,018 t in 2007 (tab. 1) following a six-year trend (fig. 2). The vast majority of this catch was landed in Los Angeles port areas (tab. 2). The total ex-vessel value generated for Pacific mackerel in 2007 was \$782,370. Industry exported 2,157 t of mackerel product, valued at nearly \$2.1 million, to 18 countries. Indonesia (397 t), Philippines (298 t), China (291), and Egypt (242 t) received over half (57%) of this product.

Oregon reported 702 t of Pacific mackerel landed in 2007 for a total ex-vessel value of \$82,608. This is up slightly from the 2006 catch of 665 t. No landings of mackerel have been reported in Washington since 2005. Washington landings of Pacific mackerel are typically low, with an annual average of 80 t (unspecified mackerel) since 1999.

Similar to sardines, the majority of Pacific mackerel landings occur in southern California and Ensenada, BCM. In the U.S., the fishing season for Pacific mackerel is 1 July to 30 June the following year. At the start of the 2007–08 season, NMFS estimated the biomass at 359,290 t, and PMFC set the HG at 40,000 t. These values are higher than the prior season (biomass: 112,700 t; HG: 19,845 t) due to changes in the modeling parameters used for stock assessment. Landings above the HG would be constrained by an incidental catch rate of 45% by weight when landed with other CPS.

Jack Mackerel. In 2007, jack mackerel landings represented less than 1% of the total catch of CPS in California with 632 t landed. This is nearly half of the total 2006 catch (1,169 t) and generated \$144,167 in ex-vessel value. Landings in Oregon continue to be low with 14 t landed in 2007 for an ex-vessel value of \$1,493. Washington reported no landings of jack mackerel during 2007.

Northern Anchovy. Landings of northern anchovy in California have been reported since 1916. Historically, anchovy was reduced to oil or fish meal and the fishery was modest compared to Pacific sardine and Pacific mackerel. However, periods of low sardine abundance saw increased anchovy landings. Peak landings were seen in the early- to mid-1970s with total annual harvest exceeding 100,000 t at times. Today, landings of northern anchovy are relatively modest, averaging about 8,500 t per year over the last 10 years (fig. 3). The vast majority of northern anchovy are landed in California, with occasional landings in Oregon and Washington. Anchovy are currently used for human consumption, animal food and live bait.

Three stocks of northern anchovy are identified: northern, central, and southern. California fishery harvests are taken from the central stock which ranges from northern Baja California, Mexico, to San Francisco, California. Studies of scale deposits on the sea floor suggest that anchovy abundance can be quite high at times. At this time, the CPS fishery management plan (FMP) regards northern anchovy as a monitored species, with no requirements for formal annual assessments.

California landings of northern anchovy in 2007 amounted to 10,390 t with an ex-vessel value of nearly \$1.2 million (tab. 1). This is 81% of total 2006 landings (12,815 t), but anchovy still ranked as the second most valuable CPS finfish after Pacific sardine. Exports of northern anchovy product from California totaled 357 t for an export value of \$339,717. Of the eight countries that received anchovy product from California, Australia received the majority (81%).

For 2007, there were no reported landings of northern anchovy in Oregon. Washington reported 153 t valued at \$35,883 ex-vessel value for 2007. Less than one metric ton was exported to Canada.

Pacific Bonito. From 1999–2007, annual Pacific bonito (*Sarda chiliensis lineolata*) landings averaged 439 t, a small percentage of the total CPS quantity landed in California. In 2007, landings dropped 91% from last year's high of 2,491 t to 222 t. The landings generated an ex-vessel value of \$158,853. No landings of Pacific bonito were reported from Oregon or Washington in 2007.

California Market Squid

In 2007, market squid (*Loligo opalescens*) was California's largest fishery for ex-vessel value and second to Pacific sardine in quantity. Total landings in the squid fishery were 1% more than in 2006, increasing from 49,150 t to 49,801 t (fig. 4). The ex-vessel price ranged from \$22–\$1,654/t, with an average of 597/t (an increase compared to the 2006 average of \$560/t). The 2007 ex-vessel value was approximately \$29.3 million, a 9% increase from 2006 (\$26.9 million). Market squid remains an important international commodity and is used domesti-

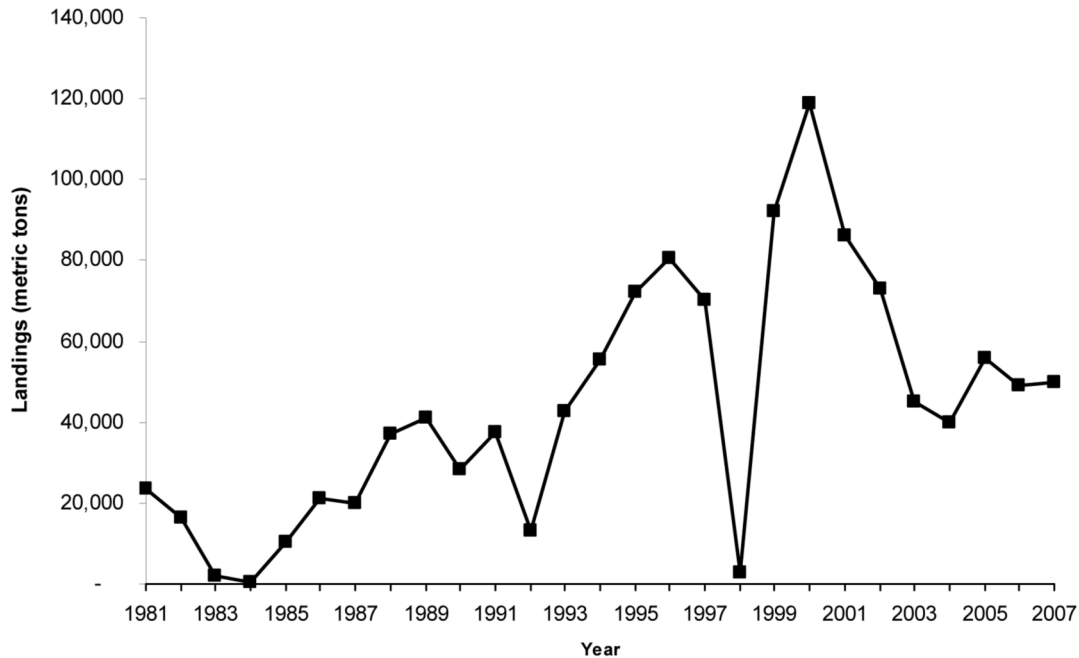


Figure 4. California commercial market squid (*Loligo opalescens*) landings, 1981–2007.

cally for food and as bait by the recreational fishery. Approximately 25,025 t of market squid were exported for a value of \$32.9 million in 2007. Asian countries were the main export market with about 82% of the trade going to China (16,910 t) and Japan (3,489 t). Approximately 9% of the trade went to England (770 t), Spain (690 t), and Australia (590 t). The remaining 9% was exported to 37 other countries. Unlike last year, no market squid was exported to Switzerland. In 2006, Switzerland accounted for 19% of the total export trade and was the second only to China.

The market squid fishery uses either seine or brail gear that is usually combined with attracting lights to capture spawning adult squid aggregations swimming in shallow water. While most fishing effort occurs at night, spawning in some areas has been observed during the day. Spawning may occur year-round; however, generally the fishery is most active from April to September in northern regions (north of Point Conception) of California and from October to March in southern regions (south of Point Conception).

The fishing permit season for market squid extends from 1 April through 31 March of the following year. During the 2007–08 season (as opposed to the 2007 calendar year) 45,813 t were landed, a 32% increase from the 2006–07 season (34,809 t). There was a 90% decline in catch from the northern fishery near Monterey in the 2007–08 season with only 53 t landed (fig. 5), and was likely influenced by the La Niña/Southern Oscillation event. Low landing numbers in this region often coin-

cide with La Niña events. However, this landing total is exceptional because it is the lowest since the 1998–99 landings (24 t). The 1998–99 season, which also occurred during a La Niña, was a hallmark season because it had the lowest landing total in the northern region since monitoring of squid began in the 1930s. Although the northern region harvests steadily climbed after the 1998–99 season to peak at 25,242 t in the 2002–03 season, the low harvests for the northern region during the 2007–08 season is a concern for management.

In contrast, landings of market squid in California were almost exclusively taken from the southern California region during the 2007–08 season, accounting for 99.9% of the total catch with 45,759 t landed (fig. 5). This regional domination of catch last occurred during the 1998–99 and 1999–00 seasons (99.7% and 99.8% respectively) and may be influenced by coinciding La Niña events. At the start of the 2007–08 season, squid fishing was centered off northern Channel Island coastlines of Santa Cruz and Santa Rosa. However, at the end of the season, fishing was centered on the west coast of Santa Catalina Island and along the coastline of La Jolla. This varies from the 2006–07 season where major landings were absent from Santa Catalina and La Jolla.

Dungeness Crab

Landings of Dungeness crab (*Cancer magister*) totaled 4,969 t in 2007, a 58% decrease from the 11,867 t landed in 2006. The 2006 catch total is an artifact of the statutory postponement of the northern California 2005–06

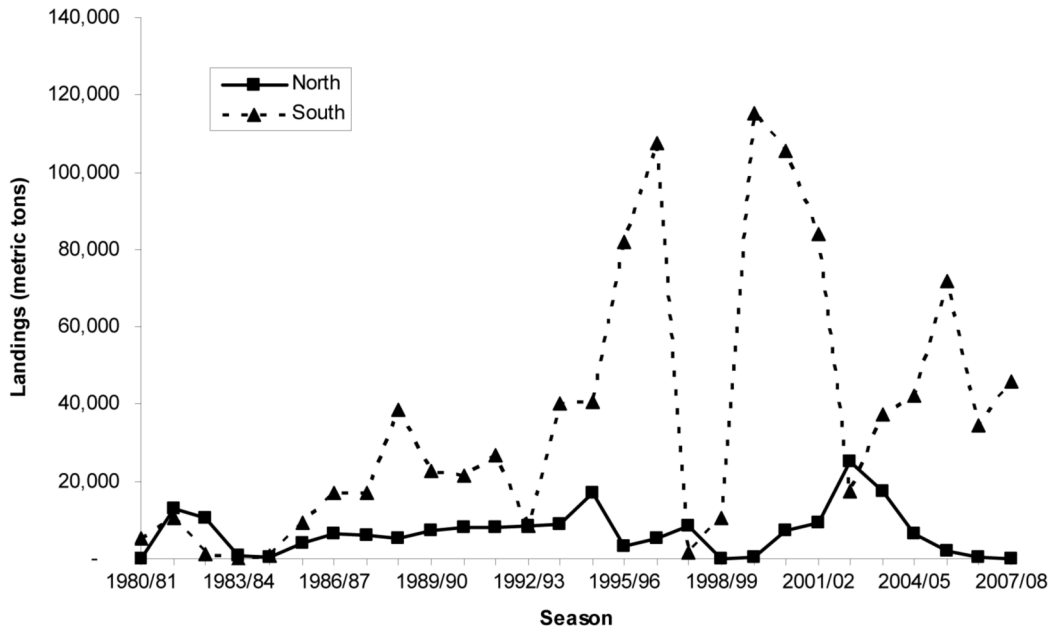


Figure 5. Comparison of market squid landings for northern and southern fisheries by fishing season (1 April–31 March), from 1980–1981 to 2007–2008 seasons.

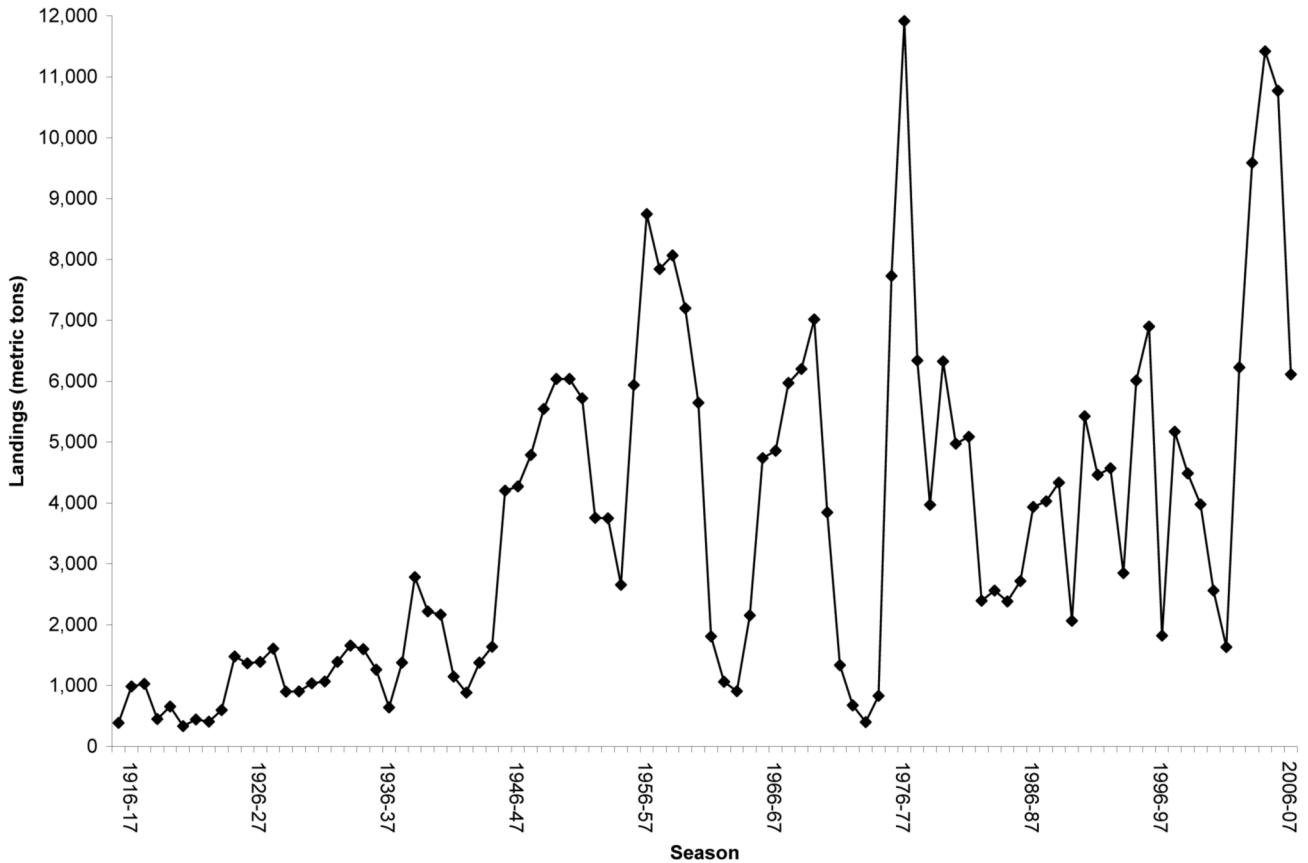


Figure 6. California commercial Dungeness crab (*Cancer magister*) landings by season (15 November–15 July), 1916–1917 to 2006–2007.

season opening, due to poor crab condition. The 2005–06 northern California season opener was delayed by the California Department of Fish and Game (CDFG), for the first time since given that authority in 1995, until the last day of 2005 to allow ample time for crab condition to improve.

The commercial Dungeness crab fishery is managed using a combination of technical measures: size, sex, and season restrictions. Only male crabs with a carapace width larger than 159 mm (6.25 in) are harvested commercially. The minimum size limit is designed to protect sexually mature male crabs from harvest for at least one season. This provision appears to be successful because northern California studies have shown, despite the presumption that nearly all legal-sized male crabs are harvested each season, that almost all sexually mature female crabs are fertilized each year. The central California season, south of the Mendocino/Sonoma county line, begins 15 November and ends 30 June. The northern California season conditionally begins on 1 December and ends 15 July. The timing of the seasons avoids the portion of the life-cycle when most crabs are molting or soft-shelled.

Commercial landings of Dungeness crab for the 2006–07 season totaled 6,109 t, just under the 10-year running average of 6,194 t per fishing season (fig. 6). The catch was a 43% decrease from the 10,769 t landed in the 2005–06 season, the third highest season on record. Historically, the fishery has been cyclical, with abundance peaking approximately every ten years. Despite the large decline in catch, ex-vessel value remained high for 2006–07 at \$30.4 million. This was only a 23% decrease from the previous season, which was the most valuable season on record. The average price paid to fishermen was \$5.69/kg (\$2.58/lb) and a good spring catch and high prices from March to July helped increase the season's value.

The fishery is also managed by limited entry. There were 519 resident vessel permits and 89 non-resident permits renewed in 2007 for a total of 608 permits. Of those, 418 boats made at least one landing in the 2006–07 season. There is no limit to the number of traps a permitted boat may fish or the frequency with which they are fished. As the groundfish industry has declined, larger multi-purpose vessels have devoted more effort to Dungeness crab. According to a 2003 CalCOFI report based on a fisherman survey, there were at least 172,000 traps being fished in California during the 2001–02 season. In 2006, fishermen roughly estimated 150,000 traps being fished, but no official estimates are available. In Oregon's Dungeness crab fishery the estimated number of traps soared from 150,000 in 2002 to 200,000 in 2005 before implementation of a trap limit. Complaints of overcrowded fishing grounds, in central California in particular, have increased in recent years.

For Californian crab fishermen, recent fishery issues have centered on the apparent increasing amount of effort in terms of traps deployed in both central and northern California. However, the Dungeness crab fishery has always had a derby aspect where much of the total catch is caught in a relatively short period of time at the beginning of the season. For example, in the 2006–07 season, 79% of the total catch was landed by 1 February—only two months after the northern season opened.

California Spiny Lobster

Commercial landings in 2007 for California spiny lobster (*Panulirus interruptus*) totaled 300 t, the lowest landings for a calendar year since 1999 (fig. 7). Increases and decreases in landings are not unexpected considering that this fishery is strongly influenced by the weather and El Niño/Southern Oscillation (ENSO) events. In 2007, landings were split between ports in San Diego County (32%), Los Angeles/Orange counties (35%), and Santa Barbara/Ventura Counties (33%). Landings in previous seasons had been highest in San Diego, followed by Santa Barbara/Ventura, and then Los Angeles/Orange Counties. The ex-vessel value of the lobster fishery was \$7.32 million in 2007, down from \$8.06 million in 2006. California ex-vessel prices for spiny lobster consistently range from \$15.43 to \$26.46/kg. The spiny lobster catch is primarily exported to Asian markets, so prices depend on the strength of these overseas markets as well as the foreign currency exchange rates. In recent years, there has been an effort to develop a domestic market. However, results have been limited, partly due to the availability of American lobsters (*Homarus americanus*) at a lower cost.

A commercial fishery for California spiny lobster has been present in southern California waters since the late 1800s, and landings have been recorded by the CDFG since 1916 (fig. 7). Fishermen use baited traps that are individually set and buoyed to capture lobster alive. There is also a recreational fishery which allows lobsters to be caught by hand, using snorkeling gear, scuba diving, or by using baited hoop nets. Up to five baited hoop nets per person, with a maximum of ten hoop nets per boat can be used. Anecdotal evidence suggests that this method of take is growing in popularity. In recent years, a modified hoop net with a rigid structure has been introduced to the recreational fishery. Recent CDFG studies suggest that this new type of hoop net is much more effective at catching lobster than the traditional style hoop net. Commercial and recreational fishermen take lobster in shallow, rocky areas from Point Conception south to the U.S.–Mexico Border and at offshore banks and islands. Lobster season for both recreational and commercial fishermen runs from late September or early

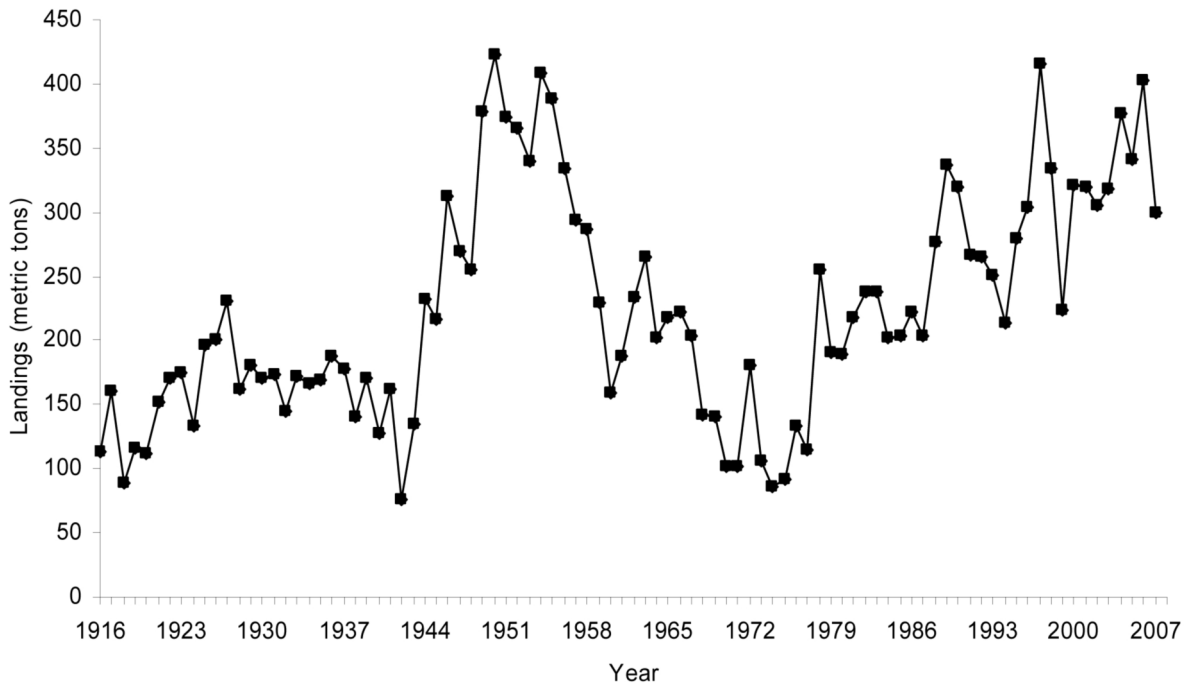


Figure 7. California landings of California spiny lobster (*Panulirus interruptus*) from 1916 to 2007.

October through mid-March to protect the spawning season, and the majority of the landings occur in the first few months of the season.

Since the 1950s, there have been several major regulation changes aimed at better managing the lobster fishery. In 1955, a minimum-size limit of 8.26 cm (3.25 in.) carapace length was established for both recreational and commercial fishermen. Since the 1976–77 season, commercial fishermen have been required to use rectangular escape ports (6.05 cm x 29.2 cm) (2.38 in. x 11.5 in.) on traps to decrease the retention of undersized lobster.

A restricted access program for the commercial take of spiny lobster was initiated in the 1996–97 season after a two-year moratorium on permits. Although the number of active participants varies little from season to season, the number of lobster operator permits declines every year. In the 2006–07 season, a total of 214 permits were renewed, with only 153 actively fishing lobster. Prior to 2003, a small number (three or less) of new permits were issued via a lottery to qualified lobster crewmembers. In February 2003, the Commission repealed the permit lottery and the capacity goal of 225 fishermen. This was done in anticipation of a formal review of the fishery to be conducted by CDFG, which did not take place as planned. Consequently, the industry returned to the Commission in 2004 and requested that an industry regulatory proposal allowing transferability of qualifying lobster permits be considered.

The CDFG and the industry worked together to craft a transferability program that would not result in a large increase in trap effort. The Commission approved the proposal and a percentage of the existing permits became transferable. For the first three fishing seasons thereafter (2005–06 through 2007–08), transfers were limited to the first ten permittees that applied. Since 1 April 2008, there are no restrictions on the number of permits that can be transferred.

A logbook for the commercial fishery has been required since 1973. Logbook compliance has remained high at 90% or greater, and CDFG has confidence in these effort estimates. The total number of trap pulls in the 2006–07 lobster season was estimated at 844,000. This number is less than the over 900,000 estimated trap pulls in the 2003–04 lobster season when the last review was conducted. However, the number of trap pulls has generally increased since the 1981–82 season when about 500,000 traps were pulled.

Currently, there are no limits on the amount of lobster commercial fishermen can land nor on the number of traps they can use. Fishermen set their traps along depth contours in shallow water at the beginning of the season and move them farther from shore (>30.5 m) as the lobsters migrate offshore. This offshore-nearshore migration of lobsters is stimulated primarily by water temperature. Typically, fishermen set between 100 and 300 traps, but those with larger boats or a crewmember may set more. The commercial lobster industry was

concerned about how the MPAs established in the northern Channel Islands in 2002 would affect their fishery. Recent CDFG landings data have not shown a notable decline in the lobster catch since the MPAs were established.

The new system of reporting (Spiny Lobster Report Card) beginning in the 2008–09 season, along with data collected from a CDFG lobster creel survey from the 2007–08 season, will allow CDFG's biologists to find out how many people are fishing for lobster, how long it takes to catch them, how many are being harvested, what type of gear is being used, and where the animals are being caught. With this information, biologists can estimate the total recreational catch and effort, and evaluate the health of the lobster resource and whether current management measures are effective.

Highly Migratory Species

Albacore. Albacore (*Thunnus alalunga*) is the most abundant tuna caught in both commercial and recreational fisheries in California and along the West Coast. In the commercial fishery, albacore are caught primarily using hook-and-line gear (jig/bait/troll), but they can also be caught using drift gill net or a purse seine. Along the entire West Coast 11,570 t were commercially landed in 2007. This is a decrease of almost 10% coast-wide, but in California there was an increase from 207 t in 2006 to 856 t in 2007. During this time period the ex-vessel value in California was \$1.6 million and price-per-kilogram decreased slightly to \$1.88/kg (\$0.85/lb), bringing it equal to the coast-wide average. Most of this catch was exported for processing and canning, but a small percentage was sold for the restaurant trade.

Historically, there have been no bag or size limits on sport-caught albacore in California. In late 2006, the PFMC adopted bag limit conservation measures for albacore (10 fish south of Point Conception, 25 fish north of Point Conception). Comparable state regulations were adopted by the Commission in 2007. Most of the recreational take of albacore comes from sportfishing in Mexican waters, which has a five-fish daily bag limit. In 2007, 100,644 albacore were reported taken by California's CPFV fleet, an increase of 381% from 2006 (20,925) and 2% from 2005 (98,611).

Yellowfin Tuna. Commercial landings of yellowfin (*Thunnus albacares*) increased slightly to 104 t in 2007, but were still down from the 286 t landed in 2005. The yellowfin were landed by purse seine gear (95%), hook-and-line gear (5%), and drift gill nets (<1%). Ex-vessel value totaled \$149,568 and price-per-kilogram declined to an average \$1.43/kg (\$0.65/lb) compared to the \$4.93/kg (\$2.24/lb) paid in 2006. Most of the catch was processed into canned consumer product, with some sold to the restaurant trade. Exports of fresh frozen yellowfin

tuna from California went to Mexico for processing as there are currently no canneries operating in California. CPFV logbook data indicate recreational anglers landed 18,606 yellowfin, continuing the decline seen last year (approximately 45,000 in 2006 and 55,000 in 2005).

Skipjack Tuna. Commercial landings of skipjack (*Katsuwonus pelamis*) continued to decline in 2007 to 5.1 t from 48 t in 2006 and 533 t in 2005. The variable catch success is likely due to seasonal fluctuation in abundance of fish within range of southern California vessels. In 2007 the ex-vessel value decreased to an average of \$0.86/kg (\$0.39/lb) from \$1.22/kg (\$0.55/lb) average paid in 2006. Skipjack is primarily landed in California by purse seine vessels. Frozen skipjack are exported for processing into canned product. CPFV logbook data indicate that recreational anglers landed 654 fish in 2007, a decrease of 86% from 2006 (4,541).

Bluefin Tuna. Commercial landings of bluefin (*Thunnus thynnus*) increased to 44.8 t in 2007 (from 0.8 t in 2006), but this is still far less than the 207 t landed in 2005. Ex-vessel value was \$58,093, and price-per-kilogram decreased to \$1.30/kg (\$0.59/lb) from an average \$4.74/kg (\$2.24/lb) in 2006. Purse seine vessels caught 95% of the bluefin landed in 2007, while in 2006 the drift gill net fleet accounted for 65% of the landings. Recreational anglers landed 1,007 bluefin in 2007, down from 7,356 fish landed in 2006. In 2007, the Commission adopted regulations in line with the PFMC conservation measure of a 10-fish bag limit for bluefin tuna.

Swordfish. Swordfish (*Xiphias gladius*) is the most valuable fish taken in the California highly migratory species (HMS) fishery. In 2007, commercial landings totaled 542 t, up 46% from the 371 t landed in 2006. The commercial catch was valued at \$3.1 million. In 2007, 89% of the commercial catch came from drift gill net gear, while harpoon fishermen landed the remainder. The price-per-kilogram decreased in 2007 to an average of \$5.68/kg (\$2.58/lb) compared to \$8.93/kg (\$4.02/lb) in 2006. Swordfish caught by harpoon is considered more valuable than gill net-caught fish. Ex-vessel price-per-kilogram can exceed \$11.11/kg (\$5.00/lb) for harpooned fish. The recreational catch of swordfish is unknown but is considered to be very few in number.

Common Thresher Shark. Common thresher shark (*Alopias vulpinus*) is the most common shark taken in the California HMS fishery. In 2007, 95% of the commercial catch of common thresher shark came from gill net vessels. Commercial landings increased by 113% in 2007 to 198 t from 93 t in 2006. The ex-vessel value totaled \$328,705, and price-per-kilogram dropped from an average of \$3.16/kg (\$1.42/lb) in 2006 to \$1.66/kg (\$0.75/lb). CPFV logbook data indicate that 54 fish were landed recreationally in 2007, double the 2006 total of

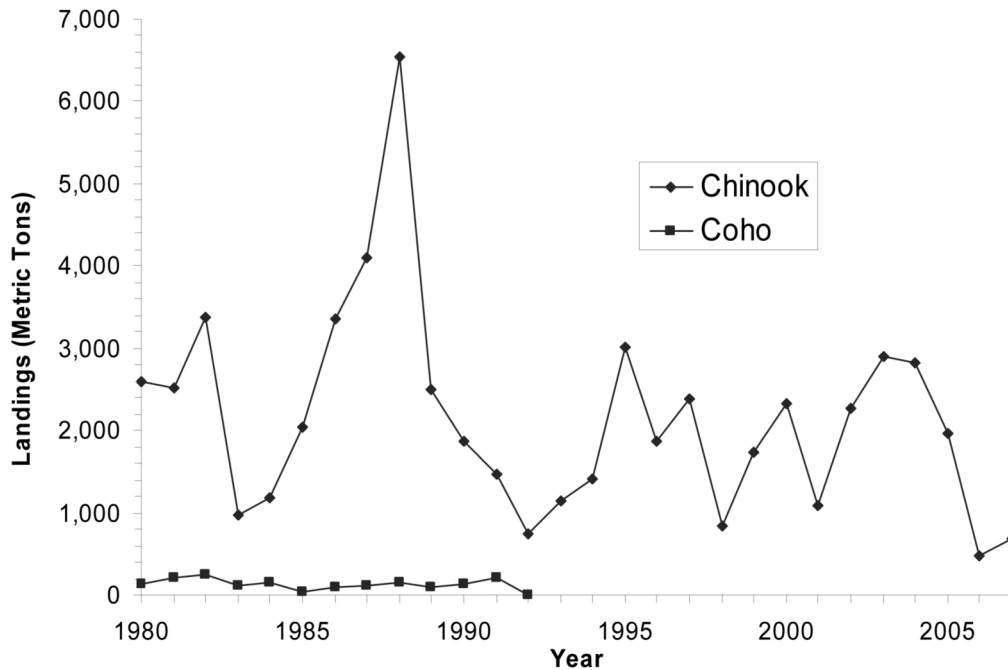


Figure 8. California commercial landings of ocean salmon from 1981 to 2007. Note: Commercial fishery landings of coho salmon (*Oncorhynchus kisutch*) were prohibited after 1992 to protect California coho salmon stocks.

27. However, recreational catches of thresher shark from private vessels may be underestimated due to the shark's increased popularity as a targeted species.

Shortfin Mako Shark. Shortfin mako shark (*Isurus oxyrinchus*) is the second most common shark landed in the commercial HMS fishery. In 2007, 74% of the commercial catch of mako shark came from drift gill net gear, 9% from set gill nets, and 13% from hook-and-line gear. Commercial landings increased 38% in 2007 to 44 t, compared to 32 t in 2006. Ex-vessel value decreased to \$76,534, due to a fall in the price-per-kilogram from an average of \$2.44/kg (\$1.10/lb) in 2006 to \$1.74/kg (\$0.79/lb) in 2007. According to CPFV logbook data, 205 mako sharks were taken in 2007, a 14% decrease compared to 238 in 2006.

Dorado (dolphinfish). Commercial landings of dorado (*Coryphaena hippurus*) totaled 2.3 t in 2007, a slight decrease from the 2.9 t landed in 2006. The ex-vessel value was \$10,077, and the price-per-kilogram decreased to \$4.38/kg (\$1.99/lb) from \$6.18/kg (\$2.78/lb) in 2006. Historically, dorado landings have been a relatively small component of the HMS fishery and vary from year to year, primarily depending on cyclic intrusions of warm water into the southern California waters. Local seafood restaurants purchase dorado when available. Recreational anglers landed 6,326 dorado in 2007 compared to 45,569 in 2006 and 6,654 in 2005.

2007 HMS Fishery Management Highlights. The PFMC's highly migratory species fishery management

plan (HMS FMP) was approved by NMFS in March of 2004. Adoption of the HMS FMP provided for implementation of new management and conservation measures, consolidation of existing state and federal regulations, and international agreements for HMS. In 2007, the PFMC continued to focus on implementing the HMS FMP.

In 2006, the PFMC moved to amend the HMS FMP to address eastern Pacific Ocean overfishing of yellowfin tuna. This process was stalled in 2007 due to the reauthorization of the Magnuson Stevens Fisheries Conservation Act. As required by the Act, the PFMC considered the need for additional domestic regulation to address the relative impact of West Coast fisheries and recommended no additional measures. These recommendations will be reconsidered by the PFMC in 2008.

In response to resolutions adopted by the Inter-American Tropical Tuna Committee (IATTC) and Western and Central Pacific Fisheries Commission (WCPFC), the PFMC will forward to the U.S. delegations of these organizations methods to characterize fishing effort on North Pacific albacore. Based on the information provided, the PFMC concludes that U.S. West Coast effort on north Pacific albacore is not increasing.

The Commission adopted state bag limit conservation measures for the recreational harvest of albacore and bluefin tunas. These measures are in line with the PFMC measures adopted in 2006.

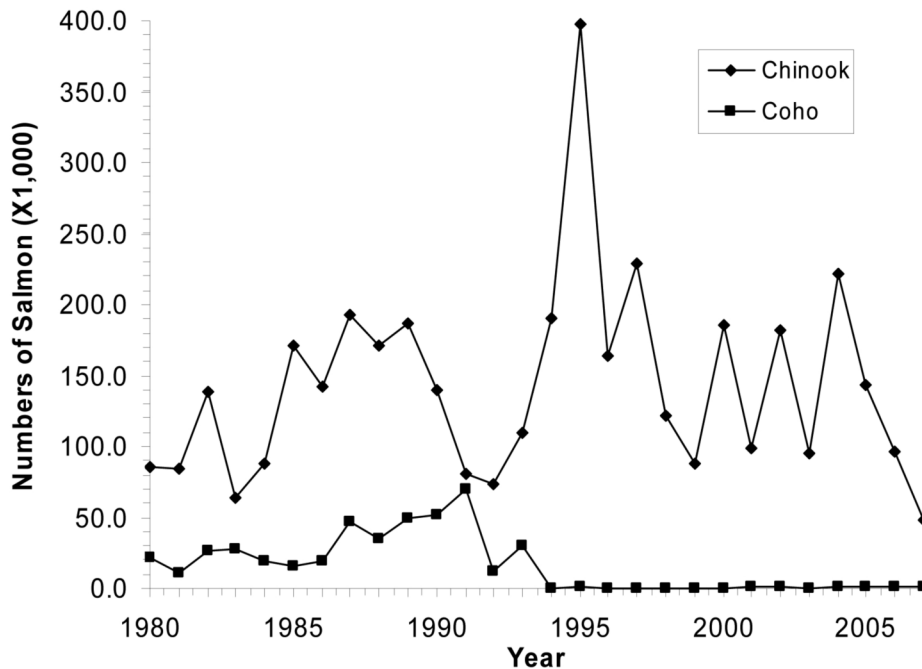


Figure 9. California recreational landings of ocean salmon from 1981 to 2007. Note: Landings of coho salmon were prohibited after 1996 to protect California coho salmon stocks. Numbers reported since 1996 are illegal harvest.

Ocean Salmon

Ocean salmon fisheries in California primarily target Chinook salmon (*Oncorhynchus tshawytscha*). The retention of coho salmon (*O. kisutch*) has been prohibited in the commercial and recreational fisheries since 1993 and 1996, respectively. Pink salmon (*O. gorbuscha*) are taken occasionally in the fisheries, usually in odd years. Each season, the PFMC and the Commission regulate California’s ocean salmon fisheries to meet the conservation objectives for Klamath River Fall Chinook (KRFC) and Sacramento River Fall Chinook (SRFC) stocks as described in the Salmon Fishery Management Plan. In addition, the fisheries must meet the NMFS Endangered Species Act consultation standards for listed stocks, including Sacramento winter Chinook (endangered), Central Valley spring Chinook (threatened), California coastal Chinook (threatened), Central California coastal coho (endangered), and Southern Oregon/Northern California coho stocks (threatened).

In 2007, California ocean salmon fisheries were not significantly constrained because both KRFC and SRFC were projected to meet their Salmon FMP conservation objectives. The commercial salmon fishery had 141 more days open than in 2006, primarily in the Fort Bragg area, for a season total of 341 days. In fact, Fort Bragg had its first April commercial fishery (2,000 Chinook quota) since 1979.

An estimated 113,400 Chinook salmon (686 t) were landed during the 2007 commercial season (fig. 8). This

was approximately 45% more by weight than the 69,700 salmon (473 t) landed commercially in 2006. The average weight per fish was 6.1 kg (13.3 lbs). The average price was \$11.44/kg (\$5.19/lb), the highest price on record and just above the \$11.27/kg (\$5.13/lb, nominal) paid in 2006. The total ex-vessel value of the fishery in 2007 was estimated to be \$7.9 million, a 47% increase from the \$5.4 million in 2006. Total commercial effort was estimated to be 10,600 boat-days fished, a 28% increase from 8,300 boat-days in 2006.

The 2007 recreational fishing season was considered “wide-open,” increased by 90 days compared to the 2006 season, for a season total of 794 days (days open in each of four management areas combined). Regulations permitted two salmon per day of any species except coho. Single-point, single-shank, barbless hooks were required north of Point Conception and anglers fishing with bait and by any means other than trolling were required to use circle hooks. The minimum size limit was 508 mm (20 inches) total length (TL), except in the KMZ where the minimum size limit was 609 mm (24 inches) TL.

An estimated 47,600 Chinook were caught recreationally in 105,700 angler-days in 2007 (fig. 9). This is the lowest harvest and effort observed since CDFG began monitoring in 1962. This represents a 51% decrease in landings and a 16% decrease in effort from 2006. Chinook landed by CPFVs and private skiffs decreased by 65% and 42% respectively compared to 2006.

TABLE 3
 Commercial groundfish landings in California for 2007 with comparisons to 2006.

	2007		2006		% change from 2006 (m tons)	% change from 2006 (\$)
	harvest (m tons)	value (\$)	harvest (m tons)	value (\$)		
Flatfishes						
Dover sole	2,725.4	\$2,349,780	1,661.8	\$1,359,749	64	73
Petrale sole	887.4	\$2,036,153	743.5	\$1,697,349	19	20
Rex sole	221.5	\$177,506	261.3	\$214,204	-15	-17
English sole	175.3	\$154,592	256.1	\$205,936	-32	-25
Pacific sanddab	152.4	\$149,026	118.1	\$119,214	29	25
Arrowtooth flounder	59.0	\$13,371	39.4	\$13,893	50	-4
Starry flounder	13.3	\$18,730	20.9	\$42,522	-36	-56
Other flatfishes (<1% in '07)	35.3	\$66,936	71.0	\$112,101	-50	-40
Flatfishes total:	4,269.6	\$4,966,094	3,172.1	\$3,764,968	35	32
Rockfishes						
Thornyheads	849.3	\$2,327,159	892.8	\$2,359,041	-5	-1
Splitnose rockfish	72.8	\$66,367	125.1	\$83,203	-42	-20
Black rockfish	61.7	\$264,075	57.5	\$231,180	7	14
Blackgill rockfish	55.0	\$125,365	82.1	\$186,067	-33	-33
Chilipepper	47.0	\$82,708	44.8	\$67,369	5	23
Bank rockfish	36.4	\$79,699	43.4	\$78,868	-16	1
Aurora rockfish	35.1	\$32,161	25.2	\$21,087	39	53
Blue rockfish	29.7	\$117,720	22.2	\$79,042	34	49
Vermilion rockfish	22.8	\$116,891	19.3	\$104,562	18	12
Brown rockfish	22.0	\$297,023	20.7	\$273,829	6	8
Other rockfish (9.3% in '07)	132.8	\$1,340,292	115.1	\$1,122,279	15	19
Overfished species						
Bocaccio	6.5	\$18,371	4.9	\$15,845	33	16
Canary rockfish	1.8	\$3,304	1.5	\$1,880	22	76
Cowcod	2.1	\$4,317			N/A	N/A
Darkblotched rockfish	41.4	\$54,992	25.9	\$30,678	60	79
Pacific ocean perch (POP)	0.5	\$552	0.3	\$303	106	82
Widow rockfish	8.6	\$19,883	8.3	\$13,238	4	50
Yelloweye rockfish	0.2	\$834	0.0	\$6	3660	13800
Rockfishes total:	1,425.7	\$4,951,713	1,489.0	\$4,668,477	-4	6
Roundfishes						
Pacific whiting	2,986.9	\$386,375	5,429.5	\$633,197	-45	-39
Sablefish	1,471.6	\$4,859,090	1,641.3	\$4,894,315	-10	-1
Lingcod	78.4	\$255,469	64.3	\$196,974	22	30
Cabezon	25.5	\$327,809	28.3	\$344,600	-10	-5
Kelp greenling	1.5	\$20,995	1.6	\$23,726	-8	-12
Roundfishes total:	4,563.9	\$5,849,738	7,165.1	\$6,092,812	-36	-4
Sharks, skates, and rays						
	262.1	\$149,772	256.5	\$158,659	2	-6
All Groundfish	10,521.3	\$15,917,317	12,082.6	\$14,684,916	-13	8

Approximately 750 coho were landed illegally during 2007, presumably by anglers who misidentified their salmon as Chinook. This is half the number of coho landed in 2006. It is assumed that many of these fish were part of the mass-marking production of coho currently occurring in Oregon and Washington; half were missing their adipose fin and most did not contain a coded-wire tag (only a small percentage of mass-marked coho contain coded-wire tags).

Fishery managers believe the relatively low commercial and recreational ocean salmon landings were due primarily to a decline in the abundance of SRFC. This stock generally contributes 80–90% of California's ocean landings. In fall 2007, only 88,000 SRFC adults returned to spawn in the Sacramento River basin, which is well below the FMP's conservation goal of 122,000–180,000

adult spawners. In addition, less than 1,900 jacks (age-2 fish) returned (lowest on record). Based on these data, the forecasted ocean abundance for 2008 was approximately 59,000 SRFC, without any additional ocean or in-river fishing. In April 2008, the PFMC and Commission closed all commercial and recreational ocean salmon fishing in California through 30 April 2009 specifically to protect SRFC.

Groundfish

Commercial Fishery Landings. The 10,521 metric tons (t) of commercial groundfish landed in California in 2007 was a 13% decrease from landings in 2006 (12,083 t) (tab. 3), a 2% increase from landings in 2005 (10,347 t), and a 14% decrease from landings in 2004 (12,225 t). Pacific whiting (*Merluccius productus*)

(2,987 t), Dover sole (*Microstomus pacificus*) (2,725 t), and sablefish (*Anoplopoma fimbria*) (1,472 t) continued to be the top species being landed in 2007, identical to species dominating landings in 2004, 2005, and 2006. The Dover sole, thornyheads (*Sebastolobus alascanus* and *S. altivelis*), and sablefish ("DTS" complex) landings accounted for 48% (5,056 t) of all commercial groundfish landings. Overall, roundfishes were caught the most (43%) in 2007, followed by flatfishes (41%) and rockfishes (14%). Overfished rockfish species accounted for less than 1% (61 t) of the landings in 2007, a 49% increase from that in 2006 (41 t). Sharks, skates, and rays accounted for 2% of the total commercial groundfish landings.

The ex-vessel value for commercial groundfish in 2007 was approximately \$15.9 million, an 8% increase from 2006 (\$14.7 million), and about a 15% increase from 2004 and 2005 (approximately \$13.8 million each year). Sablefish is considered the most valuable species being landed, followed by thornyheads, when considering price per metric ton. Again, roundfishes contributed the most to the total ex-vessel value (37%), followed by flatfishes and rockfishes (31% each). Sharks, skates, and rays accounted for only 1% of the total ex-vessel value in 2007.

The majority of groundfish landed were taken by trawl gear (87%), no change from the take of trawl landings in 2006. The remainder was taken with hook-and-line gear (9%), trap gear (3%), and net gear accounted for less than 1% of the total take.

Recreational Fishery Catches. Estimates from the California Recreational Fisheries Survey (CRFS) indicated that in 2007, California anglers targeting bottomfish took an estimated 566,372 angler trips. This was a 34% increase from 2006 (421,104 angler trips). The majority of the effort occurred in southern California (79%), particularly from CPFVs and man-made structures. In northern California (north of Point Conception), about half of the effort was from CPFVs (51%). Private boats accounted for about 20% of the effort, in both the north and the south. No estimates were made for beach and bank effort due to low sample sizes for this mode.

Groundfish take by the recreational fishery was estimated at 1,282 (t) in 2007 (tab. 4), an 18% decrease from 2006 (1,553 t). Even with an increase in effort in 2007, the catch decreased. The species accounting for half of the groundfish catch were vermilion rockfish (*Sebastes miniatus*), lingcod (*Ophiodon elongates*), blue rockfish (*Sebastes mystinus*), and black rockfish (*Sebastes melanops*). The same four species accounted for 61% of the total groundfish catch in 2006. Lingcod was the dominant species caught in the north, followed by black rockfish, blue rockfish, and vermilion rockfish. Vermilion rockfish was the dominant species caught in the south, fol-

TABLE 4
California recreational groundfish estimates for Examined and Discarded Dead (A+B1) catch by weight (metric tons) in 2007. Note: mortality rates associated with live discards were not incorporated.

Species	Metric Tons	Proportion of total groundfish
Vermilion rockfish	193.0	15%
Lingcod	173.9	14%
Blue rockfish	148.4	12%
Black rockfish	138.2	11%
Copper rockfish	65.9	5%
California scorpionfish	63.8	5%
Brown rockfish	55.7	4%
Yellowtail rockfish	55.6	4%
Olive rockfish	52.1	4%
*Bocaccio	50.9	4%
Gopher rockfish	33.7	3%
Starry rockfish	28.9	2%
Leopard shark	22.0	2%
Cabezon	21.3	2%
Pacific sanddab	15.9	1%
Greenspotted rockfish	13.2	1%
China rockfish	12.6	1%
Quillback rockfish	11.5	1%
Kelp greenling	9.5	1%
Grass rockfish	9.1	1%
Chilipepper	7.8	1%
*Widow rockfish	7.8	1%
Flag rockfish	7.3	1%
Kelp rockfish	7.1	1%
Rockfish genus	34.8	3%
Other	42.0	3%
Total groundfish:	1,282.0	

*Rockfish species of concern. Canary rockfish (5.1 mtons), yelloweye rockfish (3.8 mtons), and cowcod (0.2 mtons) are included in the "other" category.

lowed by California scorpionfish (*Scorpaena guttata*), bocaccio (*Sebastes paucispinis*), and copper rockfish (*Sebastes caurinus*). Where the majority of effort was in the south, the north was responsible for catching the most groundfish (71%).

Blue Rockfish Stock Assessment. Blue rockfish is under joint state-federal management, and in California it is managed under the Nearshore Fishery Management Plan (NFMP). The first blue rockfish stock assessment was completed in 2007 (see <http://www.dfg.ca.gov/marine/bluerockfish>). This assessment included the blue rockfish stock in California waters north of Point Conception, where blue rockfish are most commonly found. The model used to assess most stocks on the West Coast assumes that a decline in abundance is solely due to fishing, which was not believed to be the case here since declines may be related to environmental conditions, particularly declines in kelp cover. Additional uncertainties of the assessment include the variability in growth of blue rockfish over time and between areas along the coast of California. Genetic evidence has suggested two species of blue rockfish in California waters.

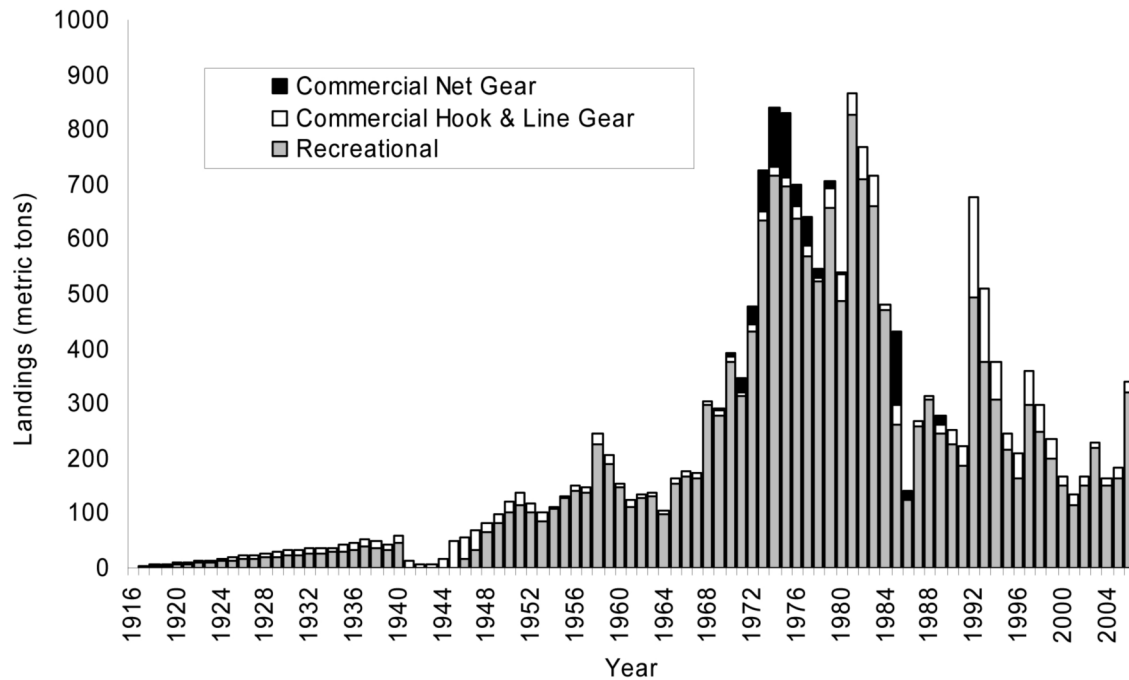


Figure 10. Blue rockfish (*Sebastes mystinus*) landings by gear type in California, north of Point Conception from 1916 to 2006.

Research is needed to determine if there are differences in life-history parameters (i.e., growth, maturity) between the two species that may be essential to appropriately assess the stock. Lastly, a lack of old males in the fishery data was of concern, and could be due to either selectivity (the ability to target and capture fish by size) or a higher natural mortality for males.

Blue rockfish are one of the primary recreationally-caught species in California and are also important in the commercial fishery (mainly hook and line), although landings from the commercial fishery are minor compared to the recreational catch (fig. 10). Due to the lack of historical reporting of blue rockfish catch, a proportion of the early rockfish catch was assigned to blue rockfish, thus the catch history was highly uncertain prior to 1969 in the commercial fishery (non-trawl) and prior to 1980 in the recreational fishery.

Stock Biomass and Recruitment. The model estimated an unfished biomass of 13,223 t, which results in a current depletion level of 29.9% (fig. 11) in 2007, falling just below the NFMP “overfished” threshold of 30%. Considering the uncertainties in the assessment, the stock assessment team felt strongly that the status of the stock was more likely in the range of 30% to 50% of unfished biomass. The highest exploitation rates (and greatest relative population declines) in the 1970s resulted in a continuous decline in spawning biomass through the early 1990s. Recruitment information was limited and highly uncertain for blue rockfish. Recruitment

appeared to be high in the 1960s, with all time low recruitment in the late 1970s. More recently, strong year classes appeared in or around 1993 and 1998. Forecasting exercises predict a slight increase in abundance, but not enough to support increased harvesting of blue rockfish in the near future.

Management. The stock assessment for blue rockfish was considered to be data-poor with many uncertainties, which presents challenges to its use for management. Prior to 2000, this species was managed within the *Sebastes* complex, and since then has been managed under the minor nearshore rockfish complex, north and south of Cape Mendocino (40°10'N lat.). In the past, no formal harvest limits were set for blue rockfish. Currently, given the possibility that blue rockfish may be experiencing overfishing, a separate catch limit should be considered, and the catch of blue rockfish should be carefully monitored.

Research and Data Needs. The Stock Assessment Review panel made recommendations on research needs to increase our knowledge of blue rockfish in California and to lessen the uncertainty in the next assessment of this species. These recommendations included better estimates of historic catches, more genetic studies, increased biological sampling and research to provide better insight into life-history parameters, fishery-independent surveys, improving recreational sampling, and an increased understanding of environmental factors affecting survival of juvenile blue rockfish.

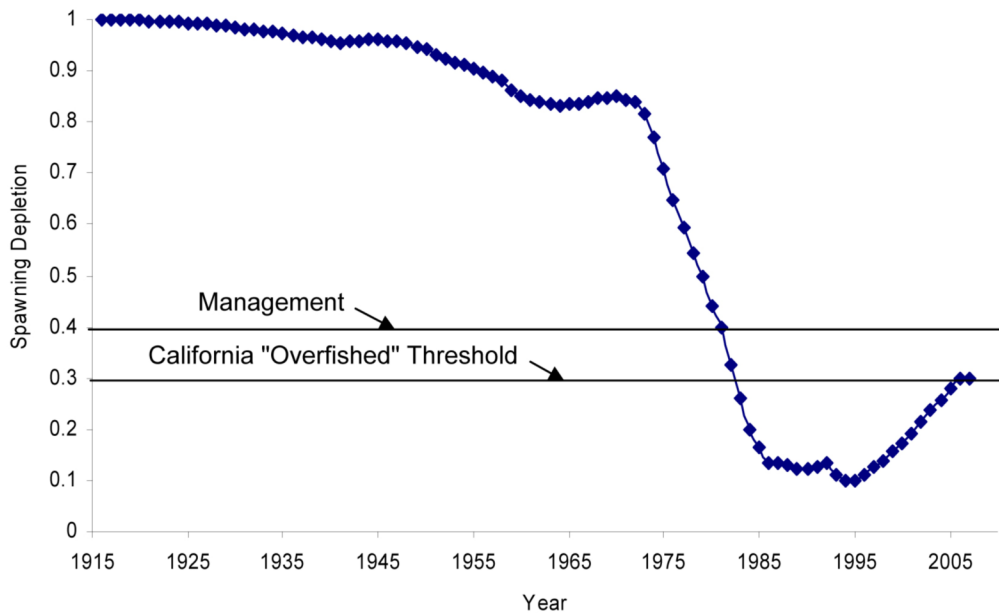


Figure 11. Time series of depletion level for blue rockfish as estimated in the base model. Management target is at 40% of unfished biomass. California's Nearshore Fishery Management Plan (NFMP) defines a stock "overfished" at or below 30% of unfished biomass.

California Halibut

California halibut (*Paralichthys californicus*) is an important flatfish species in both the commercial and recreational fisheries of central and southern California. It is found in nearshore waters on the west coast of North America from Almejas Bay, Baja California Sur, to the Quillayute River, Washington. However, the species is most common south of Bodega Bay, with the center of distribution occurring off northern Baja California. California halibut can reach 1.5 m (5 ft) total length and weigh as much as 33 kg (72 lb).

California halibut is targeted by commercial fisheries using three principal gears: trawl, set gill net, and hook-and-line. Over the past ten years, total annual landings have decreased from a peak of 596 t in 1999 to a low of 174 t in 2007. During this same period, the annual ex-vessel revenue ranged from a high of \$3.3 million in 1997 to a low of \$1.8 million in 2007.

Since 1916, commercial landings data for California halibut show a periodic shift in the majority of landings between the central and southern California port complexes. Over the past decade, central California ports have received a majority of the landings, except for 2001 and most recently in 2007, when landings were higher in southern California ports. In 2007, the Santa Barbara port complex received 40% of the total landed catch followed by San Francisco (39%), Los Angeles (13%), and San Diego (4%).

Bottom trawl is the most productive commercial gear targeting California halibut. However, landings over the

past decade have declined from 331 t in 1998 to a low of 93 t in 2007 (fig. 12). In 2006, a total of 54 trawl vessels landed 228 t of halibut compared to 36 trawl vessels that landed 93 t in 2007; a 59% decrease in landings from the previous year. Regionally, landings in southern California increased by 50% from 2006 landings, while central California landings decreased 71%, due in part to a ban on bottom trawling in Monterey Bay. The San Francisco port complex received 56% of the landings in 2007, followed by Santa Barbara (39%), Los Angeles (2%), and Monterey (2%).

Set gill net landings have also declined in the past decade from a high of 230 t in 1999 to a low of 43 t in 2007. A series of depth restrictions prohibiting set net gear in 60 fathoms or less enacted to protect seabird and sea otter populations along the central California coast have greatly affected the gill net fleet. This is evident by the lack of landings made north of Point Arguello since 2002. A total of 41 gill net vessels landed 47 t in 2006 compared to 40 gill net vessels landing 44 t in 2007. Gill net has become a southern California fishery with the Santa Barbara port complex receiving 54% of 2007 landings, followed by Los Angeles (30%) and San Diego (16%).

Annual landings reported by the hook-and-line fleet have been relatively stable over the past decade, ranging from a high of 99 t in 2003 to a low of 38 t in 2007 (fig. 12). A total of 223 hook-and-line vessels landed 46 t in 2006 compared to 175 vessels that landed 38 t in 2007. Hook-and-line catches by the top three port com-

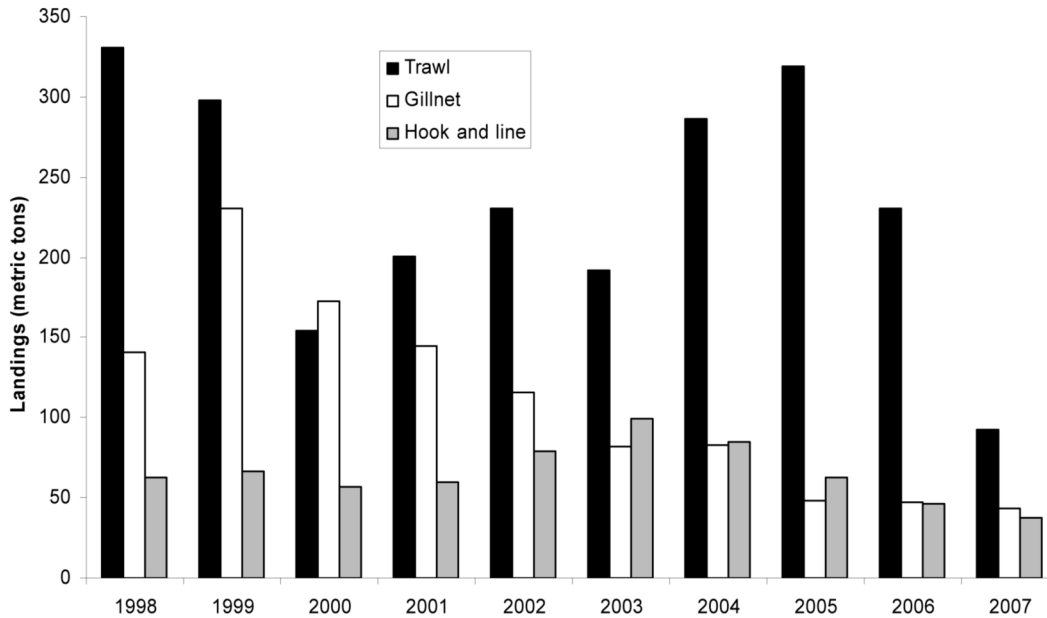


Figure 12. Commercial California halibut (*Paralichthys californicus*) landings by gear type from 1998 to 2007.

plexes were San Francisco (36%), Santa Barbara (28%), and Los Angeles (21%).

The recreational take of halibut, as reported in the Recreational Fisheries Information Network (RecFIN), from the Marine Recreational Fisheries Statistical Survey (MRFSS), showed a significant increase from 429 t (106,000 fish) landed in 1998 to 835 t (199,000 fish) landed in 2003 (fig. 13). Anglers fishing from private and rental boats caught an annual average of 84% of California halibut during this time period. In 2004, the California Recreational Fisheries Survey (CRFS) replaced the MRFSS. Recreational catch estimates obtained from RecFIN show that anglers caught 132 t (35,000 fish) of California halibut statewide in 2007 compared to 133 t (48,000 fish) in 2006 (fig. 14). CRFS data also show that private and rental boats continue to dominate the recreational halibut fishery.

Recent Management Highlights. In 2004, the California Legislature enacted Senate Bill 1459, which added restrictions on bottom trawl gear used in state waters, required implementation of a restricted access program for the California halibut trawl fishery, and granted the Commission management authority over California’s bottom trawl fisheries not managed with a state or federal fishery management plan. Additionally, the bill established a timeline for implementing additional closures if certain criteria were not met by the fishery.

A California Halibut Bottom Trawl Vessel Permit program was implemented in 2006. This permit is required for bottom trawling in the designated California Halibut Trawl Grounds (CHTG) located within state waters not

less than one nautical mile from shore between Point Arguello (Santa Barbara County) and Point Mugu (Ventura County). Additionally, a permit is required for landings of California halibut in excess of 331 kg (150 lb) that were caught in federal waters. A total of 62 permits were issued in 2006 and 58 permits were renewed in 2007.

In 2005, four areas, which amount to 13% of the CHTG, were closed to trawl gear. In addition, bottom trawling was prohibited within Monterey Bay and additional closures could be implemented in the future if performance criteria were not met. The performance criteria require that the use of trawl gear: (1) minimizes bycatch; (2) is likely not damaging seafloor habitat; (3) is not adversely affecting ecosystem health; and (4) is not impeding reasonable restoration of kelp, coral, or other biogenic habitats. In April 2008, four additional area closures comprising 42% of the CHTG were proposed. However, the Commission made the finding that three of the four should remain open.

Hagfish

The Pacific hagfish (*Eptatretus stoutii*) is a member of the Myxiniidae (hagfish) family. Hagfishes are cartilaginous and lack eyes and jaws. They have a single nostril with barbels. Members of this family also have a series of mucus-producing “slime” glands along each side of the body. This mucus, in the presence of water, converts into a jelly-like slime. This slime may act as a defensive mechanism and is produced when hagfish are agitated. Pacific hagfish occur in depths from 9 to 732 m with a

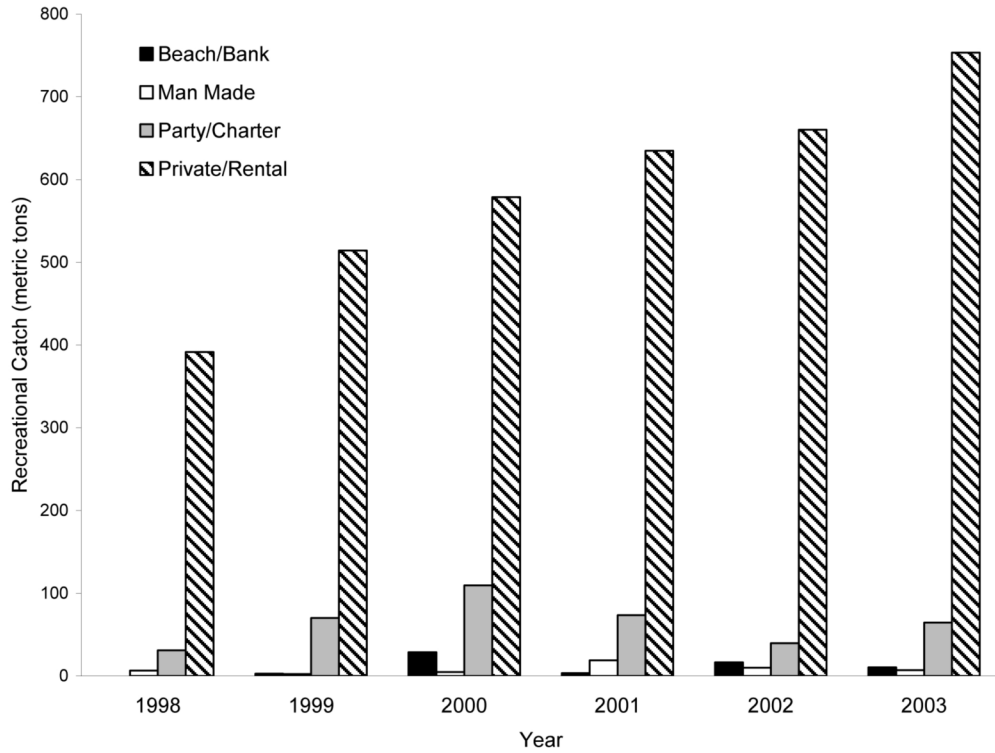


Figure 13. Recreational landings of California halibut, (*Paralichthys californicus*) as reported in the Marine Recreational Fisheries Statistical Survey (MRFSS), by four different fishing modes, from 1998 to 2003.

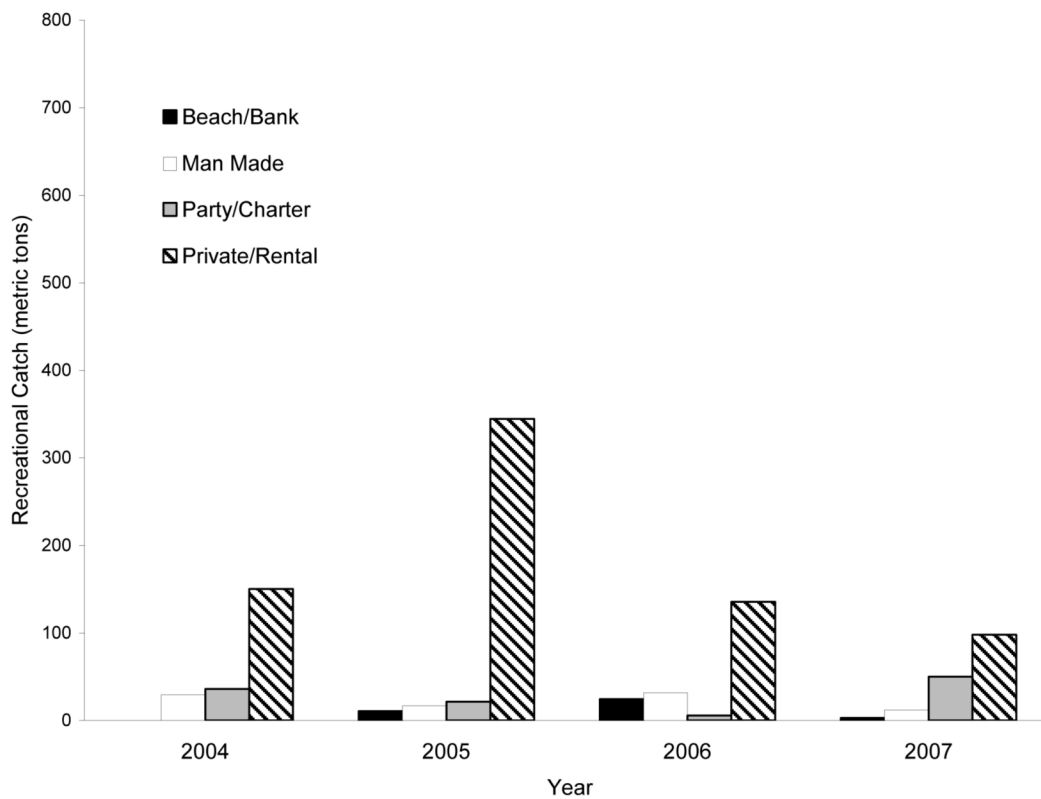


Figure 14. Recreational landings of California halibut, (*Paralichthys californicus*) as reported in the California Recreational Fisheries Survey (CRFS), by four different fishing modes, from 2004 to 2007.

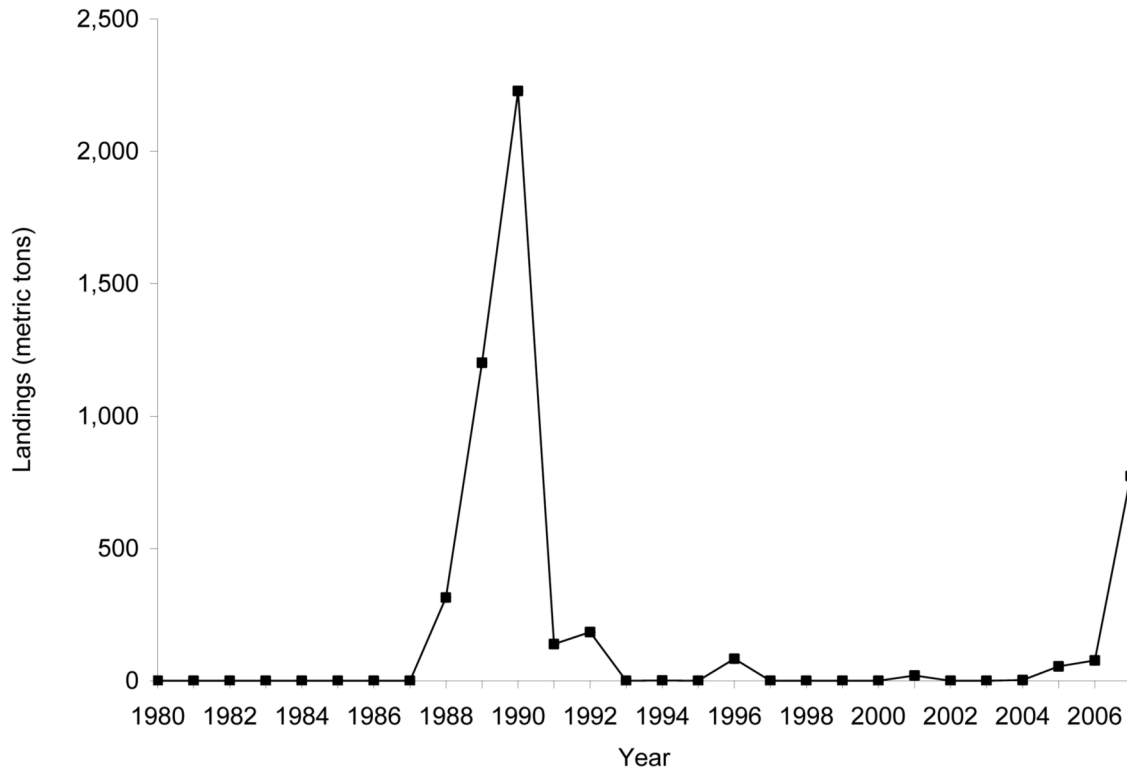


Figure 15. California commercial landings of Pacific hagfish (*Eptatretus stoutii*) from 1980 to 2007.

preference for muddy substrate. Considered scavengers, hagfish will feed upon dead fish and marine mammals, or any other animal matter they can find. Knowledge of maturation and fecundity is limited, although studies indicate that females attain sexual maturity around 325 mm total length and are between 7 and 12 years old. Hagfish fecundity is low with a female hagfish producing 20–30 eggs per reproductive cycle. Viable female hagfish may contain eggs of various stages of maturity. Reproductive cycle length is not known; however, a female’s eggs must come to full term before the next batch of eggs will mature.

Prior to 1988, hagfish landings in California were nonexistent (fig. 15). Hagfish were considered an undesirable species by U.S. fishermen but were in great demand in South Korea. Their skins are used to manufacture wallets and they are now considered a sushi delicacy for human consumption. Localized depletion of related species, brown hagfish (*Paramyxine atami*) and inshore hagfish (*Eptatretus burgeri*), near South Korea increased demand for imported hagfish from the United States in the late 1980s. In 1988, fishermen from San Francisco and Monterey were recruited to harvest hagfish for one Korean buyer. Landings and fishing effort expanded in 1989 leading to 1,201 t of hagfish landed statewide. By 1990, hagfish were landed from Eureka to San Diego. Total landings for 1990 were 2,228 t, the highest annual

landings on record. Most exported hagfish were landed fresh and then frozen for use in the Korean leather goods market. Due to Korean processing laws, imported hagfish could only be used for their skin and the flesh was discarded. While total landings increased between 1989 and 1990, Korean demand for California-caught hagfish began to decrease due to quality of skins. Hagfish from California were less desirable than those from British Columbia due to unexplained blemishes and holes.

By 2005, hagfish were no longer exported for their skin, but rather for human consumption, and were sold primarily in a live condition. In addition to a resurgence in Korean demand, many displaced commercial fishermen were looking for other sources of income. In 2007, total landings increased sharply to 773 t and ex-vessel price ranged between \$0.22/kg and \$3.97/kg with an average of \$0.70/kg. Once again, hagfish were landed from Eureka to San Diego with 62% of the 2007 landings from Eureka, followed by Monterey (16%), Los Angeles (15%), and Santa Barbara (7%). By early 2008, ex-vessel price ranged between \$0.55/kg and \$4.41/kg and averaged \$1.73/kg. The higher prices are realized for live fish.

Hagfish are taken commercially using bucket traps or Korean traps primarily in the depth range of 55 to 185 m, although fishing occurs out to 370 m. There is no recreational fishery for hagfish. Bucket traps are constructed

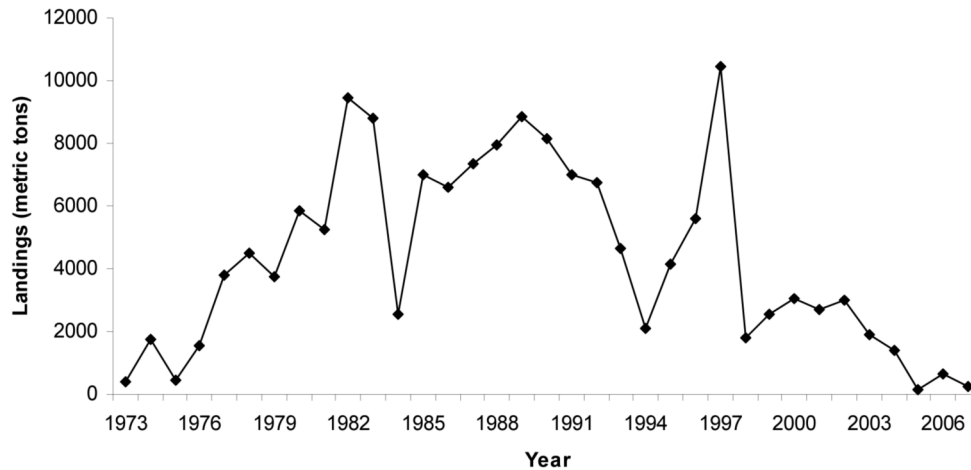


Figure 16. San Francisco Bay commercial Pacific herring (*Clupea pallasii*) sac roe landings from 1972 to 2007.

using a five-gallon bucket drilled with holes to allow water flow. A self-closing plastic cone acts as the door. Bucket traps are fished in a string with a single marker float. Korean traps are elongated plastic cylinders no greater than 15.24 cm in diameter and no more than 60.96 cm long. Korean traps employ the same type of plastic cone for an entrance. Vessels are limited to 500 Korean traps or 200 bucket traps. No species other than Pacific hagfish can be taken, possessed, or sold when Korean or bucket traps are on board the vessel. All traps must have a destruct device and popups (time-released buoys) are prohibited. A general trap permit is required to participate in this open access fishery. Traps are baited with anchovies, sardines, mackerel, squid, or fish carcasses. In 2007, the Department began to actively monitor hagfish fishing activity. Due to the difficulty in measuring live hagfish, an average count per kg per observed landing is used to document changes in average size of landed hagfish.

Pacific Herring

California's Pacific herring (*Clupea pallasii*) fisheries in 2007 had the second lowest landings in the 35-year history of the modern fishery. Statewide landings for the 2006–07 sac roe season (December 2006–March 2007) totaled 266 t, with permittees not reaching their quotas in any embayment. The San Francisco Bay fleet landed 264.9 t, 39% of their 2005–06 landings (674.9 t) (fig. 16), and only 6.7% of the 3,926 t quota. The Tomales fleet landed 1.1 t, only 0.3% of their 318 t quota and no herring were landed the previous season. Data from herring population studies conducted in San Francisco Bay suggest that fish are smaller at age, which may make them less available to commercial gill nets. There was no fishing effort in Humboldt Bay or Crescent City Harbor during the 2006–07 season.

The forecast base price for roe herring is a good indicator of the economic status of the fishery, and a factor in whether fishermen will participate in the fishery. Ex-vessel prices for roe herring are determined by a set base price, and an additional roe percentage point bonus. The base price is set per short ton of roe herring with a minimum roe percentage of 10%. Roe herring that are landed, which exceed the minimum roe recovery level, are given a bonus for each percentage point exceeding 10%. Ex-vessel prices in the herring sac roe fishery can vary greatly based on roe recovery rates. The 2006–07 ex-vessel prices for roe herring with 10% or greater roe recovery was \$400 per short ton landed, with an additional \$40 paid for each percentage point above the 10% baseline. The average roe count for the 2006–07 season was 16%, resulting in an ex-vessel value of \$640 per short ton. Due to a decrease in landings, the statewide ex-vessel value of the herring sac roe fishery fell from \$426,408 in 2006 to \$187,461 in 2007.

The San Francisco Bay herring eggs-on-kelp fishery landed 8.5 t, 28% of their 30.8 t quota, whereas the previous season had no fishing activity. Price paid for eggs-on-kelp ranges from \$13.2–39.6/kg (\$6–18/lb) depending on the quality of the product. The total estimated value of the 2006–07 eggs-on-kelp harvest was approximately \$162,996 based on an average ex-vessel price of \$19.1/kg (\$8.67/lb).

CDFG conducted spawn deposition surveys in San Francisco and Humboldt Bays to estimate the spawning biomass of the herring stock. The 2006–07 spawning biomass estimate for San Francisco Bay was 9,924 t, a 92% decrease from last season's estimate of 131,591 t. This estimate is the lowest recorded estimate in the history of the roe herring fishery, from the 1978–79 season to present. The precipitous drop in spawning biomass from a record high in 2005–06 to a record low in

2006–07 may have been caused by unfavorable environmental conditions associated with an El Niño event and an unusually dry winter. The spawning biomass estimate in Humboldt Bay for 2006–07 season was 6.4 t. This was the lowest biomass estimate recorded in the 11 seasons of spawn assessment surveys conducted in Humboldt Bay, and is just a fraction of the 11-year average of 331 t. No spawning biomass estimates were made for Tomales Bay or Crescent City in 2007.

The decline in value of California's herring fisheries is related to cultural and demographic changes in Japan, the status of Japan's economy, and increased competition from other herring fisheries outside of California. The herring roe product, "kazunoko," remains a popular Japanese New Year's food, but it continues to wane as a traditional holiday gift. The market for herring sac roe in Japan is shifting from a high-end seasonal gift product to a lower-value product geared toward the casual consumer that is available throughout the year. California's roe herring fishery faces competition in the Japanese market with products from other herring fisheries from the United States, Canada, China, and Russia.

Recreational Fishery

In 2007, CDFG received 29,497 logs from 307 CPFVs which carry sport fishing anglers and divers for hire in ocean waters off the coast of California. Of the 307 vessels submitting logs to CDFG, two split their fishing time between northern and southern California.

Since 1936, CPFV owners and operators have been required by law to submit a log of daily fishing activities. This long-term data series provides the Department with important information on catch trends and effort in recreational fishing. Fishing from CPFVs is just one component of the entire spectrum of recreational fishing that occurs. To monitor the full scope of California's recreational fishery resources, the CRFS was implemented in 2004 to collect data through field sampling and telephone surveys on all modes of recreational fishing (CPFVs, private vessels, piers, banks, and shorelines), with the primary goal of producing, in a timely manner, data needed to sustainably manage California's marine recreational fishery resources. In the future, CDFG hopes to incorporate the CPFV effort data from logbooks into the CRFS program.

Southern California. Anglers on CPFVs originating in southern California, fishing from Point Conception to the waters off Baja California, Mexico, have traditionally targeted a variety of fish species, while divers have historically targeted invertebrates such as California spiny lobster and rock scallop (*Crassadoma gigantean*) on the CPFV dive boats in southern California. The species being targeted can vary with season and year. Occasionally in waters off southern California, ENSO conditions

greatly increase the availability of species normally found in warmer waters off Mexico. Conversely, La Niña conditions increase the availability of colder-water species. Operators of CPFVs are typically quick to take advantage of the fishing opportunities provided by these changing oceanographic conditions.

In 2007, 435,821 anglers aboard 203 reporting CPFVs caught 1,974,394 fish and invertebrates south of Point Conception to waters off of Baja California (tab. 5). The catch kept by anglers in southern California in 2007 decreased by 8% compared to 2006 and the number of anglers fishing from CPFVs dropped by 6% in 2007 compared to 2006. The southern California anglers represented 80% of the anglers fishing from CPFVs statewide and caught 73% of the statewide total number of fish in 2007.

The southern California top-ten fish species or species groups reported on CPFV logs in 2007 (by number of fish kept) were rockfish (all species combined) (*Sebastes* spp.), kelp bass (*Paralabrax clathratus*), California scorpionfish, barred sand bass (*Paralabrax nebulifer*), California barracuda (*Sphyraena argentea*), sanddab (all species combined) (*Citharichthys* spp.), albacore tuna, ocean whitefish (*Caulolatilus princeps*), yellowtail (*Seriola lalandi*), and halfmoon (*Medialuna californiensis*). These top-ten species or species groups included nine of the top ten groups from 2006. The one exception was albacore tuna, which was ranked number 15 in 2006 and moved up to rank 7 in 2007. The order of abundance also changed for eight of the top-ten species or species groups between 2007 and 2006, except for rockfishes (all species combined), which remained number one for both years, and halfmoon that ranked number ten in both years (tab. 5).

For the top-twenty species of fish, catch, as reported on CPFV logs, decreased in 2007 compared to 2006 for kelp bass, barred sand bass, yellowtail, Pacific bonito, Pacific mackerel, California sheephead (*Semicossyphus pulcher*), yellowfin tuna, dorado (dolphinfish), unspecified perch-like fish (Kyphosidae/Pomacentridae), California halibut, and wahoo (*Acanthocybium solanderi*) (tab. 5). Decreases in some of the more southern highly migratory species (e.g., yellowtail, yellowfin tuna, dolphinfish) can be attributed primarily to decreased availability. Cooler oceanic waters moved onshore along the California coast in early 2007, shifting the spring and summer distribution of some of these species southward. Decreased catch of Pacific mackerel and Pacific bonito also may have been related to decreased availability.

In response to the decreased availability of warmer-water species in 2007, the southern California CPFV operators shifted their efforts to other species or species groups, including albacore tuna, California barracuda, sanddabs, and a number of nearshore species (tab. 5). Albacore landings increased almost five-fold compared

TABLE 5
 Southern California Commercial Passenger Fishing Vessel (CPFV) Catch (Number of Fish) in 2007 and 2006.

Species/Species Group	2007 Catch No. of fish	Rank	% change from 2006	2006 Catch No. of fish	Rank
Rockfish (all species combined)	492,492	1	+5	470,416	1
Kelp bass	226,997	2	-15	267,144	3
California scorpionfish	203,151	3	0	203,504	5
Barred sand bass	187,130	4	-32	277,165	2
California barracuda	169,204	5	+48	114,416	7
Sanddab	102,356	6	+38	74,059	8
Albacore tuna	96,736	7	+383	20,045	15
Ocean whitefish	80,753	8	+30	62,132	9
Yellowtail	78,078	9	-55	173,320	6
Halfmoon	59,814	10	+7	55,806	10
Pacific bonito	59,439	11	-71	204,793	4
Pacific mackerel	34,899	12	-8	37,933	13
California sheephead	29,775	13	-4	31,129	14
Yellowfin tuna	16,140	14	-66	46,919	11
Lingcod	9,317	15	+4	8,216	17
Blacksmith	7,180	16	+80	3,999	21
Dorado (dolphins)	5,646	17	-88	46,122	11
Perch-like, unspecified*	4,268	18	-50	8,488	16
Halibut-California	2,198	19	-22	2,808	23
Wahoo	2,193	20	-41	3,722	22
Fishes, unspecified**	11,199		-59	27,347	
Sharks/Rays, unspecified**	300		-33	450	
Invertebrates, unspecified**	1,380		+1280	100	
Invertebrates (lobster/scallop)	18,075		+4	17,355	
Jumbo squid	75,674		+47,795	158	
Total number kept	1,974,394		-8	2,157,546	
Number of anglers	435,821		-6	464,989	
Reporting CPFVs	211		-5	223	

*Unspecified by CPFV skipper
 **Unspecified by the author

TABLE 6
 Top Ten Rockfish Species Catch (Number of Fish) from Southern California CPFVs in 2007 and 2006.

Species/Species Group	2007 Catch No. of fish	Rank	% change from 2006	2006 Catch No. of fish	Rank
Rockfish, unspecified*	373,640	1	+6	353,574	1
Bocaccio rockfish	50,192	2	+25	40,208	2
Copper rockfish	27,934	3	+4	26,878	4
Blue rockfish	18,859	4	-35	28,929	3
Red group rockfish*	7,668	5	-7	8,248	5
Widow rockfish	5,522	6	+97	2,810	8
Gopher rockfish	4,799	7	+44	3,340	7
Vermilion rockfish	1,596	8	-67	4,865	6
Canary rockfish	1,234	9	+536	194	10
Yelloweye rockfish	324	10	+449	59	14

*Unspecified by CPFV skipper

to 2006, while California barracuda and sanddab landings increased by 48% and 38%, respectively. Increased catch was also reported for a number of nearshore species including ocean whitefish, halfmoon, lingcod, blacksmith (*Chromis punctipinnis*), and various rockfish species.

Total rockfish catch increased 5% between 2007 and 2006 (tab. 5). Seven of the ten rockfish species or species groups showed an increase between 2007 and 2006 (tab. 6). Although retention of canary rockfish (*Sebastes pinniger*) and yelloweye rockfish (*S. ruberrimus*) has been prohibited since 2002, some were reported kept in 2007.

The number of blue rockfish and vermilion rockfish reported kept decreased by 35% and 67%, respectively, between 2006 and 2007.

Jumbo squid (*Dosidicus gigas*) first showed up in CPFV catches in large quantities off Monterey, California, during the El Niño year of 1997. Anglers found these large squid could be caught on standard hook-and-line gear and an opportunistic fishery developed dependent on the availability of this invertebrate species.

An ENSO event was predicted for late 2006 into early 2007, but it was weak and dissipated early. This event

TABLE 7
 Central and Northern California CPFV Catch (Number of Fish) in 2007 and 2006.

Species/Species Group	2007 Catch No. of fish	Rank	% change from 2006	2006 Catch No. of fish	Rank
Rockfish (all species combined)	610,635	1	-9	670,814	1
Sanddab	23,930	2	-3	24,791	4
Lingcod	15,355	3	-44	27,424	3
Chinook salmon***	12,300	4	-65	35,300	2
Pacific mackerel	11,487	5	-5	12,054	5
Striped bass	5,936	6	+127	2,614	9
California halibut	3,520	7	+13	3,116	7
Kelp greenling	2,246	8	-3	2,310	10
Albacore tuna	1,838	9	+89	975	12
Cabezon	1,180	10	-12	1,339	11
Fishes, unspecified**	1,705	-78	7,601		
Sharks/Rays, unspecified**	647	-53	1,370		
Invertebrates, unspecified**	160	-41	273		
Dungeness crab	25,024	-35	38,513		
Jumbo squid	6,546	-54	14,211		
Total number kept	722,509	-14	842,705		
Number of anglers	107,036	-11	120,315		
Reporting CPFVs	114	-2	116		

**Unspecified by the author

***Catch numbers provided by Ocean Salmon Project

may have caused an influx of warm water from the south to bring the jumbo squid into central and northern California waters in 2006. They then may have moved south in 2007 as the warm-water mass dissipated. Jumbo squid movement patterns are highly variable in space and time, making it difficult to predict their availability in any given year. In 2007, 75,674 jumbo squid were caught by anglers aboard CPFVs operating in the Los Angeles area and south, compared to 158 reported in 2006 (tab. 5). While the 2007 catch was substantially higher than the catch in 2006, it was still well below the catches in 1999 and 2002 when 119,164 and 198,364, respectively, were caught.

Central and Northern California. Along the California coast north of Point Conception to the California-Oregon border, CPFV anglers traditionally target rockfish, salmon, lingcod, and, opportunistically, albacore tuna. Cabezon and other nearshore species are also taken. California halibut, striped bass, sturgeon, and leopard shark are primarily taken from within San Francisco Bay. In addition, more southerly species such as bluefin tuna, white seabass, skipjack tuna, and yellowtail may be targeted in warm-water years.

In 2007, 107,036 anglers aboard 106 reporting CPFVs caught 722,509 fish and invertebrates north of Point Conception, a 14% decrease from 2006 (tab. 7). The decrease in the catch kept between 2007 and 2006 was in part due to unexpectedly low returns of Chinook salmon, decreased availability of Dungeness crab due to natural population fluctuations, an early closure of the rockfish and lingcod fishery in parts of northern California on 1 October 2007, and the movement of jumbo squid out

of the area. The central and northern California kept fish accounted for 27% of the state's total catch (2,696,903). Central and northern California anglers represented 20% of the anglers fishing from CPFVs statewide.

The top-ten species or species groups in 2007 reported kept by anglers aboard central and northern California CPFVs (by number of fish) were rockfishes (all species combined), sanddab (all species combined), lingcod, Chinook salmon, Pacific mackerel, striped bass (*Morone saxatilis*), California halibut, kelp greenling (*Hexagrammos decagrammus*), albacore tuna, and cabezon (*Scorpaenichthys marmoratus*) (tab. 7). The top-ten species or species groups included eight of the top ten from 2006. The exceptions were albacore tuna catch, which increased 89% between 2007 and 2006, and cabezon, which decreased by 12%, but still moved from rank 11 in 2006 to rank 10 in 2007.

Most of the other top-ten species or species groups and invertebrates reported a decline in the number of fish kept in 2007 compared to 2006, except striped bass and California halibut, which increased 127% and 13%, respectively. Total rockfish catch decreased 9% between 2007 and 2006, with 610,635 and 670,814 fish kept, respectively. Most of the rankings of the other top-ten species and species groups changed between 2007 and 2006. The number of invertebrates kept in 2007 in northern and central California decreased significantly, with Dungeness crab dropping 35% from 38,513 in 2006 to 25,024 in 2007, and jumbo squid dropping 54% from 14,211 in 2006 to 6,546 in 2007 (tab. 7). This is in contrast to the reported catch of invertebrates in southern California, where the number of jumbo squid reported

TABLE 8
 Top Ten Rockfish Species Catch (Number of Fish) from Central and Northern California CPFVs in 2007 and 2006.

Species/Species Group	2007 Catch No. of fish	Rank	% change from 2006	2006 Catch No. of fish	Rank
Rockfish, unspecified*	211,542	1	+22	172,695	2
Blue rockfish	202,751	2	-32	298,974	1
Black rockfish	65,561	3	+8	60,898	3
Gopher rockfish	30,936	4	+23	25,192	5
Vermilion rockfish	30,444	5	-16	36,367	4
Copper rockfish	20,279	6	+5	19,223	6
Widow rockfish	15,020	7	-9	16,581	8
Brown rockfish	11,074	8	-16	13,229	9
Red group rockfish*	10,351	9	-39	16,992	7
Bocaccio rockfish	7,090	10	-14	8,250	10

*Unspecified by CPFV skipper

kept increased tremendously between 2006 and 2007 and the number of California spiny lobster and rock scallop reported kept increased in 2007 (tabs. 5, 7). Six of the ten species or species groups showed a decrease in catch between 2007 and 2006 (tab. 7). The two with the greatest declines were the unspecified red group rockfish (39%) and blue rockfish whose 32% decrease in the number of fish kept in the central and northern California area was similar to the 35% decrease reported for the southern part of the state (tab. 8). By contrast, two species or species groups reported increased catch in 2007 compared to 2006: the unspecified rockfish category increased 22% and gopher rockfish (*Sebastes carnatus*) increased 23%.

The number of Chinook salmon reported kept in 2007 decreased by 65% compared to 2006 (tab. 7). Fishery managers believe this decrease was primarily due to the decline of SRFC, which usually contributes significantly (80–90%) to California’s ocean sport catch.

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- W. Miller, Coastal pelagic finfish*
- M. Navarro, Market squid*
- T. Tanaka, Hagfish*