

CALIFORNIA'S WETFISH INDUSTRY: ITS IMPORTANCE – PAST, PRESENT & FUTURE

Executive Summary

In major measure, California's fishing industry was founded on "wetfish." So called traditionally because these fish were conveyed from ocean to can with minimal preprocessing, "wet from the sea", sardines, mackerels, squids and anchovies, as well as coastal tunas, have represented the lion's share of commercial fishery landings in the Golden State since before the turn of the 20th Century. Today sardines, jack and Pacific mackerel, anchovy and market squid are called, for management purposes, Coastal Pelagic Species (CPS). Another link among these species: all are harvested primarily with round-haul nets (lampara and purse seine).

The complex of fisheries that comprises the wetfish industry has shaped the character of California's culture in addition to the infrastructure of California's fishing industry. The immigrant fishermen of Asian, Italian, Slavic and other nationalities introduced new fishing gear and helped to build the fishing ports of San Pedro and Monterey, as well as San Diego and San Francisco. Although changed in many ways, the wetfish industry today remains an essential, critically important part of California's fishing industry as a whole. In the year 2000, the wetfish fishery complex produced about 455.5 million pounds (227,734 short tons) of fish, 83.6 percent of total commercial fishery landings in California, valued at \$38.9 million ex-vessel, or 29.3 percent of total value of all fisheries in California.

This report is intended to serve a double purpose: first, to acknowledge and honor the contributions of the wetfish industry to California, and further, to provide a deeper understanding of the operations of the wetfish fishing fleet, fish receivers and processors and their importance to the State. With such understanding comes the hope that this traditional, colorful part of California will survive and prosper far into the future.

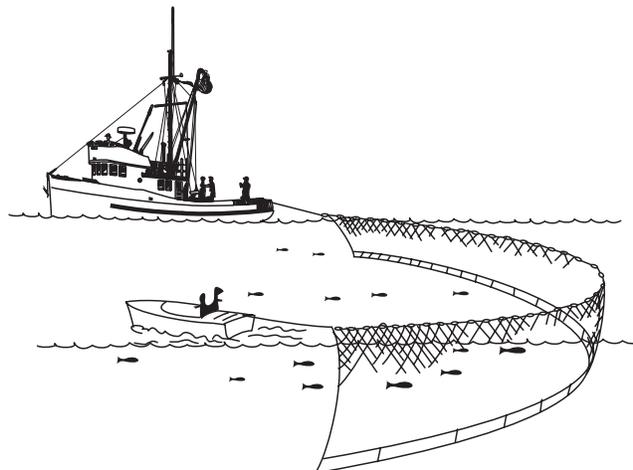
The report on CD is subdivided into the following components:

- Introduction – a QuickTime Movie highlights the history and importance of California's wetfish industry, including both historic and contemporary photographs and footage
- Executive Summary – provides abstracts of the Socio-Economic Profile and Economic Overview of the wetfish industry, followed by Highlights of each chapter, Wetfish fast facts, Issues of concern, and a Glossary of technical terms
- Socio-Economic Profile of the California Wetfish Industry, by Pomeroy, Hunter, and Los Huertos
- An Economic Overview of the California Wetfish Industry Complex, by Hackett
- Gone Fishin': Round-haul fishing – a QuickTime Movie depicts the wetfish industry in action
- Cycles of Abundance – a QuickTime Movie illustrates oceanic cycles and their influence on wetfish species
- Suggested Reading – Further information on wetfish species and oceanic cycles

The California wetfish industry comprises the fishermen, receivers and processors who are involved in the capture and processing of northern anchovy, jack and Pacific mackerel, Pacific sardine and California market squid, and in southern California, coastal tunas and Pacific bonito. Pomeroy, Hunter and Los Huertos, authors of the Socio-Economic Profile, and Hackett, author of the Economic Overview, conducted archival, survey and ethnographic research to develop both the socio-economic profile and an estimate of the value added by the present day California wetfish industry.

The Socio-Economic Profile (Pomeroy et al) focuses on the spatial and temporal organization of the present day industry, the socio-economic characteristics of its participants, and the environmental, social, economic and regulatory context in which they operate. The discussion is organized around the industry's three regional centers of activity: Monterey Bay, Ventura/Port Hueneme and San Pedro/Terminal Island. Each of these centers is described in terms of four sets of characteristics: resource availability, ports and infrastructure, processor receiving and processing capabilities, and fishermen and vessels involved in the industry. The profile highlights similarities and differences within and among these centers of activity, and between the present day industry (beginning in 1996) and the historic California wetfish industry (1800s through 1995).

The Economic Overview (Hackett) of commercial fishing and processing includes economic information on market structure characteristics, product prices and quantities, value added, and other trends in wetfish production between 1981 and 2000. Relevant historical information is also provided for fishermen and receivers / processors. The overall trend in the wetfish fisheries has been one of growth in landings and inflation-adjusted value added by California fishermen from the early 1980s to 2000. Hackett's report also includes an economic overview of present day wetfish receiving and processing, including processing techniques, product types, market channels and their intermediate (e.g. secondary processing) and end uses. These include products such as frozen whole fish sold as bait or animal feed, fresh and frozen seafood products, and pet food, which account for the majority of California wetfish production. Smaller quantities of canned, smoked and other specialty wetfish products are also produced in California. Hackett's report provides a range of estimated value added by receivers / processors in California in 2000. After processing, the various wetfish products made in California move downstream into the wholesale distribution and export market channels. These export channels have become increasingly important for California wetfish products, as demonstrated by the sharp increase in inflation-adjusted revenues from wetfish exports during the 1990s into 2000. In 2000, wetfish accounted for a significant proportion of commercial fishery landings in California (83.6 percent by weight and 29.3 percent by ex-vessel value).



Highlights – Socio-Economic Profile

1. The present day California wetfish industry has strong connections to the “traditional” industry dating back to the late 1800s.
 - Most fishermen and many processors come from families with two or more generations of participation in the industry.
 - Relationships in the industry are social as well as economic.
 - These relationships provide important human, social and economic resources, which have enabled industry participants to withstand variable and uncertain environmental, regulatory and economic conditions.

2. The wetfish industry is organized around three regional centers of activity (from north to south): the Monterey Bay area in central California, and Ventura/Port Hueneme and San Pedro/Terminal Island in southern California.
 - Monterey and San Pedro are the “anchors” of the industry, given their historic role in establishing the sardine industry.
 - The Ventura/Port Hueneme area’s importance has grown in recent years as new technologies and markets have increased the cost effectiveness of fishing the Channel Islands.
 - These conditions have spurred the development of local receiving capabilities, and have attracted purse seiners from Washington State to the Ventura/Port Hueneme area, primarily to fish for squid.

3. The industry’s three centers of activity are connected by strong and complex linkages.
 - These linkages have been enhanced by fishermen’s increased mobility, processors’ development of receiving and processing capabilities within and among regions, and the social and economic ties between processors and fishermen.
 - Although Monterey and San Pedro as well as resident Ventura area fishermen have long fished the Ventura/Port Hueneme area, this activity has increased markedly since the 1990s following changes that increased the feasibility of fishing the Channel Islands.
 - All of the major Monterey processors and most of the major San Pedro processors have developed receiving capabilities in the Ventura/Port Hueneme area.

4. Two harbors within each region play a critical role in the wetfish industry.
 - Most of the catch is delivered to one harbor in each region: Moss Landing, Port Hueneme and San Pedro.
 - Most of the boats tie up in Monterey, Ventura and San Pedro.
 - Harbor infrastructure critical to the industry -- docking and unloading space, fuel and ice facilities, boatyards, marine supply stores and other providers of essential goods and services -- varies markedly within and across the three regions.
 - These providers of goods and services, in turn, depend on the wetfish industry.

5. The wetfish industry and the businesses (including harbors) that provide essential goods and services are dependent upon one another.
 - Most of the harbors that support the industry depend upon it for direct revenues, commercial fishing activities to help qualify for federal dredging funds, and in some areas, to serve as a cultural backdrop to tourism.
 - This is not the case for Port Hueneme and San Pedro/Terminal Island, where cargo and oil industry activities overshadow the wetfish industry.
6. The wetfish industry is interconnected with, and complements, local agriculture in its shared use of transport services, ice plants, packing materials, cold storage facilities, and seasonal labor, especially in the Monterey and Ventura/Port Hueneme areas.
7. Large swings in resource availability strongly influence fishermen's and processors' strategies.
 - Most fishermen rely on CPS finfish (sardines, jack and Pacific mackerel, anchovy), squid and one other fishery as part of an "annual round" of fishing.
 - Most can shift their effort among wetfish species locally, or move to another regional center of activity in response to resource availability (provided sufficient demand).
 - The viability of these strategies is contingent on fishermen's mobility, processors' ability to receive wetfish and squid at alternative locations, and demand for product, which varies in response to a larger suite of global conditions.
8. Whereas sardine, mackerel and anchovy have been the "bread and butter" of the industry, the recent growth of the squid fishery has afforded a substantial infusion of resources and energy into the industry.
 - However, sharp fluctuations in the availability of squid and associated demand, especially since the 1997-98 El Niño, and the rebirth of the sardine industry and new markets have prompted many fishermen and processors to re-direct their efforts to sardine.
 - Whereas the industry has traditionally focused on quantity for canning and reduction, global demand has led to a shift toward table quality frozen whole products for human consumption and high-end aquaculture feed.
9. In 2000, commercial landings of wetfish, including squid and coastal tunas, totaled 455.6 million pounds (227,734 short tons) worth \$38.9 million ex-vessel, and accounted for 83.6 percent by weight and 29.3 percent by value of all commercial fish landings in California.

Highlights – Economic Overview

- Estimated value added by commercial fishermen and receiver / processors:

Real value added (inflation adjusted) by fishermen in the wetfish industry complex fluctuates due to both market and environmental conditions, and ranged from a low of \$10.5 million in 1992 to a high of \$35.8 million in 2000. Two-thirds of real harvester value added was generated from the market squid fishery. Real (inflation adjusted) value added by wetfish fishermen in 2000 represented 29 percent of the total for all landed fish in California.

Real value added by receiver / processors (many of whom also perform their own distribution and export functions) in 2000 is estimated to range between \$37.5 and \$90.2 million, with a median estimate of \$62.5 million. Based on our median estimate, real processor value added is about twice that added by commercial fishing, a relationship consistent with a recent analysis of the West Coast fishing industry complex by the Pacific States Marine Fisheries Commission. It is not unusual for processing and distribution to add a higher proportion of value than primary production or harvest in commodity-based industries.

Combined real value added by commercial fishing and receiving / processing in the wetfish industry complex in 2000 is estimated to range between \$73.3 million and \$126.1 million, with a median estimate of \$98.3 million.

- Trends and impacts associated with export markets:

Export markets are playing an increasingly important role in this industry. The real value of California exports of anchovy, mackerel, sardines, squid and coastal tunas increased by 317 percent between 1989 and 2000, rising to almost \$90 million in constant 1982 dollars in 2000. In contrast, real harvester revenues increased by 88.4 percent in the same time period.

In the period between 1989 and 2000, market squid generally represented between two-thirds and three-fourths of the value of total California exports in this industry (with the exception of El Niño years such as 1998).

In 1990 Pacific sardines represented approximately five percent of California exports by weight and by value. Between 1990 and 2000 the sardine fishery experienced a remarkable period of growth. By 2000 sardines represented almost one-third of California exports by weight, and almost one-fourth of California exports by value.

- Trends in product types:

At its peak the California tuna fishery employed 2,000 fishermen and an additional 6,000 workers at canneries, boat building and repair facilities. Between 1982 and 1984 many of the major California tuna canneries relocated outside of the continental U.S. to Asia, American Samoa, Central and South America, and Puerto Rico.

The remaining major California tuna canneries at Terminal Island have undergone many changes in ownership in recent years and currently are closed down (although some minor quantities of niche market tuna canning still occurs in California). In August 2001 Thai-Union, owner of Chicken of the Sea, announced that their tuna cannery in California would be shut down and the equipment moved to their facility in American Samoa. Landings of all coastal tunas in California declined from 22.3 million pounds in 1981 to 5.2 million pounds in 2000.

The reduction fishery has been in a long-term decline since the mid-1970s. The decline in anchovy landings since 1982 can be attributed in part to declines in fish meal and oil prices, which reduced prices offered by reduction processors in the anchovy reduction fishery. The California Department of Fish and Game reports that no anchovy were reduced from 1992 to 1995, and only 7.8 million pounds of anchovy were reduced from 1996 to 1998. Reduction processors reported in 1999 that reduction is at best a break-even exercise, and as a result few orders are placed and few vessels participate in the anchovy reduction fishery.

These product forms have been replaced in large part by frozen fish (whole or cleaned), much of which is exported.

- Important trends in landings:

Landings in the resurgent California sardine fishery increased steadily during the 1980s and 1990s, rising from 31 thousand pounds in 1981 to 118.3 million pounds in 2000. The remarkable recovery in this historically important fishery is due to rapid growth in spawning biomass and subsequent increases in harvest quotas. The share of total real California wetfish export value contributed by Pacific sardines rose from approximately five percent in 1990 to almost 25 percent in 2000. According to the National Marine Fishery Service, sardines have been one of the top three commercial species landed in California based on weight between 1992-2000.

The harvest and processing of sardines in California contributed an estimated 20 percent of total real value added in the wetfish industry complex in 2000.

Although market squid landings in California fluctuate due to El Niño conditions, landings increased from 51.8 million pounds in 1981 to 260 million pounds in 2000. Squid was the top commercial marine species landed in California in 1997, 1999 and 2000 based on ex-vessel revenue, and was second in 1995 and 1996. Moreover, squid was the top commercial species in California based on weight in 1993-2000 (with the exception of 1998).

- Important trends in landings (continued):

The harvest and processing of market squid in California contributed an estimated 60 or more percent of total real value added in the wetfish industry complex in 2000.

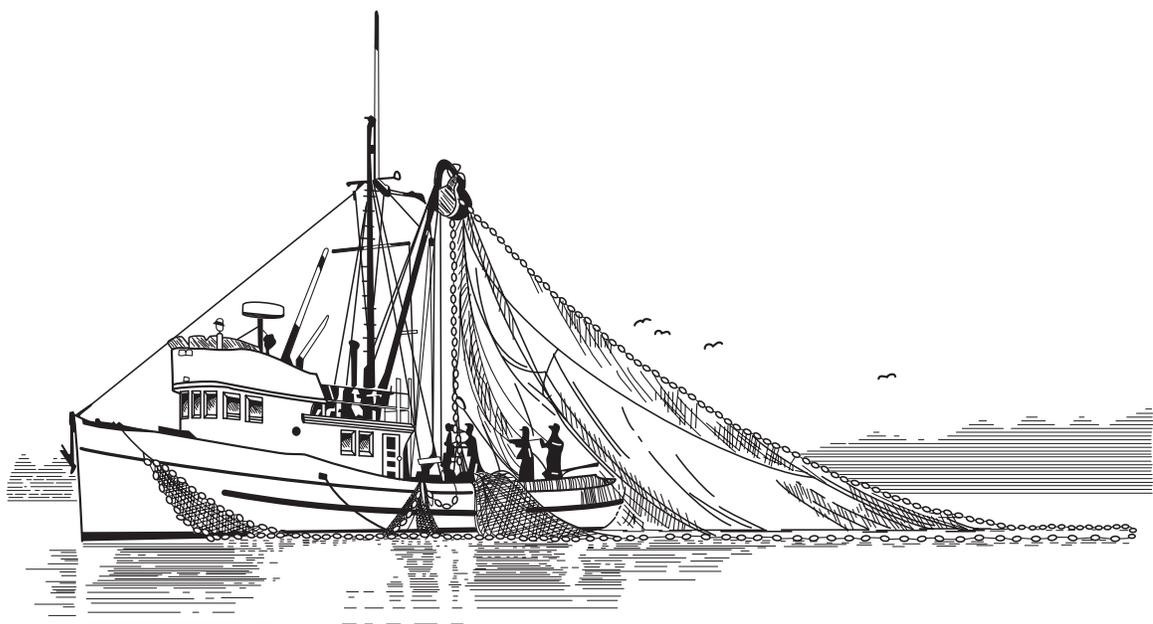
Taken together, squid and sardines represented 90 percent of overall landings and 91 percent of real ex-vessel value added in 1999 and 2000.

- Trends in the market structure of commercial fishing and receiving / processing operations:

In most of the wetfish fisheries, commercial fishing is a moderately concentrated to unconcentrated industry structure, meaning that landings are distributed among a relatively large number of fishermen. California's tuna fisheries are the most concentrated in this industry complex, meaning that landings are distributed among a relatively small number of fishermen.

In most of the wetfish fisheries in which receiver / processors serve as buyers, their industry structure is moderately concentrated to concentrated, meaning that most wetfish are sold to a relatively small number of firms.

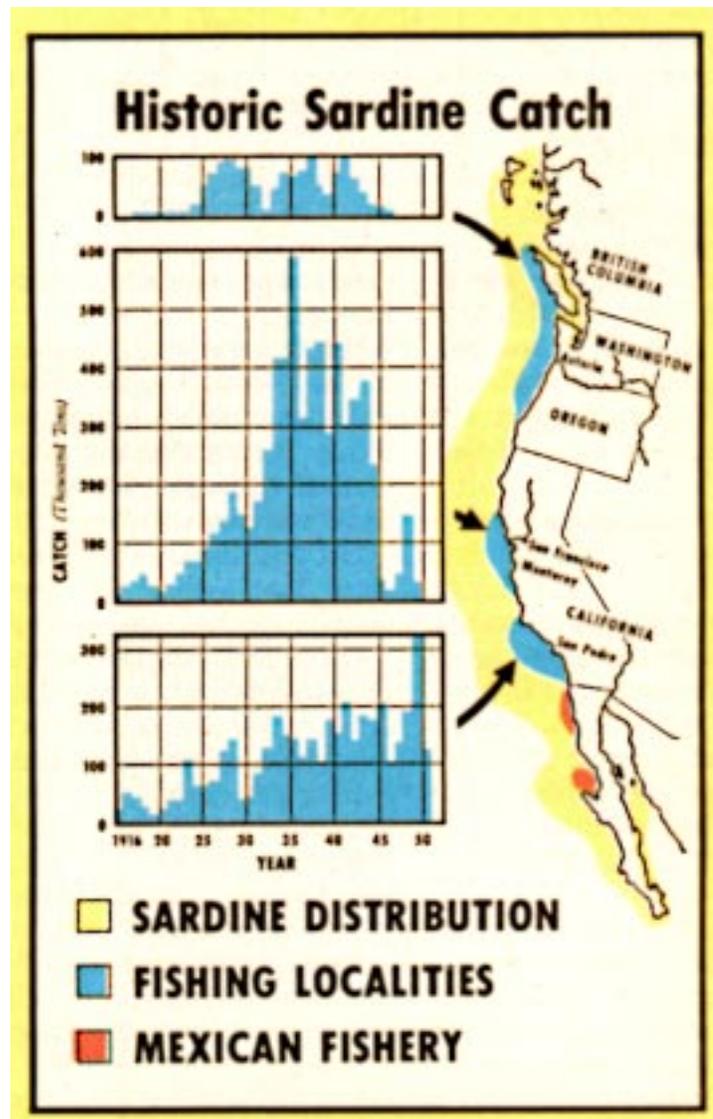
The international markets in which California wetfish exports compete are competitive, and are occasionally prone to trade barriers, such as the 45 percent tariff on imported squid imposed by China in 2000.



Fast Facts about California Wetfish

Sardines

- Historically the sardine fishery was the largest fishery in the western hemisphere. During the heyday of the fishery, 1915-1951, California landed 83 to 93 percent of the total West Coast catch. (See historic landings map below.)
- At the zenith of the sardine fishery (circa 1945), Monterey boasted 19 canneries and 20 reduction plants. The fishing fleet numbered well over 100 boats, with 84 purse seine vessels. During this period, Monterey was known as the Sardine Capital of the World. In total tonnage, Monterey ranked third among the world's major fishing ports (behind only Stavanger, Norway and Hull, England).
- Studies of fish scale deposition in ocean basin sediments going back 1,700 years indicate sardine abundance fluctuates widely over periods averaging about 60 years; population declines are estimated to last an average of 36 years, while recoveries last an average of 30 years. The most recent period of abundance began in the late 1970s. Other sardine stocks around the world show similar natural fluctuations.
- Scientists declared the sardine resource fully recovered in 1998; the spawning biomass was estimated at more than one million metric tons.
- In 2000 California's resurgent sardine fishery contributed about 20 percent of total real value added in the wetfish industry, representing almost one third of California exports by weight and nearly one fourth of California exports by value.
- Only one cannery in California continues to can sardines for human consumption; it is located in the Monterey area.



Market Squid

- One of the oldest fisheries in California, the market squid fishery began in Monterey Bay in 1863. Chinese fishermen rowed the bay at night in skiffs, with a blazing torch mounted in the bow to attract the squid. Accompanying skiffs set a small purse seine around the congregated squid and pulled net by hand. The catch was dried in nearby fields and exported chiefly to China.
- The market squid is smaller than many other squid species, reaching a length of 12 inches, including its eight arms and two feeding tentacles. Market squid have a short life span, perhaps one year or less. Squid die after spawning.
- The market squid harvest fluctuates widely due to natural cycles, such as El Niño events. The fishery also fluctuates depending on international market forces. Typical of short-lived, highly fecund species, however, the market squid resource appears to recover fully in a relatively short time period. Consequently, squid can probably be harvested more intensively than longer-lived marine species.
- During the 1990s, market squid ranked as the largest commercial fishery by volume in six years of the decade (1993-2000, excluding 1998), and in four of those years (1966, 1997, 1999 and 2000) ranked as the state's most valuable fishery resource. Among US exports of edible fishery products in 1999, market squid ranked 6th by volume and 16th by value, higher than any other commercial fishery in California.
- Between 1989-2000, California market squid contributed about 66 to 75 percent of the value of total California exports in the wetfish industry (except for El Niño years, e.g. 1998)

Mackerels

- Pacific mackerel, also called chub or blue mackerel, supported a major fishery in California during the 1930s and 1940s, and again in the 1980s. Pacific mackerel ranked first in volume of California finfish landings from 1984 through 1991.
- Before 1928, when canning began, Pacific mackerel was landed incidentally in the sardine fishery and was used primarily as fresh fish. Most of the harvest came from southern California waters. In 1928 the first large-scale canning of mackerel took place. The development of the mackerel canning industry provides "one of the most spectacular pages in the history of the world's fisheries. Almost overnight the mackerel catch rose from tenth to second place among California fisheries, exceeded only by sardine." (Croker, 1937)
- Smaller lampara boats dominated the mackerel fishery in the early days (1928-1929); by 1929-30 the San Pedro fleet had adopted ring nets. Cannery prices for mackerel were \$8 to \$10 a ton during the depression years (1930-32). The number of lampara boats in the mackerel fleet peaked in 1933-34 at 45 vessels. By 1934 it was apparent that the larger purse seine boats were better adapted to large-scale mackerel fishing, and just as they had some years before in the sardine fishery, purse seiners supplanted the lampara boats.

Mackerels – continued

- In 1934 a total of 23 purse seine boats fished regularly for mackerel out of San Pedro; 69 purse seiners landed mackerel in the Los Angeles region. The total number of boats harvesting mackerel had increased to 477 by 1937; purse seine vessels landed the vast majority of the catch.
- In 1937 a total of 16 canneries packed mackerel in southern California: 8 were located on Terminal Island, 3 in Long Beach, 2 in Wilmington and 3 in Newport Beach. Then as now, Pacific mackerel peaked in abundance during late summer and early fall, neatly filling the lull before sardine canning season, which traditionally began in the fall.
- A scarcity of mackerel became apparent as catches dropped off, beginning in the latter 1930s. A moratorium was placed on the fishery in 1970. In 1972, new legislation imposed a strict landing quota based on estimates of stock (age-one plus) biomass.
- An extraordinary series of successful year classes in the late 1970s initiated recovery of the Pacific mackerel resource and allowed the fishery to reopen in 1977, with quota equal to 30 percent of the total biomass in excess of 20,000 tons. Quotas from 1992 through 2000 averaged 24,445 tons, with a high of 47,200 tons set by the Pacific Fishery Management Council for the 1999-2000 season.
- Originally called horse mackerel, jack mackerel was reported in commercial catches as early as 1888, but was a minor component of the coastal pelagic fishery until 1947. In that year jack mackerel landings increased almost tenfold to 65,000 tons, as the canning industry turned to jack mackerel to offset the decline of sardine and Pacific mackerel resources. Between 1947 and 1979, jack mackerel landings comprised six to 65 percent of annual CPS landings. The recovery of Pacific mackerel in the 1970s shifted effort away from jack mackerel. The CPS fleet prefers Pacific mackerel because jack mackerel occur farther offshore and tend to aggregate over rocky bottom, increasing the risk of damage to expensive round-haul nets. In recent years, the recovery of sardines and increased demand for squid worldwide have also contributed to the decline of jack mackerel landings in California.
- In 2000, 65 vessels qualified for limited entry permits to harvest coastal pelagic species, including mackerel.

Coastal Tunas

- Reportedly the failure of historic sardine runs off southern California in 1903, coupled with an experimental pack of 700 cases of albacore tuna, led to the development of the US tuna canning industry. Erratic supplies of albacore precipitated southward expansion of the fledgling tuna fishery to subtropical waters of Baja California and Mexico, which resulted initially in catches of bluefin tuna, then as fishing expanded, yellowfin, bigeye and skipjack tunas.

Coastal Tunas – continued

- Fishery landmarks include the introduction of the first two tuna clippers in 1924, large baitboats over 100 feet in length, development of brine refrigeration in the late 1930s, evolution of light-weight nylon net in 1954 to replace the cumbersome old-style cotton nets, and introduction of the power block at about the same time. These innovations precipitated the rapid conversion of baitboats to the more efficient catching power of purse seiners. From 1954-1962, 97 tuna clippers converted to seiners. By 1976, the tuna fleet consisted of 141 purse seine vessels over 100-ton capacity (not including “local” wetfish boats). The development of the purse seine liberated the tuna fleet to search for fish far offshore.
- The US Pacific tuna fleet based in southern California developed to legendary proportions through decades of enterprise. At its peak, the tuna fishery involved more than 2,000 fishermen, whose catch provided work for 10,000 or more additional employees in canneries, boat building and repair facilities.
- In the post World War II era, San Diego was known as the tuna capital of the world, with six canneries in operation, in addition to canneries in Los Angeles / Terminal Island, Monterey and San Francisco, many of which also canned tuna.
- Beginning in the early 1980s, the major canneries in southern California decided to close their California plants, and the once mighty tuna fleet also departed in large part. Reasons for their departure are many, including:
 - In 1984 the International Trade Commission denied relief to US canners, who could not compete with mushrooming imports of low-priced water-packed tuna, primarily from Thailand. Congress also failed to act in support of the domestic tuna industry. Canners thus moved offshore to reduce their operating costs.
 - Increasingly strict marine mammal protection laws restricted the US tuna fleet.
 - Mexico declared a 200-mile exclusive economic zone, and in the 1990 reauthorization of the Magnuson Fisheries Conservation and Management Act, the US removed its former exemption for highly migratory species, in effect recognizing coastal state jurisdiction over tunas and other migratory stocks. This action “officially” closed Mexican waters to the tuna and coastal wetfish fleets.
- In 1990, led by StarKist’s parent company, H.J. Heinz, US canneries initiated a “dolphin-safe” policy, declining to buy tuna harvested in association with dolphins. This policy drove many purse seiners to the western Pacific. As a result, the US fleet that operated in the eastern Pacific decreased from 141 purse seiners in 1976 to 9 in 1999. (Coan, NMFS. 2001)
- Today, following tradition, some California purse seine vessels, particularly those home-ported in southern California, harvest coastal tunas during summertime as part of an annual round of fishing.

Vessels fishing tuna in the eastern Pacific must abide by all federal and state regulations, including those proposed by the Inter-American Tropical Tuna Commission (IATTC), and any other international regulatory agency in which the US is a member.

The Last Word

California's wetfish industry today is a traditional industry with a contemporary outlook. Today's industry is streamlined: although there are fewer boats, and many in the wetfish fleet have fished for decades, fishing gear is more efficient now; fishing crews are smaller. Processing facilities operate under strict sanitary rules (Hazard Analysis Critical Control Point--HACCP) mandated by the federal government.

Government action and inaction have played a major role in shaping the course of the wetfish industry. From the military procurement policy during World War I to current proposals for federal and state marine reserves that seek to curtail fishing, the fishermen and fish processors of California have been the beneficiaries or victims of the actions – legislative or administrative – or lack of action by local, state and federal governments. For example:

- Federal government procurement policy during World War I spurred the building of a number of canneries in San Pedro and Monterey.
- Federal government action in setting lower tariffs on fish packed in water than on fish packed in oil (rewarding Iceland for supporting US troops during World War II) had the unintended, and perhaps unforeseeable, consequence of allowing foreign tuna processors to export the newly popular water-packed tuna in huge volumes at rock-bottom prices to the US. (Ironically, Thai packers capitalized on a “health-conscious” marketing strategy originally launched by StarKist -- tuna packed in spring water.)
- The failure of the government to correct this inequity was a primary reason US canners shifted production out of California, and perhaps caused the failure of a few.
- State and federal water and air quality laws and regulations increased the economic cost of doing business in California. Meanwhile, local government (e.g. Los Angeles Harbor District) charged fish canneries rent at the same rate as cargo operations, all contributing to the canneries' unprofitability and ultimate departure.
- Federal laws, including the Marine Mammal Protection Act, increased costs and concerns of vessel owners and led to the relocation or sale of many vessels involved in both wetfish and local tuna fisheries.

The list goes on.

Still, the melting-pot culture that infused California along with the immigration of Chinese, Japanese, Italian, Slavonian and other nationalities of fishermen still enriches the fishing ports of Monterey and San Pedro, as well as San Diego and San Francisco.

California seas are among the most productive in the world. The wetfish that provided the lion's share of fishery commerce in the early 1900s still represents the bulk of the California catch today. Today, much of that catch is exported around the world. Indeed, today California's wetfish industry fills another critical economic role, helping to offset the US trade deficit, for seafood is the second largest commodity deficit, after oil, in the United States.

To be sure much has changed, but much – the traditions, the culture, the importance – remains the same. Today sons and daughters continue the enterprise begun by their fathers and grandfathers 50 or 100 years ago, as yet another generation comes of age. California's wetfish industry still abides by its traditional *raison d'être*, summed up in an old Italian expression: “Eredita” – roughly translated, “pass it on”.

Issues of Concern

1. Continued access to CPS resources is a critical issue of concern to California wetfish fishermen and receiver / processors.

In 2002 the wetfish industry faces several regulatory decisions that will affect access. These include:

- Squid - A State fishery management plan is slated for approval in 2002, which likely will include a limited-entry provision and proposal to provide “replenishment zones” where no fishing is allowed, and may also include proposals for trip limits and/or a cap on season landings. New proposed restrictions are in addition to existing weekend closures implemented statewide.
- Sardine - The issue of coastwide allocation of the sardine harvest guideline will resurface, along with review of the “environmental control rule” now used to determine the harvest guideline.
- Mackerel - The PFMC will entertain discussion to determine the best way -- directed fishery or incidental catch -- to utilize a declining mackerel harvest guideline. Decreases in the mackerel harvest guideline, based on recent stock assessments, have cut short the directed fishery to allow for continued harvest of sardines without undue restrictions, because sardines and mackerel often school together.

- In light of the cyclical nature of wetfish resources, including squid, management strategies must be flexible to allow movement between CPS resources during their periods of abundance.
- Most CPS finfish fishermen also fish squid; however, some squid fishermen do not fish other wetfish.

Variation in management options between fisheries in the wetfish complex, for example incompatibility of squid and CPS finfish limited entry permits regarding transferability of permits, creates potential hardship for fishermen who fish both squid and CPS species on one vessel.

2. Committing adequate resources to CPS research at both state and federal levels is essential to provide sufficient data to determine CPS stock assessments and harvest guidelines as comprehensively as possible. Stock assessments to be approved include:

- Squid - CPS FMP Amendment 10 requires a definition of Maximum Sustainable Yield (MSY) for all coastal pelagic species, including squid. Because squid MSY is unknown at present, MSY proxy is proposed, based on an egg escapement model, which presumes that eggs have “escaped” prior to harvest. Such an assumption can be ground-truthed through sufficient port sampling.
- Sardine - The harvest formula is now based on a sliding scale (5-15 percent of spawning biomass), determined in part by three-year average sea surface temperature. Colder average temperatures result in a lower harvest guideline. Discussion will center on the appropriateness of the environmental control rule and unplanned consequences on fishing.

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- Comprehensive biomass surveys along the entire west coast, particularly in the northwest, are essential to measure the full extent of CPS resources, particularly sardines, as management measures and harvest guidelines are based on these assessments.

In the past, sardine biomass surveys took place in the Channel Islands and Southern California Bight and the quota for the entire state of California was based on this estimate of spawning biomass. Since the sardine population has expanded northward as far as British Columbia, Canada, surveys of spawning biomass are needed in these northern areas as well to estimate population size accurately, as sardine fisheries are growing in these areas.

In natural cycles of sardine abundance and absence, fish are available in northern waters at the peak of warm-water oceanic regimes. Northern fishery quotas should be based on northern biomass.

During sardine declines, fish disappear from northern waters first. Historical fisheries in BC, Washington and Oregon harvested sardines at the height of their abundance and ceased when the sardine biomass declined.

3. Allocation of the sardine harvest guideline between northern and southern fishing areas may be discussed at PFMC meetings in 2002.
 - CPS regulations established a limited entry fishery south of Point Arena, CA. Following coastwide expansion of the sardine biomass, “open access” sardine fisheries have developed in Oregon and Washington, managed by the respective states. However, the harvest allocation demarcation line, allocating two-thirds to the southern California fishery and one-third to the northern, remains at San Simeon Point, south of Monterey. The allocation and demarcation line were set, prior to the emergence of northwestern fisheries, to provide sufficient larger fish for the Monterey fishery.
 - Sardines typically migrate northward during spring and summer, returning south in the fall. The Monterey fishery typically waits until late summer-early fall to harvest larger sardines on their southward migration.
 - Pacific northwestern biomass surveys, with individual sub-area harvest guideline based on these stocks, are important, both to provide harvest guidelines based on best available science and to insure adequate stocks for the Monterey fishery. Although not an issue during periods of sardine abundance, in times of reduced abundance, absent a separate northwestern harvest guideline, the northern harvest allocation potentially could be filled before the Monterey fishery gained access to larger fish.
 - Biological evidence exists that the far northern stock harvested in the Pacific northwest may be different from the prevalent stock found off California, further justifying the need for separate biomass surveys and a separate harvest guideline. A third sub-area harvest guideline should be established, based on spawning biomass in the area north of Point Arena.

Issues of Concern – continued

4. Efforts to implement Marine Protected Areas (MPAs) in the Channel Islands and off the California coast may significantly restrict wetfish harvesting, causing economic harm to the wetfish industry, although migratory coastal pelagic fish resources such as sardines, mackerel and squid will not benefit measurably from these site-specific “no take” zones.
 - At present this MPA process does not consider existing management measures for squid and other coastal pelagic species, nor proposed measures such as the “replenishment zone” concept under consideration in the state squid FMP.
5. Coastal pelagic species such as sardines are “transboundary” stocks, migrating from Mexico to Canada during their peak periods of abundance. The California CPS fishery today is strictly managed under a conservative harvest guideline, based on the population estimated in US waters and subtracting the biomass estimated to exist south of the border. However, currently no such consideration or cooperation is reciprocated by other harvesting countries.
 - Cooperative tri-lateral management is essential between the US, Mexico and British Columbia: both to insure the long-term health of the harvestable resource and to avoid penalizing the US wetfish fishery and domestic fishermen by unilaterally reducing their share of the harvest guideline.
6. California’s wetfish industry provides substantial economic benefits to port cities and regions in which it operates, as well as to the State as a whole. Maintaining adequate infrastructure to foster and facilitate operations is essential to the long-term viability of the wetfish industry.
7. The cost of doing business in California is increasing, caused in large part by an increased regulatory burden from a growing list of environmental initiatives (e.g. clean water, clean air, precautionary fishery management etc.). Despite these increased costs, California’s wetfish industry must operate in a global marketplace.
 - California wetfish products face competition in international markets from product produced by countries with lower operating costs and often protected by tariff and non-trade barriers.
In domestic markets, California wetfish products compete with a flood of lower-priced imported product (e.g. canned sardines from Mexico)
 - US trade policies should provide an equitable balance between “free trade” and support for US producers/exporters.

2002 Time Line for Regulatory Action

State Process

California Market Squid Fishery Management Plan (FMP)

Date	Task
March 2002	CDFG completes draft FMP document
March-June 2002	CDFG accepts public comment on draft FMP
July 2002	CDFG completes Revised FMP
August 2002	CDFG submits Final FMP to California Fish & Game Commission with preferred alternatives
September-October 2002	Fish & Game Commission process
December 2002	Commission adopts or rejects FMP

Federal Process

Coastal Pelagic Species FMP

March 2002	PFMC adopts public review draft of Amendment 10 to CPS FMP
June 2002	PFMC takes final action on Amendment 10 of CPS FMP
Other issues considered under FMP process:	
May-June 2002	<ul style="list-style-type: none"> • Pacific mackerel assessment, harvest guideline, season structure for 2002-2003 season • Inseason management of 2001-2002 fishery • Annual SAFE document for CPS managed under FMP • Consider Stock Assessment Review process for actively managed CPS • Pacific sardine assessment, harvest guideline allocation, timing of fishery • VHS for sardine

Glossary of Technical Terms

Socio-Economic Profile

Actively managed species: One of two classifications for species covered by a federal fishery management plan. Actively managed species require annually determined harvest limits based on current biomass estimates. (swr.ucsd.edu/fmd/summary.htm)

Brail or dip net: A net used for transferring the catch from a seine net after it has been brought alongside the fishing vessel. It is operated either entirely by hand or partly by hand and partly by hydraulic power. Whereas some brails have a single opening at the mouth of the net, some have an opening at the bottom, which can be pulled (pursed) closed to hold the catch, or opened to release fish (e.g. into the hold). (www.psmfc.org/akfin/ff/glossary.html#d)

Dewatering box: A stainless steel or aluminum structure through which fish are pumped into the hold of a fishing vessel or a shoreside bin to be weighed. The dewatering box consists of a chute through which fish pass, but which is perforated to allow excess water to drain away from the hold or bin.

Forklength: The length of a fish as measured from the tip of its snout to the fork in the tail. (www.afrf.org/glossary.htm#F)

Lampara: A type of round-haul net used to catch schooling fishes. The lampara net has a large central bag of webbing and short wings of larger mesh, hung so that when the wings are pulled in, the net forms a scoop, trapping the fish. After a lampara net is deployed, the leadline at the bottom of the net is pulled until it closes the net into a scoop, and the catch is brought onboard the boat. (California Seafood Council. California's Golden Seas Appendix. ca-seafood.ucdavis.edu/download/index.htm; www.cisanctuary.org/wt/fisheryhaul_line.htm)

Light boat: A vessel, usually smaller than a purse seiner, that assists the purse seiner in locating squid, using powerful lights (maximum 30,000 watts, shielded) to attract squid to the surface for the purse seiner to set upon.

Monitored species: One of two classifications for species covered by a federal fishery management plan. Monitored species are not subject to mandated harvest limits based on current biomass estimates, although other management measures such as area closures may be employed. (swr.ucsd.edu/fmd/summary.htm)

Purse seine: A type of round-haul net designed to catch schooling fishes. The purse seine net consists of a straight wall of webbing with metal rings attached to the bottom. A purse line is threaded through the rings, which when pulled, closes the bottom of the net like a purse, trapping the fish inside. (California Seafood Council. California's Golden Seas Appendix. ca-seafood.ucdavis.edu/download/index.htm)

Glossary of Technical Terms

Purse seine (cont'd)

When the net has been set ... a line running through rings at the bottom of the net is drawn closed like a purse. The rings then are brought aboard, and the wings of the net are pulled aboard with a power block. The catch is captured in the bag of the net, from which it is pumped or scooped and transferred to the vessel's hold. Many fishermen now use drum seines, which retrieve the net via a large reel mounted at the stern of the vessel.
(www.cisanctuary.org/wt/fishery/haul_line.htm)

Round-haul net: There are two types of round-haul nets: the lampara and the purse seine. These nets are used to catch sardines, anchovies, squid, bonito, mackerel, tuna and herring. Both types of round-haul nets consist of long panels of netting that are used to encircle a school of fish. A skiff released from the fishing vessel holds one end of the net in place while the vessel quickly encircles the school, completing the circle at the skiff.

Scoop boat: A fishing vessel that uses a brail or dip net to transfer the catch into the hold. Scoop boats are most common in the live bait fishery for wetfish.

Sponson: To increase the stability and/or capacity of a vessel by modifying its breadth.

Stickwater: Wastewater from vessels and offloading operations that contains fish, seawater and oil residues.

Stretch: To increase the stability and/or capacity of a vessel by modifying its length.

Glossary of Technical Terms

Economic Terms

Concentration ratio: A measure of market concentration representing the share of total market purchases or sales accounted for by the largest four firms (“C4”) or eight firms (“C8”) in the market. The larger is C4 or C8, the more concentrated the market is said to be.

Herfindahl-Hirschman (HH) Index: A measure of market concentration obtained by squaring the market share of each firm in the industry, and then summing these squared market shares. For example, a monopoly (one seller) has an HH index of 100^2 or 10,000. In contrast, if 10 firms each have 10 percent market shares, then the resulting HH index would be 10^2 for the first firm, plus 10^2 for the second firm, plus.... 10^2 for the tenth firm, which equals 1,000.

Market concentration: The extent to which total market purchases or sales are accounted for by a few of the largest participants in the market.

Market structure: The economically distinguishing characteristics of a market, including the number of participants, the extent to which the products or services that they exchange are similar or different, the extent of concentration, and the ease with which new participants can enter the market.

Oligopoly: A market structure featuring a small number of sellers, a relatively high degree of concentration among those sellers, and significant costs of entry confronting potential new sellers.

Oligopsony: A market structure featuring a small number of buyers, a relatively high degree of concentration among those buyers, and significant costs of entry confronting potential new buyers.

