

2010 CALIFORNIA LEGISLATIVE FISHERIES FORUM

Department of Fish and Game Annual Report



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FISHERIES FORUM

Department of Fish and Game

Marine Fisheries Report

Fisheries Reports

Dungeness crab

Northern and central California waters are the source of California's catch of Dungeness crab. The state's most valuable commercial crab fishery began in the San Francisco area in the mid-1800s. In the 1940's, the fishery expanded rapidly to the northern portion of the state where most of the catch is now made. Both the commercial and recreational fishing seasons employ relatively simple management techniques and despite large fluctuations in catches, the resource appears to be sustainable over the long-term. With landing records dating back to 1916, information on the commercial catch and value is plentiful, but the 2009-10 season is the first for which an estimate of the sport catch can be made.

The primary Central California fishing ports include Avila-Morro Bay, Monterey, San Francisco and Bodega Bay. The most productive grounds in central California are off San Francisco including the Gulf of the Farallones and waters north to the Russian River (Sonoma County). Dungeness crab fishing grounds off northern California (above Point Arena) are much larger and extend from Fort Bragg to the California-Oregon border, with the prime area located between Eureka and Crescent City. Crescent City has continued to have the largest season landing totals of all ports. Sport fishing from private boats and charter boats, or Commercial Passenger Fishing Vessels (CPFVs), occurs throughout the same range.

Sport fishery

With fewer ocean sport fishing opportunities on the north coast, popularity of sport crabbing is rising. Crabbers are allowed a bag and possession limit of 10 crabs per day and a smaller than commercial size limit of five and three-quarter inches wide. Since 2008, the sport season has opened statewide on the first Saturday of November and runs through July 30 in northern California and June 30 in central California. The early November opener gives sport fishers several weeks of crabbing before they encounter large numbers of commercial traps on the crab grounds.

CPFVs operate from various ports, offering a fishing opportunity to sport crabbers without their own vessel. They are most numerous in the San Francisco/Bodega Bay area. Other productive ports include Fort Bragg and Trinidad. In central California, sport crabbers aboard a charter vessel have a

reduced limit of only six crabs per day and an increased size limit of six inches wide. Historically, rough estimates put the combined private and CPFV sport catch at about one percent of commercial catch. However, the Department of Fish and Game (Department) expanded its recreational fish sampling program to include Dungeness crab for the 2009-10 season. Preliminary estimates show that approximately 228,000 pounds, or 114,000 crab, were landed in November and December equating to about 1.7 percent of the combined commercial and sport catch for these months.

Commercial fishery

Legislation restricted access to Dungeness crab fishing permits beginning in 1995. A limited entry permit system was then enacted by the legislature with the provision that most permits are transferable. Currently, there are less than 600 permits, with only about 440 active during the past season. However, there is concern among some fishermen that an increase in use of latent permits could cause overfishing and further overcrowding of crab fishing grounds.

The Dungeness crab catch has followed a cyclical pattern, with peaks and troughs approximately every seven to 12 years. The 2003-04 through 2005-06 seasons were among the highest commercial catches on record. As expected, the 2006-07 through 2008-09 catches decreased significantly. Landings for 2008-2009 totaled 6.2 million pounds, well below the 10-year moving average of 13.2 million pounds. However, the preliminary catch for November and December 2009 is at 10.5 million pounds, with final season numbers probably approaching the 10-year average, representing a significant upswing in catch from recent lows.

Despite the decreases in catches of recent years, a relatively high price per pound kept the ex-vessel value robust - maintaining Dungeness crab as one of the most valuable fisheries in California. For example, the 2007-08 season catch was worth \$23.0 million, while the 2009-10 season so far is worth 19.2 million.

The Dungeness crab fishery is one of the last major commercial fisheries in California managed by the Legislature, and management is based on – sex, season, and size. Only male crabs over six and one quarter inches wide may be retained in the commercial fishery. This helps protect the reproductive potential of the populations. The fishery also utilizes open and closed seasons intended to avoid fishing during molting and mating times.

California, Oregon and Washington share many management concerns and coordinate on interstate issues through the Tri-State Dungeness Crab Committee. Each year, northern California synchronizes its northern opening date based on a standardized crab quality test also conducted in Oregon and Washington. The last important interstate development, effective in 2007, was the reciprocal Limited Entry 200 provision established within the reauthorized

Magnuson Stevens Fishery Conservation and Management Act. In essence, the States were given management jurisdiction in federal waters for Dungeness crab. The effect has been to align regulations in state and federal waters within each state.

In recent years, the most pressing issue has been the number of traps deployed in both central and northern California. Unlike Washington and Oregon, California has no limit to the number of traps a boat may fish or the frequency with which they are fished. As the groundfish industry has declined, larger multi-purpose vessels have devoted more effort to Dungeness crab. Complaints of overcrowded fishing grounds, particularly in central California, have continued. Traps are frequently lost or buried in storms and litter California crab grounds and beaches. They can become hazards for vessels and marine mammals. Documented and potential marine mammal entanglements have led NOAA to elevate the California and Oregon Dungeness crab fisheries to Category II on the 2009 List of Fisheries, as required by the Marine Mammal Protection Act. All Dungeness crab vessels are now required to carry a Marine Mammal Authorization Permit.

Opinions run both for and against the implementation of a trap limit program, similar to those in Oregon and Washington. Central California fishermen have tried three times unsuccessfully to legislate a limit on the number of traps allowed in their area. Northern crabbers have generally been opposed to this measure, particularly those that fish central California during the two weeks prior to the northern opener. Failures to reform the fishery in the past were generally attributed to lack of agreement between north and central California fishermen.

In 2008, Dungeness crab fishermen began working on a cooperative approach to managing their fishery. Their effort resulted in SB1690 (Wiggins), which added section 8276.4 to the Fish and Game Code and mandated the Ocean Protection Council to facilitate a limited-term Dungeness Crab Task Force (DCTF) in 2009. The DCTF objective was to make recommendations on management measures such as trap limits, fleet size reduction and season opening date changes, among others, to the Joint Committee on Fisheries and Aquaculture, the Department and the Fish and Game Commission (Commission) by January 2010. Recommendations submitted included establishment of a pilot trap limit program modeled along the lines of Oregon's program, and an extension of the task force sunset date.

For more information, go to the Department's Marine Region website:
www.dfg.ca.gov/marine/invertebrate/crabs.asp

California Spiny Lobster

The commercial fishery for California spiny lobster in southern California began in the late 1800s. Fishermen use baited traps that are individually buoyed and

deployed along the mainland coast from Pt. Conception to the U.S.-Mexico border and at all the offshore islands. There is also a large recreational fishery, involving skin and scuba divers, and fishermen using hoop nets.

The 2008-09 commercial lobster season landings totaled 728,000 pounds, with an ex-vessel value of \$7.8 million. Landings were almost split evenly between ports in San Diego County (31 percent), Los Angeles/Orange counties (35 percent), and Santa Barbara/Ventura counties (34 percent), similar to the previous season. The 2008-09 catch and value increased from the previous season, when commercial landings totaled 675,000 pounds with an ex-vessel value of just over \$7 million. The preliminary landing total for the 2009-10 commercial season is 695,500 pounds. The 10-year average catch for the commercial fishery is 725,000 pounds. Lobster is a high value product, with fishermen usually receiving over \$10 a pound. The median price paid per pound during the 2008-09 lobster season was \$11, the same as during the 2007-08 season.

Commercial lobster season opens the first Wednesday in October and closes the first Wednesday after the 15th of March, while the recreational season opens the weekend before the commercial opener. Fluctuations in lobster landings are not unexpected, as the fishery is strongly influenced by El Niño and La Niña events. The lobster catch is primarily exported to Asian markets, with prices dependent on market demand. In recent years, fishermen have been trying to develop local markets. They have had limited success because of the widespread availability of less expensive American (Maine) lobsters and cheaper imported spiny lobster tails.

In 1955, a minimum carapace size limit of 3.25 inches was established for both sport and commercial fishermen. Since the 1976-77 season, commercial fishermen have been required to use rectangular escape ports on their traps to decrease the retention of undersized lobster. This management tool, along with warming ocean conditions, apparently helped reverse a lengthy downward trend in landings. The total number of commercial traps pulled, an index of fishing effort, increased eight percent in the 2008-09 season to 874,000 pulls. The number of traps pulled has gradually increased since the 1981-82 season when about 500,000 traps were pulled. Although there are currently no trap limits or catch quotas for the spiny lobster fishery, a restricted access program for the commercial take of spiny lobster was initiated in the 1996-97 season. There are currently 203 lobster permittees.

In addition to a season and size limit, the recreational fishery is managed by a daily bag and possession limit of seven lobsters. Not more than five baited hoop nets per fisherman may be used from shore, and divers are limited to using their hands only. Not more than 10 hoop nets per vessel are allowed to be used, regardless of the number of fishermen aboard.

Beginning with the 2008-09 sport lobster season, lobster report cards were required to be purchased so that fishermen can record their catch and effort by date, location and gear type. Approximately 27,500 cards were sold in 2008 for the first half of the 2008-09 season. Department projections indicate that the total recreational catch could be nearly half that of the commercial catch based on the subsample of returned report cards. Although gear trends varied by location, scuba diving was more common than skin diving, and traditional, flat hoop nets were more popular than the newer, conical hoop nets.

The Department has been working on collaborative research projects involving lobster populations in the northern Channel Islands with students of Dr. Lenihan at UCSB, Dr. Hovel at SDSU, and Dr. Lowe at CSULB. Dr. Hovel is also involved in a collaborative effort with the Department to study the abundance, distribution, and movement of lobster in San Diego Bay funded by the Port of San Diego. Preliminary results indicate a larger population of lobsters in the Bay than previously reported, and only a small portion of that population has moved several miles to new home ranges.

In a project with Scripps Institution of Oceanography, Department staff is helping to count larval lobsters in nearly fifty years of archived water samples collected during California Cooperative Oceanic Fisheries Investigations (CalCOFI) cruises. This effort, it is hoped, will create an index of spiny lobster spawning biomass in the southern California bight.

The Department has begun development of a spiny lobster stock assessment. The assessment is a key component of a fishery management plan (FMP) that the Department may eventually undertake. The Department hosted a lobster data and stock assessment needs workshop at UCSB in December 2009. Lobster researchers, fishermen, and NGOs were invited with the goal of determining what datasets exist inside and outside the Department, and what models have been used elsewhere in lobster assessments.

The Department is also working with the Environmental Defense Fund to seek funding and partners to begin development of a Lobster FMP including all of the public process and science that is needed for this endeavor. The Department will have oversight and will provide at least half of the staff time necessary to complete the FMP. If funding is obtained soon, work will begin and an FMP will be completed within the next four years.

For more information on the California spiny lobster, go to the Department's Marine Region website: www.dfg.ca.gov/marine/invertebrate/lobster.asp

Pacific Herring

California's Pacific herring sac-rope fisheries are limited to the four largest spawning locations: San Francisco Bay, Tomales Bay, Humboldt Bay, and

Crescent City Harbor. San Francisco Bay has the largest herring spawning stock south of British Columbia and historically produces more than 90 percent of California's herring catch. The long-term average spawning biomass for the San Francisco Bay spawning population is approximately 99 million pounds. Annual catch quotas are based on spawning biomass estimates, age structure analysis, and up-to-date oceanographic information.

San Francisco Bay herring fisheries were closed by the Commission for the 2009-10 season. This was the first time a herring fishery closure was approved by the Commission since the fishery began in 1973-74. The Department and the Director's Herring Advisory Committee (composed of fishing industry representatives) recommended a zero harvest or no fishery option for the 2009-10 season due to the unprecedented low spawning biomass in the San Francisco stock for three consecutive seasons, with the 2008-09 season at a historical low of 9.6 million pounds. Based on the low numbers of herring returning from previous year classes, the Department was concerned that there were not enough four-year old and older herring to support a sustainable fishery. There was additional concern over weak year class strength, which has been far below average and a strong year class to support the fishery in the future was not evident. At these low levels, the San Francisco stock is considered depressed and it becomes vital to protect herring and their role in the ecosystem. Pacific herring is a critical species and plays an important role in oceanic and bay food webs. Precautions were enacted so that the San Francisco stock can be rebuilt to a level that provides long term sustainability for the fishery while ensuring there is an adequate numbers to preserve Pacific herring importance as forage for oceanic and bay species. In addition, potential impacts from the *Cosco Busan* oil spill remain unresolved, as the results from the Natural Resources Damage Assessment study on oil impacts to herring resources have yet to be released.

Preliminary survey data in 2010 indicate a substantial increase in the size of the biomass spawning in San Francisco Bay over the 2009-10 season. Due to this increase, the Department anticipates recommending a limited San Francisco Bay herring roe fishery for the 2010-11 season. It is still too early to determine what size that quota may be but the Department is considering a quota that would facilitate stock rebuilding and limit the number of young fish taken by the fishery to provide sustainability and safeguard its role in the ecosystem.

The Department is currently developing a Fishery Management Plan (FMP) for Pacific herring. The goals of this plan include restoring healthy age structure to the population, managing commercial harvest to achieve a sustainable fishery, and providing forage to other species that utilize herring as a food source. The FMP development process will continue for at least three years and involve the fishing industry and others interested in herring as an important ecosystem component.

For more information, go to the Department's Marine Region website:
www.dfg.ca.gov/marine/herring/index.asp

Abalone

Seven species of abalone are found in California: red, white, black, green, pink, pinto, and flat. Currently, only red abalone can be taken in a recreational free-diving fishery north of San Francisco Bay, primarily in Sonoma and Mendocino Counties. A brief commercial red abalone fishery in northern California was closed in 1945 but had never been a significant part of statewide landings. The commercial and recreational abalone fisheries south of San Francisco Bay were closed by the Legislature in 1997 due to a decline in the populations. Fishing pressure, predation by sea otters in central California, and the withering syndrome (WS) disease contributed to the population decline. Recovery of abalone populations in the closed areas has been slow, and except for San Miguel Island (SMI), no areas south of San Francisco Bay are being considered for the reopening of an abalone fishery.

The Abalone Recovery and Management Plan (ARMP) was written by the Department and approved by the Commission in December 2005. The ARMP outlines restoration strategies for depleted abalone stocks in central and southern California. It also describes the management approach to be used for northern California red abalone and eventually for other recovered abalone stocks. The Commission adopted the ARMP with the selection of an alternative which examines the potential for reopening a fishery on the SMI red abalone stock, depending upon the condition of that particular stock.

Northern California Red Abalone

The primary method of evaluating the status of red abalone populations is the estimation of abalone density using fishery independent SCUBA surveys at eight northern California index sites on a triennial basis. Surveys conducted from 2005 through 2007 had red abalone densities at levels well above the ARMP level for a reduction in the Total Allowable Catch (TAC) (0.68 abalone/m²). Current surveys in 2008 and 2009 had much lower abalone densities which dropped the average density to 0.53 abalone/m² and is close to ARMP trigger levels for reducing the TAC (0.50 abalone/m²) in this triennial period. Concerns on this significant decrease in density have prompted the Department to consider possible regulation changes.

Creel surveys interview abalone fishermen at heavily used sites and provide the Department with detailed catch and effort information which are designed to detect declines in local abundance. These surveys were started as annual surveys in the 1970s and are currently conducted every other year. Abalone report cards and telephone surveys also provide valuable fishery dependent data. Recreational abalone fishermen are required to record their catch on an

abalone report card and return the card to the Department at season's end. Based on report card returns and a telephone survey of report card purchasers, the total catch for 2008 was estimated to be 265,000 abalone, a substantial decrease from the highest estimate of 309,000 in 2007. Annual catch estimates from 2002 to 2008 have ranged from 235,000 to 309,000 with an overall average of 264,000 abalone for that period. The telephone survey included economic data which was used to estimate \$9.7 million was spent for abalone trips in 2008 compared to \$11.5 million in 2007 and \$7.8 million in 2002.

Abalone report card catch location data for 2008 shows the Fort Ross area in Sonoma County continues to be the most productive location for abalone harvesting. Catch at this area, which includes two popular sites over a few miles of coastline, nearly doubled between 2005 and 2007 and has accounted for 20 percent of the annual catch for the past two years (2007, 2008).

The WS bacterial disease which devastated some southern California abalone populations has not made a noticeable impact on abalone populations in northern California. The cool waters in the north apparently prevent the disease from adversely impacting abalone populations there.

Southern California Red Abalone

The Department has been conducting the SMI fishery consideration process since 2006. During this process the Department has sought collaboration by empanelling a constituent group, the Abalone Advisory Group (AAG). The purpose of the AAG is to provide the Commission with a limited range of fully developed alternatives for managing a potential SMI fishery. To provide data for the SMI fishery consideration process, the Department and constituents developed a cooperative assessment survey of red abalone populations at SMI. Comprehensive red abalone surveys were conducted at SMI in 2006, 2007 and 2008. The AAG and the Department used this information in developing a stock assessment for SMI red abalone. The stock assessment creates the basis for determining a potential Total Allowable Catch (TAC) as part of the fishery consideration process.

Along with the stock assessment, the process has also developed four separate fishery management options for the Commission to consider. The AAG, with the help of the Department and facilitation team, generated a report outlining the work to date. This report was submitted to the Commission in February of this year. Currently the process is on hold and the Commission is waiting for further information before they make a decision on a fishery. The AAG is now in recess until further information is gathered from a supplemental modeling exercise and on feasibility of implementing each of the four fishery options. The AAG will reconvene at a later date once this information is acquired.

White and Black Abalone

The Department applied for and was granted an Endangered Species Act Section 6 agreement with NOAA fisheries in 2009. This agreement allows the Department to compete for Section 6 grant funding for restoration of endangered species under the jurisdiction of NOAA Fisheries (i.e. white and black abalones). The project entitled, "Developing and Implementing Restoration Tools for the Critically Endangered White Abalone", will begin in July 2010 and will continue for three years. The grant (\$1.08M total) will be used to fund the white abalone captive rearing program at UC Davis, Bodega Marine Laboratory, and for Department biologists to conduct experimental stocking studies to determine the optimal technique for out-planting captive reared abalone for restoration.

Black abalone was listed as an endangered species by NOAA Fisheries on January 14, 2009. Black abalone populations in southern California remain severely depressed since the closure of the fishery in 1993. However recent evidence shows some recruitment and potential recovery at San Nicolas and Santa Cruz Islands. Current restoration research efforts have been focused on finding some sort of genetic-based resistance to WS, a disease that has devastated once abundant black abalone populations. Additionally research efforts are also focused on successful captive propagation of the species for recovery out-planting.

Pink and Green Abalone

Pink and green abalone surveys were conducted at the southern Channel Islands (Santa Catalina and San Clemente islands) from 2005 to 2008. Exploratory surveys are now complete for these species. Size frequency data at the survey sites show that while the broad size range criterion specified in the ARMP are not being met for either species, in some areas, green abalone were close to that criteria and showed evidence of recent reproduction and recruitment. Based on these surveys, it appears that achieving this first criterion level of recovery in the ARMP, will take a considerable time period.

The Department continues work on an NOAA Fisheries funded aggregation study with pink and green abalone at Santa Catalina and San Clemente islands. This study began in the summer of 2008 and will continue until the fall of 2010 and involves aggregating and tagging abalone to monitor their survival, growth rates, and movement. The Department is conducting this study collaboratively with several partners, the Long Beach Aquarium of the Pacific and former commercial abalone divers. Aggregation of wild adult abalone for successful spawning is listed as a potential recovery task in the ARMP to help enhance recovery efforts. If the study shows that active aggregation of abalone can form persistent spawning groups, then the Department may consider using these recovery techniques on a larger spatial scale to enhance recovery. These data will also

be useful to determine the effectiveness of aggregation in other species of abalone.

For more information, go to the Department's Marine Region website:
www.dfg.ca.gov/marine/invertebrate/abalone.asp

Red Sea Urchin

Statewide landings of red sea urchins in 2009 totaled 12.2 million pounds worth \$7.8 million (ex-vessel) to the fishermen. The red sea urchin fishery, which targets the spiny echinoderm for its roe, operates in two areas of the state: northern California between San Francisco and Cape Mendocino and southern California, from Point Conception south and at the Channel Islands. Southern California landings were 8.2 million pounds in 2009, and northern California landings jumped to four million pounds, well above the 10-year average of 2.8 million pounds.

The sea urchin fishery is managed by limiting fishing days during the summer months, a minimum size limit, a maximum of 300 permits and a logbook requirement to provide detailed catch and effort information. There are currently 305 sea urchin permits statewide, and 190 of the diver permittees were active in 2009. One of the primary causes of reduced landings during the past decade, appears to be declining market demand, particularly in the traditional Japanese market, rather than depressed stocks. Some sea urchin processors in southern California, where most of the divers operate, have put their divers on daily quotas in response to the decline in demand, which has been exacerbated by the global recession. The industry has had limited success in expanding their market domestically, and some processors believe that the domestic market is maximized.

The California Sea Urchin Commission (CSUC), originally funded by an assessment on sea urchin landings paid in equal shares by divers and processors, was launched in April 2004. The CSUC publishes newsletters, holds meetings, and has a system of port representatives to keep fishery participants informed of relevant news and activities. The organization held their required referendum vote in 2009, and the sea urchin processors withdrew from CSUC. CSUC has been dealing with several issues that will impact the fishery, including permit transferability and capacity goal, the expansion of the sea otter population along the Santa Barbara coast, and the establishment of additional marine protected areas (MPAs) in southern and northern California. The low price the divers are getting for sea urchins (currently 60 to 70 cents a pound) continues to be a major problem for the industry.

CSUC has continued to fund Dr. Steven Schroeter's sea urchin settlement studies that have resulted in a long-term database on sea urchin recruitment in northern and southern California. CSUC has also hired consultants to establish

a 'Barefoot Ecologist Program' for training commercial sea urchin divers to gather sea urchin size and density information in conjunction with their regular fishing activities. The goal is to gather data that will eventually be used in collaboration with Department collected fishery data.

For more information on sea urchins please see the following web site:
www.dfg.ca.gov/marine/invertebrate/seaurchin.asp

Pacific Salmon

The Pacific Fishery Management Council's (Council) Salmon Fishery Management Plan (FMP) was developed in 1977 and was the first FMP implemented by that regional fishery management entity. Each year, the Council develops management measures that establish fishing areas, season dates, harvest quotas, legal fishing gear, minimum size lengths, and possession and landing restrictions for salmon taken fisheries in federal waters off California, Oregon, and Washington. These measures must meet the goals of the FMP that address spawning escapement needs, allow for freshwater fisheries, and meet the needs of salmon species listed under the federal Endangered Species Act (ESA). Measures recommended by the Council must be approved and implemented by the Secretary of Commerce. In general, the State Commissions then consider modifications to regulations so that federal and state rules are consistent in all waters.

Ocean salmon fisheries harvest a mixture of stocks that can differ greatly in their respective abundance and productivity. Managers develop measures that selectively protect stocks of concern based on differences in life history and distribution by time and area of "strong" and "weak" stocks. The Commission, the Council, and the NMFS have implemented various protective regulations to reduce fishery impacts on populations of Sacramento River winter Chinook, Central Valley spring Chinook, and California coastal Chinook and coho. All of these stocks are listed under both federal and State ESAs

Of the five species of Pacific salmon found on the West Coast, Chinook and coho are most frequently encountered off California; however the retention of coho salmon has been prohibited in all California ocean fisheries since 1995.

In 2007, an estimated 87,940 Sacramento River Fall Chinook (SRFC) adults (ages three, four, and five) returned to spawn in the Sacramento River Basin. This escapement was below the annual conservation objective of 122,000-180,000 adult spawners required by the Council's Salmon FMP and is the third lowest on record. Fishery scientists forecasted a 2008 ocean abundance of 59,100 SRFC salmon adults. Even without any additional ocean or river fishing in 2008, the SRFC would not meet their FMP spawner goal and a Conservation Alert was triggered. In April 2008, the Council, National Marine Fisheries Service, and the Commission closed all commercial and recreational ocean

salmon fisheries in California due to this significant decline in Sacramento River Fall Chinook.

In late 2008, an estimated 64,456 SRFC adult (ages three, four, and five) salmon escaped to the Sacramento River Basin to spawn (the second lowest adult escapement on record). Fishery scientists forecasted a 2009 ocean abundance of 122,196 SRFC ocean adults and would allow for an almost negligible fishery. In early 2009 a multi-agency, multi-disciplinary scientific panel investigated over 40 potential environmental and physical causes for SRFC's decline and determined that the unusually poor ocean conditions in 2005 and 2006 resulted in very low survival of juvenile salmon entering the ocean. The panel also highlighted long-term poor river conditions as another major factor.

Ocean salmon fishing in 2009 consisted of a 10 day ocean sport fishery in California. Those 10 days were contained within the Klamath Fishery management Zone in the far north of the state to try to take advantage of returning Klamath Fall Chinook in the late summer. There was no commercial or other recreational ocean fishing opportunities in California in 2009.

In late 2009, an estimated 39,530 SRFC adult (ages three, four, and five) salmon escaped to the Sacramento River Basin to spawn (the lowest adult escapement on record). This was the third consecutive year that the escapement goal was missed for CV fall Chinook. Fishery scientists forecasted a 2010 ocean abundance of 245,483 SRFC ocean adults. While the 2009 ocean abundance forecast was slightly over the minimum escapement goal, the actual return was far less than that. This overestimation has sparked some concern among fishery scientists regarding the performance of the model as it applies to current conditions. As a result NMFS guidance stated that the 2010 ocean salmon season should be designed to target the upper portion of the goal escapement range of 122,000-180,000 adult spawners. The 2010 ocean salmon seasons for sport and commercial fisheries as set by the Council were designed to allow for a target escapement of 180,000 SRFC adult spawners as opposed to the 122,000 SRFC level of the past. An evaluation of the causes of the stock's failure to meet its conservation objective for a third consecutive year and the resulting report will be completed by March 2011.

For more information, including specific fishing opportunities, go to the Department's Marine Region website: www.dfg.ca.gov/marine/oceansalmon.asp

Market Squid

The California commercial market squid fishery began in the mid-1800s and has grown to be one of the state's premier fisheries. In 2009, market squid was the largest fishery in terms of volume and the most valuable fishery. Statewide, over 200 million pounds of market squid were landed in 2009 with an ex-vessel value of \$56.4 million. In 2008, the fishery landed 84 million pounds and was worth

\$26.4 million. From 1999 to 2008, the market squid fishery averaged \$20.7 million in value and 142.7 million pounds in landings. The average price per pound decreased from \$0.31 in 2008 to \$0.28 in 2009.

Traditionally, market squid are targeted at the end of their life span on spawning grounds adjacent to Monterey, the Channels Islands including Catalina, and the mainland coast south of Point Conception. Fishing usually takes place during the night, and market squid are located by light boat vessels using sonar and then aggregated near the surface using attractant lights. In the Monterey area, the fishery is most active during the summer months; whereas in southern California, the majority of market squid landings take place during winter months.

The presence of market squid is strongly correlated with environmental factors, such as water temperature and nutrient availability. Although the majority of landings usually occur in southern California, landings in Monterey have been unusually low since 2005. The decline in squid landings has been attributed to the cyclical nature of the market squid population and changes in environmental conditions. When squid are abundantly available the demand of the commercial market becomes the limiting factor.

Market squid is a federally monitored species and a state managed fishery. In 2005, the Commission adopted the Market Squid Fishery Management Plan (MSFMP), which implemented a series of fishery control rules. A harvest guideline, weekend closures, large-scale gear closure areas, light wattage and shielding requirements, and a limited entry program was also implemented under the MSFMP.

For more information on market squid, go to the Department's Marine Region website: www.dfg.ca.gov/marine/cpshms/marketsquid.asp

Pacific Sardine

The Pacific sardine has been a major component of California's commercial fisheries. The historic sardine fishery existed from the early 1900s, crashed in the 1940s, and saw resurgence in the late 1980s. In 2009, sardine was California's second largest fishery by volume and sixth in ex-vessel value. Statewide landings in 2009 were 82.8 million pounds with an ex-vessel value of approximately \$5.6 million. Landings occurred mainly in the San Pedro-Terminal Island and Monterey-Moss Landing port complexes. The 2009 California Coastal Pelagic Species limited entry fleet consisted of 65 permits; 35 of those permitted vessels landed sardine.

California's fleet is only part of the coast wide fleet targeting sardines. Both Oregon and Washington have fisheries active primarily off the Columbia River. The fishery is managed through a Fishery Management Plan (FMP) adopted by the Pacific Fishery Management Council (Council) through a quota system. In

2009, the coastwise quota of 147.5 million pounds was reached. This is the second time since its resurgence that the sardine quota had been achieved. To allow fishing access to the quota by all of the fleets in the west coast fishery, the Council allocated the quota in three time periods based on an annual (Jan 1 – Dec 31) management cycle. The 1st allocation lasted 51 days; markedly longer than the 2nd and 3rd allocations which lasted 17 and 9 days, respectively. Increased fishing efforts, such as vessels making multiple landings per day, were observed during all allocation periods. Fishing effort continued during weekends, a period normally not fished. The 2009 fishery behavior was characteristic of a “derby” style fishery, leading to a temporally shortened season. The Pacific sardine fishery was officially closed by NOAA Fisheries on September 23, 2008.

The Council adopted a HG of 158.8 million pounds for the 2010 Pacific sardine fishery. This quota also incorporates a set-aside allocated for dedicated Pacific sardine research consisting of a coast-wide aerial survey and simultaneous fishing in 2010.

For more information on Pacific sardine, go to the Department’s Marine Region website: www.dfg.ca.gov/marine/cpshms/pacificsardine.asp

Nearshore Finfish

Nineteen nearshore species are managed under California’s Nearshore Fishery Management Plan (NFMP) implemented in 2002; 17 are also jointly managed according to the federal Pacific Fishery Management Council’s (Council) Groundfish Fishery Management Plan. Rockfish species identified in the NFMP include black, blue, brown, calico, China, copper, gopher, grass, olive, quillback, and treefish rockfishes and are referred to as the minor nearshore rockfishes. The other species in the NFMP include cabezon, California scorpionfish, greenlings, California sheephead, and monkeyface prickleback; the latter two are exclusively state-managed.

The commercial fishery is generally regulated by a combination of allowable fishing depths, cumulative two-month trip limits, size restrictions for certain species, permit and gear restrictions, and season adjustments to prevent landings from exceeding specified harvest limits. Federally designated “overfished” groundfish species including bocaccio, canary, cowcod and yelloweye rockfishes are protected with very low harvest limits (bycatch only) while stocks rebuild (see Groundfish Management section), and these low harvest limits continue to constrain fishing opportunities for associated healthy nearshore species, especially in northern areas of the state. Final management measures depend on the adopted harvest limits and resulting allocations to fishery sectors. The Department, in conjunction with the Council, developed fishing regulations that maximize fishing opportunities as much as possible while continuing to conserve these “overfished” stocks.

Results of recent assessments are provided in Table 1. According to the NFMP, “healthy” stocks are those for which the estimated stock size is at or greater than 60 percent of an unfished stock size and “precautionary” stocks are those stocks for which the estimated stock size is at or above 30 percent of the unfished stock size.

Table 1. Current status of recently assessed nearshore stocks

Species	Most Recent Stock Assessment	Population Status
Cabazon	2009	Healthy
Black rockfish	2007	Healthy
Blue rockfish	2007	Precautionary
Gopher rockfish*	2005	Healthy
Ca scorpionfish*	2005	Healthy

Restricted Access Nearshore Fishery

Nearshore Fishery Permit

In 2003, the Commission adopted a regional restricted access program for the commercial nearshore fishery that affected the landings of ten nearshore species referred to as the shallow nearshore group. The group consists of: black-and-yellow, China, gopher, grass, and kelp rockfishes, kelp and rock greenling, California scorpionfish, California sheephead, and cabazon. Permit holders are allowed to land these nearshore species only for the region for which the permit is issued when fishing is permitted. A total statewide capacity goal of 61 permits was set to assure fishery sustainability; although many more permits were initially allowed.

Table 2. Nearshore Fishery Permits by Region

Region	Boundaries	Capacity Goal	Active Permits in 2009
North Coast	Oregon-California border south to 40°10' N latitude (near Cape Mendocino, Humboldt County)	14	8
North-Central Coast	40°10' to Point Año Nuevo (San Mateo County)	9	24
South-Central Coast	Point Año Nuevo to Point Conception (Santa Barbara County)	20	51
South Coast	Point Conception to the California-Mexico border	18	40
Total Permits		61	123

Deeper Nearshore Fishery Permit

Also in 2003, a deeper nearshore species fishery permit system was created with non-transferable permits that allowed the catching and landing of eight deeper

nearshore species of rockfishes on a statewide basis. It also capped the level of participation. These species include: black, blue, brown, calico, copper, olive, quillback, and treefish rockfishes. When the program began in 2003, a total of 292 permits were issued. By comparison, in 2009, that number decreased to 220 permits. Of these 220, only 88 could be considered “active”.

2009 Commercial Nearshore Landings

In 2009, 532,812 pounds of nearshore permit species were landed statewide generating an ex-vessel value of \$2.3 million. The 2009 total ex-vessel revenues generated by nearshore rockfish species, cabezon, greenlings, California sheephead and California scorpionfish are provided in Table 3. These relatively high ex-vessel amounts are due to the contribution of the lucrative live-fish component of the fishery. The nearshore live-fish fishery evolved from the demand for specialty foods in Asian restaurants and markets in southern California. What started out as an alternative fishery quickly expanded into a multimillion dollar industry by the early 1990s. In 2009, the nearshore live-fish component of the fishery accounted for 81 percent of all nearshore species landed.

Table 3. Ex-Vessel Revenue by Region for Nearshore Species Groups (2009)

Region	Nearshore Rockfishes	Cabazon, Greenlings	CA Sheephead	CA Scorpionfish	All Species
North Coast	\$408,141	\$18,496	\$0	\$0	\$426,637
North-Central Coast	\$265,043	\$45,937	\$0	\$0	\$310,980
South-Central Coast	\$861,142	\$136,140	\$2,813	\$0	\$1,000,096
South Coast	\$160,995	\$49,926	\$330,988	\$29,533	\$571,441
Total	\$1,695,321	\$250,499	\$333,801	\$29,533	\$2,309,154

For more information, go to the Department’s Marine Region website:
www.dfg.ca.gov/marine/groundfishcentral/index.asp

Groundfish

Approximately 92 species of bottom-dwelling marine fishes are included in the federal Groundfish Fishery Management Plan (FMP) implemented by the Pacific Fishery Management Council (Council) in 1982. Since then, these species have been managed under the joint jurisdiction of the state and the federal government. Species and species groups managed under the FMP include all rockfishes (about 60 species), sablefish, thornyheads, lingcod, Dover sole and selected other flatfishes (not including California halibut), Pacific whiting, and some sharks and skates.

The 2009 commercial groundfish landings for all gears in California totaled 22.6 million pounds with an ex-vessel value of \$19.9 million.

The recreational fishery harvest in California totaled 2.7 million pounds in 2009. Approximately 73 percent of the recreational groundfish catch for 2009 occurred north of Point Conception. Recreational fishing effort, especially north of Point Conception, is often severely constrained by depth restrictions in order to conserve federally designated “overfished” species like canary and yelloweye rockfishes which often occur in deeper water. The California Recreational Fisheries Survey (CRFS) begun in 2004, provides catch and effort estimates for marine recreational finfish fisheries.

“Overfished” federal groundfish species including bocaccio, canary, cowcod and yelloweye rockfishes are protected with very low harvest limits (bycatch only) while stocks rebuild. These low harvest limits for “overfished” species also constrain fishing opportunities for healthy fish stocks found in association with the “overfished” species. The commercial fishery is generally regulated by a combination of allowable fishing depths, trip limits, permit and gear restrictions, and season adjustments to prevent landings from exceeding harvest limits. The recreational fishery is regulated using daily bag limits, seasons, area closures, size, gear, and depth restrictions. Depth-based Rockfish Conservation Areas (RCAs) implemented in 2003 continue to be used to protect species of concern by closing their primary depth range to groundfish fishing. The RCA closures are expected to remain in place until “overfished” stocks are rebuilt or a better management approach is adopted. The RCA depth boundaries have been modified to accommodate healthy fisheries as much as possible and change throughout the year to increase or restrict access as needed. Enforcement of the RCAs has been enhanced by the federal requirement of electronic Vessel Monitoring Systems to be on board all commercial fishing vessels with federal Limited Entry permits or open access vessels that fish in federal waters (farther than three miles from shore).

Additional tools are currently being developed and implemented through the Council process to enhance groundfish fisheries management. The Council is nearing completion of the development of a program (Trawl Rationalization) which will assign individual quotas (IQ) for target species and species complexes to individual trawl permits. The Trawl IQ program will move the fleet toward greater accountability for fishing behavior while reducing discards and overall by-catch in the trawl fleet.

For more information, go to the Department’s Marine Region website:
www.dfg.ca.gov/marine/groundfishcentral/index.asp

California Halibut

California halibut is an important flatfish species to commercial and recreational fisheries in central and southern California. Individual fish can grow to 5 feet in total length and weigh as much as 72 pounds. A size limit of 22 inches total length has been in effect for the commercial fishery since 1979. From 1999 to 2009, total annual commercial landings ranged from a high of 1.31 million pounds in 1999 to a low of 389,300 pounds in 2007 and averaged 814,600 pounds. During this same period, annual ex-vessel value ranged from a high of \$3.28 million in 1999 to a low of \$1.84 million in 2007. In 2009 commercial landings totaled approximately 615,500 pounds with an ex-vessel value of \$2.57 million. The top two port complexes, by pounds landed for all gear types combined, were San Francisco (52 percent) and Santa Barbara (36 percent).

California halibut are harvested using three primary commercial gears: trawl, hook-and-line, and set gill net; together these comprised 97 percent of 2009 halibut landings. Trawl was the dominant commercial gear used to harvest halibut in 2009, accounting for 50 percent of the total catch. Hook-and-line was the second most dominant commercial gear, accounting for 28 percent of the total catch. The remainder, 19 percent of the total catch, was taken by set gill nets.

From 1999 to 2009, annual recreational California halibut landings ranged from a high of 1.84 million pounds in 2003 to a low of 291,000 pounds in 2007, and averaged 920,000 pounds annually; this exceeded the average annual landings of the commercial fishery during the same period. Preliminary data for the 2009 recreational fishery showed an estimated 928,400 pounds of California halibut landed. Recreational anglers target California halibut from shore, private skiffs, and party boats (CPFVs) using hook-and-line gear. Similar to the commercial fishery, a recreational fishing regulation established in 1971 requires a minimum size of 22 inches total length for retention. Each recreational angler is limited to five California halibut per day south of Point Sur (Monterey County) and three California halibut per day north of Point Sur.

In 2009, the Department sampled a total of 1,040 California halibut (928 from the commercial fishery and 112 from the recreational fishery) in San Francisco/Half Moon Bay, Monterey, Santa Barbara, and Los Angeles port areas. Lengths and weights were recorded, and, if possible, sex was determined and otoliths were extracted for subsequent ageing. California halibut are also sampled routinely in the recreational fishery by the California Recreational Fisheries Survey (CRFS).

In September 2009, the Department concluded an 8-month (June-September 2008 and 2009) hooking mortality study of California halibut in San Francisco Bay. The goal of the survey was to investigate the impact, if any, of hook-and-line gear on released sub-legal sized California halibut. All fish were caught by Department staff, assessed for condition, measured, and hook location was

noted. Select California halibut were retained for observation at the San Francisco Aquarium of the Bay to monitor the effects of hooking. During the two study seasons, 88 California halibut and 81 other fish were caught. Final analysis of the data is pending.

The Department has entered into a contract with a stock assessment expert to conduct the first ever statewide stock assessment of California halibut. Data compilation began in January 2009. The results are due in November 2010 and will provide the Department with an important measure of the status of the California halibut resource to assist in the evaluation of current management.

For more information on California halibut, go to the SFMP website:
www.dfg.ca.gov/marine/sfmp/index.asp

Pacific Hagfish

The Pacific hagfish is a member of the Myxiniidae (hagfishes) family. Members of this family have mucous-producing “slime” glands along each side of the fish’s body. When agitated, the hagfish will produce a protein-based mucous that, when mixed with water, produces a thick, viscous slime. This behavior is the reason hagfish are commonly called “slime eel”.

Pacific hagfish are the target of a robust, statewide re-emergent fishery. Prior to 1982, hagfish were not landed or targeted by California fishermen and were considered only a nuisance due to their tendency to eat bait or destroy catches such as netted sharks and hooked deep-water rockfish. Hagfish can burrow into a trapped- or long-lined-hooked fish, eat the internal organs and, if time allows, the rest of the fish.

In 1982 in Korean waters, a fishery for two related hagfish species was receiving heavy fishing pressure; the hagfish were being pursued for food and an “eel skin” leather trade. In the mid 1980’s, due to fishery depletion, Korean hagfish processors began to look for outside sources of hagfish. By late 1987, Korean processors began to solicit California fishermen, mostly from the San Francisco and Monterey port areas, to target hagfish. After one year of fishing, eight vessels had landed 690,000 pounds. The hagfish were frozen and shipped to Korea for processing.

Shortly thereafter, interest in hagfish increased and California fishing activity surged. In 1989, statewide landings reached 2.6 million pounds from 80 participating vessels. The ports with the greatest activity were Ventura, Santa Barbara, Oxnard, and San Francisco. Landings reached the highest on record in 1990 with 5.0 million pounds from 56 participating vessels. Ironically, during this time, Korean interest in hagfish from California declined along with ex-vessel price. During the 1990 fishing season, skins of hagfish from California became less desirable due to holes from bites from other hagfish and unexplained

pinholes commonly occurring in the dorsal part of the skin. During the curing process, these holes and bite marks would stretch and make the “leather” piece unusable. Hagfish demand decreased in 1991, and total catch fell to 300,000 pounds. Between 1992 and 2004, annual landings ranged from zero to 404,000 pounds and averaged 68,000 pounds.

Fishing effort and landings increased again in 2005 due to a renewed interest in Pacific hagfish from California. The species was sought primarily for human consumption in Asia, mostly in Korea. Most hagfish were caught and sold live to local fish receivers, and this practice continues today.

There is no recreational fishery for hagfish. The commercial hagfish fishery is one of the few remaining open access fisheries in California, and there is no closed season. In 2009, 51 vessels made at least one landing, although in any given month only from 10 to 27 (average 21) vessels made at least one landing. Many vessels participate in other seasonal fisheries and during periods of closure rely on hagfish.

Little is known about the status or biomass of Pacific hagfish stocks. Based on landings from the first surge of fishing activity from 1989 to 1991 and the current pulse, which began in 2007, the biomass must be large. In an effort to monitor the fishery, particularly changes in average size of landed fish, the Department actively samples hagfish from San Pedro and Morro Bay. Due to the physical impossibility of measuring the length of individual hagfish in a live condition, staff use a count-per-pound method to monitor changes in average size of harvested hagfish.

For more information on Pacific hagfish, go to the SFMP website:
www.dfg.ca.gov/marine/sfmp/index.asp

Ocean Management and Data Program

Marine Life Protection Act (MLPA) Process

The MLPA, passed in 1999, requires the Department to develop a master plan for Marine Protected Areas (MPAs) in California that includes information on specific site recommendations, implementation and phasing, funding, monitoring, enforcement and management. The MLPA contains specific goals for MPAs including, but not limited to, ecosystem protection, protecting representative habitats, helping sustain marine populations, improving the existing array of MPAs, and ensuring that the new system functions, to the extent possible, as a network.

The MLPA Initiative (Initiative) began in August 2004. It is a comprehensive process, funded by a public/private partnership, which is taking a regional

approach to the implementation of the MLPA. The Initiative process includes the following primary entities:

- Blue Ribbon Task Force (BRTF), appointed by the Secretary for California Natural Resources Agency, which provides guidance and oversight;
- Science Advisory Team (SAT), appointed by the Director of Fish and Game, which provides scientific advice to the BRTF, Regional Stakeholder Group, and California Fish and Game Commission (Commission) in developing alternative MPA proposals;
- Regional Stakeholder Group (RSG), appointed by the chair of the BRTF and the Department Director, with the primary objectives of:
 - developing regional goals and objectives for a network component of MPAs;
 - developing MPA-specific objectives;
 - reviewing existing MPAs relative to goals and objectives; and
 - developing alternative MPA proposals as required by the MLPA;
- Statewide Interests Group (SIG) is composed of members from key interest groups from around the state with a willingness and capacity to communicate with as broad a constituency as possible. The SIG provides a forum for enhanced communication between the BRTF and stakeholders regarding implementation of the MLPA Initiative;
- Department staff, who provide biological and fisheries management expertise, scientific input, policy advice, review alternative MPA proposals for enforcement feasibility and function, engage in public outreach, manage scientific collecting permits, coordinate the California Environmental Quality Act and regulatory processes, conduct scientific monitoring and sequential assessment and review of MPA efficacy, and other informational and staffing needs; and
- MLPA Initiative staff and contractors, who provide professional facilitation at meetings, a geographical information system data base for informational needs and mapping, contracted research, review of all documents, and other critical process needs.

Regional Planning Updates

Central Coast Study Region (CCSR):

MPAs in the CCSR, which encompasses state waters from Point Conception (Santa Barbara County) to Pigeon Point (San Mateo County), became effective in September 2007.

North Central Coast Study Region (NCCSR):

MPA planning for the NCCSR, which spans state waters from Pigeon Point (San Mateo County) to Alder Creek (Mendocino County), began in 2007. The North Central Coast Regional Stakeholder Group (NCCRSG) was convened in April

2007 and finished three final MPA proposals in March 2008 that were forwarded to the BRTF. The BRTF created a fourth proposal known as the Integrated Preferred Alternative (IPA) based on key components from each of the three final NCCRSR proposals. The BRTF IPA was unanimously selected as the preferred alternative MPA proposal to be submitted to the Commission in April 2008. The Commission adopted the IPA as its preferred alternative proposal for the regulatory process on August 5, 2009 and regulations will become effective on May 1, 2010. Through a partnership between the Department and the MPA Monitoring Enterprise, a monitoring plan for MPAs in the NCCSR was developed. The plan was recently adopted as an appendix to the master plan for MPAs by the Commission on April 7, 2010.

South Coast Study Region (SCSR):

MPA planning for the SCSR, which encompasses state waters from Point Conception (Santa Barbara County) to the U.S./Mexico border, began in June 2008 with a series of informational public workshops. The South Coast Regional Stakeholder Group (SCRSG) convened in October 2008 and finished three final MPA proposals in September 2009 that were forwarded to the BRTF. The BRTF completed an IPA by integrating, and in some cases modifying, MPAs from each of the three final SCRSG proposals. In November 2009, the BRTF voted to recommend that the Commission select the IPA as the regulatory preferred alternative for the SCSR. The Commission received the BRTF IPA on December 9, 2009 and directed the Department to prepare the regulatory package including CEQA process using the IPA as their preferred alternative.

North Coast Study Region (NCSR):

Beginning in July 2009, the MLPA Initiative held a series of workshops in the NCSR, which spans state waters from Alder Creek (Mendocino County) to the California/Oregon border, to inform stakeholders and the public about the MLPA process in the NCSR. This is the fourth of five study regions to undergo the MLPA planning process. Appointments of the north coast SAT members made by the Department Director were announced on October 27 and the north coast SAT held their first meeting on October 30, 2009 which was a joint meeting with the south coast SAT. Appointments of the north coast BRTF members made by the Secretary of the California Natural Resources Agency were announced on November 17 and the north coast BRTF held their first meeting on November 18-19, 2009. Selection of stakeholders for the North Coast Regional Stakeholder Group (NCRSG) by the chair of the BRTF and the Department Director was announced on January 29, 2010. As was done in past study regions, the NCRSG will be developing alternative MPA proposals for the NCSR. The SAT, Department, and State Parks will evaluate these proposals relative to how well they meet scientific guidelines developed by the SAT and follow Department and State Parks feasibility criteria, as well as their ability to meet the MLPA goals and objectives. An iterative MPA proposal process will continue through

approximately August 2010. The BRTF will consider the proposals, their evaluations, and potential socioeconomic impacts and select a preferred alternative in approximately October 2010. The BRTF will then forward the final proposals and their recommendation for a preferred alternative to the Commission in approximately December 2010, which will initiate the Commission's formal regulatory process with additional opportunities for public input.

Implementation

The Department continues to identify and address complex and costly challenges for full implementation of the coastwide network of MPAs, such as conducting scientific monitoring and sequential assessment and review of MPA efficacy, ensuring adequate enforcement, engaging in public outreach, and managing scientific collecting permits. Utilizing existing public-private partnerships and developing new partnerships is a focus for successful long term management. For example, recognizing the need for scientific monitoring of the statewide network of MPAs, a collaborative baseline data collection project was carried out during the spring and summer of 2008 to help inform future evaluation and management of the MPA network. Other partnerships have been established or are being developed to inform and enhance public awareness as management challenges in conducting effective public outreach, education, and enforcement are identified. Such mutually beneficial partnerships include many federal and state agencies such as the National Marine Sanctuaries, the California Department of Parks and Recreation (State Parks), the Monitoring Enterprise, academic and non-government organizations such as Resources Legacy Fund Foundation, Partnership for Interdisciplinary Studies of Coastal Oceans and Reef Check.

For more information, go to the Department's MLPA website:
www.dfg.ca.gov/mlpa.

California Recreational Fisheries Survey

The California Recreational Fisheries Survey (CRFS) began in January 2004 in order to provide timely and accurate recreational angling catch and effort (number of fishing trips) estimates to manage California's marine recreational finfish fisheries on a sustainable basis. CRFS is a joint effort between the Department and the Pacific States Marine Fisheries Commission (PSMFC) with funding from state and federal sources.

CRFS conducts research to obtain essential fishery information for all marine fisheries managed by the state as required by the Marine Life Management Act. CRFS at-sea, dockside, and telephone surveys gather marine recreational fishery data on fishing catch and effort to generate monthly estimates of total catch by species for six geographic districts along California's coast. The

program provides information on where and when fish were caught and whether they were kept or released. State and federal fishery managers can track catch and make in-season responses if catches are projected to be higher or lower than expected before the end of the fishery year. Managers examine catch rates, average fish lengths and weights and other fishery information collected by CRFS to monitor changes in the fisheries. CRFS data are used to help determine if catch or season limits need to be changed.

The CRFS protocol consists of a multi-part survey combining field sampling and telephone surveys. The field sampling is conducted during daylight hours at publicly-accessible sites. Samplers intercept anglers upon the completion of fishing activity at beaches, piers, jetties, onboard commercial passenger fishing vessels, and at public launch ramps. Samplers conduct a voluntary interview with intercepted anglers about fishing activities and catch, and obtain biological catch information. Samplers cannot sample angling effort that occurs at night or from boats that depart from and return to private marinas. For these areas where field sampling cannot be conducted, a telephone survey of licensed anglers is used to obtain fishing effort information. A different telephone survey is conducted to obtain commercial passenger fishing vessel effort information. The field sampling, angler telephone survey, commercial passenger fishing vessel telephone survey, and information on sport fishing license sales are combined to estimate total recreational fishing effort and catch.

In 2009, approximately 40 samplers were employed statewide to gather recreational fishing effort and catch data. The CRFS samplers interviewed more than 66,000 anglers at more than 400 sites, and examined almost 207,000 fish. The licensed angler telephone survey completed 26,000 interviews in 2009.

Anglers took an estimated 4.7 million trips to fish for marine fish in California in 2009. Fifty-eight percent of those trips were taken by anglers fishing in San Diego, Orange, and Los Angeles counties, eight percent by anglers in Ventura and Santa Barbara counties, and thirty-three percent by anglers north of Point Conception to the Oregon border. The five fishes most commonly taken by anglers from San Diego, Orange and Los Angeles counties included: Pacific mackerel, Pacific sardine, Pacific sanddab, white croaker, and yellowfin croaker.

In 2008, the CRFS program began two pilot studies to verify the estimates of: 1) fishing effort by anglers who depart from private-access sites such as marinas, and 2) catch by anglers who fish from boats that depart from and return to private-access sites compared to the catch by anglers who depart from public-access sites such as launch ramps. The pilot studies were profiled in a recent Outdoor California article "Fishing for Data."

The Marina Study's goal was to test the accuracy of phone survey results for private and rental boats returning to private-access sites. Samplers stationed at entrances to seven marina sites in San Diego, Orange and Los Angeles counties

counted the number of returning boats and counted the number of anglers. The data were expanded to the entire population of marinas within those counties and monthly estimates of fishing effort were generated and compared to estimates generated by the licensed angler telephone survey. Analysis showed that both methods produce similar estimates of fishing effort in southern California, but the field survey is more costly to conduct.

The Saltwater Angler Logbook Study is a comparison of the fishing activities of boating anglers in southern California who depart from public-access sites with the fishing activities of anglers who depart from private-access sites. The goal is to compare fishing effort, and catch and discard rates by species between the two populations of anglers. More than 1,000 volunteer participants provided information for almost 4,000 trips. Analysis is underway at this time. Early results indicate that anglers who depart from private-access sites use bigger boats, carry more anglers and spend more time at sea for each trip.

For more information on the CRFS program, please visit the Department's Marine Region website: www.dfg.ca.gov/marine/crfs.asp