

REVIEW OF SOME CALIFORNIA FISHERIES FOR 1985

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Total 1985 landings of fishes, crustaceans, and mollusks declined for the fifth straight year. Landings declined 21% from 1984 to a level 52% below the average for the last ten years. Continuing closures of California tuna processing plants were the primary reason for the persistent decline.

Landings of pelagic wetfishes increased slightly for the first time in four years (Table 1). Both the Pacific herring and market squid fisheries rebounded from the low levels recorded during the recent warm-water period. While mackerel landings remained relatively stable, and the anchovy reduction fishery faded, the Pacific sardine resource continued a modest trend of apparent increased abundance.

Groundfish landings increased somewhat over 1984 levels, with significant gains for flatfishes and Pacific whiting almost offset by declines for rockfishes. Swordfish landings set a new high; for the first time in several years harpoon vessels contributed considerably, augmenting the catches of the drift gill net fleet. Pacific ocean shrimp landings increased for the second straight year.

Moderate decreases were recorded for the Dungeness crab and lobster fisheries, while albacore decreased by almost 50% from 1984 landings.

Sportfish landings were more comparable to those years with "normal" water temperatures: there were fewer exotics, and salmon were healthier.

PACIFIC SARDINE

The moratorium on commercial fishing for Pacific sardines (*Sardinops sagax caeruleus*) remained in effect during 1985 because the spawning biomass was assessed as remaining below the 20,000 tons required before a fishery may be allowed. However, recent occurrences of sardines in mackerel and live bait catches, in California Department of Fish and Game (CDFG) sea surveys, and in CalCOFI ichthyoplankton surveys, as well as observations by aerial fish spotters indicated that the biomass might be approaching 20,000 tons. CDFG and the National Marine Fisheries Service, Southwest Fisheries Center designed and conducted a survey in May to determine whether the sardine spawning biomass had exceeded this level. The

TABLE 1
 Landings of Pelagic Wet Fishes in California in Short Tons

Year	Pacific sardine	Northern anchovy	Pacific mackerel	Jack mackerel	Pacific herring	Market squid	Total
1964	6,569	2,488	13,414	44,846	175	8,217	75,709
1965	962	2,866	3,525	33,333	258	9,310	50,254
1966	439	31,140	2,315	20,431	121	9,512	63,958
1967	74	34,805	583	19,090	136	9,801	64,489
1968	62	15,538	1,567	27,834	179	12,466	57,646
1969	53	67,639	1,179	26,961	85	10,390	106,307
1970	221	96,243	311	23,873	158	12,295	133,101
1971	149	44,853	78	29,941	120	15,756	90,897
1972	186	69,101	54	25,559	63	10,303	105,266
1973	76	132,636	28	10,308	1,410	6,031	150,489
1974	7	82,691	67	12,729	2,630	14,452	112,576
1975	3	158,510	144	18,390	1,217	11,811	190,075
1976	27	124,919	328	22,274	2,410	10,153	160,111
1977	6	111,477	5,975	50,163	5,827	14,122	187,570
1978	5	12,607	12,540	34,456	4,930	18,899	83,437
1979	18	53,881	30,471	18,300	4,693	22,026	129,389
1980	38	47,339	32,645	22,428	8,886	16,958	128,294
1981	31	57,659	42,913	15,673	6,571	25,915	148,762
1982	145	46,364	31,275	29,110	11,322	17,951	136,167
1983	388	4,740	35,882	20,272	8,829	2,010	72,121
1984	259	3,258	46,531	11,768	4,241	622	66,679
1985*	652	1,792	38,100	10,316	8,801	10,881	70,542

*Preliminary

survey used the presence of sardine eggs to assess the extent of spawning area in southern California waters. Sardine spawning covered an estimated 670 n.mi.², which was determined to be characteristic of a biomass of at least 20,000 tons. As provided by current law, CDFG announced the opening of a 1,000-ton fishery to begin January 1, 1986. Apart from the 75-ton live bait quota initiated last year, this is the first directed take of sardines allowed in California since the moratorium took effect in 1974.

The trend of increasing occurrences of sardines in the mackerel fishery, which slowed last year, appears to have resumed. An estimated 652 tons of sardines were landed incidentally with mackerel during 1985 (Table 1). This is the largest annual take in 20 years. Monterey landings accounted for 6% of the incidental catch, and local fishermen reported sighting large schools of sardines in Monterey Bay on several occasions. The proportion of observed mackerel landings containing sardines increased from 30% in 1983 and 1984 to over 57% during 1985. Sardines constituted 1.3% of the overall 1985 "mackerel" catch; during March-April sardines were nearly 3% of the catch. Length frequencies of incidentally caught sardines show an increasingly broader distribution from 1983 through 1985, indicating that recruitment has continued.

Sardine landings in live bait declined to roughly 25% of the 1984 estimated landings, and failed to reach the 75-ton annual quota. This probably resulted from a decreased demand for sardines rather than a decline in availability. Live bait fishermen often targeted instead on squid, which were available for the first time in recent years and are often preferred as bait for certain big game fish. Legislation passed in 1985 increases the annual live bait quota for sardines from 75 to 150 tons, effective January 1, 1986.

During CDFG experimental young fish surveys in July and August, only adult sardines were captured. Evidence of sardine recruitment was not observed until September, when young-of-the-year fish appeared in both the live bait catch and sea survey trawls. Adult and juvenile catch frequencies during the September cruise were lower than last year's; however, the catch frequency of juveniles suggests that the 1985 year class is similar in strength to the 1984 year class and considerably weaker than the 1983 year class. Adult fish captured during the sea survey cruises were in progressively more advanced stages of prespawning condition from July through September. Also, a greater proportion of adult sardines occurring in the mackerel fishery were nearing spawning in the late summer than in the spring. These observations suggest that a large portion of spawning occurred during late summer and

early fall this year; the historical sardine population spawned mostly in spring.

Current state law provides for the rehabilitation of the sardine resource. During the process of rehabilitation a small fishery is allowed. If the spawning population increases beyond 20,000 tons, CDFG may increase the seasonal quota, but at such a rate as to allow for the continued recovery of the population. Only limited markets exist now for sardines, and it remains to be seen whether new markets and uses will develop as the resource recovers.

NORTHERN ANCHOVY

At least one processor in both the northern (north of Point Buchon) and southern permit areas issued orders for northern anchovy (*Engraulis mordax*) for reduction during the 1984-85 season. Fishermen, however, found anchovies unprofitable and concentrated their efforts on mackerel. The anchovy price per ton dropped from \$38 to between \$25 and \$30, and fishermen reported that large anchovy schools were not locally available in either permit area.

A single landing of 77 tons was made during the 1984-85 reduction season (Table 2). This landing occurred at Terminal Island in November 1984, against the southern area quota of 6,250 tons. No landings for reduction purposes were made toward the northern area 1984-85 season quota of 694 tons.

Using an egg production biomass assessment method, the National Marine Fisheries Service esti-

TABLE 2
**Anchovy Landings for Reduction Seasons in the
 Southern and Northern Areas, in Short Tons**

Season	Southern area	Northern area	Total
1966-67	29,589	8,021	37,610
1967-68	852	5,651	6,503
1968-69	25,314	2,736	28,050
1969-70	81,453	2,020	83,473
1970-71	80,095	657	80,752
1971-72	52,052	1,374	53,426
1972-73	73,167	2,352	75,519
1973-74	109,207	11,380	120,587
1974-75	109,918	6,669	116,587
1975-76	135,619	5,291	140,910
1976-77	101,434	5,007	106,441
1977-78	68,476	7,212	75,688
1978-79	52,696	1,174	53,870
1979-80	33,383	2,365	35,748
1980-81	62,161	4,736	66,897
1981-82	45,149	4,953	50,102
1982-83	4,925	1,270	6,195
1983-84	70	1,765	1,835
1984-85*	77	0	77

*Preliminary

mated the 1985 northern anchovy spawning biomass at 574,421 tons (521,000 metric tons). The U.S. optimum yield for the 1985-86 season was set at 159,750 tons, and the harvest quota for reduction purposes was set at 154,350 tons. Allocations established were 10,000 tons for the northern permit area, and 144,350 tons for the southern area.

The 1985-86 reduction season opened on August 1 in the north and September 15 in the south. Approximately 909 tons of anchovy were landed between November 15 and December 30, 1985. All landings were made in the northern permit area by two boats fishing just outside the Monterey Bay breakwater. Efforts to fill reduction orders dropped off as fish moved out of the area.

Statewide reduction landings of northern anchovy for 1985 were 909 tons. Nonreduction landings totaled 883 tons. The live bait catch was estimated at 5,055 tons. Bait was highly available year-round.

Trawl surveys during 1985 indicate dominance by the 1984 and 1983 year classes (66% and 22% by number, respectively, in survey samples). Although young-of-the-year (1985 year-class) fish made a strong showing in live bait hauls from June through December, reports of poor catches of young fish in the 1985 Mexican reduction fishery, and their poor representation in CDFG recruitment surveys indicate that the 1985 year class may actually be weak.

JACK MACKEREL

Approximately 10,320 tons of jack mackerel (*Trachurus symmetricus*) were landed during 1985. Jack mackerel constituted roughly 21% of total mackerel landings. This marks the seventh consecutive year that jack mackerel have contributed less than Pacific mackerel to the California mackerel fishery. It is the second consecutive year that jack mackerel have contributed such a low proportion of the mackerel fishery since this species first supported a fishery in the late 1940s.

Jack mackerel dominated landings only during January, when landings of Pacific mackerel were limited by interseason restrictions, and overall mackerel landings were the lowest of the year. Jack mackerel were mostly unavailable or not sought after in southern California during the last four months of the year. The composition of northern California catches varied greatly throughout the year, with jack mackerel constituting less than 1% of the catch in October and more than 95% of the catch in January and February. Calculated throughout the year, jack mackerel made up 23% of the northern California mackerel catch and 20% of the southern California catch. This is in contrast to 1984 and 1983, when jack mackerel contributed a consider-

ably larger proportion of the mackerel landings in the north than in the south.

Sea surveys conducted during 1985 indicate fair to good recruitment for the 1985 year class of jack mackerel.

PACIFIC MACKEREL

The 1984-85 season (July 1-June 30) for Pacific mackerel (*Scomber japonicus*) was closed on December 20 because the adjusted season quota of 26,000 tons has been landed. Interseason restrictions were in effect through January, limiting the take of Pacific mackerel to 50% or less by number, or pure loads of 3 tons or less. The season reopened on February 5 after the California Fish and Game Commission (FGC), as recommended by CDFG, augmented the quota with 5,000 tons per month for February, March, and April, with uncaught portions of the monthly allotments to be added to the next month's quota. The quota increase resulted from a reevaluation of the 1984-85 Pacific mackerel total biomass, finally estimated to range between 131,000 and 242,000 tons. For the first time this estimate included consideration of Mexican commercial and U.S. recreational catches in cohort analysis.

Landings continued to be low despite quota increases, because southern California processors imposed a landing limit of approximately 70 tons per boat per month through March. In April the landing limit was increased to 50-60 tons per boat per week, but the price per ton was lowered from \$190 to \$163. On April 24, the FGC added another 15,000 tons to the season's allowable catch, bringing the 1984-85 season quota to 56,000 tons. Fishing for the remainder of the season was slow. Although the price was increased to \$170 per ton, landing limits were decreased to 25 and 50 tons per boat per week, because inventories of frozen mackerel reportedly exceeded last year's by 60%. In Monterey only about 1,600 tons of mackerel were landed from January through June, because fishermen concentrated their efforts on squid. The National Marine Fisheries Service (NMFS) began to investigate the use of Pacific mackerel in a federal surplus commodities program to help ease poor local market conditions, which were partly caused by competition from foreign countries.

The 1984-85 season ended with a total catch of 43,270 tons of Pacific mackerel. Approximately 83% was landed in southern California. Pacific mackerel constituted an average 93% of total mackerel landings from January through June 1985, and 81% of total landings for the 1984-85 season. Areas where fish were caught from February through June ranged from off the Santa Barbara coast to outside Santa Monica Bay, and out to Santa Cruz, Anacapa, and Santa Catalina islands.

The 1985-86 season opened July 1, 1985. The Pacific mackerel biomass was estimated to range between 178,000 and 260,000 tons, providing a season fishery quota of 40,000 tons. The season started off slowly, because Terminal Island processors were closed for much of July. Southern California purse seiners fished up the coast to Morro Bay in August, when landings increased substantially.

On September 9, urgency legislation (AB 1197) was passed. This law (1) requires CDFG, by February 1 of each year, to estimate the total Pacific mackerel population size for the current season, and the expected size at the beginning of the next season; (2) sets the quota at 30% (up from 20%) of the population above 20,000 tons when the total biomass is between 20,000 and 150,000 tons; (3) allows for no quota restrictions (open fishery) when the biomass is greater than 150,000 tons; (4) allows CDFG to adjust quotas during any portion of the season; (5) increases the pure-ton interseason restrictions from 3 to 6 tons; and (6) eliminates the 10-inch size limit. Quota restrictions for the remainder of the 1985-86 season were subsequently lifted upon consideration of the estimated biomass range.

Landings were high in September, but declined in October during a dispute over landing limits and prices. Fishing resumed in November, with landing limits remaining in place and the price reduced to \$155 per ton. Landings were limited by a lack of orders, particularly in northern California. December landings were high, for fish were locally abundant, and orders increased.

By the end of December approximately 22,870 tons of Pacific mackerel had been landed for the 1985-86 season. Landings for 1985 reached 38,100 tons, of which only 7% was landed in northern California. This is a decrease from the 18% northern California contributed to mackerel landings last year. As in 1984, the 1980 and 1981 year classes of Pacific mackerel accounted for the majority of landings. Fish 3 years of age and younger showed better recruitment than in 1984, but the 1982 and 1983 year classes still appear very weak. The strong showing of the 1984 year class, as 1-year-olds, is encouraging. Young-of-the-year fish did not enter the fishery during 1985, and sea survey experimental cruises to assess recruitment of Pacific mackerel off southern California gave preliminary indications that the 1985 year class may be weak.

MARKET SQUID

The California market squid (*Loligo opalescens*) fishery landed 10,881 tons during 1985, a very large increase over the last two years' landings (Table 1). However, this was still 23% below the last ten-year average. The California squid fishery is best described

as two separate fisheries: the northern California (or Monterey) fishery, and the southern California fishery.

In Monterey the fishery normally follows a summer-fall season, but has been atypical the last three years. This year the fishery started earlier than normal. Large squid (seven to eight per pound) were caught in April, although there were signs that they were not abundant. In good years the boats are usually at the dock unloading their catch shortly after sunrise. This year, boats spent more time looking for squid and arrived at the dock as late as noon, with highly variable fishing success. The initial price was \$600 per ton.

Fishermen voluntarily increased the spawning escapement by giving the squid two weeks to spawn undisturbed in May. Squid landed during May were still large, but many were spent, and the overall quality was poorer than two weeks earlier. The price dropped to \$400 per ton.

During the summer, fishing moved northerly, away from the traditional grounds near Monterey to the area between Año Nuevo and Pigeon points. Fishing ranged from excellent to spotty, with landings through mid-September. Despite continued effort, commercial boats were unable to catch squid after that time. Party-boats, however, were still successfully jigging squid for bait in November.

For the Monterey fishery, squid were scarce throughout the year. Although demand was strong, only 4,286 tons were landed. This is a great improvement over the past two years, but is still only 30% of the 14,000 tons landed in 1981, the best single year in the past 40 years.

The southern California squid fishery typically has a fall-winter season, running from early November through February. This pattern had not been followed since 1982, because of a lack of squid, which was probably related to El Niño. This year, however, the pattern resumed; significant landings began in October and continued through the winter. Early in the year, squid were very large, averaging about 5 per pound; later in the year, they ranged from 8-11 per pound.

Southern California landings totaled 6,595 tons, 75% of which were landed during the last quarter of the year. The price at the beginning of the year, when squid was still in very strong demand, went as high as \$700 per ton. The price then dropped steadily until the end of the year, stabilizing at \$200 per ton.

PACIFIC HERRING

The Pacific herring (*Clupea harengus pallasii*) fishery recovered in 1985 from the transitory effects of the 1982-84 El Niño. The 1984-85 seasonal (December-March) catch of 8,264 tons exceeded the 7,590-ton statewide quota and nearly tripled the 1983-84 seasonal

catch of 3,000 tons. Annual catch figures for 1985 also improved, more than doubling the 1984 catch (Table 1). There was a corresponding economic improvement in the fishery. The base price for 10% roe recovery increased to \$1,000 per ton and resulted in an ex-vessel value for the 1984-85 fishery of over \$9 million.

Population estimates from 1984-85 spawning-ground surveys in Tomales and San Francisco bays paralleled the improvement in the fishery. After the poor 1983-84 season, almost 6,600 tons of herring returned to Tomales Bay this past season, and in San Francisco Bay the population increased 15%, to 46,000 tons.

Herring exhibited good growth characteristics during 1984; weight lost during the period of poor growth caused by El Niño was regained. The generally good condition of herring this year contributed to the success of the 1984-85 fishery.

Based on the 1984-85 population estimates, the statewide herring quota for 1985-86 was increased to 8,690 tons. Early 1985-86 season catches have been excellent. This, coupled with an increase in the ex-vessel price for 10% roe recovery to \$1,200 per ton, should result in another very good herring season.

GROUND FISH

California's 1985 commercial groundfish landings (Table 3), including California halibut (*Paralichthys californicus*), were 43,730 metric tons (MT) with an ex-vessel value of \$28 million. This represents an increase of 2,658 MT or 6% from the previous year, but is still 18% less than the record 1982 catch of 52,152 MT. California landings constituted 38% of the total 1985 Washington-Oregon-California (WOC) commercial groundfish harvest. Trawl vessels continued their historical domination of the fishery, landing 81% of California's 1985 commercial catch.

Trawl landings of the principal groundfish species, with the exception of lingcod (*Ophiodon elongatus*) and Pacific ocean perch (*Sebastes alutus*), increased from 4% to 41% over 1984 levels. Dover sole (*Microstomus pacificus*), sablefish (*Anoplopoma fimbria*), and Pacific whiting (*Merluccius productus*)—species of particular sensitivity to market fluctuations—registered increases due in part to robust market demand and, in the case of Dover sole, to the continued expansion of the Morro Bay flatfish fishery. Trawl-caught rockfish (*Sebastes* spp.) landings remained relatively stable. The setnet fishery for rockfish and lingcod continued its expansion.

Federal and state management regulations for the WOC area restricted the harvest of sablefish, widow rockfish (*S. entomelas*), and other rockfishes during the year. The coastwide widow rockfish optimum yield

TABLE 3
 California Groundfish Landings (Metric Tons)

Species	1984	1985*	Percent change
Dover sole	9,774	12,159	24%
English sole	952	1,073	13%
Petrale sole	590	863	46%
Rex sole	568	906	60%
Thornyheads	2,124	2,975	40%
Widow rockfish	2,781	3,065	10%
Other rockfish	14,727	11,812	-20%
Lingcod	950	696	-27%
Sablefish	4,823	5,167	7%
Pacific whiting	2,335	3,023	29%
Other groundfish	1,448	1,991	38%
TOTAL	41,072	43,730	6%

*Preliminary

(OY) was set at 9,300 MT, and the sablefish OY was set at 13,600 MT. Vessel trip and frequency limits were the regulatory measures used to provide a year-round fishery without exceeding harvest quotas or guidelines. The year began with a coastwide widow rockfish trip limit of 30,000 pounds once per week, but with the option to land 60,000 pounds biweekly. For the third consecutive year, a 40,000-pound trip limit without a frequency restriction was retained for the rockfish complex for the waters from Cape Blanco, Oregon, to the Mexican border. Unrestricted landings of sablefish were allowed, with the provision that landings of fish less than 22 inches total length could not exceed 5,000 pounds per trip in all areas north of Point Conception.

The rapid pace of the WOC fishery necessitated in-season regulatory measures. On April 28 the biweekly widow rockfish trip limit was rescinded to reduce the rate of landings. This proved to be insufficient, and on July 21 the widow rockfish trip limit was reduced to 3,000 pounds per trip without a frequency limitation. The latter measure sustained the fishery throughout the year. It became necessary to impose a sablefish trip limit of 13% of a trawl vessel's total weight of fish landed per trip, effective November 25, by which time 90% of the OY had been harvested. Sablefish harvests by other gear types were unaffected. This limit remained in effect until December 5, when the sablefish OY of 13,600 MT was captured, and landings were prohibited.

DUNGENESS CRAB

California Dungeness crab (*Cancer magister*) landings during the 1984-85 commercial season totaled 4.75 million pounds. This was 0.58 million pounds less than the previous season.

In northern California, fishing began on December 4, after a price settlement of \$1.25 per pound. The

price was increased shortly thereafter to \$1.75 per pound. Weather during the season was generally good, and 347 vessels trapped 92% of the season's catch by the end of January. As in the 1983-84 season, few sublegal crabs were observed. The season closed on July 15.

Landings for Crescent City, Trinidad, Eureka, and Fort Bragg were 2.29, 0.33, 1.38, and 0.17 million pounds, respectively.

A high opening price of \$2.00 per pound and low volume catches greeted San Francisco crabbers on opening day, November 12. Many fishermen stopped fishing in December because of low production. The season closed on June 30 with a total catch of 0.58 million pounds. It was a disappointing season after the previous season's landings of 0.86 million pounds.

PACIFIC OCEAN SHRIMP

Statewide landings of ocean shrimp (*Pandalus jordani*) in 1985 totaled 3.3 million pounds, increasing for the second straight year. Areas of production were Area A (False Cape to the Oregon border) and Area C (Pigeon Point to the Mexican Border). The ex-vessel price of \$0.35 per pound was uniform statewide.

Area C landings of 39,000 pounds resulted from a combination of targeted trips for ocean shrimp and incidental catches in fisheries for spot and ridgeback prawns. The Area C total represents the lowest annual catch since 1979. The low price and a scarcity of shrimp discouraged all but one vessel (double-rigged) from fishing. Inexpensive shrimp imports and improved catches in other areas also contributed to the low effort for ocean shrimp in the Morro Bay and Avila areas.

Landings from Area A (California-Oregon border to False Cape) totaled 2.9 million pounds, more than double the 1.1 million pounds landed during 1984 but still well below the 1973-82 average of 4.6 million pounds. Shrimpers landed an additional 0.45 million pounds in Area A; these were caught in Oregon waters. The \$0.35 per pound price received throughout the season was the lowest ex-vessel price since 1979.

Only 31 boats (16 single-rigged and 15 double-rigged) delivered shrimp to Area A ports during the season (April 1 through October 31); this was the lowest number of boats since 1977 (excluding 1983). Single-rigged vessels had an average seasonal catch rate of 398 pounds per hour; double-rigged vessels averaged 573 pounds per hour.

One-year-old shrimp constituted 87.1% of all shrimp sampled. The incoming year class (1985) made up only 2.4% of the samples, but during October they constituted 13.9% of the samples. This indicates good recruitment. Average counts per pound ranged from

152.8 in May to 105.3 in October and averaged 123.6 for the season.

PELAGIC SHARK AND SWORDFISH

During 1985, 245 permits were issued for harpooning swordfish (*Xiphias gladius*), and 227 drift gill net permits were issued for taking pelagic sharks and swordfish. In addition, 33 permits were issued in a special category authorizing swordfish to be taken by drift gill nets north of Point Arguello.

Harpoon fishermen enjoyed their most successful season since the record year of 1978, landing approximately 0.5 million pounds of swordfish. During 1978 an unprecedented 3.8 million pounds were landed. It is still not clear why record numbers of swordfish moved into waters off southern California in 1978, since nothing even close to this has occurred before or since. The success achieved in 1985, however, may be attributable to the use of spotter aircraft. An eight-year ban on the use of spotter aircraft was lifted by the California Fish and Game Commission late in 1984.

Reported swordfish landings by drift gillnetters fell slightly in 1985. Logbook submittals indicated 23,129 fish caught for the 1985-86 season (May through January), as opposed to 25,367 fish reported for the same period during the 1984-85 season. A reduction in fishing effort during the month of January, due mainly to inclement weather, probably accounts for the decrease in total reported landings this past season. Waters adjacent to the escarpment bordering the Southern California Bight, and the seamounts—particularly Rodriguez and San Juan—remained the most productive fishing grounds during the 1985-86 season.

Preliminary 1985 landings of swordfish will once again set a new high mark. Because of the combined success of harpooners and gillnetters, 5.25 million pounds of swordfish were reported, with an ex-vessel value of \$13.4 million.

Common thresher shark (*Alopias vulpinus*) landings amounted to 1.5 million pounds, equaling the previous season's mark. The mean length of fish taken in this fishery continued to decline in 1985. The 1986-87 season will be shortened by a 2.5-month closure (June 1-August 14) in an attempt to take the pressure off what is believed to be a depressed thresher shark stock.

CALIFORNIA SPINY LOBSTER

Daily log returns from the 1984-85 (first Wednesday in October to first Wednesday after March 15) commercial California spiny lobster (*Panulirus interruptus*) fishery documented a precipitous decline in legal lobster catch. The level was the lowest in 12 years.

A spirited anticipation pervaded the fishery; the 440 authorized fishermen represented the largest partici-

pation in the 15 years since an application fee was initiated. But enthusiasm dwindled, and the 474,000 trap-hauls from 200 boats made up the lowest reported effort since the 1980-81 season, 12% below the peak established during the 1983-84 season.

Log entries tallied a total sublegal ("short") retention of 419,000 animals at a 0.89 catch-per-trap (CPT) rate. Sublegal CPT levels have steadily increased during the nine years since sublegal escape ports were first required.

A total of 245,000 legal-sized lobsters was logged. Commercial fishery landing receipts documented a total weight of 400,000 pounds, and an average ex-vessel price of \$4.00 per pound. Thus the 1984-85 fishery was valued at \$1.6 million, 16% below the previous season's estimate. The 0.52 legal CPT rate tied 1973-74 as the poorest season, and catch rates for the months of November (0.42 legals) and December (0.39 legals) were the poorest ever in the 12-year history of logbook records.

Catch success, as measured by pounds-per-hundred-trapping-hours (PPHTH) averaged 1.4, compared to 1.7 the previous season. Monthly catch success was highest in October (2.0), declined to 0.9 in December, and recovered modestly to 1.3 in February and March.

Depressed catch success was largely restricted to southern California's mainland coast. The lightly trapped northern mainland (8% of the state's trapping effort from Malibu Point to Point Arguello) took 8% of the state catch and averaged just under 1.0 PPHTH. South of Santa Monica Bay a concentrated 64% of the trapping effort took 47% of the state catch at a success rate of 1.1 PPHTH.

The Channel Islands portion of the fishery was least affected during this off season. Indeed, the effort here increased slightly from the previous season. Twenty-seven percent of the state's trapping effort captured 44% of the catch at a success rate double that of the mainland.

Although the 1984-85 season was disappointing to a large sector of the fishery—specifically those concentrating their efforts along the mainland coast—the outlook is not all bad. A continuation of the high sublegal retention should initiate a rapid recovery of legal recruitment from a presumably recovering standing stock of late juveniles/young adults. Preliminary log returns indicate that catch success for the 1985-86 season has improved, especially along the northern mainland coast.

The highly productive but densely trapped southern mainland coast continues to foster unrest among veteran lobster fishermen. Although logbook records indicate the most strongly recovering sublegal stock levels in the state, saturation trapping of the nearshore

waters off populous San Diego, Orange, and Los Angeles counties effectively limits most fishermen's economic gain to the high catchability months of October and November. High competition for the early season profits has created a spiraling escalation of trap deployment. Overcapitalized fishermen can incur disastrous losses from sudden storms, poaching, theft, or concurrent boating activity. Turnover among participants is high.

Stock conservation management seems to be perpetuating biologically sound harvest rates, and gradual increase is expected in the near future. However, socioeconomic considerations may shift the fishery to limited-entry management. Preliminary legislation has been initiated by San Diego-based veteran fishermen and processors in this regard.

ALBACORE

The 1985 albacore (*Thunnus alalunga*) season had a fairly traditional start, with an excellent bite near Midway Island at the end of May, and fish appearing off southern and Baja California in June. By the end of June, fish had been spotted as far north as Mendocino Ridge (about 150 miles west of Cape Mendocino). During the last half of July, commercial boats were fishing from northern Baja California to the Oregon-Washington border. By the end of August, the best albacore fishing was along the Mendocino Ridge. Much of September's fishing was hampered by rough weather, but most vessels concentrated their efforts off Point Arena and Bodega Bay when weather permitted. During early and mid-October, many boats were working their last trip of the season.

The 1985 season total for California was about 7,200 tons. Approximately 1.5% of this was accounted for by fishermen retailing their catch directly to the public. The season total was a little more than half the previous season's landings. The 1985 landings also fell 17% below the last 10-year average and 36% below the last 25-year average (11,182 tons). During 1984 the southern California purse seine fleet contributed significantly to the catch. This year, as is more typical, the fish were not readily available and schooling at the surface, and so were not vulnerable to round haul nets.

As in the recent past, there were very low landings in Oregon and Washington this season. Approximately 750 tons were landed in Oregon and 150 tons in Washington. This brought the WOC fishery landings to about 8,100 tons, or 60% of the last ten-year coastwide average. California has historically landed about 60% of the albacore caught in the WOC fishery, but over the last few years this percentage has shifted. Last year California contributed 93% of the total tonnage, and this year about 85%. To help put this in perspective on

an ocean-wide scale, the WOC fishery lands roughly 10%-20% of the annual Pacific-wide catch.

A 1985 price agreement of \$1,300 per ton for fish weighing 9 pounds or more, and \$950 per ton for fish less than 9 pounds was reached in June between Pan Pacific Cannery and the Western Fishboat Owners Association. During the summer the price dropped twice, bringing the rate down to \$1,000 per ton for fish sold directly to the cannery. This price was as low as the rates in the mid-1970s. Shipping charges continued to be deducted from albacore sales at other locations. In 1984, the prices opened at \$1,400 per ton for fish 9 pounds or more and \$1,125 per ton for fish less than 9 pounds. By the end of the season, prices had declined to \$1,150 per ton and \$875 per ton.

Market demand has been one of the most significant influences on the fishery. Pan Pacific at Terminal Island was the only cannery to process and can albacore this season. The other major cannery, Starkist, stopped processing tuna in the United States in October 1984. This year it did continue, however, to purchase albacore, shipping it to Puerto Rico for processing. Fewer buyers and low prices, combined with occasional wholesaler buying limits, discouraged many fishermen. Considering that southern California sport boats reported fair to excellent fishing this season, the low commercial landings are probably due more to reduced fishing effort than fish availability.

In the fall of 1983, U.S. and Japanese scientists met to discuss the status of the Pacific-wide population. They concluded that the stock appears to be well exploited, and is being fished near the estimated ranges of maximum sustainable yield.

RECREATIONAL FISHERY

The catch record of sport anglers fishing on commercial passenger fishing vessels (CPFVs or party-boats) roughly reflects the success of ocean-going anglers on private boats. These two groups account for the vast majority of the marine sportfish catch. During the past four years, this catch record has demonstrated wide fluctuations in relative catch success for many species as a result of the 1982-84 El Niño phenomenon. Even though the onset of El Niño was in 1982, the coastal water temperatures along California in 1982 were "normal" or within normal limits of a ten-year mean, and relative abundance of many species caught by CPFV anglers was also normal. However, the 1983 and 1984 warm-water phenomenon caused wide fluctuations in catch rates. This report compares catch rates of CPFVs from 1982 through 1985, when coastal water temperatures returned to normal.

The catch of a number of species rose markedly in 1983, increased again in 1984, and returned to near

normal in 1985 (Table 4). These species include California barracuda (*Sphyræna argentea*), Pacific bonito (*Sarda chiliensis*), dolphinfish (*Coryphaena hippurus*), jack mackerel, and striped marlin (*Tetrapturus audax*). One species, bluefin tuna (*Thunnus thynnus*), supported increased catches in 1983, 1984, and 1985. Catches of California sheephead (*Pimelometopon pulchrum*), skipjack tuna (*Euthynnus pelamis*), yellowfin tuna (*Thunnus albacares*), and yellowtail (*Seriola lalandei*) increased strikingly in 1983, then decreased in 1984 and again in 1985 to levels similar to those of 1982. Although the catch record includes landings from long-range boats that fish off Mexico and operate from San Diego, many of the above fishes are subtropical species that increased in California waters as far north as Santa Barbara during 1983 and 1984. In addition, bonito were caught as far north as Crescent City, and barracuda as far north as San Francisco Bay.

A number of species had declining catches in both 1983 and 1984 but increased to levels approaching "normal" in 1985. This group includes barred sand bass (*Paralabrax nebulifer*), kelp bass (*P. clathratus*), California halibut, Pacific mackerel, and white seabass (*Cynoscion attractoscion*). The rockfish complex (*Sebastes* spp.) followed a similar pattern, but did not increase to the same extent in 1985. Some species did not follow the same patterns, but still demonstrated strong fluctuations. For example, albacore catches declined in 1983 then rose in 1984 to provide a record second only to the 230,000 fish taken in 1962. The least desirable pattern is that of lingcod (*Ophiodon elongatus*); the catch has declined every year since 1982.

While the catch data of fish taken from CPFVs might be considered a reflection of abundance, other factors detract from this belief. One is the 1982-84 disruption in water temperature patterns that could have altered the feeding habits of some species like rockfishes in northern California. CPFV operators claim that these species were present, but were in very poor condition and would not take a baited hook. Another factor that may account for lower catches of southern California resident fishes like kelp bass, sand bass, and halibut is that fishing effort was largely directed toward migrant game fishes (e.g., tunas and yellowtail) from more southerly waters.

In summary, the 1982-84 El Niño phenomenon provided exceptionally good fishing for recreational anglers in the Southern California Bight and exceptionally poor fishing north of Point Conception.

TABLE 4
**Reported Catch and Nominal Effort of Selected Species Landed by
 California-Based Commercial Passenger Fishing Vessels**

Species	Numbers of fish			
	1982	1983	1984	1985
California barracuda	73,135	81,989	87,414	75,448
Barred sand bass	273,828	158,353	136,612	299,152
Kelp bass	312,891	304,645	222,771	273,299
Striped bass	3,646	14,206	13,524	9,686
Pacific bonito	219,478	348,050	377,678	120,139
Dolphinfish	1,099	4,992	6,532	1,307
California halibut	11,804	5,682	3,209	7,090
Lingcod	49,791	30,543	23,797	20,603
Pacific mackerel	914,238	630,003	604,324	695,708
Jack mackerel	4,404	5,308	13,261	6,825
Marlin, unspecified	33	65	287	68
Rockfishes	3,089,655	2,346,270	2,015,791	2,043,129
Sablefish	1,578	15	568	3,928
Salmon, unspecified	103,576	55,560	71,491	108,851
White seabass	1,899	1,003	973	1,045
California sheephead	37,242	68,972	38,522	35,934
Albacore tuna	36,690	17,161	211,285	172,493
Bluefin tuna	665	1,912	2,834	4,980
Skipjack tuna	32	103,040	30,357	238
Yellowfin tuna	2,035	116,298	8,648	3,898
Ocean whitefish	22,604	22,095	64,241	84,381
Yellowtail	37,308	178,688	96,018	45,509
All others	174,014	130,146	142,256	135,985
Total fish	5,370,645	4,624,996	4,172,393	4,149,696
Total anglers	775,473	691,792	701,737	711,787

Contributors:

Dennis Bedford, pelagic shark, swordfish
Patrick Collier, Pacific ocean shrimp
Terri Dickerson, albacore, market squid
Paul Gregory, recreational fishery
Jim Hardwick, pelagic wetfishes (central California)
Frank Henry, groundfish
Kenneth Miller, California spiny lobster

Sandra Owen, Pacific ocean shrimp
Cheryl Scannell, northern anchovy, Pacific mackerel
Jerome Spratt, Pacific herring
Ronald Warner, Dungeness crab
Patricia Wolf, Pacific sardine, jack mackerel

Compiled by Richard Klingbeil