# California's Living Marine Resources:
# A Status Report

The Resources Agency
The California Department of Fish and Game

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# Human Ecosystem Dimension



## Human Benefits of the Marine Ecosystem

Marine ecosystems provide opportunities for consumptive and non-consumptive uses of marine resources. Some activities, such as commercial, recreational and subsistence fishing, kelp harvesting and harvesting of marine specimens for aquarium use, are consumptive in the sense that they result in permanent removal of ecosystem resources. Other activities (tidepooling, marine mammal and bird watching, kayaking and observational diving) are more commonly characterized as non-consumptive. However, the distinction between consumptive and non-consumptive use is not always clear cut, as activities that are not necessarily intended to be consumptive may sometimes result in inadvertent injury to marine animals or disruption of their habitat.

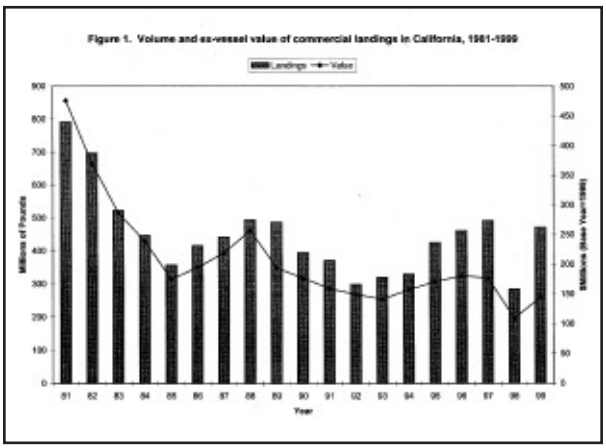
Marine ecosystems also benefit people who may never use or even see marine resources but nevertheless value their existence. Non-use value may be motivated by the desire to have ecosystem resources available for future use or by the satisfaction of knowing that such resources exist, regardless of whether they are ever put to human use.

The remainder of this report focuses on the two major consumptive uses of marine resources— commercial and recreational fishing. The intent is not to diminish the importance of other sources of use and non-use value but rather to address informational and reporting requirements of the Marine Life Management Act.

## Factors Affecting Commercial and Recreational Fishery Activity

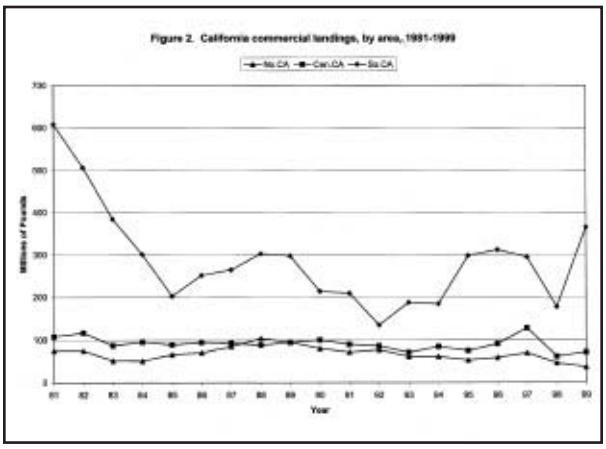
Commercial and recreational fishery landings are affected by many factors. Landings tend to increase with stock abundance, as fish are easier and less costly to locate and harvest when they are at higher levels of abundance. The availability of some species on local fishing grounds may vary across seasons or years, depending on ocean temperature and other environmental factors. Weather conditions and economic circumstances (market demand and prices) may discourage or encourage fishing activity. Fishing behavior is also affected by regulatory restrictions, which are imposed for a variety of reasons and take a variety of forms.

Regulations may be imposed for biological reasons. For instance, harvest restrictions may be imposed to protect a particular fish stock or to reduce incidental take of other stocks that are caught simultaneously with that stock. Regulations may be imposed to protect habitat or to reduce injury or mortality to marine mammals or seabirds




that may result from interactions with fishing operations. Regulations may be imposed for economic reasons. For instance, seasons may be set to coincide with periods when a fish stock is in prime marketable condition or when market demand is high. Regulations may be imposed for social reasons, such as providing equitable harvest opportunities or reducing the potential for conflict among different sectors of a fishery.

Regulations can take a variety of forms, including license and permit programs, harvest quotas, season closures, area closures, trip limits, bag limits (for recreational anglers), size limits and restrictions on quantity and type of gear. Reporting requirements such as landings receipts, logbooks or on-board observers may be imposed to ensure that fishery monitoring, management, enforcement and research needs are met. A particular type of regulation may serve different objectives, depending on the context in which the regulation is imposed. For instance, trip limits may be used to discourage targeting on a particular species while allowing a limited amount of incidental take of that species. Trip limits may be used to slow the harvest rate to enhance real-time monitoring capability in fisheries where quotas would otherwise be quickly exhausted. Trip limits may also serve economic objectives, such as lengthening the duration of the

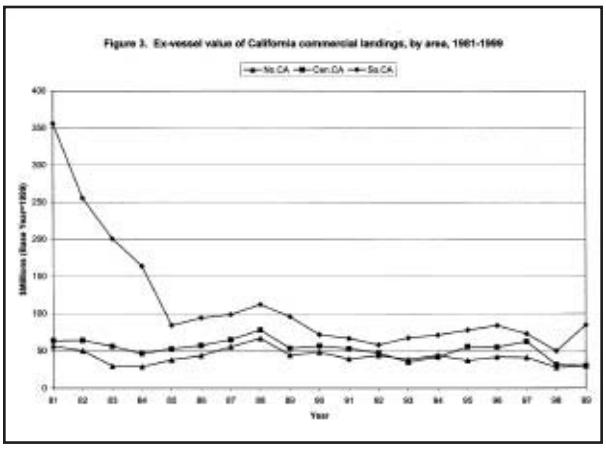


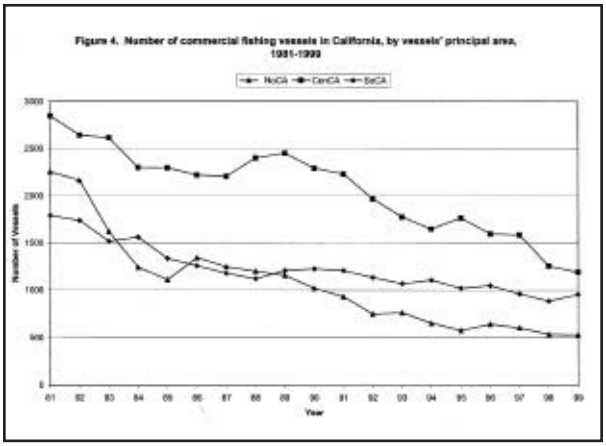
fishing season or ensuring that landings do not exceed processing capacity.

For fishing vessels and fish dealers, net economic benefit is properly measured as the difference between their gross revenues and economic costs. However, net economic benefits cannot be estimated for either of these fishery sectors, due to lack of complete economic data. Instead, landings by fishing vessels and landings receipts by fish dealers are described in terms of their ex-vessel value. Ex-vessel value overstates the economic value of the fishery to fishing vessels, as it does not include any consideration of harvesting costs. For dealers, ex-vessel value represents the cost of obtaining fish. Information on revenues earned from processing/marketing these landings is not generally available. In addition, some dealers may also process/market fish imported from other states or countries; the revenues and costs associated with these imported products are also not known.

## Commercial Fisheries Landings and Ex-vessel Value

This section describes trends in the volume and ex-vessel value of California commercial landings. The harvest information presented here is based on landings receipts and therefore excludes discards and live bait catch. Fish may be discarded in commercial fishery operations for a variety of reasons. Discards may include fish that are of sublegal size, exceed a vessel's hold capacity or trip limit, or are not of marketable size or species. Information on the level of discards and discard mortality is generally not known. Live bait used by recreational fishermen is also not reported on landings receipts, since transactions between buyers and sellers of live bait typically take place at sea. Logbook data indicate that bait haulers harvest a maximum of 12 million pounds of live bait each year.

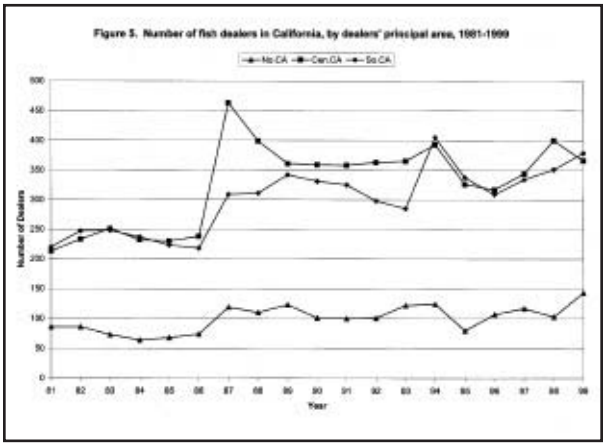



Commercial landings in California decreased from 791.4 million pounds in 1981 to 472.1 million pounds in 1999. Ex-vessel revenues also fell during this period from $475.7 million to $144.4 million in 1999. All dollar values presented here and throughout the remaining of this report have been corrected for inflation to 1999 dollars. The precipitous decline experienced during the early-1980s was largely the result of a shift in tuna landings from California ports to less costly cannery operations in American Samoa and Puerto Rico. The decline in tuna landings and revenues has been compounded by declines in landings of species such as groundfish, urchin, shark and swordfish, salmon, abalone. Other species (*e.g.*, market squid, lobster, prawn, coastal pelagics) have been the target of expanding fisheries, while still others (*e.g.*, crab, Pacific herring, shrimp) exhibit no obvious pattern or trend in landings and revenues.

From 1995 through 1999, the species groups accounting for most of the ex-vessel value of California landings were (in descending order of value) groundfish, market squid, crab, albacore/other tunas, sea urchin, herring, shark/swordfish, salmon, coastal pelagics, lobster, prawn, shrimp and abalone. The species composition of landings and revenues varies significantly by area. Over 90 percent of the ex-vessel value of landings in northern California consists of groundfish, crab, shrimp and sea urchin. In central California, 90 percent of total ex-vessel value is contributed by groundfish, herring, salmon, crab, prawn, shark/swordfish and coastal pelagics. In southern California, 90 percent of total value is contributed by squid, albacore/other tuna, sea urchin, coastal pelagics, shark/swordfish, lobster and groundfish. Landings and revenues have historically been higher in southern California than in central or northern California. The major reason for this difference is the large contribution made by the high-volume squid and coastal pelagic fisheries to southern California landings and revenues.

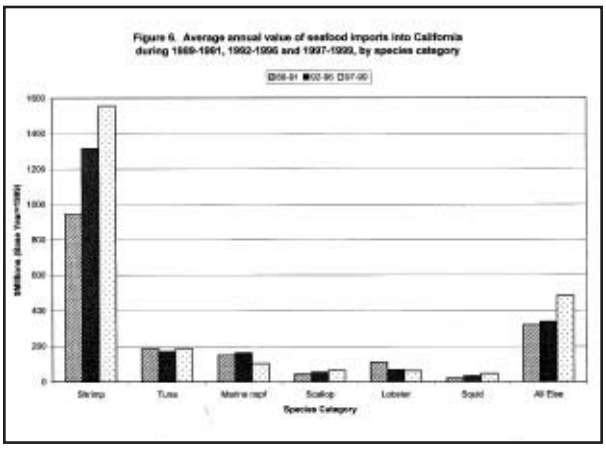
The State of California requires that all commercial fishing vessels, crew members, and fish businesses be licensed




to operate in the state, and further requires that all businesses and fishermen who accept seafood for commercial purposes maintain landings receipts. The state also imposes additional license and permit requirements that are specific to certain types of fishing activities. In addition, federal permits are required for vessels that qualify to participate in the groundfish and coastal pelagics limited-entry fisheries. Permits and licenses represent upper-bound estimates of fishery participation, as not all permit/license holders actively engage in fishery activity each year. The next two sections of this report describe the extent of actual participation in the harvesting and processing sectors.

## Harvesting Sector

The number of commercial fishing vessels that land fish in California declined from 6,897 in 1981 to 2,690 in 1999. While the majority of these boats land fish solely at California ports, a significant minority also makes landings in Oregon or Washington. California boats may fish in other states as well (*e.g.*, Alaska); however, the extent of such activity is not known.




Categorizing vessels according to their "principal area" (*i.e.*, the area in which they made the plurality of their revenues from California landings), the statewide pattern of declining fleet size is evident in all areas. From 1981 to 1999, the number of boats declined from 2,256 to 532 (76 percent) in northern California, from 2,848 to 1,191 (58 percent) in central California, and from 1,793 to 967 (46 percent) in southern California. The number of boats has been consistently higher in central California than in the other two areas.

Just as some vessels engage in interstate fishing activity, a small but significant minority of vessels lands fish both inside and outside of their principal fishing area within California. From 1981 through 1999, 82 percent of vessels whose principal area was northern California made landings in northern California only, while the remaining 18 percent also made landings in other areas (mostly central California). Of vessels whose principal area was central California, 87 percent made landings in central California only, and 13 percent also made landings in northern and/or southern California. Of vessels whose principal area was southern California, 88 percent made landings in southern California only, and the remaining 12 percent also made landings in other areas (mostly central California).

The percent of boats earning less than $5,000 per year declined from 53 percent during the period from 1981 through 1985 to 34 percent during the 1995 through 1999 period, while the percent of boats accounting for 90 percent of the ex-vessel value of statewide landings increased from 20 percent (1981-1985) to 35 percent (1995-1999). The highly skewed revenue distribution characteristic of the early 1980s reflects the sizeable contribution of tuna fishery participants to total statewide revenues during those years. The tendency toward a less skewed distribution of revenue after the mid-1980s was apparent in northern, central and southern California as well as statewide. Nevertheless, the commercial fishery remains characterized by a large number of low-revenue vessels and a small number of high-revenue vessels, with hook-and-line

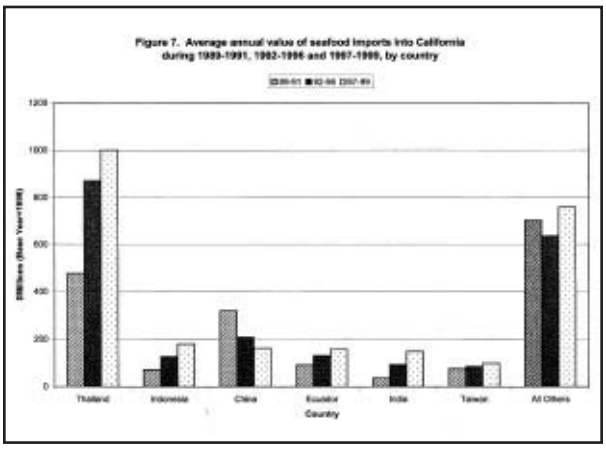
Street fish market, Fisherman's Wharf, San Francisco, CA
Credit: UC Davis Sea Grant

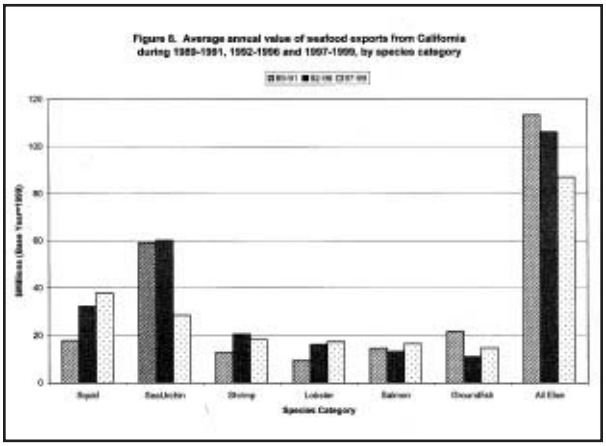
salmon and groundfish vessels disproportionately represented in the low-revenue segment.

From 1981 through 1999, ex-vessel revenue from California landings averaged $46,500 per boat and did not exhibit any consistent trend or pattern. However, the statewide average masks significant regional differences in this regard. From the 1981-1985 period to the 1994-1999 period, average revenue per boat increased significantly in northern California from $24,500 to $60,800, increased less dramatically in central California from $20,800 to $30,100, and declined in southern California from $126,000 to $74,900. The fishing opportunities that developed in southern California after the mid-1980s were not sufficient to compensate for the decline in revenues from the highly lucrative tuna fishery. Nevertheless, average revenue per boat is still higher in southern California than elsewhere in the state.

For the years 1995 through 1999, commercial landings and revenues were categorized into 23 different combinations of species and gear that depict major types of fishery activity in the state. Table II-7 describes average annual landings and revenues in each major fishery in northern, central and southern California during the 1995-1999 period, presented in declining order of revenue. For each fishery, the table also includes the number of participating vessels (defined as vessels who earned at least five percent of their California revenue from that fishery) and the number of participating vessels for whom the fishery is their "principal fishery" (that is, the fishery from which they derive the plurality of their California revenue).

Table II-8 characterizes the vessels in each principal fishery category in terms of average landings and revenues per year from the vessel's principal California fishery, from other California fisheries, and from Oregon and Washington fisheries. Average revenue per boat varies widely among fisheries, and tends to be lowest in the groundfish and salmon hook-and-line fisheries and highest in the trawl and seine fisheries. The distribution of average rev-

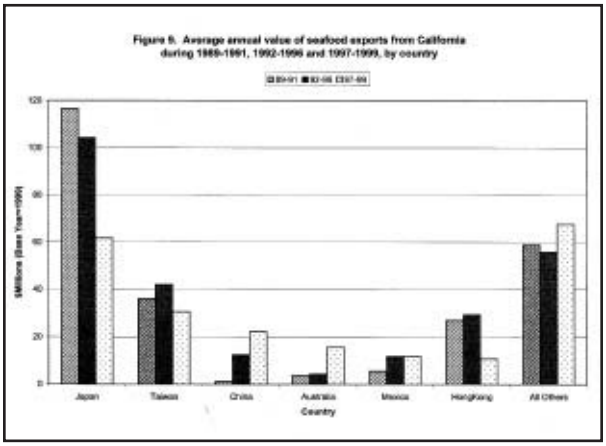



enue per vessel among fisheries is suggestive of vessels' economic dependence on their principal fishery relative to other California fisheries and to Oregon and Washington fisheries. For instance, some vessels (*e.g.*, shrimp trawl in northern California) earn more revenue from their out-of-state landings than their California landings. For these vessels in particular, adverse conditions in their out-of-state fisheries can result in a significant diversion of effort to the California fisheries in which they also participate, and vice versa. At the other end of the spectrum are vessels that derive most if not all of their revenue from their principal fishery (*e.g.*, urchin diving in central California). Because of this lack of diversification, such vessels are particularly vulnerable to changing conditions in the fishery in which they do participate. It should be cautioned that ex-vessel revenue comparisons are merely suggestive of differences in economic value, as such comparisons do not account for differences in operating costs across fisheries.

According to Tables II-7 and II-8, the highest-revenue fisheries do not necessarily support the largest numbers of boats or generate large ex-vessel revenues per boat. For instance, the salmon hook-and-line fishery is the third largest contributor to ex-vessel revenue in central California ($6.5 million) and serves as the principal fishery for 579 vessels, yet generates only $9,000 in ex-vessel revenue per boat per year. The tuna seine fishery is the third largest contributor to ex-vessel revenue in southern California ($9.6 million) and yields higher revenue per boat than any other fishery statewide ($914,600 per boat per year); yet tuna seine is the principal fishery for only 10 boats.

The Tables in II-3 describe the most common combinations of fisheries in which vessels participated from 1995 through 1999. The number in each rectangle represents the average annual number of vessels that participated solely in that fishery during the 1995-1999 period, and the number on each line connecting the rectangles represents the average annual number of vessels that participated




in that particular two-fishery combination. The asterisks denote the most common three-fishery combinations. Only fisheries or fishery combinations that represent an annual average of at least three vessels appear in the figure. Since the abalone dive fishery has been closed to commercial fishing since 1998, the 1995-1999 statistics on that fishery included in Tables II-7, II-8 and II-3 include the recent years of zero fishing activity (1998-1999).

Patterns of behavior vary significantly by area. In northern California, crab pot is the predominant fishery in terms of the number of vessels that participate solely in that fishery (153) and the frequency with which crab pot vessels also engage in other fisheries. In central California, the largest numbers of vessels engage in the salmon hook-and-line (419), groundfish hook-and-line (332) and herring (121) fisheries. The most common combinations involve salmon and groundfish hook-and-line (92), and salmon hook-and-line and crab pot (88). In southern California, the largest numbers of vessels engage in the sea urchin (156), groundfish hook-and-line (119) and lobster pot (102) fisheries. Groundfish hook-and-line vessels are also notable in terms of the number of other fisheries in which they participate. While interactions exist among the prawn, groundfish and cucumber trawl fisheries, trawl fisheries in southern California are seldom pursued in combination with other gear types.

## The Processing Sector

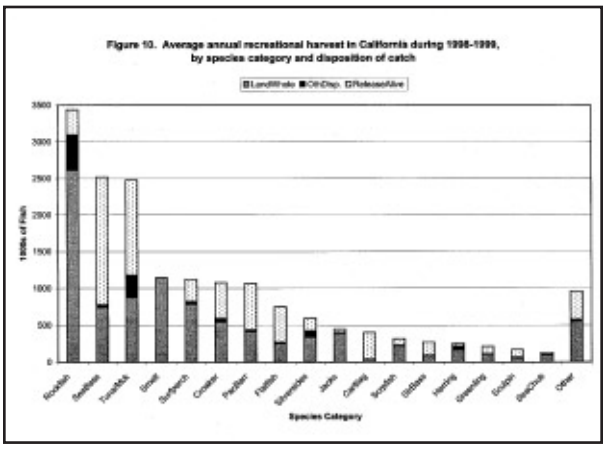
Between 1981 and 1999, the number of fish dealers increased statewide from 519 to 888. Categorizing dealers according to their "principal area" (*e.g.*, the area of California accounting for the plurality of the ex-vessel value of their landings receipts), the number of dealers increased from 86 to 143 (+66 percent) in northern California, from 213 to 366 (+42 percent) in central California, and from 220 to 379 (+72 percent) in southern California. The number of dealers has been consistently lower in northern California than in other areas of the state.

The increase in numbers of dealers has followed a distinctive pattern: a relatively stable number of dealers during the 1981-1986 period, followed by a stepwise increase in 1987 and relatively stable (albeit higher) numbers thereafter. The ex-vessel value of average annual landings receipts per dealer shows a parallel though opposite stepwise pattern. From the 1981-1986 period to the 1987-1999 period, the average annual number of dealers increased from 547 to 825, while the value of landings receipts per dealer decreased from $531,500 to $209,500 over the same period. The decline in average value per dealer is largely due to the post-1986 increase in the number of dealers for whom the value of landings was less than $5,000. Many of these small dealers are commercial fishing vessel operators who sell their landings directly to restaurants and markets rather than to a processor. The decline in annual value per dealer has been particularly severe in southern California (falling from $805,500 in 1981-1985 to $233,900 in 1986-1999), where the effect of the post-1986 increase in the number of small dealers was compounded by the drastic reduction in high-priced tuna landings experienced in that area through the early 1980s. Since the decline of the tuna fishery, northern California has generally replaced southern California as the area with the highest average value of landings per dealer.

The distribution of landings receipts among dealers is highly skewed, with 16 percent of the dealers responsible for 90 percent of the value of landings from 1987 through 1999. This pattern is repeated throughout the state, with 20 percent of dealers in northern California and 16 percent of dealers in central and southern California accounting for 90 percent of ex-vessel value in their respective areas of the state.

## The Trade Sector

Generally speaking, imports into the U.S. are categorized by their initial port of entry, which is not necessarily their final destination. Thus, some imports that

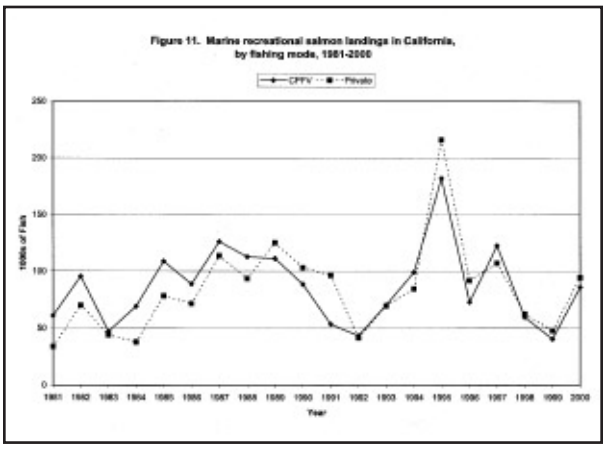


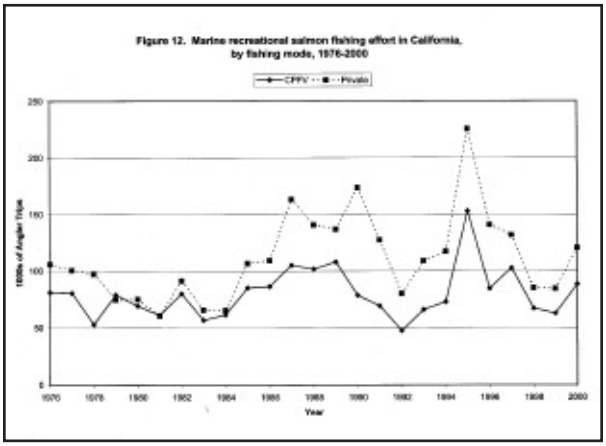
enter the U.S. at Nogales, Arizona and Honolulu, Hawaii likely end up in California markets. For this reason, seafood imports into California should be considered suggestive rather than definitive estimates of California consumer demand for imported seafood.

Like imports, exports from the U.S. are categorized in terms of the port from which they left the U.S. Thus, not all exports from a state necessarily originate from fisheries in that state. California exports may include fish landed in Mexico and subject to additional handling or processing in California before being sold to a third country. Exports also include fish that were imported and not sold, then re-exported in substantially the same condition as when imported.

The dollar value attached to imports represents the Customs value, that is, the price actually paid for merchandise when sold to the U.S., excluding U.S. import duties, freight, insurance and other charges incurred in bringing the goods to the U.S. The dollar values attached to exports and re-exports is the "free alongside ship" value, that is, the value at the port of export, defined as the transaction price including charges and transportation costs incurred in bringing the merchandise to the port of exportation.

Between 1989 and 1999, the value of seafood products imported into California increased from $1.6 trillion to $2.4 trillion, while imports into the U.S. as a whole increased from $6.9 trillion to $9.0 trillion. About 30 percent of the value of U.S. imports enters the country at California ports. Shrimp imports, which have increased dramatically over the past decade, have consistently comprised about 60 percent of the value of California seafood imports. The average annual value of shrimp imports was $1.6 trillion during the 1997-1999 period. Significant though much smaller amounts of tuna ($187.6 million), unspecified marine fish ($104.1 million), scallop ($65.1 million), lobster ($62.2 million) and squid ($47.0 million) were also imported during that period. The countries from which California received most of its seafood imports



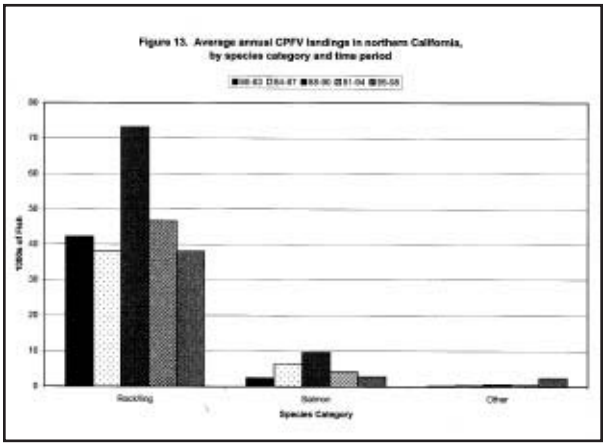




during the 1997-1999 period (in order of declining annual import value) were Thailand ($999.6 million), Indonesia ($179.1 million), China ($162.5 million), Ecuador ($157.9 million), India ($148.6 million) and Taiwan ($99.4 million). Imports from all of these countries except China have been on a generally increasing trend over the past decade.

From 1989 through 1999, the value of seafood products exported from California and from the U.S. as a whole averaged $246.2 million and $3,215.3 million respectively. About eight percent of total U.S. seafood exports originated from customs districts in California. In recent years (1997-1999), squid has replaced sea urchin as California's major export. The major species groups comprising California exports during the 1997-1999 period (in order of declining average annual value) were squid ($37.9 million), sea urchin ($28.5 million), shrimp ($18.3 million), lobster ($17.4 million), salmon ($16.6 million) and groundfish ($14.7 million). Although exports to Japan have declined significantly over the past decade, Japan remains the major recipient of California exports. California's major seafood export trading partners from 1997 through 1999 (in order of declining annual export value) were Japan ($61.7 million), Taiwan ($30.6 million), China ($22.2 million), Australia ($15.7 million), Mexico ($11.9 million) and Hong Kong ($10.8 million).

## Sport and Subsistence Fisheries

Some fishermen do not earn revenue from their catch but rather fish for pleasure and/or to provide food for personal consumption. The economic value of the sport/subsistence (hereafter loosely referred to as "recreational") fishery depends on which segment of the fishery is being considered. For instance, the value of fishing to anglers would be measured by consumer surplus, that is, the maximum amount that anglers would be willing to pay for the fishing experience over and above what they actually pay. The value of fishing to businesses that provide services to anglers, such as commercial passenger




fishing vessels (CPFVs), would be measured by the difference between their gross revenues and economic costs. The economic impact of fishing on local economies would be measured by the multiplier effects on income and employment that occur as money spent by anglers moves through the economy. Collection and analysis of data needed to estimate these various types of economic effects are underway. Until such studies are completed, all that is available at this time are approximate estimates of angler expenditures.

## Effort and Harvest

Approximately 4.7 million marine recreational angler trips were made annually in California during 1998-1999 — 2.9 million trips (61 percent) in southern California (Santa Barbara County and southward) and 1.9 million trips (39 percent) in central/northern California (San Luis Obispo County and northward). The proportion of total effort in each area associated with man-made structures (e.g., piers), beaches, CPFVs and private boats was 22 percent, 10 percent, 22 percent and 46 percent respectively in southern California, and 24 percent, 18 percent, nine percent and 49 percent in central/northern California. Approximately 17.8 million fish were harvested annually during 1998-1999, of which 9.6 million were landed in whole condition, 7.1 million were discarded alive, and 1.2 million were used as bait, filleted, given away or discarded dead.

Harvest levels vary significantly across species groups. During 1998-1999, the major components of harvest included rockfish (3.4 million fish), sea basses and tuna/mackerel (2.5 million fish each), and smelt, surfperch, croakers and Pacific barracuda (1.1 million fish each). Flatfish, silversides, jacks, sharks, rays, scorpionfish, striped bass, herring greenlings, sculpins and sea chubs made smaller though significant contributions to total harvest. The percentage of total catch retained by anglers or discarded dead (*e.g.*, not released alive) varies widely, ranging from a high of 85-90 percent for smelt, rockfish, jacks and herring to a low of 11 percent for cartilaginous fish.

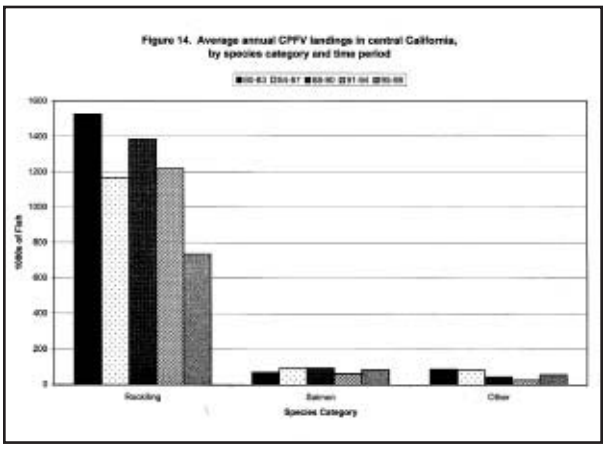
Harvests vary across fishing modes and areas as well as species. During 1998-1999, annual harvests (excluding fish released alive) ranged from highs of 1,995,000 fish for CPFV anglers and 2,171,000 fish for private boat anglers in southern California, to lows of 344,000 fish for southern California beach anglers and 600,000 fish for central/northern California anglers fishing from man-made structures. Sea basses, tuna/mackerel, Pacific barracuda, California scorpionfish and jacks are much more commonly caught in southern California, while striped bass and salmon are more commonly caught in central/northern California. Rockfishes are an important component of boat-based harvests in southern California and the dominant component in northern California.

## Recreational Fishery Expenditures

Based on the average annual number of marine recreational fishing trips made in U.S. waters during 1998-1999, aggregate annual trip-related expenditures were estimated to be approximately $202.0 million for southern California and $107.9 million for central/northern California. These estimates, combined with license, fishing gear and boat-related expenses of $128.4 million in southern California and $68.6 million in central/northern California, bring total annual statewide angler expenditures to $506.9 million.

## Additional Information on the Salmon and CPFV Sport Fisheries

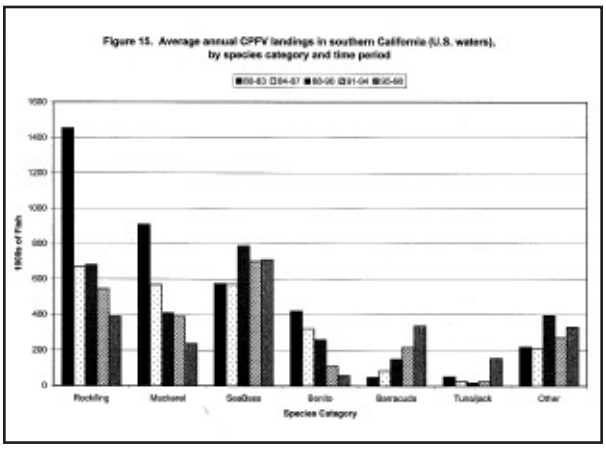
DFG sponsors a number of data collection programs that provide detailed information regarding certain segments of the marine sport fishery. One such program is the Ocean Salmon Project (OSP), which provides informa-



tion on harvest and effort in California's ocean salmon fisheries (both recreational and commercial). It also sponsors a CPFV logbook program. Not all CPFVs participate in the program and the participation rate varies somewhat from year to year. Nevertheless, logbook-based estimates of effort and catch are generally considered to be useful indicators of trends in the CPFV fishery.

According to data collected in the OSP, recreational salmon landings and effort in both central and northern California were lower and less variable in the years prior to 1985 than they have been in subsequent years 1985 through 2000. Record low levels of landings and effort were experienced by both CPFV and private boat anglers in 1992 and record highs in 1995. While CPFV and private boat landings have been markedly similar over time, fishing effort has been consistently higher for private boats than CPFVs. From 1985 through 2000, annual salmon landings averaged 91,600 fish for CPFVs and 93,600 for private boats, while annual effort averaged 86,200 CPFV trips and 128,300 private boat trips. Neither landings nor effort exhibit any consistent long term trend.

According to data collected in CPFV logbooks, the number of CPFVs that participate annually in the marine recreational fishery averaged 297 boats from 1980 through 1998. Categorizing CPFVs according to their "principal area" (*e.g.*, the area in which they made the plurality of their fishing trips), the number of northern California CPFVs increased from an annual average of 18 boats during the 1980-1987 period to 30 boats during the 1988-1991 period, then decreased to an average of 13 boats during the 1992-1998 period. The number of central California CPFVs declined from an annual average of 137 boats during the 1980-1991 period to 105 boats during the 1992-1998 period. The CPFV fleet in southern California, many of which fish in Mexican as well as U.S. waters, increased in size from an average of 145 boats (1980-1994) to 183 boats (1995-1998). Of these 183 boats, 119 fished exclusively in U.S. waters, 58 fished in both U.S. and Mexican waters, and five fished exclusively in Mexican waters.




The number of CPFV angler trips in northern California averaged 6,782 (1980-1984), increased to 13,271 (1985-1991), then declined to 6,087 (1992-1998). In central California, fishing effort declined from an annual average of 206,121 angler trips (1980-1991) to 159,634 angler trips (1992-1998). For CPFVs based in southern California, fishing effort in U.S. waters experienced peaks in 1980-1982, 1990 and 1997-1998, while effort in Mexican waters peaked in 1984-1985 and 1997-1998. Fishing effort in southern California (in both U.S. and Mexican waters) displays no obvious trend over time.

Paralleling the changes in fishing effort, CPFV landings in northern California also increased through the 1980s, peaked in the late 1980s and early 1990s, then declined throughout the 1990s. This same trend was followed by both major components of northern California landings – rockfish/lingcod and salmon. Landings of "other" species, which have historically been very modest, were augmented by crab harvests from 1995 through 1998, when CPFVs began employing crab pots on fishing trips to help supplement declining harvests of finfishes. Central California landings, which ranged from 1.5 to 1.8 million fish during the early 1980s, have declined to well under one million fish in recent years. This decline has been largely driven by the precipitous decline in rockfish/lingcod landings. Salmon landings and landings of "other" species (including species such as crab, striped bass, sturgeon, flatfishes, mackerel, tuna, shark) followed no obvious trend. Landings associated with southern California trips in U.S. waters declined from well over four million fish during the early 1980s to around two million fish during the late 1990s. Increases in sea bass and barracuda landings during 1980-1998 were overshadowed by much larger declines in rockfish, mackerel and bonito landings. Tuna/jack landings do not follow any obvious long term trend, although they have been unusually high in recent years. "Other" landings include a diversity of species, including California scorpionfish, ocean whitefish, sea chubs, wrasses, croakers and flatfishes among others.

Since 1995, the CPFV logbook database has included information that allows fishing trips to be distinguished from diving trips and also allows trips to be distinguished by target species. From 1995 through 1998, diving trips comprise a very modest proportion of total CPFV activity in both northern and central California. CPFV fishing trips in northern California were targeted largely at salmon (39 percent), rockfish/lingcod (48 percent) and salmon and rockfish/lingcod combined (10 percent). CPFV fishing trips in central California were targeted at salmon (45 percent), rockfish/lingcod (35 percent), salmon and rockfish/lingcod (three percent), and striped bass/sturgeon, shark, tuna

and other/unspecified species (17 percent). From 1995 through 1998, the contribution of salmon to total CPFV landings in northern and central California (seven percent and 10 percent respectively) was much lower than the proportion of trips targeted at salmon. Conversely, the rockfish/lingcod contribution to total northern and central California landings (88 percent and 84 percent respectively) was much higher than the proportion of trips targeted at rockfish/lingcod. Such marked disproportionalities between landings and effort highlight the large differences in catch-per-unit-effort that can exist among species groups. The singular reliance of northern and central California CPFVs on salmon, rockfish and lingcod harvests and the unprecedented regulatory restrictions on harvests of these species in recent years are significant contributing factors to the decline in effort and landings experienced in northern and central California in recent years.

Southern California CPFVs participate in a range of fishing and diving activities. From 1995 through 1998, about 79 percent of angler trips made by southern California boats involved fishing in U.S. waters, 14 percent involved fishing in Mexican waters, seven percent involved diving in U.S. waters, and less than one percent involved dive trips in Mexican waters. Of the 183 CPFVs that operated in southern California during 1995-1998, 63 fished in Mexican waters. Mexican as well as California fishing regulations are an important consideration for this significant minority of southern California CPFVs.

From 1995 through 1998, 91 percent of southern California CPFV fishing trips in U.S. waters were not targeted at any particular species, reflecting the prevalence of freelance trips on which anglers are provided with the opportunity to catch a diversity of species. Of the remaining nine percent of trips, two percent were specifically targetine tuna and seven percent rockfish/lingcod. About 55 percent of total rockfish/lingcod landings in southern California were made on trips specifically targeting rockfish/lingcod and the remaining 45 percent landed on freelance trips. This highlights one of the complexities associated with management of the southern California CPFV fishery, that is, how to meet harvest goals for managed species (like rockfish and lingcod) that are taken jointly with other species without unduly restricting harvests of these other species.

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## References

Thomson, Cynthia J. and Daniel D. Huppert. 1987. Results of the Bay Area Sportfish Economic Study (BASES), NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-78, 70 pp.

Thomson, Cynthia J. and Stephen J. Crooke. 1991. Results of the southern California Sportfish Economic Survey. NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-164, 264 pp.

**Table II-1.** Commercial landings (millions of pounds), by year and species group, 1981-1999.[1]

| Year | Groundfish | Squid | Crab | Alb/Other Tuna | Urchin | Herring | Shark/Sword | Salmon |
|---|---|---|---|---|---|---|---|---|
| 1981 | 94.4 | 51.8 | 11.8 | 337.1 | 26.5 | 13.1 | 4.8 | 6.0 |
| 1982 | 116.7 | 36.9 | 8.2 | 251.6 | 19.5 | 23.4 | 5.7 | 8.0 |
| 1983 | 90.0 | 4.0 | 6.7 | 248.7 | 17.8 | 17.7 | 5.8 | 2.4 |
| 1984 | 90.1 | 1.2 | 7.0 | 182.4 | 15.1 | 8.5 | 7.6 | 2.9 |
| 1985 | 95.0 | 22.7 | 7.9 | 68.2 | 20.1 | 17.6 | 8.9 | 4.3 |
| 1986 | 92.5 | 46.9 | 9.8 | 69.0 | 34.1 | 16.9 | 6.7 | 7.3 |
| 1987 | 91.8 | 44.1 | 8.6 | 80.6 | 46.1 | 18.6 | 5.3 | 8.8 |
| 1988 | 88.5 | 82.1 | 12.7 | 75.7 | 52.0 | 19.1 | 4.3 | 14.2 |
| 1989 | 94.4 | 90.2 | 7.2 | 55.5 | 51.4 | 20.6 | 4.5 | 5.6 |
| 1990 | 86.7 | 62.7 | 12.3 | 37.4 | 45.3 | 16.5 | 3.5 | 4.3 |
| 1991 | 79.7 | 83.2 | 6.0 | 19.0 | 42.3 | 16.3 | 3.1 | 3.7 |
| 1992 | 77.3 | 28.9 | 9.9 | 20.6 | 33.2 | 14.2 | 3.3 | 1.6 |
| 1993 | 62.4 | 94.4 | 13.5 | 24.9 | 27.0 | 9.6 | 3.5 | 2.5 |
| 1994 | 54.8 | 122.0 | 14.6 | 26.0 | 23.9 | 6.7 | 3.4 | 3.1 |
| 1995 | 63.5 | 154.9 | 10.4 | 26.1 | 22.3 | 10.4 | 2.4 | 6.6 |
| 1996 | 62.4 | 177.6 | 13.6 | 42.4 | 20.1 | 12.2 | 2.5 | 4.1 |
| 1997 | 65.5 | 155.1 | 11.3 | 37.2 | 18.1 | 20.8 | 3.1 | 5.3 |
| 1998 | 50.6 | 6.6 | 12.1 | 38.1 | 10.4 | 4.5 | 2.8 | 1.8 |
| 1999 | 33.1 | 201.8 | 9.6 | 24.6 | 14.2 | 5.2 | 3.8 | 3.8 |

**Table II-1.** Commercial landings (millions of pounds), by year and species group, 1981-1999.[1] (continued)

| Year | CPS | Lobster | Prawn | Shrimp | Nearshore | Abalone | All Else | Total |
|---|---|---|---|---|---|---|---|---|
| 1981 | 232.6 | 0.5 | 0.6 | 5.3 | 2.6 | 1.1 | 3.2 | 791.4 |
| 1982 | 215.7 | 0.5 | 0.4 | 5.4 | 2.3 | 1.2 | 3.2 | 697.8 |
| 1983 | 122.9 | 0.5 | 0.3 | 2.1 | 1.5 | 0.8 | 1.7 | 522.8 |
| 1984 | 123.7 | 0.4 | 0.6 | 3.0 | 2.3 | 0.8 | 1.5 | 447.3 |
| 1985 | 102.0 | 0.4 | 1.0 | 4.6 | 3.0 | 0.8 | 1.3 | 357.6 |
| 1986 | 120.8 | 0.5 | 0.8 | 7.0 | 2.1 | 0.6 | 1.1 | 416.1 |
| 1987 | 124.7 | 0.4 | 0.3 | 8.2 | 2.1 | 0.8 | 1.5 | 442.1 |
| 1988 | 129.2 | 0.6 | 0.3 | 11.5 | 2.3 | 0.6 | 1.7 | 494.8 |
| 1989 | 136.1 | 0.7 | 0.4 | 14.6 | 2.1 | 0.7 | 3.6 | 487.5 |
| 1990 | 106.2 | 0.7 | 0.4 | 10.3 | 2.0 | 0.5 | 6.0 | 394.9 |
| 1991 | 99.9 | 0.6 | 0.4 | 11.8 | 2.9 | 0.4 | 1.7 | 371.2 |
| 1992 | 85.7 | 0.6 | 0.3 | 19.6 | 1.8 | 0.5 | 1.3 | 298.9 |
| 1993 | 67.9 | 0.6 | 0.4 | 8.6 | 2.1 | 0.5 | 1.8 | 319.8 |
| 1994 | 57.6 | 0.5 | 0.6 | 12.1 | 3.1 | 0.3 | 1.7 | 330.4 |
| 1995 | 115.7 | 0.6 | 0.8 | 6.8 | 3.2 | 0.3 | 1.4 | 425.4 |
| 1996 | 107.5 | 0.7 | 1.1 | 10.6 | 3.4 | 0.2 | 3.3 | 461.6 |
| 1997 | 151.2 | 0.9 | 1.1 | 15.7 | 2.7 | 0.1 | 4.2 | 492.3 |
| 1998 | 147.2 | 0.7 | 1.3 | 3.0 | 1.4 | 0.0 | 3.3 | 283.9 |
| 1999 | 163.4 | 0.5 | 2.0 | 5.8 | 1.4 | 0.0 | 2.9 | 472.1 |

[1] "Nearshore" includes non-rockfish species caught in nearshore areas (*e.g.*, California sheephead, white croaker, white seabass).

**Table II-2.** Ex-vessel value ($millions, base year=1999), by year and species group, 1981-1999.[1]

| Year | Groundfish | Squid | Crab | Alb/Other Tuna | Urchin | Herring | Shark/Sword | Salmon |
|---|---|---|---|---|---|---|---|---|
| 1981 | 38.3 | 8.5 | 17.2 | 317.6 | 8.4 | 7.9 | 9.6 | 25.3 |
| 1982 | 46.5 | 5.6 | 13.6 | 198.7 | 5.6 | 15.8 | 12.5 | 31.5 |
| 1983 | 36.5 | 1.1 | 14.0 | 163.1 | 5.8 | 18.9 | 13.7 | 7.0 |
| 1984 | 35.8 | 0.4 | 14.3 | 118.2 | 5.3 | 2.8 | 20.7 | 11.4 |
| 1985 | 39.9 | 5.3 | 14.7 | 36.6 | 6.8 | 8.7 | 23.1 | 15.3 |
| 1986 | 42.8 | 6.2 | 17.9 | 38.3 | 13.4 | 7.6 | 20.8 | 20.2 |
| 1987 | 44.5 | 5.3 | 15.2 | 48.3 | 17.9 | 7.9 | 18.2 | 32.6 |
| 1988 | 40.1 | 10.2 | 21.0 | 55.1 | 25.2 | 7.4 | 15.2 | 52.5 |
| 1989 | 40.7 | 8.7 | 11.3 | 32.8 | 28.4 | 5.9 | 16.6 | 16.5 |
| 1990 | 37.2 | 5.7 | 21.8 | 18.4 | 29.7 | 10.5 | 10.7 | 14.1 |
| 1991 | 34.4 | 7.2 | 10.0 | 9.4 | 39.5 | 11.1 | 9.3 | 10.5 |
| 1992 | 34.9 | 2.8 | 14.1 | 11.5 | 33.9 | 10.5 | 9.6 | 5.1 |
| 1993 | 28.0 | 11.3 | 16.4 | 15.2 | 29.4 | 2.8 | 10.9 | 6.3 |
| 1994 | 28.2 | 15.6 | 21.4 | 16.5 | 27.7 | 3.5 | 11.5 | 7.0 |
| 1995 | 38.7 | 23.7 | 16.9 | 11.4 | 24.1 | 10.3 | 7.8 | 12.4 |
| 1996 | 37.8 | 22.8 | 19.5 | 23.5 | 19.6 | 15.8 | 7.1 | 6.3 |
| 1997 | 35.8 | 21.2 | 20.8 | 20.1 | 15.7 | 15.6 | 7.3 | 7.5 |
| 1998 | 25.0 | 1.7 | 21.8 | 19.0 | 8.0 | 0.6 | 6.7 | 3.1 |
| 1999 | 22.4 | 33.3 | 18.2 | 16.3 | 13.4 | 2.2 | 9.1 | 7.4 |

| Year | CPS | Lobster | Prawn | Shrimp | Nearshore | Abalone | All Else | Total |
|---|---|---|---|---|---|---|---|---|
| 1981 | 23.7 | 2.7 | 1.6 | 5.3 | 2.8 | 3.5 | 4.0 | 475.7 |
| 1982 | 21.1 | 3.0 | 1.7 | 5.4 | 1.2 | 3.6 | 4.0 | 369.6 |
| 1983 | 15.5 | 3.0 | 0.8 | 2.1 | 0.9 | 2.6 | 1.2 | 286.3 |
| 1984 | 14.7 | 2.6 | 0.8 | 3.0 | 1.1 | 3.2 | 1.2 | 238.4 |
| 1985 | 11.5 | 2.7 | 1.3 | 4.6 | 1.8 | 3.4 | 1.0 | 174.4 |
| 1986 | 12.7 | 3.1 | 1.5 | 7.0 | 1.3 | 2.6 | 0.9 | 194.7 |
| 1987 | 11.0 | 2.9 | 1.0 | 8.2 | 1.3 | 3.3 | 1.2 | 218.7 |
| 1988 | 12.7 | 4.2 | 1.3 | 11.5 | 1.4 | 2.6 | 1.3 | 256.7 |
| 1989 | 12.3 | 5.0 | 1.3 | 14.6 | 1.2 | 3.9 | 2.0 | 193.4 |
| 1990 | 7.9 | 4.8 | 1.9 | 10.3 | 1.2 | 3.0 | 3.6 | 176.5 |
| 1991 | 8.3 | 4.4 | 2.1 | 11.8 | 1.5 | 2.1 | 1.5 | 158.8 |
| 1992 | 7.1 | 4.4 | 1.7 | 19.6 | 1.0 | 3.2 | 1.4 | 149.3 |
| 1993 | 4.2 | 4.0 | 2.6 | 8.6 | 0.6 | 3.5 | 2.6 | 141.2 |
| 1994 | 4.1 | 3.8 | 3.2 | 12.1 | 2.0 | 2.9 | 2.0 | 157.0 |
| 1995 | 5.6 | 5.1 | 3.3 | 6.8 | 2.1 | 2.7 | 1.0 | 170.5 |
| 1996 | 5.6 | 5.3 | 4.4 | 10.6 | 2.0 | 2.3 | 1.4 | 180.5 |
| 1997 | 8.4 | 7.0 | 5.8 | 15.7 | 1.8 | 1.1 | 1.2 | 176.5 |
| 1998 | 6.8 | 4.8 | 6.4 | 3.0 | 1.6 | 0.0 | 1.3 | 109.0 |
| 1999 | 7.4 | 3.7 | 5.8 | 5.8 | 1.3 | 0.0 | 1.1 | 144.4 |

[1] "Nearshore" includes non-rockfish species caught in nearshore areas (*e.g.*, California sheephead, white croaker, white seabass).

**Table II-3.** Average annual landings and ex-vessel value during 1995-1999, by area and major species group.

### Northern California

| Species Group | Pounds x 1000 | Percent | (Base Year $=1999) | Percent |
|---|---|---|---|---|
| Groundfish | 30,233.7 | 57% | 13,564.4 | 38% |
| Crab | 8,067.0 | 15% | 13,257.6 | 37% |
| Shrimp | 6,425.7 | 12% | 3,531.2 | 10% |
| Urchin | 3,321.6 | 6% | 2,724.9 | 8% |
| Albacore/Other Tuna | 1,105.3 | 2% | 951.8 | 3% |
| All Else | 3,402.0 | 7% | 1,467.9 | 4% |
| Total | 52,555.3 | 100% | 35,497.8 | 100% |

### Central California

| Species Group | Pounds x 1000 | Percent | (Base Year $=1999) | Percent |
|---|---|---|---|---|
| Groundfish | 22,771.8 | 27% | 14,985.8 | 32% |
| Herring | 10,431.2 | 12% | 8,800.1 | 19% |
| Salmon | 4,131.5 | 5% | 6,939.9 | 15% |
| Crab | 2,428.0 | 3% | 5,135.0 | 11% |
| Prawn | 335.6 | 0% | 2,279.0 | 5% |
| Shark/Swordfish | 758.9 | 1% | 2,093.4 | 5% |
| Coastal Pelagics | 32,000.3 | 38% | 1,499.2 | 3% |
| Albacore/Other Tuna | 1,618.6 | 2% | 1,448.6 | 3% |
| Shrimp | 1,912.5 | 2% | 1,314.0 | 3% |
| Market Squid | 7,709.4 | 9% | 1,197.8 | 2% |
| All Else | 1,192.4 | 1% | 1,181.2 | 2% |
| Total | 85,290.2 | 100% | 46,874.0 | 100% |

### Southern California

| Species Group | Pounds x 1000 | Percent | (Base Year $=1999) | Percent |
|---|---|---|---|---|
| Market Squid | 131,468.9 | 45% | 19,344.8 | 26% |
| Albacore/Other Tuna | 30,924.4 | 11% | 15,662.8 | 21% |
| Urchin | 13,057.8 | 5% | 12,906.9 | 18% |
| Coastal Pelagics | 104,979.2 | 36% | 5,261.4 | 7% |
| Shark/Swordfish | 2,059.3 | 1% | 5,229.5 | 7% |
| Lobster | 683.1 | 0% | 5,174.6 | 7% |
| Groundfish | 2,007.4 | 1% | 3,382.5 | 5% |
| Prawn | 915.9 | 0% | 2,813.2 | 4% |
| Crab | 891.2 | 0% | 1,067.1 | 1% |
| All Else | 2,237.8 | 1% | 2,974.6 | 4% |
| Total | 289,225.0 | 100% | 73,817.4 | 100% |

### Total California

| Species Group | Pounds x 1000 | Percent | (Base Year $=1999) | Percent |
|---|---|---|---|---|
| Groundfish | 55,012.9 | 13% | 31,932.7 | 20% |
| Market Squid | 139,187.8 | 33% | 20,546.4 | 13% |
| Crab | 11,386.1 | 3% | 19,459.6 | 13% |
| Albacore/Other Tuna | 33,648.2 | 8% | 18,063.1 | 12% |
| Urchin | 17,040.0 | 4% | 16,151.1 | 10% |
| Herring | 10,628.9 | 2% | 8,910.9 | 6% |
| Shark/Swordfish | 2,915.3 | 1% | 7,609.2 | 5% |
| Salmon | 4,348.7 | 1% | 7,347.7 | 5% |
| Coastal Pelagics | 137,003.8 | 32% | 6,764.9 | 4% |
| Lobster | 683.2 | 0% | 5,175.5 | 3% |
| Prawn | 1,261.4 | 0% | 5,157.7 | 3% |
| Shrimp | 8,373.9 | 2% | 4,876.8 | 3% |
| Abalone | 121.7 | 0% | 1,205.1 | 1% |
| All Else | 5,458.6 | 1% | 2,988.4 | 2% |
| Total | 427,070.5 | 100% | 156,189.2 | 100% |

**Table II-4.** Number of vessels that make commercial landings in California, categorized according to whether or not they also make landings in Oregon or Washington, 1981-1999.

| Year | CA Only | CA & OR | CA & WA | CA, OR & WA | Total |
|---|---|---|---|---|---|
| 1981 | 5,832 | 787 | 135 | 143 | 6,897 |
| 1982 | 5,762 | 555 | 106 | 130 | 6,553 |
| 1983 | 5,257 | 396 | 83 | 94 | 5,830 |
| 1984 | 4,779 | 261 | 103 | 31 | 5,174 |
| 1985 | 4,451 | 235 | 87 | 37 | 4,810 |
| 1986 | 4,305 | 365 | 106 | 69 | 4,845 |
| 1987 | 4,162 | 352 | 104 | 76 | 4,694 |
| 1988 | 4,204 | 354 | 135 | 92 | 4,785 |
| 1989 | 4,376 | 309 | 125 | 64 | 4,874 |
| 1990 | 4,155 | 273 | 122 | 48 | 4,598 |
| 1991 | 4,032 | 214 | 102 | 40 | 4,388 |
| 1992 | 3,536 | 170 | 118 | 46 | 3,870 |
| 1993 | 3,271 | 196 | 93 | 58 | 3,618 |
| 1994 | 3,102 | 161 | 107 | 52 | 3,422 |
| 1995 | 3,074 | 184 | 83 | 35 | 3,376 |
| 1996 | 2,994 | 205 | 74 | 30 | 3,303 |
| 1997 | 2,857 | 190 | 96 | 20 | 3,163 |
| 1998 | 2,505 | 119 | 51 | 24 | 2,699 |
| 1999 | 2,495 | 128 | 45 | 22 | 2,690 |

**Table II-5.** Number of vessels by principal area, categorized according to whether or not they also make landings outside their principal area, 1981-1999.

| | Principal Area=Northern CA | | | | Principal Area=Central CA | | | | Principal Area=Southern CA | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | No.CA Only | No.& Cen. | Other Comb. | Total | Cen.CA Only | No.& Cen. | So.& Cen. | Other Comb. | Total | So.CA Only | So.& Cen. | Other Comb. | Total |
| 1981 | 1920 | 311 | 25 | 2256 | 2488 | 259 | 82 | 19 | 2848 | 1635 | 135 | 23 | 1793 |
| 1982 | 1842 | 289 | 36 | 2167 | 2274 | 232 | 110 | 29 | 2645 | 1566 | 155 | 19 | 1740 |
| 1983 | 1472 | 141 | 10 | 1623 | 2269 | 190 | 139 | 21 | 2619 | 1325 | 159 | 35 | 1519 |
| 1984 | 1066 | 160 | 16 | 1242 | 2008 | 177 | 102 | 15 | 2302 | 1313 | 230 | 20 | 1563 |
| 1985 | 891 | 198 | 23 | 1112 | 2033 | 147 | 105 | 13 | 2298 | 1160 | 152 | 24 | 1336 |
| 1986 | 1127 | 198 | 20 | 1345 | 1935 | 164 | 108 | 16 | 2223 | 1112 | 121 | 26 | 1259 |
| 1987 | 951 | 241 | 57 | 1249 | 1843 | 244 | 99 | 21 | 2207 | 1025 | 132 | 23 | 1180 |
| 1988 | 940 | 211 | 49 | 1200 | 2035 | 250 | 101 | 16 | 2402 | 979 | 90 | 53 | 1122 |
| 1989 | 858 | 240 | 60 | 1158 | 2069 | 296 | 69 | 20 | 2454 | 1056 | 89 | 64 | 1209 |
| 1990 | 842 | 130 | 48 | 1020 | 2011 | 184 | 84 | 14 | 2293 | 1111 | 76 | 40 | 1227 |
| 1991 | 767 | 127 | 40 | 934 | 1944 | 189 | 82 | 18 | 2233 | 1080 | 101 | 27 | 1208 |
| 1992 | 597 | 71 | 83 | 751 | 1778 | 90 | 83 | 18 | 1969 | 998 | 90 | 47 | 1135 |
| 1993 | 605 | 94 | 65 | 764 | 1562 | 132 | 63 | 20 | 1777 | 954 | 73 | 42 | 1069 |
| 1994 | 521 | 101 | 33 | 655 | 1370 | 155 | 101 | 23 | 1649 | 958 | 107 | 42 | 1107 |
| 1995 | 470 | 76 | 33 | 579 | 1539 | 97 | 116 | 14 | 1766 | 903 | 96 | 21 | 1020 |
| 1996 | 507 | 112 | 24 | 643 | 1428 | 92 | 70 | 7 | 1597 | 929 | 95 | 25 | 1049 |
| 1995 | 512 | 68 | 24 | 604 | 1406 | 88 | 84 | 9 | 1587 | 858 | 86 | 18 | 962 |
| 1998 | 445 | 76 | 17 | 538 | 1105 | 64 | 76 | 11 | 1256 | 806 | 64 | 17 | 887 |
| 1999 | 459 | 59 | 14 | 532 | 1057 | 56 | 74 | 4 | 1191 | 846 | 98 | 11 | 955 |

**Table II-6.** Average annual number of boats that make California landings, ex-vessel revenue per boat from California landings, number and percent of boats earning less than $5,000 per year from California landings, and number and percent of boats accounting for 90 percent of ex-vessel value of aggregate landings, by principal area and time period.

| | 1981-1985 | 1986-1994 | 1995-1999 |
|---|---|---|---|
| **Principal Area=Northern CA:** | | | |
| Number of Boats | 1,680 | 1,008 | 579 |
| Ex-Vessel Revenue Per Boat | $24,500 | $48,300 | $60,800 |
| #(%) Boats Earning <$5K Per Year | 983(59%) | 386(37%) | 162(28%) |
| #(%) Boats Accting for 90% of Ex-Vessel Value of Northern California Landings | 419(25%) | 341(35%) | 236(41%) |
| **Principal Area=Central CA:** | | | |
| Number of Boats | 2,542 | 2,134 | 1,479 |
| Ex-Vessel Revenue Per Boat | $20,800 | $25,100 | $30,100 |
| #(%) Boats Earning <$5K Per Year | 1,420(56%) | 967(46%) | 627(43%) |
| #(%) Boats Accting for 90% of Ex-Vessel Value of Central California Landings | 727(29%) | 737(34%) | 512(35%) |
| **Principal Area=Southern CA:** | | | |
| Number of Boats | 1,630 | 1,201 | 988 |
| Ex-Vessel Revenue Per Boat | $126,000 | $67,400 | $74,900 |
| #(%) Boats Earning <$5K Per Year | 682(42%) | 402(33%) | 256(26%) |
| #(%) Boats Accting for 90% of Ex-Vessel Value of southern California Landings | 290(18%) | 401(34%) | 382(39%) |
| **Total California:** | | | |
| Number of Boats | 5,853 | 4,344 | 3,046 |
| Ex-Vessel Revenue Per Boat | $50,600 | $41,800 | $50,700 |
| #(%) Boats Earning <$5K Per Year | 3,085(53%) | 1,755(40%) | 1,045(34%) |
| #(%) Boats Accting for 90% of Ex-Vessel Value of Total California Landings | 1,119(20%) | 1,375(32%) | 1,072(35%) |

**Table II-7.** Average annual 1995-1999 landings, ex-vessel value of landings, and vessel participation in major commercial fisheries, by area.

| Major Northern CA Fisheries | Landings (1000 lbs) | Value ($1000s, Base Year=1999) | # Participating Vessels | # Vessels Participating As Principal Fishery |
|---|---|---|---|---|
| Crab trap | 7,886.0 | 13,095.5 | 309 | 247 |
| Groundfish trawl | 28,683.7 | 11,322.9 | 71 | 56 |
| Shrimp trawl | 6,084.1 | 3,179.5 | 58 | 25 |
| Urchin dive | 3,318.9 | 2,742.1 | 64 | 61 |
| Groundfish H&L | 1,562.8 | 1,925.4 | 158 | 103 |
| Tuna H&L | 966.4 | 837.6 | 43 | 17 |
| Salmon H&L | 406.1 | 654.5 | 86 | 44 |
| Groundfish/misc. trap | 363.9 | 459.4 | 35 | 16 |
| Shark/swordfish gillnet | 102.0 | 308.9 | 9 | 4 |
| Herring | 121.1 | 104.4 | 5 | 4 |

| Major Central CA Fisheries | Landings (1000 lbs) | Value ($1000s, Base Year=1999) | # Participating Vessels | # Vessels Participating As Principal Fishery |
|---|---|---|---|---|
| Groundfish trawl | 17,406.2 | 9,097.8 | 73 | 61 |
| Herring | 10,014.2 | 8,585.5 | 149 | 136 |
| Salmon H&L | 3,847.1 | 6,512.4 | 704 | 579 |
| Crab trap | 2,564.3 | 5,209.2 | 207 | 127 |
| Groundfish H&L | 4,056.2 | 4,710.2 | 520 | 415 |
| Prawn trawl | 317.9 | 2,039.2 | 18 | 13 |
| Shark/swordfish gillnet | 581.9 | 1,683.5 | 30 | 21 |
| Squid seine/other net | 8,817.7 | 1,282.9 | 13 | 5 |
| Tuna H&L | 1,470.1 | 1,248.1 | 123 | 44 |
| CPS seine | 20,333.9 | 961.6 | 13 | 7 |
| Shrimp trawl | 985.7 | 956.9 | 19 | 10 |
| Urchin dive | 686.7 | 546.9 | 17 | 10 |
| Groundfish/misc. trap | 153.1 | 382.5 | 34 | 13 |
| Abalone dive | 31.8 | 313.1 | 9 | 8 |
| Prawn trap | 34.4 | 249.2 | 8 | 3 |
| Shark/swordfish H&L | 101.2 | 240.9 | 9 | 3 |

Table II-7 (continued).

| # Vessels<br>Major Southern CA Fisheries | Landings (1000 lbs) | Value ($1000s, Base Year=1999) | # Participating Vessels | Participating As Principal Fishery |
|---|---|---|---|---|
| Squid seine/other net | 129,556.2 | 19,150.2 | 87 | 70 |
| Urchin dive | 13,007.9 | 12,835.5 | 223 | 207 |
| Tuna seine | 23,001.5 | 9,644.1 | 21 | 10 |
| Tuna H&L | 7,473.2 | 5,736.9 | 115 | 65 |
| CPS seine | 115,869.4 | 5,671.8 | 46 | 23 |
| Lobster trap | 680.7 | 5,157.5 | 202 | 168 |
| Shark/swordfish gillnet | 1,053.9 | 2,548.2 | 80 | 50 |
| Groundfish H&L | 1,588.5 | 2,193.8 | 205 | 157 |
| Shark/swordfish H&L | 795.6 | 1,875.9 | 42 | 27 |
| Prawn trawl | 745.3 | 1,679.9 | 27 | 19 |
| Groundfish/misc. net | 810.8 | 1,232.3 | 58 | 31 |
| Crab trap | 900.4 | 1,097.2 | 76 | 35 |
| Prawn trap | 135.1 | 1,011.9 | 28 | 18 |
| Abalone dive | 87.6 | 877.0 | 33 | 13 |
| Groundfish/misc. trap | 219.1 | 663.2 | 66 | 19 |
| Shark/swordfish dive | 119.3 | 632.0 | 24 | 20 |
| Groundfish trawl | 255.0 | 525.3 | 32 | 20 |
| Cucumber dive | 398.6 | 244.3 | 22 | 21 |
| Salmon H&L | 89.8 | 171.1 | 18 | 7 |
| Cucumber trawl | 236.4 | 167.1 | 12 | 5 |
| Shrimp other net | 63.5 | 22.2 | 3 | 3 |

**Table II-8.** Average annual 1995-1999 landings and ex-vessel revenue per boat from the principal fishery, from other California fisheries and from Oregon and Washington fisheries, by vessels' principal area and principal fishery.

| | Landings/Boat/Year (1000 Pounds) | | | | Ex-Vessel Revenue/Boat/Year ($1000s) | | | |
|---|---|---|---|---|---|---|---|---|
| Northern California Principal Fisheries | Principal Fishery | Other CA | OR/WA | Total | Principal Fishery | Other CA | OR/WA | Total |
| Crab trap | 26.0 | 17.1 | 9.8 | 52.9 | 43.8 | 12.7 | 8.8 | 65.2 |
| Groundfish trawl | 473.1 | 61.1 | 385.7 | 919.8 | 185.1 | 37.2 | 44.8 | 267.2 |
| Shrimp trawl | 110.2 | 38.9 | 249.4 | 398.5 | 58.6 | 30.1 | 134.5 | 223.2 |
| Urchin dive | 54.2 | 0.7 | 2.7 | 57.6 | 43.9 | 1.5 | 2.5 | 47.9 |
| Groundfish H&L | 10.6 | 3.1 | 1.6 | 15.3 | 12.7 | 4.3 | 2.3 | 19.4 |
| Tuna H&L | 27.1 | 2.7 | 30.6 | 60.5 | 24.0 | 3.6 | 28.3 | 55.9 |
| Salmon H&L | 1.8 | 0.8 | 0.2 | 2.8 | 3.2 | 1.1 | 0.3 | 4.6 |
| Groundfish/misc. trap | 10.8 | 3.7 | 3.5 | 18.0 | 14.8 | 5.1 | 6.3 | 26.2 |
| Shark/swordfish gillnet | 13.2 | 10.3 | 107.6 | 131.0 | 42.3 | 11.3 | 102.9 | 156.5 |
| Herring | 25.9 | 1.2 | 0.0 | 27.1 | 19.4 | 1.2 | 0.0 | 20.5 |
| Groundfish trawl | 275.3 | 18.8 | 333.9 | 628.0 | 145.4 | 11.1 | 52.9 | 209.4 |
| Herring | 64.2 | 18.5 | 1.8 | 84.5 | 53.4 | 2.9 | 1.3 | 57.7 |
| Salmon H&L | 5.3 | 1.4 | 1.9 | 8.6 | 9.0 | 1.8 | 2.3 | 13.1 |
| Crab trap | 16.1 | 9.1 | 1.9 | 27.0 | 32.7 | 8.4 | 1.9 | 43.1 |
| Groundfish H&L | 8.6 | 0.8 | 0.2 | 9.6 | 10.2 | 1.1 | 0.2 | 11.5 |
| Prawn trawl | 23.3 | 44.7 | 87.4 | 155.4 | 153.8 | 34.0 | 46.3 | 234.1 |
| Squid seine/other net | 573.8 | 479.3 | 0.0 | 1053.1 | 85.7 | 46.0 | 0.0 | 131.6 |
| Tuna H&L | 17.1 | 2.7 | 17.9 | 37.6 | 14.4 | 4.0 | 16.7 | 35.2 |
| CPS seine | 2030.9 | 334.9 | 0.0 | 2365.9 | 99.2 | 53.2 | 0.0 | 152.4 |
| Shrimp trawl | 26.1 | 4.2 | 78.7 | 109.0 | 52.7 | 4.9 | 52.4 | 110.0 |
| Urchin dive | 60.3 | 1.1 | 0.0 | 61.4 | 47.6 | 2.2 | 0.0 | 49.7 |
| Groundfish/misc. trap | 8.1 | 2.2 | 0.0 | 10.3 | 20.8 | 4.3 | 0.0 | 25.1 |
| Abalone dive | 2.3 | 2.0 | 0.1 | 4.4 | 22.5 | 2.1 | 0.1 | 24.7 |
| Prawn trap | 8.1 | 16.2 | 0.9 | 25.2 | 59.8 | 12.6 | 0.5 | 72.8 |
| Shark/swordfish H&L | 11.2 | 2.7 | 0.7 | 14.6 | 27.0 | 7.5 | 1.9 | 36.4 |

Table II-8 (cont.)

| Southern California Principal Fisheries | Landings/Boat/Year (1000 Pounds) Principal Fishery | Other CA | OR/WA | Total | Ex-Vessel Revenue/Boat/Year ($1000s) Principal Fishery | Other CA | OR/WA | Total |
|---|---|---|---|---|---|---|---|---|
| Squid seine/other net | 1516.9 | 674.7 | 5.2 | 2196.7 | 226.0 | 44.9 | 4.5 | 275.4 |
| Urchin dive | 60.2 | 3.0 | 5.1 | 68.2 | 58.8 | 4.2 | 0.9 | 63.8 |
| Tuna seine | 1882.1 | 1288.6 | 4.9 | 3175.6 | 806.4 | 104.0 | 4.1 | 914.6 |
| Tuna H&L | 105.0 | 15.1 | 36.2 | 156.3 | 70.5 | 9.4 | 31.3 | 111.3 |
| CPS seine | 2475.8 | 482.5 | 0.4 | 2958.8 | 132.0 | 89.5 | 0.1 | 221.6 |
| Lobster trap | 3.7 | 3.8 | 0.1 | 7.6 | 28.2 | 6.4 | 0.1 | 34.7 |
| Shark/swordfish gillnet | 16.4 | 23.5 | 8.3 | 48.2 | 42.9 | 19.7 | 7.1 | 69.7 |
| Groundfish H&L | 8.9 | 1.7 | 0.3 | 11.0 | 12.2 | 1.4 | 0.3 | 13.9 |
| Shark/swordfish H&L | 26.8 | 6.7 | 3.0 | 36.5 | 62.8 | 15.3 | 2.4 | 80.4 |
| Prawn trawl | 32.5 | 9.2 | 56.5 | 98.2 | 79.4 | 11.6 | 12.2 | 103.2 |
| Groundfish/misc. other net | 17.5 | 12.1 | 0.6 | 30.3 | 28.1 | 10.6 | 0.5 | 39.2 |
| Crab trap | 15.1 | 1.4 | 0.0 | 16.6 | 18.3 | 4.7 | 0.0 | 23.0 |
| Prawn trap | 6.1 | 2.6 | 0.5 | 9.1 | 47.4 | 9.1 | 0.4 | 56.9 |
| Abalone dive | 2.1 | 9.1 | 0.4 | 11.7 | 21.4 | 9.7 | 0.3 | 31.5 |
| Groundfish/misc. trap | 4.6 | 2.9 | 0.0 | 7.5 | 14.0 | 7.2 | 0.0 | 21.3 |
| Shark/swordfish dive | 5.2 | 1.2 | 0.0 | 6.3 | 27.3 | 1.8 | 0.0 | 29.1 |
| Groundfish trawl | 9.0 | 8.0 | 7.9 | 24.9 | 20.9 | 6.0 | 2.7 | 29.6 |
| Cucumber dive | 2.6 | 4.0 | 0.5 | 32.9 | 15.1 | 9.8 | 0.0 | 24.8 |

**Table II-9.** Number of fish dealers by principal area, categorized according to whether or not they also receive landings outside their principal area, 1981-1999.

| | Principal Area=Northern CA | | | | Principal Area=Central CA | | | | Principal Area=Southern CA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | No.CA Only | No.& Cen. | Other Comb. | Total | Cen.CA Only | No.& Cen. | So.& Cen. | Other Comb. | So.CA Total | So.& Only | Other Cen. | CA Comb. | Total | Dealers |
| 1981 | 81 | 3 | 7 | 86 | 182 | 15 | 12 | 4 | 213 | 201 | 17 | 2 | 220 | 519 |
| 1982 | 77 | 8 | 1 | 86 | 209 | 9 | 11 | 4 | 233 | 227 | 18 | 2 | 247 | 566 |
| 1983 | 67 | 6 | 0 | 73 | 221 | 14 | 12 | 4 | 251 | 217 | 27 | 4 | 248 | 572 |
| 1984 | 53 | 11 | 0 | 64 | 211 | 8 | 9 | 4 | 232 | 207 | 28 | 2 | 237 | 533 |
| 1985 | 59 | 9 | 0 | 68 | 200 | 9 | 19 | 2 | 230 | 187 | 35 | 1 | 223 | 521 |
| 1986 | 65 | 7 | 2 | 74 | 213 | 4 | 18 | 3 | 238 | 188 | 24 | 6 | 218 | 530 |
| 1987 | 103 | 12 | 4 | 119 | 420 | 22 | 17 | 4 | 463 | 275 | 29 | 5 | 309 | 891 |
| 1988 | 102 | 6 | 2 | 110 | 361 | 21 | 15 | 2 | 399 | 272 | 29 | 10 | 311 | 820 |
| 1989 | 108 | 10 | 5 | 123 | 329 | 15 | 12 | 5 | 361 | 294 | 37 | 11 | 342 | 826 |
| 1990 | 85 | 11 | 5 | 101 | 322 | 14 | 21 | 2 | 359 | 285 | 34 | 12 | 331 | 791 |
| 1991 | 85 | 12 | 3 | 100 | 312 | 21 | 19 | 6 | 358 | 290 | 26 | 9 | 325 | 783 |
| 1992 | 85 | 10 | 6 | 101 | 307 | 21 | 24 | 11 | 363 | 257 | 26 | 15 | 298 | 762 |
| 1993 | 104 | 14 | 4 | 122 | 318 | 21 | 21 | 5 | 365 | 237 | 31 | 17 | 285 | 772 |
| 1994 | 98 | 14 | 12 | 124 | 333 | 24 | 27 | 9 | 393 | 331 | 59 | 15 | 405 | 922 |
| 1995 | 54 | 14 | 12 | 80 | 284 | 9 | 27 | 6 | 326 | 292 | 37 | 8 | 337 | 743 |
| 1996 | 88 | 13 | 6 | 107 | 274 | 19 | 18 | 6 | 317 | 267 | 30 | 12 | 309 | 733 |
| 1997 | 89 | 24 | 4 | 117 | 301 | 17 | 18 | 8 | 344 | 297 | 30 | 7 | 334 | 795 |
| 1998 | 78 | 19 | 6 | 103 | 360 | 16 | 19 | 5 | 400 | 312 | 29 | 10 | 351 | 854 |
| 1999 | 120 | 16 | 7 | 143 | 339 | 11 | 13 | 3 | 366 | 328 | 43 | 8 | 379 | 888 |

**Table II-10.** Average annual number of fish dealers, ex-vessel value of California landings receipts per dealer, number and percent of dealers accounting for less than $5,000 per year in California landings receipts, and number and percent of dealers accounting for 90 percent of ex-vessel value of aggregate landings receipts, 1981-1986 and 1987-1999, by dealers' principal area.

| | 1981-1986 | 1987-1999 |
|---|---|---|
| **Principal Area – Northern CA:** | | |
| Number of Dealers | 75 | 112 |
| Ex-Vessel Value of CA Landings Receipts/Dealer | $542,700 | $380,300 |
| #(%) Dealers With<$5K Per Year in CA Receipts | 18(23%) | 52(46%) |
| #(%) Dealers Accounting for 90% of Ex-Vessel Value of Northern California Landings | 25(33%) | 22(20%) |
| **Principal Area – Central CA:** | | |
| Number of Dealers | 233 | 370 |
| Ex-Vessel Value of CA Landings Receipts/Dealer | $246,700 | $138,800 |
| #(%) Dealers With<$5K Per Year in CA Receipts | 76(33%) | 186(50%) |
| #(%) Dealers Accounting for 90% of Ex-Vessel Value of Central California Landings | 50(21%) | 58(16%) |
| **Principal Area – Southern CA:** | | |
| Number of Dealers | 239 | 344 |
| Ex-Vessel Value of CA Landings Receipts/Dealer | $805,500 | $233,900 |
| #(%) Dealers With<$5K Per Year in CA Receipts | 69(29%) | 131(38%) |
| #(%) Dealers Accounting for 90% of Ex-Vessel Value of southern California Landings | 28(12%) | 55(16%) |
| **All California:** | | |
| Number of Dealers | 547 | 825 |
| Ex-Vessel Value of CA Landings Receipts/Dealer | $531,500 | $209,500 |
| #(%) Dealers With<$5K Per Year in CA Receipts | 163(30%) | 369(45%) |
| #(%) Dealers Accounting for 90% of Ex-Vessel Value of Total California Landings | 103(19%) | 134(16%) |

**Table II-11.** Volume and value of imports and exports of edible fish products at California customs districts and at all United States customs districts, by year, 1989-1999.

| | Imports | | | | Exports | | | |
|---|---|---|---|---|---|---|---|---|
| | Millions of Pounds | | $Millions (Base Year=1999) | | Millions of Pounds | | $Millions (Base Year=1999) | |
| **Year** | **Calif.** | **U.S.** | **Calif.** | **U.S.** | **Calif.** | **U.S.** | **Calif.** | **U.S.** |
| 1989 | 569.8 | 3,243.0 | 1,636.7 | 6,863.7 | 106.6 | 1,406.0 | 255.2 | 2,940.8 |
| 1990 | 627.4 | 2,884.6 | 1,808.6 | 6,289.9 | 99.2 | 1,947.3 | 231.7 | 3,463.1 |
| 1991 | 687.0 | 3,014.8 | 1,895.1 | 6,595.2 | 131.6 | 2,058.6 | 260.1 | 3,669.5 |
| 1992 | 710.3 | 2,894.0 | 2,015.5 | 6,491.3 | 105.2 | 2,087.6 | 223.6 | 3,942.7 |
| 1993 | 708.9 | 2,917.2 | 1,948.3 | 6,477.0 | 86.7 | 1,986.0 | 216.6 | 3,407.3 |
| 1994 | 777.1 | 3,034.8 | 2,325.8 | 7,207.3 | 135.9 | 1,978.5 | 284.8 | 3,390.6 |
| 1995 | 729.8 | 3,066.5 | 2,230.8 | 7,217.5 | 183.8 | 2,047.2 | 293.8 | 3,466.8 |
| 1996 | 759.6 | 3,169.8 | 2,222.9 | 7,017.3 | 218.7 | 2,112.1 | 281.8 | 3,161.9 |
| 1997 | 832.0 | 3,338.8 | 2,533.5 | 7,961.2 | 248.3 | 2,018.9 | 269.7 | 2,785.5 |
| 1998 | 911.1 | 3,647.0 | 2,513.8 | 8,289.2 | 142.6 | 1,663.9 | 158.9 | 2,291.8 |
| 1999 | 979.0 | 3,887.9 | 2,471.5 | 9,013.9 | 285.4 | 1,961.1 | 232.3 | 2,848.5 |

**Table III-1.** Average annual marine recreational fishing effort and harvest during 1998-1999 in southern and central/northern California, by fishing mode (1000s of fish).

| Area/Fishing Mode | 1000s of Angler Trips | Landed Whole | Released Alive | Other Disposition | Total |
|---|---|---|---|---|---|
| Southern California | | | | | |
| Man-made | 624 | 837 | 644 | 233 | 1,714 |
| Beach | 281 | 327 | 247 | 17 | 590 |
| CPFV | 641 | 1,733 | 973 | 262 | 2,968 |
| Private | 1,324 | 1,960 | 4,075 | 211 | 6,246 |
| Total | 2,869 | 4,857 | 5,939 | 723 | 11,518 |
| Central/Northern California | | | | | |
| Man-made | 440 | 533 | 192 | 67 | 792 |
| Beach | 344 | 1,582 | 206 | 17 | 1,805 |
| CPFV | 168 | 1,131 | 122 | 171 | 1,423 |
| Private | 921 | 1,459 | 648 | 205 | 2,311 |
| Total | 1,872 | 4,705 | 1,168 | 460 | 6,331 |
| Total California | | | | | |
| Man-made | 1,064 | 1,370 | 836 | 300 | 2,506 |
| Beach | 625 | 1,909 | 453 | 34 | 2,395 |
| CPFV | 808 | 2,864 | 1,095 | 433 | 4,391 |
| Private | 2,245 | 3,419 | 4,723 | 416 | 8,557 |
| Total | 4,741 | 9,562 | 7,107 | 1,183 | 17,849 |

Source: Marine Recreational Fishery Statistics Survey.
Includes harvests in U.S. waters only. "Other Disposition" refers to fish used as bait, filleted, given away or discarded dead. All landings are in 1000s of fish.

**Table III-2.** Average annual marine recreational harvest (excluding fish released alive) during 1998-1999 in southern and central/northern California, by fishing mode and species category.

| Southern California | | Central/Northern California | |
|---|---|---|---|
| Species Category | 1000s of Fish (%) | Species Category | 1000s of Fish (%) |
| **Man-Made** | | | |
| Tuna/mackerel | 413 (39%) | Silversides | 185 (31%) |
| Croaker | 204 (19%) | Surfperch | 164 (27%) |
| Silversides | 150 (14%) | Croaker | 78 (13%) |
| Herring | 145 (14%) | Herring | 61 (10%) |
| Surfperch | 71 (7%) | Anchovy | 47 (8%) |
| Other | 87 (8%) | Other | 65 (11%) |
| Total | 1,070 (100%) | Total | 600 (100%) |
| **Beach** | | | |
| Surfperch | 218 (63%) | Smelt | 1,145 (72%) |
| Croaker | 59 (17%) | Surfperch | 343 (21%) |
| Silversides | 24 ( 7%) | Silversides | 41 (3%) |
| Sea chub | 16 (5%) | Other | 70 (4%) |
| Other | 27 (8%) | Total | 1,599 (100%) |
| Total | 344 (100%) | | |
| **CPFV** | | | |
| Rockfish | 668 (33%) | Rockfish | 1,204 (92%) |
| Sea basses | 313 (16%) | Salmon | 50 (4%) |
| Tuna/mackerel | 281 (14%) | Greenling | 21 (2%) |
| Pacific barracuda | 269 (13%) | Other | 27 (2%) |
| Calif scorpionfish | 151 (8%) | Total | 1,302 (100%) |
| Other | 313 (16%) | | |
| Total | 1,995 (100%) | | |
| **Private Boat** | | | |
| Sea basses | 502 (23%) | Rockfish | 1,034 (60%) |
| Tuna/mackerel | 379 (17%) | Tuna/mackerel | 89 (5%) |
| Rockfish | 328 (15%) | Croaker | 85 (5%) |
| Pacific barracuda | 192 (9%) | Flatfish | 80 (5%) |
| Jacks | 168 (8%) | Striped bass | 70 (4%) |
| Croaker | 156 (7%) | Greenling | 68 (4%) |
| Flatfish | 125 (6%) | Salmon | 55 (3%) |
| Calif scorpionfish | 86 (4%) | Other | 237 (14%) |
| Other | 235 (11%) | Total | 1,718 (100%) |
| Total | 2,171 (100%) | | |

Source: Salmon harvest estimates obtained from DFG's Ocean Salmon Project. All other harvest estimates obtained from Marine Recreational Fishery Statistics Survey.

**Table III-3.** Estimated average annual expenditures by marine anglers during 1998-1999 in southern and central/northern California ($millions, base year=1999), by expenditure category.

| Expenditure Category | Southern CA | Northern CA | Total CA |
|---|---|---|---|
| Trip-Related Expenses | | | |
| Man-Made | $ 18.1 | $ 13.2 | $ 31.3 |
| Beach | 9.8 | 15.1 | 24.9 |
| CPFV | 81.4 | 17.0 | 98.4 |
| Private | 92.7 | 62.6 | 155.3 |
| Total | $202.0 | $107.9 | $309.9 |
| Licenses/Fishing Gear | 54.3 | 29.0 | 83.3 |
| Boat-Related Expenses | 74.1 | 39.6 | 113.7 |
| Grand Total | $330.4 | $176.5 | $506.9 |

Source: Trip-related expenses based on average annual 1998-1999 effort estimates (Table III-1) and estimates of average expenditures per trip by fishing mode derived from Thomson and Crooke (1991) for southern California and from Thomson and Huppert (1987) for central/northern California and corrected for inflation to 1999 dollars. License/gear and boat-related expenses based on the observation from Thomson and Crooke (1991) that license/gear and boat-related expenses are 27 percent and 37 percent respectively of total trip expenditures in southern California, and extrapolating that result to central/northern California.

**Table III-4.** Number of CPFVs participating in the marine recreational fishery during 1980-1998, by vessels' principal fishing area.

| Year | NoCA | CenCA | U.S.Only | SoCA:U.S. &Mex | MexOnly | Total | All Boats |
|---|---|---|---|---|---|---|---|
| 1980 | 14 | 142 | 83 | 57 | 6 | 147 | 303 |
| 1981 | 15 | 125 | 85 | 52 | 14 | 151 | 291 |
| 1982 | 20 | 136 | 92 | 50 | 9 | 151 | 307 |
| 1983 | 21 | 145 | 96 | 52 | 6 | 154 | 320 |
| 1984 | 19 | 140 | 80 | 65 | 17 | 162 | 321 |
| 1985 | 17 | 142 | 78 | 58 | 19 | 155 | 314 |
| 1986 | 18 | 140 | 82 | 53 | 7 | 142 | 300 |
| 1987 | 22 | 134 | 76 | 45 | 10 | 131 | 287 |
| 1988 | 27 | 132 | 102 | 47 | 8 | 157 | 316 |
| 1989 | 41 | 146 | 83 | 55 | 14 | 152 | 339 |
| 1990 | 32 | 135 | 87 | 45 | 11 | 143 | 310 |
| 1991 | 21 | 125 | 87 | 23 | 15 | 125 | 271 |
| 1992 | 16 | 120 | 91 | 39 | 3 | 133 | 269 |
| 1993 | 16 | 107 | 90 | 32 | 6 | 128 | 251 |
| 1994 | 13 | 107 | 98 | 34 | 7 | 139 | 259 |
| 1995 | 13 | 99 | 117 | 47 | 6 | 170 | 282 |
| 1996 | 10 | 105 | 121 | 47 | 6 | 174 | 289 |
| 1997 | 11 | 105 | 125 | 66 | 4 | 195 | 311 |
| 1998 | 13 | 95 | 114 | 73 | 5 | 192 | 300 |

Source: CPFV logbooks. Southern California CPFVs distinguished according to whether they fish in U.S. and/or Mexican waters.

**Table III-5.** Number of CPFV angler trips, by year and area.

| Year | NoCA | CenCA | SoCA | Total U.S. Waters | Mexican Waters | Grand Total |
|---|---|---|---|---|---|---|
| 1980 | 5,665 | 204,146 | 492,290 | 702,101 | 59,739 | 761,840 |
| 1981 | 6,948 | 205,380 | 556,721 | 769,049 | 61,460 | 830,509 |
| 1982 | 6,694 | 213,206 | 503,280 | 723,180 | 52,756 | 775,936 |
| 1983 | 8,024 | 180,898 | 433,514 | 622,436 | 69,210 | 691,646 |
| 1984 | 6,577 | 188,275 | 415,036 | 609,888 | 91,666 | 701,554 |
| 1985 | 11,591 | 210,894 | 413,102 | 635,587 | 81,601 | 717,188 |
| 1986 | 11,064 | 189,780 | 407,614 | 608,458 | 51,755 | 660,213 |
| 1987 | 13,251 | 208,989 | 396,309 | 618,549 | 59,862 | 678,411 |
| 1988 | 12,496 | 217,284 | 427,610 | 657,390 | 53,967 | 711,357 |
| 1989 | 15,595 | 226,333 | 420,976 | 662,904 | 74,681 | 737,585 |
| 1990 | 14,724 | 222,149 | 474,761 | 711,634 | 57,433 | 769,067 |
| 1991 | 14,179 | 175,329 | 434,945 | 624,453 | 37,100 | 661,553 |
| 1992 | 7,586 | 164,792 | 407,831 | 580,209 | 55,258 | 635,467 |
| 1993 | 5,617 | 169,566 | 377,125 | 552,308 | 40,626 | 592,934 |
| 1994 | 4,949 | 161,637 | 364,774 | 531,360 | 51,765 | 583,125 |
| 1995 | 6,806 | 169,402 | 408,547 | 584,755 | 58,074 | 642,829 |
| 1996 | 6,021 | 137,312 | 435,940 | 579,273 | 74,846 | 654,119 |
| 1997 | 5,456 | 165,899 | 554,117 | 725,472 | 99,304 | 824,776 |
| 1998 | 6,175 | 133,133 | 483,420 | 622,728 | 106,504 | 729,232 |

Source: CPFV logbooks. "Mexican waters" pertains to trips departing from southern California ports to fish in Mexican waters.

**Table III-6.** Landings on CPFV fishing trips (1000s of fish), by year and area.

| Year | NoCA | CenCA | SoCA | Total U.S. Waters | Mexican Waters | Grand Total |
|---|---|---|---|---|---|---|
| 1980 | 24.2 | 1,545.4 | 4,517.1 | 6,086.6 | 321.2 | 6,407.8 |
| 1981 | 51.9 | 1,747.0 | 4,267.0 | 6,065.9 | 248.6 | 6,314.5 |
| 1982 | 42.4 | 1,781.8 | 3,363.5 | 5,187.7 | 182.9 | 5,370.6 |
| 1983 | 60.9 | 1,654.9 | 2,547.0 | 4,262.7 | 362.2 | 4,624.9 |
| 1984 | 33.5 | 1,485.3 | 2,249.5 | 3,768.3 | 404.0 | 4,172.3 |
| 1985 | 53.5 | 1,364.3 | 2,471.2 | 3,889.0 | 290.1 | 4,179.1 |
| 1986 | 41.6 | 1,198.9 | 2,617.9 | 3,858.4 | 217.1 | 4,075.5 |
| 1987 | 50.4 | 1,314.3 | 2,485.0 | 3,849.7 | 256.2 | 4,105.9 |
| 1988 | 56.9 | 1,390.1 | 2,651.2 | 4,098.2 | 254.2 | 4,352.4 |
| 1989 | 82.4 | 1,574.1 | 2,618.9 | 4,275.4 | 321.6 | 4,597.0 |
| 1990 | 111.1 | 1,606.5 | 2,824.5 | 4,542.1 | 243.5 | 4,785.6 |
| 1991 | 73.0 | 1,345.9 | 2,694.5 | 4,113.4 | 175.9 | 4,289.2 |
| 1992 | 69.7 | 1,526.7 | 2,275.7 | 3,872.1 | 219.6 | 4,091.7 |
| 1993 | 31.4 | 1,312.3 | 2,112.2 | 3,455.9 | 166.7 | 3,622.6 |
| 1994 | 30.8 | 1,049.1 | 1,945.7 | 3,025.6 | 189.4 | 3,215.1 |
| 1995 | 43.9 | 923.2 | 1,980.0 | 2,947.1 | 222.8 | 3,169.8 |
| 1996 | 32.1 | 743.7 | 2,350.6 | 3,126.5 | 249.0 | 3,375.5 |
| 1997 | 43.4 | 957.3 | 2,356.1 | 3,536.8 | 384.2 | 3,921.0 |
| 1998 | 53.7 | 882.8 | 2,008.1 | 2,944.6 | 377.9 | 3,322.5 |

Source: CPFV logbooks. "Mexican waters" pertains to harvests on trips that depart from southern California ports to fish in Mexican waters.

**Table III-7.** Annual number of CPFV boat and angler trips in 1995-1998, by area and trip type.

| Area/Trip Type | 1995 | 1996 | 1997 | 1998 | Avg. |
|---|---|---|---|---|---|
| **Northern California** | | | | | |
| Total Fishing Trips: | 6,806 | 6,021 | 5,456 | 6,175 | 6,115 |
| Salmon | 2,948 | 3,264 | 1,808 | 1,554 | 2,394 |
| Rockfish/lingcod | 3,222 | 2,161 | 2,839 | 3,410 | 2,908 |
| Salmon/rockfish/lingcod | 321 | 519 | 553 | 1,034 | 607 |
| Other/unspecified | 314 | 77 | 256 | 177 | 207 |
| Total Dive Trips | 26 | 15 | 0 | 10 | 13 |
| NoCA Total | 6,832 | 6,036 | 5,456 | 6,185 | 6,128 |
| **Central California** | | | | | |
| Total Fishing Trips: | 169,402 | 137,312 | 165,899 | 133,133 | 151,437 |
| Salmon | 86,899 | 56,567 | 78,202 | 48,645 | 67,578 |
| Rockfish/lingcod | 58,008 | 52,865 | 52,233 | 51,795 | 53,725 |
| Salmon/rockfish/lingcod | 5,098 | 3,408 | 5,135 | 3,777 | 4,354 |
| Strbass/sturgeon | 2,522 | 3,720 | 5,572 | 5,349 | 4,291 |
| Shark | 1,012 | 526 | 628 | 428 | 648 |
| Tuna | 140 | 1,127 | 6,500 | 4,014 | 2,945 |
| Other/unspecified | 15,723 | 19,099 | 17,629 | 19,125 | 17,894 |
| Total Dive Trips | 1,126 | 1,249 | 716 | 38 | 782 |
| CenCA Total | 170,528 | 138,561 | 166,615 | 133,171 | 152,219 |
| **Southern California** | | | | | |
| Total Fishing Trips-CA: | 408,547 | 435,940 | 554,117 | 483,420 | 470,506 |
| Rockfish/lingcod | 31,684 | 34,923 | 30,525 | 26,595 | 30,932 |
| Tuna | 12,006 | 2,992 | 13,586 | 18,124 | 11,677 |
| Other/unspecified | 364,857 | 398,025 | 510,006 | 438,701 | 427,897 |
| Total Fishing Trips-Mex: | 58,074 | 74,846 | 99,304 | 106,504 | 84,682 |
| Tuna | 35,691 | 34,692 | 56,029 | 62,164 | 47,144 |
| Other/unspecified | 22,383 | 40,154 | 43,275 | 44,340 | 37,538 |
| Total Dive Trips-CA | 37,089 | 43,128 | 44,938 | 33,014 | 39,542 |
| Total Dive Trips-Mex | 446 | 790 | 394 | 659 | 572 |
| SoCA Total | 504,156 | 554,704 | 698,753 | 623,597 | 595,303 |

Source: CPFV logbooks.