California Department of Fish and Game
Agency Report
to the
Technical Subcommittee
of the
Canada-United States Groundfish Committee

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A. AGENCY OVERVIEW

Within the California Department of Fish and Game (CDFG), the Marine Region is responsible for protecting and managing California's marine resources under the authority of laws and regulations created by the State Legislature, the California Fish and Game Commission (CFGC) and the Pacific Fishery Management Council (Council). The Marine Region is unique in the CDFG because of its dual responsibility for both policy and operational issues within the State's marine jurisdiction (0 – 3 miles). It was created to improve marine resources management by incorporating fisheries and habitat programs, environmental review and water quality monitoring into a single organizational unit. In addition, it was specifically designed to be more effective, inclusive, comprehensive and collaborative in marine management activities.

The Marine Region has adopted a management approach that takes a broad perspective relative to resource issues and problems. This ecosystem approach considers the values of entire biological communities and habitats, as well as the needs of the public, while ensuring a healthy marine environment. The Marine Region employs approximately 200 permanent and seasonal staff that provide technical expertise and policy recommendations to the CDFG, CFGC, Council, and other agencies or entities involved with the management, protection, and utilization of finfish, shellfish, invertebrates, and plants in California's ocean waters.

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B. MULTISPECIES STUDIES

1. Research and Monitoring

(a) *Commercial Fishery Monitoring*

Statistical and biological data from landings are continually collected and routinely analyzed by CDFG staff to provide current information on groundfish fisheries and the status of the stocks. California's primary commercial landings database is housed in CDFG's Commercial Fisheries Information System. Outside funding also enables California fishery data to be routinely incorporated into regional databases such as Pacific Coast Fisheries Information Network (http://www.psmfc.org/pacfin).

Commercial sampling occurs at local fish markets where samplers determine species composition of the different market categories, measure and weigh fish and take otoliths for future ageing. Market categories listed on the landing receipt may be single species (e.g., bocaccio) or species groups (e.g., group slope rockfish). Samplers need to determine the species composition so that landings of market categories can be split into individual species for management purposes.

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Table 1. Commercial groundfish landings and samples taken in 2010.

Common Name	Metric tons	Len	Oto	Common Name	Metric tons	Len	Oto
Flatfish:				Flatfish:			
Dover sole	2622	1192	348	Hornyhead turbot	5	159	--
Petrale sole	213	2011	3	Rock sole	2	--	--
Arrowtooth flounder	68	337	--	Pacific sanddab	0	1078	30
Rex sole	55	1542	1	Fantail sole	0	30	--
English sole	24	944	10	Curlfin sole	--	46	--
Starry flounder	13	193	--	Slender sole	--	19	--
Sand sole	8	112	--	CO turbot	--	1	--
Rockfish:				Rockfish:			
Chilipepper rockfish	342	1481	450	Redbanded rockfish	1	319	--
Blackgill rockfish	95	1284	133	Unspecified rockfish	0	--	--
Group slope rockfish	78	--	--	Canary rockfish	0	57	5
Splitnose rockfish	64	999	33	Aurora rockfish	0	942	30
Black rockfish	53	174	--	Speckled rockfish	0	170	--
Gopher rockfish	28	625	15	Shortbelly rockfish	0	148	--
Brown rockfish	27	465	--	Rosy rockfish	0	24	--
Darkblotched rockfish	17	1097	238	Flag rockfish	0	17	--
Grass rockfish	12	358	1	Greenblotched rockfish	0	12	2
Vermilion rockfish	12	147	4	Squarespot rockfish	0	22	--
Black-and-yellow rockfish	11	300	--	Pacific ocean perch	0	47	--
Widow rockfish	10	311	100	Group bolina rockfish	0	--	--
Bank rockfish	7	274	50	Cowcod	0	--	--
Bocaccio	4	68	16	Greenstriped rockfish	0	21	--
California scorpionfish	3	--	--	Group gopher rockfish	0	--	--
Blue rockfish	3	95	--	Group nearshore rockfish	0	--	--
Copper rockfish	3	83	--	Group rosefish rockfish	0	--	--
China rockfish	2	129	1	Honeycomb rockfish	0	--	--
Treefish	2	69	--	Group small rockfish	0	--	--
Group shelf rockfish	1	--	--	Yelloweye rockfish	0	--	--
Yellowtail rockfish	1	7	4	Rosethorn rockfish	0	3	2
Kelp rockfish	1	44	--	Calico rockfish	0	--	--
Quillback rockfish	1	16	--	Pinkrose rockfish	0	--	--
Greenspotted rockfish	1	294	1	Rougheye rockfish	--	121	28
Starry rockfish	1	21	--	Shortraker rockfish	--	8	--
Group red rockfish	1	--	--	Stripetail rockfish	--	2	--
Olive rockfish	1	9	--	Tiger rockfish	--	1	--
Skates:				Skates:			
Longnose skate	141	638	--	Sandpaper skate	--	9	--

Common Name	Metric tons	Len	Oto	Common Name	Metric tons	Len	Oto
Skates:				Skates:			
Unspecified skate	23	--	--	California skate	--	1	--
Big skate	1	8	--				
Round fish:				Roundfish:			
Sablefish	2449	4933	--	Lingcod	47	375	--
Pacific whiting	2427	448	--	California sheephead	31	11	--
Longspine thornyhead	552	4502	--	Cabezon	23	280	--
Shortspine thornyhead	462	2856	--	Unspecified thornyheads	13	--	--
California halibut	236	3	--	Kelp greenling	2	--	--
Unspecified grenadier	95	--	--	Spotted ratfish	0	8	--
Pacific grenadier	--	331	--	Rock greenling	0	1	--
Sharks:				Sharks:			
Spiny dogfish	6	--	--	Soupfin shark	3	--	--
Leopard shark	3	--	--				

Source: Commercial Fisheries Information System (landings) and California Cooperative Groundfish Survey (sample data).

(b) *Recreational Fishery Monitoring*

The California Recreational Fisheries Survey (CRFS) began in January 2004 to provide catch and effort estimates for marine recreational finfish fisheries. The CRFS generates monthly estimates of total recreational catch for four modes of fishing (beach/bank and shore, piers and jetties, commercial passenger fishing vessels (CPFVs), and private vessels launched from public launch ramps) for six geographic districts along California's 1000 plus miles of coast. The data are used by state and federal regulators to craft regulations to protect fish stocks and provide recreational fishing opportunities. The sampling data and estimates are available on the Recreational Fisheries Information Network (http://www.recfin.org).

The CRFS is a multi-part survey which uses field sampling and telephone surveys. Each year the CRFS samplers interview more than 60,000 anglers at more than 500 sites, and examine approximately 200,000 fish. The licensed angler telephone survey completes about 26,000 interviews annually. The telephone survey is contracted and is not done by CDFG staff. The high sampling levels have contributed to greater accuracy and precision in estimating catch and effort, especially for overfished species such as yelloweye rockfish.

As a condition of their fishing permit, operators of CPFVs are required to submit a record of their fishing activities on a log provided by the CDFG. The operators must complete and submit a log of each fishing trip. Each log documents the target species, the fishing method, the type of bait, the number and type of fish landed or released, the number of anglers and hours fished, and the location where most of the fish were caught. In 2010, 28,700 logs were received by CDFG and processed. The database is maintained in CDFG's Commercial Fisheries Information System.

In 2011, CRFS began using the mandatory CPFV logs along with a field validation survey to estimate CPFV effort. A voluntary telephone survey was used to estimate CPFV effort prior to 2011. Catch rates are based on a field survey which consists of onboard and dockside sampling of CPFV trips.

For additional information, go to http://www.dfg.ca.gov/marine/crfs.asp.

Contributed by Connie Ryan (cryan@dfg.ca.gov)

(c) *Inseason Monitoring*

Commercial fishery

The CFGC has authority under state law to manage nearshore species (as defined by the state's Marine Life Management Act and the Nearshore Fisheries Management Act). The CFGC has given CDFG the authority to take action as a routine management measure to close the recreational and/or commercial sectors of the cabezon, California sheephead, and greenling fisheries upon projected attainment of their respective established optimum yields and fishery allocations. The CDFG also has authority to make inseason trip limit adjustments to the commercial fisheries for cabezon, California sheephead and greenlings. In 2009 and 2010, the CDFG closed the commercial greenling fishery early (September 1 and November 1, respectively) as it has for the past seven years. Commercial cabezon trip limits were not changed inseason in 2009 and 2010. Previously, trip limits were reduced in period 5 (September-October) in order for the fishery to remain open year round. Currently, inseason monitoring is used to track landings against statewide total allowable catches, statewide and/or regional allocations and trip limits.

Inseason monitoring of California commercial nearshore species landings is now conducted by CDFG biologists in the areas north and south of 40°10' North Latitude near Cape Mendocino. This work is done in conjunction with inseason monitoring, management and regulatory tasks conducted by the Council. Weekly tallies of landing receipts are used for inseason monitoring. At present, inseason monitoring focuses on overfished species such as cowcod and yelloweye rockfish.

Recreational fishery

The CDFG has additional authority to take inseason action to modify management measures or close the recreational fishery for groundfish if harvests are projected to exceed or be well below federally-established harvest guidelines. Inseason monitoring of California recreational groundfish species catch is conducted by CDFG biologists utilizing a mathematical model that includes projected catch based on previous years' data as well as current catch rates obtained weekly from CRFS staff. In July 2009, the inseason monitoring of yelloweye rockfish, a species that significantly constrains the recreational catch of all rockfish, became available online to the public at http://www.dfg.ca.gov/marine/groundfishcentral/tracking.asp.

In May 2008, the CDFG took inseason emergency action to restrict fishing depth to less than 20 fathoms in the Northern and North-Central Groundfish Management Areas (California/Oregon border to Pigeon Point) for the recreational fishery to protect overfished rockfish species (canary and yelloweye rockfishes). The CDFG did not implement proposed Yelloweye Rockfish Conservation Areas, despite the Council's recommendation, because it was uncertain that the savings (catch reduction) would benefit the fishery.

In August 2008, the CDFG again took inseason emergency action to split the North-Central Groundfish Management Area at Point Arena into the North-Central North of Point Arena and the North-Central South of Point Arena Groundfish Management Areas (Figure 1). Additionally the North-Central North of Point Arena Groundfish Management Area was closed to groundfish fishing for the remainder of the year. This was done to ensure that California did not exceed its recreational catch of yelloweye rockfish. At the time the emergency action was taken the state had already caught 62 percent of the allowable catch of yelloweye rockfish, with 84 percent taken above Point Arena. Closing the area north of Point Arena allowed the remaining areas to remain open through the end of the season and the yelloweye rockfish allowable catch was not exceeded. Along with this, the emergency action extended the 20 fathom depth closure that was due to expire based on the May 2008 emergency action.

In January 2009, the CFGC adopted regulations for the 2009-2010 recreational groundfish fishery to make them consistent with proposed federal regulations. The changes included:

- Modify the season for the Northern Groundfish Management Area from May 1 through December 31 to May 15 through September 15, and make permanent the 20 fathom depth closure.
- Modify the season for the North-Central North of Point Arena Groundfish Management Area from June 1 through November 30 to May 15 through August 15 and make permanent the 20 fathom depth closure.
- Maintain the season for the North-Central South of Point Arena Groundfish Management Area from June 1 through November 30 and the depth closure at 30 fathoms.
- Modify the season for the Monterey South-Central Groundfish Management Area from May 1 through November 30 to May 1 through November 15.
- Modify the season for the Morro Bay South-Central Groundfish Management Area from May 1 through November 30 to May 1 through November 15.
- Increase the cabezon bag limit from one fish to two within the RCG 10-fish bag limit.
- Prohibit the take of bronzespotted rockfish.
- Increase the bocaccio bag limit from one fish to two within RCG 10-fish bag limit, except in the Cowcod Conservation Area where the bag limit would remain zero (no take).
- Allow the take of leopard shark in several enclosed bays statewide year round and in all depths.

- Remove the gear restrictions for Pacific sanddabs and “other flatfish” and increase the season to year round.

Figure 1. Recreational groundfish management areas, August 2008 through December 2010. Prior to August 2008, the North-Central North of Point Arena and the North-Central South of Point Arena were combined and called the North-Central Region.

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(d) *Study on the Effects of Allowing Limited Entry Trawl Permit Holders to Fish Fixed Gear*

A study was conducted by the Nature Conservancy with cooperation from the Central Coast Groundfish Project, a private organization, to determine viability of a

cooperatively managed community fishing association employing limited entry trawl permittees and using longline, trap, and hook and line gear under shared aggregate catch limits for both target and bycatch species. The study also looked at combining quota shares for overfished species and participants agreed to monitor activity jointly and to take collective action if necessary to limit the take of overfished species. The results of the two-year study revealed that the biggest economic factor was the cost of observer coverage. The community fishing association shared observers to help reduce costs. The study also showed that community fishing association members can work together to monitor the group's take of target and bycatch species to keep within aggregate catch limits, which, given the low catch limits for overfished species, can reduce the risk of having to stop fishing if a high number of overfished species are caught in one set. The results were presented to the Council prior to the adoption of the trawl rationalization program (individual quota program). The final report can be accessed at: http://www.pcouncil.org/resources/archives/briefing-books/september-2010-briefing-book-2/#groundfish.

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2. Management

(a) *2010 State Management Measures Affecting Groundfish*
Since 2007, commercial fishery management has remained basically the same. Recreational fishery management, on the other hand, has experienced many changes including increasing the number of groundfish management areas from five to seven and adding more species-specific regulations (e.g., leopard shark and Pacific sanddab) in order to maximize fishing opportunities while limiting the catch of "overfished" cowcod, bocaccio, canary, darkblotched, widow and yelloweye rockfishes. As a result the only groundfish fishery, recreational or commercial, to close early in 2010 was the commercial greenling fishery.

- Commercial measures:
  - The boundaries of the trawl rockfish conservation area (RCA) closure north of 40°10' North Latitude near Cape Mendocino remained at 75 – 200 fathoms for two-month management periods 1, 2, 3, 5 and 6;, 100 – 200 fathoms during period 4. In periods 1 and 6, the RCA lines were modified to exclude certain petrale sole areas from the RCA.
  - The boundaries of the trawl RCA closure south of the remained at 100 – 150 fathoms year-round, with a closure of the shoreline – 150 fm around the offshore islands south of Point Conception.
  - The boundaries of the non-trawl RCA closure north of 40°10' North Latitude remained at 20 – 100 fathoms year round.
  - The boundaries of the non-trawl RCA closure south of 40°10' North Latitude remained at 30 – 150 fathoms between 40°10' North Latitude and Pt. Conception, and 60 – 150 fathoms south of Pt. Conception, including the offshore islands, year round.

- The season lengths for groundfish in waters off California remained the same as in previous years.

- Recreational measures for groundfish including rockfish, cabezon, and greenlings (RCG complex); lingcod; leopard shark; Pacific sanddab and "other flatfish"; other federal groundfish; and associated state-managed species (rock greenlings, California sheephead, and ocean whitefish) included season length and depth/area closures:
  - Northern Groundfish Management Area (Oregon border to 40°10' North Latitude, see Figure 1):
    - Season length: Open May 15 through September 15. Lingcod is open May 15 through Sept 15. Leopard shark within Humboldt Bay is open year round; outside of Humboldt Bay the same season as other species applies. Pacific sanddab and "other flatfish" are open year round. Divers and shore-based anglers are open year round for all species except lingcod which is open April 1 through November 30.
    - Depth restrictions: Fishing allowed shoreward of the 20 fathom contour line, except for Pacific sanddab and "other flatfish" which have no depth restrictions. No depth restrictions for leopard shark within Humboldt Bay; outside the bays the same 20 fathom restriction applies.
  - North-Central North of Point Arena Groundfish Management Area (40°10' North Latitude to Point Arena, see Figure 1):
    - Season length: Open May 15 through August 15. Pacific sanddabs and "other flatfish" are open year round. Divers and shore-based anglers are open year round for all species except lingcod which is open April 1 through November 30.
    - Depth restrictions: Fishing allowed shoreward of the 20 fathom contour line, except for Pacific sanddab and "other flatfish" which have no depth restrictions.
  - North-Central South of Point Arena Groundfish Management Area (Point Arena to Pigeon Point, see Figure 1):
    - Season length: Open June 13 through October 31. Pacific sanddabs and "other flatfish" are open year round. Leopard shark is open year round within the following areas: San Francisco Bay, Bodega Harbor, Tomales Bay, Bolinas Bay and Drake's Estero Bay; outside these areas the same season as other species applies. Divers and shore-based anglers are open year round for all species except lingcod which is open April 1 through November 30.
    - Depth restrictions: Fishing allowed shoreward of the 20 fathom contour line, except for Pacific sanddab and "other flatfish" which have no depth restrictions. Leopard shark has no depth restrictions within the bays mentioned above; outside the bays the same 20 fathom restriction applies.
  - Monterey South-Central Groundfish Management Area (Pigeon Point to Lopez Point, see Figure 1):
    - Season length: Open May 1 through November 15. Leopard shark is open year round within Elkhorn Slough, outside the same season as other

species applies. Pacific sanddab and “other flatfish” are open year round. Divers and shore-based anglers are open year round for all species except lingcod which is open April 1 through November 30.

- Depth restrictions: Fishing allowed shoreward of the 40 fathom contour line except for Pacific sanddabs and “other flatfish” which have no depth restrictions. Leopard shark has no depth restrictions within Elkhorn Slough; outside the same 40 fathom restriction applies.

o Morro Bay South-Central Groundfish Management Area (Lopez Point to Point Conception, see Figure 1):

- Season length: Open May 1 through November 15. Lingcod is open May 1 through November 15. Pacific sanddab and “other flatfish” are open year round. Divers and shore-based anglers are open year round for all species except lingcod which is open April 1 through November 30.
- Depth restrictions: Fishing allowed shoreward of the 40 fathom contour line except for Pacific sanddabs and “other flatfish” which have no depth restrictions.

o Southern Groundfish Management Area (Point Conception to U.S./Mexico border, see Figure 1):

- Season length: Open March 1 through December 31. Lingcod is open April 1 through November 30. California scorpionfish, Pacific sanddab and “other flatfish” are open year round. Lingcod is open April 1 through November 30. Leopard shark is open year round within Newport Bay, Alamitos Bay, San Diego Bay and Mission Bay; outside the same season as other species applies. Divers and shore-based anglers are open year round for all species except lingcod which is open April 1 through November 30.
- Depth restrictions: Fishing allowed shoreward of the 60 fathom contour line. California scorpionfish is limited to less than 40 fathoms January 1 through February 28; 60 fathoms the rest of the year. Leopard shark has no depth restrictions within the bays mentioned above; outside the bays the same 60 fathom restriction applies. Divers and shore-based anglers are open year round for all species except lingcod which is open April 1 through November 30.

o Cowcod Conservation Areas (in federal waters near San Diego, Figure 1):

- Season length: Nearshore rockfishes, ocean whitefish and California sheephead are open March 1 through December 31. Lingcod is open April 1 through November 30. California scorpionfish, Pacific sanddab and “other flatfish” are open year round. The above mentioned species are open year round to divers and shore-based anglers, except that lingcod is open April 1 through November 30. Shelf rockfish, slope rockfish and other federal groundfish are closed year round.
- Depth restrictions: Fishing allowed in waters less than the 20 fathom contour line.

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(b) *Nearshore Management*

In 2002, the CFGC adopted California's Nearshore Fishery Management Plan (FMP) for 19 species (black, black-and-yellow, blue, brown, calico, China, copper, gopher, grass, kelp, olive, quillback, and treefish rockfishes; cabezon; kelp and rock greenlings; California scorpionfish; California sheephead; and monkeyface prickleback). All but California sheephead, rock greenling and monkeyface prickleback are also included in the Council's federal Groundfish FMP. The Nearshore FMP is based on a framework management approach that gives the CFGC a comprehensive management strategy to prevent overfishing, rebuild depressed stocks, ensure conservation, promote habitat protection and provide for non-consumptive uses.

The CFGC adopted seasonal closures, total allowable catch, and trip limits for cabezon, kelp greenling, and California sheephead. Additionally, the CFGC provided CDFG with authority to close any of these fisheries upon attainment of the total allowable catch. Seasonal closures coincide with federal groundfish closures in waters off the state of California.

Between 2008 and 2010, the CFGC took no action regarding commercial groundfish fisheries in California (state regulations provide for automatic conformance with federal regulations. No changes were made to state-managed species such as cabezon, kelp greenling and California sheephead. The CDFG and the CFGC both took action to make changes relative to the recreational fishery between 2008 and 2010 (see Section Inseason Monitoring Section above).

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(c) *Restricted Access for Nearshore Fisheries*

The State of California began a restricted access program for the commercial nearshore fishery in 2003. The Nearshore Fishery Permit is required to take 10 shallow nearshore species: black-and-yellow, gopher, kelp, China, and grass rockfishes, kelp and rock greenlings, California scorpionfish, California sheephead, and cabezon. These species can be taken with hoolk and line gear only; trap gear can be used with a trap endorsement. The Nearshore Fishery Permit program was set up on a regional basis with four regions: North Coast Region (Oregon border to 40°10' North Latitude near Cape Mendocino), North-Central Coast Region (40°10' North Latitude to Point Año Nuevo), South-Central Coast Region (Point Año Nuevo to Point Conception), and South Coast Region (Point Conception to the U.S./Mexico border). Nearshore Fishery Permit holders may only take these nearshore species within the region for which the permit is issued. Both transferable and non-transferable Nearshore Fishery Permits are issued.

A permit capacity goal was set for each nearshore region: 14 for the North Coast Region, 9 for the North-Central Coast Region, 20 for the South-Central Coast Region, and 18 for the South Coast Region. Until a region reaches its capacity goal, transferability is on a two-for-one basis, whereby two permits are purchased,

one is retired and the other is used to fish. When the program began in 2003, a total of 224 permits were issued. In 2010, the number of permit had decreased to 167; however the number of permits in each region remains above its respective capacity goal.

The Nearshore Fishery Bycatch Permit program, which was started in 2003, authorized the take, possession, and landing of shallow nearshore species by vessels using only trawl or entangling nets (gill and trammel nets). Fifteen Nearshore Fishery Bycatch Permits were issued in 2010.

A Deeper Nearshore Species Fishery Permit program was also implemented in 2003. This permit allows the take of the following eight species of deeper nearshore rockfishes: black, blue, brown, calico, copper, olive, quillback and treefish. The permit is non-transferable, because there is no capacity goal for the fishery. Permit holders are not restricted by gear and may catch and land these species anywhere in the state where fishing is allowed. A total of 294 permits were issued in 2003; the number of permits issued decreased to 206 in 2010.

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C. By Species

1. Pacific Whiting

(a) *Primary Whiting Season*
California shore-based landings of trawl caught Pacific whiting (*Merluccius productus*) totaled 2421 metric tons in 2010, 3.7 percent of the 65,938 metric ton optimum yield (OY) for the United States shore-based sector. Landings in 2010 represented a 35 percent increase from the 1792 metric tons landed in 2009. The increase in landings was largely due to an increased OY in 2010.

Nine vessels targeted whiting with trawl gear during the 2010 primary season. The primary whiting season in California waters north of 40° 10' North Latitude near Cape Mendocino started April 1, 2010. The area south of 40° 10' North Latitude opened April 15, 2010. The first landing occurred on May 1, 2010. On May 16, 2010, NMFS closed the primary season south of 42° North Latitude with 2421 metric tons of whiting landed. The fleet landed 82 percent of the 2961 metric ton allocation for the season south of 42° North Latitude. The coastwide season opened June 15. There were no shore based whiting landings in California during the coastwide season.

(b) *Shoreside Whiting Exempted Fishing Permit Fishery*
Nine midwater trawlers participated in the 2010 EFP fishery and landed 2421 metric tons of unsorted whiting at six fish businesses with first receiver status. The trawlers fished under the provisions of an exempted fishing permit, which required maximized retention of total catch, and allowed them to land unsorted whiting

catches at fish businesses with first receiver status without penalty for taking prohibited species or exceeding federal groundfish trip limits.

Total bycatch for all EFP whiting vessels weighed 47 metric tons. The bycatch included 266 Chinook salmon (0.50 metric tons total) for a harvest rate of 0.11 salmon per metric ton of whiting. Rockfish bycatch amounted to 46 metric tons with a harvest rate of 19 kilograms rockfish per metric ton of whiting. Rockfish bycatch represented the majority (98 percent) of the whiting bycatch and was primarily made up of chilipepper, splitnose and widow rockfishes at 24, 14 and 9 metric tons, respectively.

NOAA Fisheries' Shoreside Whiting Catch Monitor program conducted onboard monitoring the whiting fishery in 2010. At the docks, Pacific States Marine Fisheries Commission technicians collected species composition and biological samples of whiting and rockfish bycatch species.

Contributed by Mike Fukushima (mfukushima@dfg.ca.gov)

2. Chilipepper Rockfish

Exempted fishing permits have been granted in recent years to study the use of different gears, commercial and recreational, to target chilipepper rockfish inside RCAs currently closed to groundfish fishing. The RCAs were implemented to protect overfished rockfish species such as yelloweye and canary rockfish. This has resulted in underutilization of other healthy rockfish stocks (e.g., chilipepper rockfish). The goal of these studies is to determine if alternate fishing strategies can provide additional fishing opportunities for both recreational and commercial fisheries while protecting overfished stocks. At this time, there are no progress reports available.

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3. Kelp Greenling

The kelp greenling (*Hexagrammos decagrammus*) is one of the19 nearshore finfish species in California's Nearshore FMP. It inhabits nearshore kelp beds and rocky reefs to a depth of 150 feet, and is harvested by recreational and commercial fisheries from Point Conception to the Oregon border. Little is currently known about kelp greenling population dynamics, and kelp greenling was listed as having a "data-poor" status in a 2005 stock assessment review. Specifically, there is lack of sound scientific data pertaining to age and growth, maturity, abundance, distribution, and size class structure. The CDFG's Fisheries Independent Scuba Assessment Project initiated an age, growth and maturity study in November 2007. The specific objectives of the study are to: 1) determine age and growth parameters of kelp greenling using otoliths from all size classes and sexes; 2) verify periodicity of growth band formation by otolith edge analysis, and marking captive

fish with oxytetracycline; 3) estimate length/age at maturity by visual and histological inspection of reproductive tracts; and 4) determine spawning season by comparing monthly gonadosomatic and hepatosomatic indices.

A total of 385 kelp greenling were collected through monthly sampling. Females ranged from 126 to 411 mm total length (n = 162). Males ranged from 116 to 391 mm total length (n = 223). Otoliths were examined and there was no significant difference between left and right otolith length. Maturity data collected indicates that kelp greenling spawn from September to January. Preliminary estimates of size at 50 percent maturity are 275 mm and 215 mm total length for females and males, respectively. Age data analysis is currently underway.

Contributed by Sean Hoobler (shoobler@dfg.ca.gov)

4. Cabezon

The cabezon (*Scorpaenichthys marmoratus*) is one of the 19 nearshore finfish species in California's Nearshore FMP. Successful implementation of the Nearshore FMP requires collection of missing essential fishery information. For cabezon, there is limited information available on population abundance, natural mortality and changes in biomass. In addition, previous age estimates for cabezon have not been validated. The CDFG's Fisheries Independent Scuba Assessment Project has initiated two studies. The first study is a multiple mark-recapture survey to collect information on catch, size, abundance and movement of cabezon and associated nearshore fishes in Carmel Bay, from Cypress Point to Yankee Point. The study area encompasses three marine protected areas (MPAs), allowing reserve effects to be investigated. A total of 1673 fishes comprised of 16 species were caught in the Carmel Bay study areas during 2008-2010. Cabezon were the fourth most common species caught, composing 6 percent of the catch (107 fish). The recapture rate of fishes has been low (46 fish or 3 percent) but comparable to other studies in this area. Data from this study is currently being analyzed. The results of these studies will provide essential fishery information for use in future stock assessments and management decisions.

The second study is for age validation. Chemical age validation techniques will be used, because otolith edge analysis methods were unsuccessful in validating cabezon ages greater than 6 years in previous studies. Cabezon held in local aquariums will be injected with oxytetracycline or immersed in Alizarin red, marked externally for individual identification, and then sacrificed after one year. Periodicity of growth band formation can then be validated. In 2010, five adult cabezon were collected and injected with oxytetracycline. Due to complications, these fish were sacrificed from 8 to 11 months after injection. Marked otoliths are currently being processed.

Contributed by Diane Haas (dhaas@dfg.ca.gov)

D. OTHER RELATED ACTIVITIES AND STUDIES

1. Marine Life Protection Act (MLPA) Process

Overview: The MLPA, passed by California State Legislature in 1999, requires the CDFG to redesign its system of marine protected areas (MPAs) to increase its coherence and its effectiveness at protecting the state's marine life, habitat, and ecosystems. Significant advances have been made towards the successful implementation of the MLPA on a regional basis, and the development of a cohesive statewide network of MPAs statewide. Previous attempts to implement the MLPA on a statewide level through a single action were unsuccessful. As a result, a Memorandum of Understanding established in 2004 created a public-private partnership commonly referred to as the MLPA Initiative, which split the state into five separate regional MPA planning processes (Figure 2). Four of five regional MPA planning processes have been completed thus far; three of these have been adopted by the CFGC, two of which are currently in effect, the third will go into effect later this year. The fourth region is pending CFGC adoption and the fifth has yet to undergo a planning process. Options for a planning process in the fifth and final region are currently under development. This section provides a description of the MPA classification system used in California, includes an update regarding the status of each region and an overview of its MPAs, and provides information on research and monitoring of adopted MPAs in California.

(a) Classifications:

There are different classifications used in California's MPA network. This includes three MPA designations, and one additional marine managed area designation:

- State Marine Reserve (SMR): Prohibits all take and consumptive use (commercial and recreational, living or geologic). Permitted research, and non-consumptive uses may be allowed.
- State Marine Park (SMP): Prohibits commercial take but may allow select recreational harvest to continue. Access for research and non-consumptive use is encouraged.
- State Marine Conservation Area (SMCA): May allow select recreational and commercial harvest to continue. Access for research and non-consumptive uses is encouraged.
- State Marine Recreational Management Area (SMRMA): Provides subtidal protection equivalent to an MPA, while still allowing legal waterfowl hunting to continue. No other uses are restricted.

Figure 2. Marine Life Protection Act Study Regions.

(b) Regional Planning Update and MPA Overview:

Central Coast Region: This region extends from Pigeon Point south to Point Conception (Figure 2). A network of 29 MPAs covering approximately 204 square

miles of state waters or about 18% of the study region has been in place since September 2007 (Table 2; Figure 3).

Table 2. Central coast region marine protected areas.

Type of Marine Protected Area (number)	Area (square miles)	Region (Percentage)
State Marine Reserve (13)	84	7
State Marine Conservation Area (14)	111	10
State Marine Park (1)	6	< 1
State Marine Recreational Managed Area (1)	3	< 1
Total (29)	**204**	**18**

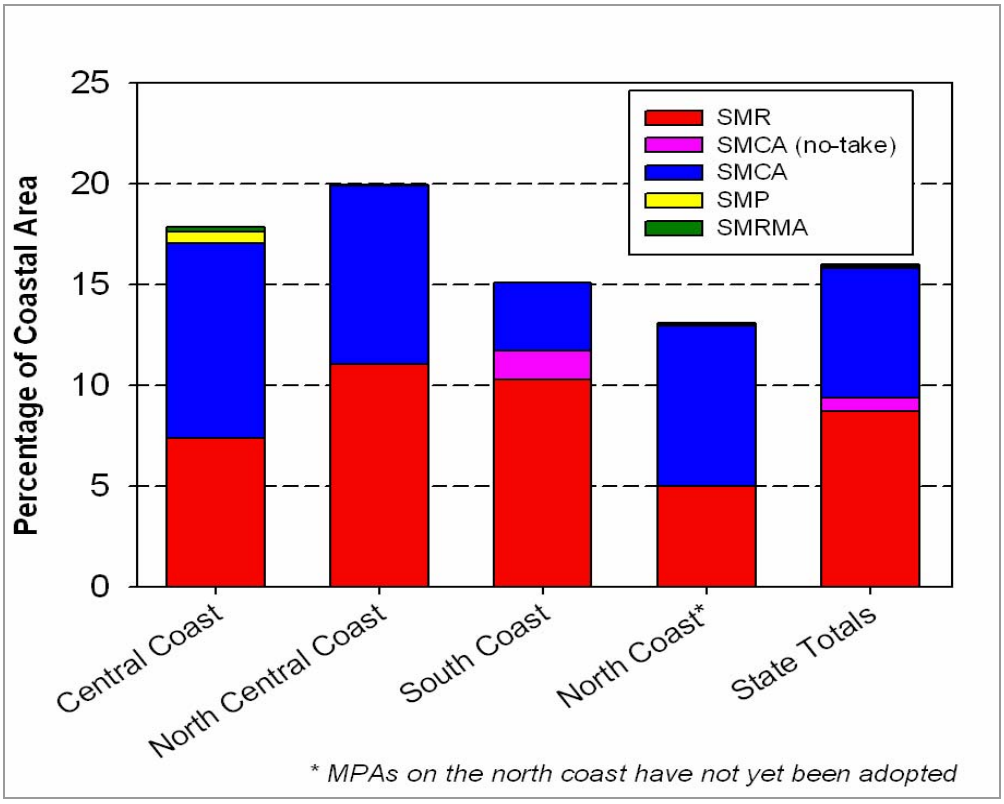

Figure 3. Marine protected area designation percentage by coastal region.

North Central Coast Region: This region extends from Alder Creek near Point Arena south to Pigeon Point (Figure 2). A network of 25 MPAs, including seven special closures covering approximately 152 square miles of state waters and representing approximately 20% of the study region has been in effect since May 2010 (Table 3; Figure 3).

Table 3. North central coast region marine protected areas.

Type of Marine Protected Area (number)	Area (square miles)	Region (Percentage)
State Marine Reserve (10)	84	11
State Marine Conservation Area (12)	68	9
State Marine Park (0)	N/A	N/A
State Marine Recreational Managed Area (3)	<1	< 1
Special Closures (7)	1	<1
Total (25)	**152**	**20**

South Coast Region: This region extends from Point Conception county south to the U.S./Mexico border (Figure 2). A network of 49 MPAs and 3 special closures (including 13 MPAs and 3 special closures previously established at the Channel Islands) covering approximately 354 square miles of state waters and representing approximately 15% of the region is expected to go into effect late 2011 (Table 4; Figure 3).

Table 4. South coast region marine protected areas.

Type of Marine Protected Area (number)	Area (square miles)	Region (Percentage)
State Marine Reserve (19)	242	10
State Marine Conservation Area (20)	80	3
No-take State Marine Conservation Area (10)	33	1
State Marine Park (0)	N/A	N/A
State Marine Recreational Managed Area (0)	N/A	N/A
Special Closures (3)	2	< 1
Total (49)	**354**	**15**

North Coast Region: This region extends from the California/Oregon border south to Alder Creek near Point Arena (Figure 2). The public planning process in this region occurred between July 2009 and February 2011. The planning process resulted in two final MPA proposals and additional recommendations for the CFGC to consider. The CFGC is expected to begin its formal regulatory process in mid-2011 with additional opportunities for public input.

San Francisco Bay Study Region: The San Francisco Bay Study Region (waters within San Francisco Bay, from the Golden Gate Bridge northeast to the Carquinez Bridge; Figure 2) is the fifth and final study region for consideration under the MLPA. The MLPA Initiative is currently developing an options report for how a MPA planning process might be approached in the San Francisco Bay Study Region. The options report will also consider other planning processes that have taken place within the study region, as well as lessons learned from previous regional MLPA planning processes.

(c) Linking to the National System of MPAs: To date, the CDFG has nominated the 25 MPAs and seven special closures adopted in the North Central Coast for inclusion into the United States National System of MPAs, in addition to the Central

Coast MPAs previously nominated. As of the March 25, 2011 Federal Register notice, they have been officially listed as part of the National System of MPAs.

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

2. Research on and Monitoring of Marine Protected Areas

Overview: One of the primary requirements of the MLPA is adaptive management. To facilitate this requires a comprehensive monitoring program to measure performance of MPAs relative to stated regional objectives and MLPA goals. This comprehensive monitoring program is being developed through collaboration between CDFG and the MPA Monitoring Enterprise. The MPA Monitoring Enterprise was created through the State's Ocean Protection Council and the Ocean Sciences Trust to coordinate the development of the MPA monitoring program, to house and analyze monitoring data, and synthesize results in a manner that assists managers and policy makers in adaptive management decisions. The MPA Monitoring Enterprise is currently in the process of developing monitoring priorities and a monitoring framework for the regional and the statewide networks of MPAs.

- *Central Coast MPA Monitoring Program:* The CDFG has begun initial plans to prepare a five-year review of the MPAs established in this region and a progress report to the CFGC is anticipated in late 2012. This report will rely on information collected from baseline monitoring studies conducted since 2007.

- *North Central Coast MPA Monitoring Program:* A comprehensive monitoring plan for MPAs in this region was developed through the MPA Monitoring Enterprise in partnership with the CDFG, and baseline monitoring projects for this region are currently underway in their second field season.

- *South Coast MPA Monitoring Program*: A comprehensive monitoring plan for MPAs in this region was developed by the MPA Monitoring Enterprise in partnership with the CDFG, was released for public review in April 2011. Proposals submitted for the South Coast Baseline Program are currently in review and projects that are awarded funding are anticipated to begin field work in the summer or early fall, pending MPA implementation. Approximately $4 million was approved by the California Ocean Protection Council and administered by Sea Grant for baseline studies.

- *Channel Islands MPA Monitoring Program:* In 1998, prior to enactment of the MLPA, a group of concerned citizens requested the CFGC establish a series of MPAs in the Channel Islands. Following a long process, the Channel Islands MPAs were implemented in 2003. Though not created under the MLPA, the Channel Islands MPAs will be considered in the MLPA process in the South Coast Region. Monitoring of the Channel Islands MPAs has reached its five year comprehensive evaluation. A special session dedicated to the five year evaluation was held at the California Islands Symposium on February 7 – 8,

2008. Monitoring projects included biophysical and socioeconomic-human use investigations. Please see http://www.dfg.ca.gov/marine/channel percent5Fislands/ for more information on the Channel Islands MPA monitoring.

- *CDFG Remotely Operated Vehicle (ROV) MPA monitoring*: Since 2003, the CDFG has used a ROV to perform visual surveys of fish populations and habitat in California's MPAs. The objective of these surveys is to establish baseline conditions inside and outside MPAs and to examine initial changes in fish size and density after MPA implementation. The ROV program works closely with the MPA Monitoring Enterprise to coordinate surveys with studies funded through the baseline monitoring programs. To date, extensive surveys have been completed in the Channel Islands (2003 – 2009), Central Coast Region (2007 – 2009), and North Central Coast Region (2009). The CDFG plans to continue ROV surveys in MPAs in the North Central Coast and South Coast regions in 2011 and 2012.

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3. Baseline Population Study of nearshore species in Carmel Pinnacles State Marine Reserve, Carmel Bay

Carmel Pinnacles State Marine Reserve (Pinnacles) was established in September 2007 as one of 29 newly designated MPAs along the central coast of California. Prior to its implementation as an MPA, limited data had been collected on fish populations from this site. Over a three year period from 2008 through 2010, data on nearshore groundfish abundances, sizes, catch rates, and movements inside this MPA and in a nearby reference site at Carmel Point were collected by CDFG staff using mark/recapture methods. Fish were caught using both hook and line gear aboard a chartered vessel, and commercial live fish trap gear aboard a CDFG skiff. Sampling was conducted during summer through early fall each year; typically July through September. Species of interest included lingcod, cabezon, kelp greenling and rockfish. Following capture, fish were measured, tagged and released. Fish exhibiting excessive trauma or fish that were less than 20 cm total length were released without tagging.

Over three sampling years, a total of 87 volunteer anglers using hook and line gear caught 3449 fish, 2878 of which were tagged. The catch was comprised of 18 different species. Overall, more fish were caught outside the MPA than were caught inside, although fish were typically larger inside the MPA. Black, blue, canary, copper, olive, vermilion and yellowtail rockfish were caught more frequently at Carmel Point, while gopher, china and kelp rockfish were more common at Pinnacles. All other species were caught in similar numbers or too few were caught to report on. Blue, gopher and olive rockfish were the most common fishes caught both inside and outside of the MPA.

To complement hook and line sampling, a total 745 traps were deployed yielding 1237 caught fish, 1156 of which were tagged over the three years. Twelve species were represented in the catch. Gopher rockfish, china rockfish, and cabezon were the most common species trapped at Pinnacles, while gopher rockfish, black-and-yellow rockfish and kelp greenling were the most common fish trapped at Carmel Point. Gopher rockfish was overwhelmingly the dominant fish caught at both sites making up 74 and 80 percent of the catch at Carmel Point and Pinnacles, respectively. More fish were trapped inside the MPA than outside the MPA and fish inside the MPA were typically larger than those caught outside.

Collecting baseline data on fish communities at Carmel Pinnacles State Marine Reserve will provide an important metric for future comparison of population dynamics and MPA effectiveness. Data collected may also provide useful information for stock assessments for some "data-poor" species. This work complements similar studies being undertaken along California's central coast by researchers at Moss Landing Marine Laboratories and Cal Poly San Luis Obispo.

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APPENDIX 1:

2010 CALIFORNIA GROUNDFISH COMMERCIAL FISHERY REVIEW

The 2010 California commercial groundfish harvest (Table 5) was approximately 14.3 thousand metric tons (31.4 million pounds), with an ex-vessel value of $20.5 million. Total harvest was 20 percent lower in 2009 compared to 2008, but remained essentially unchanged between 2009 and 2010. Revenue increased slightly, rising 4.5 percent in 2009 and 3.0 percent in 2010, totaling $19.9 and $20.5 million, respectively. Despite a 37.1 percent decrease in total landings between 2000 and 2010, revenue increased a modest 2.0 percent over the same time period. Much of the decrease in landings between 2000 and 2010 is due to reductions in allowable catch and limiting participation in various sectors of the groundfish fishery (e.g., groundfish trawl, sablefish fixed gear).

In 2010, 76 percent of the groundfish landed was taken by bottom and mid-water trawl gear, a slight decrease from the 80 percent observed in 2009. Line gear accounted for the second largest amount at 19 percent, a slight increase from 15 percent observed in 2009. Trap gear was steady at 4 percent in both 2009 and 2010, while gill and trammel net landings account for less than 0.5 percent of the total catch. Since 2000, there has been a 47 percent decrease in trawl landings due to increased restrictions and a vessel buyback program. Gill and trammel net gear decreased 91 percent due in large part to increased state and federal regulations. On the other hand, trap landings and hook and line gear landings increased 60 and 30 percent, respectively, between 2000 and 2010 as fishermen sought alternate ways to catch groundfish.

Pacific whiting, Dover sole, sablefish, thornyheads and petrale sole dominated California's 2010 groundfish harvest, making up approximately 81 percent of the state's landings (84 percent of groundfish revenue). Pacific whiting experienced a 35 percent increase in 2010 compared to 2009, with landings of 2427 and 1792 metric tons, respectively. The increase in landings was due to an increase in the allocation of Pacific whiting in 2010. Landings of Dover sole increased slightly (4.7 percent) in 2010. Sablefish landings increased by 9 percent while thornyheads were essentially unchanged. Petrale sole decreased 43 percent compared to 2009. Rockfish landings were virtually unchanged between 2009 and 2010; however, landings decreased 61 percent between 2000 and 2010 due to increased restrictions aimed at protecting overfished rockfish species (e.g., canary and yelloweye rockfish) resulting in lower allowable catches coastwide.

Contributed by Traci Larinto (tlarinto@dfg.ca.gov)

Table 5. California commercial groundfish landings (metric tons) for 2008-2010.

	2008	2009	2010[1]	2000	Percent change between 2000 and 2010
FLATFISH					
Arrowtooth flounder	44	45	68	26	158.6
Dover sole	3024	3167	2622	3287	-20.2
English sole	139	73	24	303	-92.1
Petrale sole	929	532	213	635	-66.4
Starry flounder	10	17	13	21	-36.9
Sanddabs	126	107	56	744	-92.5
Other flatfish	147	114	66	270	-75.6
ROCKFISH					
Bocaccio	7	6	4	25	-84.7
Canary	1	1	0[2]	16	-97.2
Chilipepper	103	241	342	447	-23.4
Darkblotched	30	46	17	11	51.9
Shortbelly	--[2]	0	0	4	-94.3
Splitnose	86	57	64	23	182.7
Widow	31	4	10	718	-98.6
Yellowtail	4	2	1	49	-97.8
Minor shelf	26	22	16	150	-89.2
Minor slope	205	222	182	326	-44.2
Black (north of 40° 10')	95	90	50	41	23.5
Minor Nearshore (north of 40° 10')	18	5	3	13	-74.6
Shallow nearshore (south of 40° 10')	55	52	54	85	-36.6
Deeper nearshore (south of 40° 10')	37	39	36	70	-48.7
Unspecified rockfish[2]	1	1	0	23	-98.0
California scorpionfish	4	3	3	19	-82.2
Longspine thornyhead	695	540	552	880	-37.3
Shortspine thornyhead	418	485	462	289	59.9
Unspecified thornyhead[2]	2	2	13	75	-82.6
ROUNDFISH					
Cabezon	23	18	23	116	-80.3
Kelp greenling	1	1	2	23	-93.0
Lingcod	70	57	47	54	-14.1
Longnose skate[3]	--	78	141	--	--
Pacific whiting	4944	1792	2427	4986	-51.3
Sablefish	1552	2249	2449	1859	31.7
Spiny dogfish	45	45	6	9	-37.6
Other fish	279	143	125	822	-84.8
TOTAL	**14,266**	**11,283**	**11,119**	**17,665**	**-37.1**

Notes:

1. Landings data for 2010 are preliminary.
2. Zero (0) indicates that less than 1 metric tons was landed; -- indicates no landings occurred.
3. Unspecified rockfish and unspecified thornyhead market categories were discontinued in 2001.
4. Longnose skate market category was added in 2009. Prior to that, longnose skates were included in the unspecified skate category.

Source: California Fisheries Information System.

APPENDIX 2:

2010 CALIFORNIA GROUNDFISH RECREATIONAL FISHERY REVIEW

The 2010 California recreational groundfish fishery caught approximately 641 metric tons (Table 6), based on estimates generated by the Recreational Fisheries Information network (RecFIN) that are based data collected by California Recreational Fisheries Survey (CRFS) samplers using both sampler examined catch and fish observed discarded dead. Recreational groundfish catch in 2010 was approximately 15 percent less than in 2009 and was likely due to participation in other fisheries or less effort as regulations were essentially the same in 2009 and 2010. Changes to the sampling protocol instituted in 2004 prevent a direct comparison between 2000 and 2010 recreational catch. However, given that the recreational fishery has seen increased restrictions since 2000, much like the commercial fishery, the overall catch is likely lower.

Rockfishes made up 77 and 78 percent of the recreational groundfish catch in 2009 and 2010, respectively. This is not surprising given that anglers most commonly reported bottomfish as the target species when asked by CRFS samplers. Of the rockfish, black and vermilion were the most frequently caught in 2009 and 2010, followed by brown, gopher and copper rockfishes. California scorpionfish, a closely related species in southern California, accounted for 5 percent of the rockfish catch both years. Of the non-rockfish groundfish, lingcod was most frequently caught at 10 and 9 percent in 2009 and 2010, respectively. Lingcod was followed by sanddabs, leopard shark, cabezon and California sheephead (not a groundfish species, but a state nearshore species).

Contributed by Traci Larinto (tlarinto@dfg.ca.gov)

Table 6. California recreational groundfish catch[1] (metric tons) for 2009-2010.

	2009	2010[2]		2009	2010
			Flatfish		
Butter sole	--[3]	0.0[3]	Sanddabs	33.6	43.6
English sole	--	0.0	Sand sole	0.3	0.5
Petrale sole	0.6	0.3	Starry flounder	0.8	0.6
Rock sole	0.8	0.4	**Flatfish total**	**36.1**	**45.5**
			Rockfish		
Bank rockfish	0.0	0.1	Halfbanded rockfish	0.4	0.4
Black-and-yellow rockfish	11.6	11.2	Honeycomb rockfish	3.5	4.0
Black rockfish	243.0	179.8	Kelp rockfish	4.2	6.2
Blue rockfish	45.3	45.9	Mexican rockfish	0.0	0.0
Bocaccio	46.5	56.9	Olive rockfish	24.4	11.9
Brown rockfish	60.3	69.3	Quillback rockfish	5.6	2.7
Calico rockfish	0.2	0.3	Rosethorn rockfish	--	0.1
California scorpionfish	66.0	63.3	Rosy rockfish	4.3	4.6
Canary rockfish	14.6	12.7	Speckled rockfish	6.6	7.0
Chilipepper	2.0	2.7	Squarepsot rockfish	2.7	1.6
China rockfish	19.9	16.5	Starry rockfish	23.8	18.6
Copper rockfish	59.8	47.8	Stripetail rockfish	0.0	0.0
Cowcod	--	0.0	Tiger rockfish	0.2	0.1
Flag rockfish	6.2	5.1	Treefish	7.9	5.3
Freckled rockfish	0.0	0.1	Unspecified rockfish	42.1	14.6
Gopher rockfish	57.4	75.9	Vermilion rockfish	130.4	139.1
Grass rockfish	9.2	5.7	Widow rockfish	1.5	0.7
Greenblotched rockfish	0.3	0.2	Yelloweye rockfish	4.6	1.3
Greenspotted rockfish	15.5	11.2	Yellowtail rockfish	49.0	24.3
Greenstriped rockfish	1.5	0.8	**Rockfish total**	**970.7**	**848.0**
			Roundfish		
Cabezon	31.8	23.5	Rock greenling	0.6	0.3
California sheephead	31.7	20.1	Sablefish	0.0	--
Kelp greenling	14.6	10.4	Unspecified greenling	0.0	--
Lingcod	127.7	94.3			
Monkeyface prickleback	3.9	4.4	**Roundfish total**	**210.4**	**153.0**
			Sharks and skates		
Big skate	0.5	0.0	Soupfin shark	0.4	1.2
California skate	0.0	0.0	Spiny dogfish	4.5	1.5
Leopard shark	34.9	34.6	**Sharks and skates total**	**40.4**	**37.4**
			GRAND TOTAL	**1258**	**1084**

Notes:

1. Recreational catch includes sampler examined catch and discarded dead catch.
2. Catch data for 2010 are preliminary.
3. Zero (0) indicates that less than 1 metric ton was caught; -- indicates no catch was recorded.

Source: The Pacific Recreational Fisheries Information Network (RecFIN).