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.

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

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[1] and samples taken in 2011.

Common name	Metric tons	Len	Oto	Common name	Metric tons	Len	Oto
Flatfish:				Flatfish:			
Dover sole	2797	1529	349	Pacific sanddab	4	409	
Petrale sole	193	1570	27	Rock sole	2	27	
Arrowtooth flounder	105	750	84	Curlfin sole	0	4	
Rex sole	79	2361	77	Fantail sole	0	47	
Unidentified sanddab	45			Slender sole	0	1	
English sole	19	302	8	Deepsea sole	--	2	
Unidentified flatfish	19	13		Diamond turbot	--	2	
Sand sole	16	281		C-O turbot	--	1	
Starry flounder	10	230		Longfin sanddab	--	1	
Hornyhead turbot	6	93					
Rockfish:				Rockfish:			
Chilipepper rockfish	293	574		Starry rockfish	0	15	
Blackgill rockfish	162	1365	204	Canary rockfish	0	12	
Group slope rockfish	60			Flag rockfish	0	27	
Brown rockfish	35	244		Speckled rockfish	0		
Gopher rockfish	35	584	3	Greenblotched rockfish	0	1	
Black rockfish	30	349	44	Rosy rockfish	0		
Vermilion rockfish	21	238		Redbanded rockfish	0	374	247
Black-and-yellow rockfish	14	274		Greenstriped rockfish	0	26	1
Grass rockfish	14	242		Pacific ocean perch	0	81	34
Splitnose rockfish	10	436	17	Swordspine rockfish	0		
Blue rockfish	10	348	27	Group bolina rockfish	0		
Bocaccio rockfish	8	70	2	Honeycomb rockfish	0	35	
Bank rockfish	7	225	74	Rosethorn rockfish	0	5	
Copper rockfish	4	67		Group rosefish rockfish	0		
Darkblotched rockfish	4	882	330	Cowcod	0	1	
Treefish	2	56		Group small rockfish	0		
Aurora rockfish	2	2145	781	Yelloweye rockfish	0		
China rockfish	2	18		Group nearshore rockfish	0		
Yellowtail rockfish	1	74	29	Squarespot rockfish	0	1	
Group red rockfish	1			Chameleon rockfish	0		
Widow rockfish	1	49		Blackspotted rockfish	--	17	24
Greenspotted rockfish	1	208		Freckled rockfish	--	1	
Kelp rockfish	1	26		Rosy rockfish	--	3	
Quillback rockfish	1	7	1	Rougheye rockfish	--	64	81
Olive rockfish	1	9		Shortraker rockfish	--	2	
Group shelf rockfish	1			Silvergray rockfish	--	1	1
Unspecified rockfish	0			Stripetail rockfish	--	1	1
Shortbelly rockfish	0						
Skates:				Skates:			
Longnose skate	195	1272		Big skate	0	2	
Unspecified skate	31			Black skate	--	7	
California skate	0			Sandpaper skate	--	7	
Round fish:				Round fish:			
Sablefish	2735	4875		California scorpionfish	5		
Shortspine thornyhead	557	5712		Pacific whiting	5	43	

Common name	Metric tons	Len	Oto	Common name	Metric tons	Len	Oto
Roundfish:				Roundfish:			
Longspine thornyhead	541	4857	2	Cabezon	37	148	
California halibut	258	8		Lingcod	34	225	
Unspecified grenadier[2]	107			Kelp greenling	3	52	
Giant grenadier[2]	--	8		Unspecified thornyhead	1		
Pacific grenadier[2]	--	103		Spotted ratfish	0		
California sheephead	39	7		Rock greenling	0	1	
Sharks:				Sharks:			
Lepoard shark	3			Spiny dogfish	1	1	
Soupfin shark	2						

Notes:

1. Landings for 2011 are preliminary.
2. CDFG landing receipts only have a species code for grenadiers, unspecified, and may include giant and pacific grenadier.

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, man-made structures, commercial passenger fishing vessels (CPFVs), and private and rental boats] 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, a telephone survey of licensed anglers, and CPFV logs (activity records for each trip). In 2011, approximately 55 CRFS samplers gathered recreational fishing effort and catch data statewide. The CRFS samplers interviewed almost 46,000 anglers at more than 400 sites, and examined more than 174,000 fish. The contractor for the licensed angler telephone survey completed 26,000 interviews, and CDFG received, processed and used more than 25,000 CPFV logs. 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 2011, CRFS began using the mandatory CPFV logs along with a field validation survey to estimate CPFV effort. A voluntary telephone survey of CPFV operators 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.

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, canary and yelloweye rockfish.

In 2011, no inseason changes were made for cabezon, California sheephead and greenlings. The last time the CFGC had to take inseason action was in 2008. Fewer participants and increased trip limits for some species has allowed the fishery to continue unchanged.

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Recreational fishery

The CFGC has given the CDFG 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 2011, no inseason management actions were taken. The CFGC has not had to take inseason action for the recreational fishery since 2008, due in part to modifying management areas and seasonal closures to better reduce the take of yelloweye rockfish.

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2. Management

(a) *2011 State Management Measures Affecting Groundfish*

Commercial fishery

Commercial fishery management has remained unchanged between 2007 and 2010; however, in 2011 the CFGC took action to increase the total allowable catch (TAC) and bimonthly trip limits for cabezon based on an increase in the cabezon allowable catch limit (ACL) adopted by the Council, roughly double the previous year's ACL (69 and 148 metric tons, 2010 and 2011, respectively). Based on the increased ACL, the CFGC adopted regulations increasing the state's total allowable catch (TAC) and the commercial and recreational allocations to 199,000 and 127,200 pounds, respectively (previously 92,800 and 59,300 pounds, respectively). Along with the increased TAC, the CFGC increased the commercial cabezon trip limits (Table 2).

Table 2. Cabezon commercial trip limit changes in 2011, effective June 9, 2011.

	Old trip limits (pounds)	New trip limits (pounds)
January-February	300	300
March-April	100	100
May-June	250	500
July-August	150	500
September-October	900	500
November-December	100	300

Recreational fishery

In June 2010, the Council increased California's recreational harvest guideline for lingcod from 422 metric tons in 2010 to 1151 metric tons in 2011 and 2012. In order to maximize opportunity for lingcod while continuing to avoid overfished species, the Council chose to remove the lingcod spawning closure for all modes of recreational fishing in California. To allow for additional retention of lingcod, the Council adopted a new recreational size limit of 22 inches, previously 24 inches, in an effort to maximize fishing opportunity and to make regulations consistent among California, Oregon and Washington.

In June 2011, the CFGC adopted regulations for the 2011-2012 recreational groundfish fishery to make them consistent with proposed federal regulations. Delays in adopting the federal regulations caused a subsequent delay in adopting state regulations, which were effective June 9, 2011. The changes included:

- Renaming the recreational groundfish management areas for simplicity (Figure 1)
- Combining two areas (Monterey South-Central and Morro Bay South-Central) into one (Central) because there were no longer any differences in the regulations
- Allowing year-round take of lingcod from beach, banks and man-made structures connected to shore
- Removing lingcod spawning closure (October through March) to align with the rockfish, cabezon and greenling (RCG) seasons in each management area
- Reducing the lingcod size limit to 22 inches, previously 24 inches
- Reducing the lingcod fillet limit to 14 inches, previously 16 inches
- Increasing the cabezon bag limit (from 2 to 3 fish) within the RCG complex 10-fish bag limit
- Restricting the take of cabezon, kelp and rock greenling to not more than two hooks on one line to be consisted with rockfish and lingcod
- Increasing the depth from 40 to 60 fm in January and February for the take of California scorpionfish to be consisted with RCG depth restrictions
- Clarifying that rockfish can be taken by hand or while diving or spearfishing

Figure 1. Recreational groundfish management areas for 2011.

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

(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. In 2011, the only management changes to nearshore species are discussed 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, China, gopher, grass and kelp rockfishes, kelp and rock greenlings, California scorpionfish, California sheephead, and cabezon. These species can be taken with hook-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 2011, the number of permit had decreased to

164; 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 2011.

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 199 in 2011.

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C. BY SPECIES

1. Pacific Whiting

(a) *Primary Whiting Season*

There were no directed whiting trips during the 2011 primary Pacific whiting (*Merluccius productus*) season. The primary whiting season off California started April 1, 2011 between 40° 30' North Latitude and 42° 00' North Latitude and on April 15, 2011 south of 40° 30' North Latitude.

Pacific whiting quota share holders that fished in 2010 did not participate in the 2011 early primary season off California, and either waited for the season north of 42° 00' North Latitude to open June 15, 2011, or fished for other groundfish. Prior to the inception of Individual Fishing Quotas (IFQ) in 2011, local and out of state vessels that participated in the early primary season off California landed whiting under a common harvest cap set at 5 percent of the annual allocation for the coast wide shore-based whiting fishery. Personal communication with individuals involved in the whiting fishery indicated the potential risk of encountering high operating costs, scattered schools, and small fish in the shore-based IFQ whiting fishery off California overshadowed the potential benefit of harvesting whiting earlier in the year. Pacific whiting quota share was better applied to the main fishery in the north where there are larger fish, higher volumes, and greater processing capacity.

(b) *Trawl Individual Fishing Quota Program (IFQ)*

California shore-based landings of trawl caught Pacific whiting totaled 4.5 metric tons in 2011 and represented a 99 percent reduction from 2010 landings. Two first receivers documented whiting on 18 fish landing receipts. The ex-vessel price for whiting was $0.00/lb. The mean weight of whiting per landing was 547 pounds. Whiting landing pounds constituted .01 percent of all federally managed groundfish

landed by vessels using limited entry trawl gear in 2011. The zero value and low poundage indicate that Pacific whiting was taken as bycatch with targeted groundfish species. Six vessels used large or small footrope trawl gear to take whiting. No vessels used midwater trawl to take whiting, another indicator that Pacific whiting were bycatch.

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 () *Sebastes goodei*) 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, no fish were caught using EFPs, and no EFPs for chilipepper rockfish were renewed.

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

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. Prior to 2011, very little was 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 was 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 completed an age, growth and maturity study in November 2011.

The specific objectives of the study were to: 1) determine age and growth parameters of kelp greenling using otoliths from all size classes and sexes; 2) validate periodicity of growth band formation by 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 a monthly sampling program. Females ranged from 126 to 411 mm total length (n = 162). Males ranged from 116 to 391 mm total length (n = 223).

Length-at-age data was used to generate growth curves for male and female kelp greenling using von Bertalanffy, Gompertz, and logistic growth functions. Growth model parameters were estimated using a non-linear least-squares regression and SigmaPlot graphical software program (Systat Software, 2006). From the growth curves we compared coefficient of determination, significance level, and residual mean square error and determined that the von Bertalanffy Growth Function (VBGF) model best fit the data (Figure 2).

Female $L\infty$ = 386 mm, R^2 = 0.76, $p < 0.0001$, K = 0.35
Male $L\infty$ = 356 mm, R^2 = 0.83, $p < 0.0001$, K = 0.49

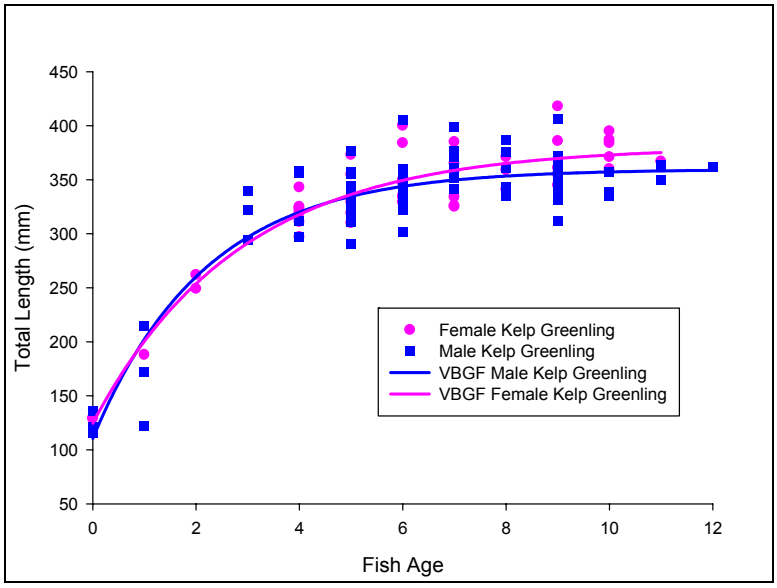

Figure 2. VBGF model showing growth curves for female (n=82) and male (n=101) kelp greenling.

Otoliths were examined and there was no significant difference between left and right otolith length. Periodicity of growth band formation in kelp greenling was validated by treating captive fish with oxytetracycline, an antibiotic readily incorporated into calcified tissues during osteogenesis. The resulting formation of a permanent mark at time of tagging and subsequent formation of a single pair of growth bands (comprised of one opaque and one translucent band), formed after the addition of the mark, validated this ageing method for kelp greenling (Figure 3).

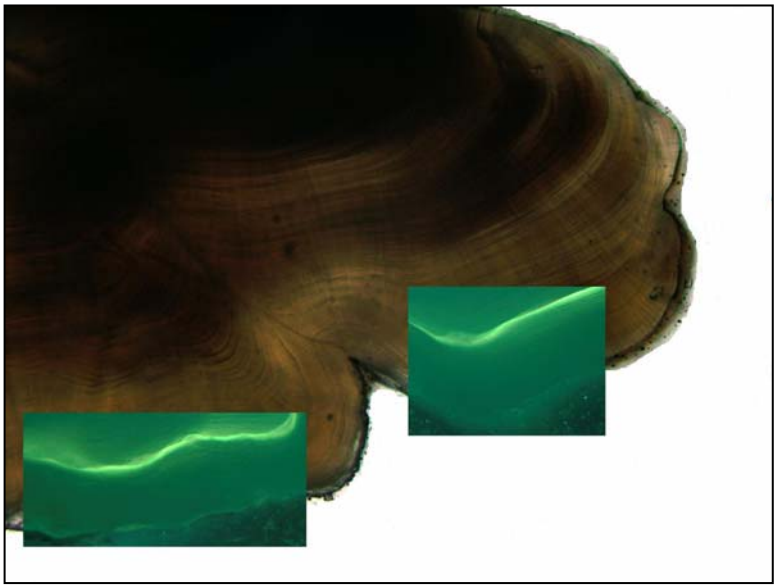

Figure 3. Sectioned kelp greenling otolith viewed under reflected light, with inset of otolith under epifluorescent light showing oxytetracycline mark and subsequent growth.

Estimates of size at 50 percent maturity were 275 mm and 215 mm total length for females and males, respectively. Seasonal maturity data indicated that kelp greenling spawn from September to January.

Contributed by Sean M. 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 generating essential fishery information lacking for the species. 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 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 encompassed two 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). Catch-per-unit-effort (CPUE) was greater for cabezon outside MPAs than inside MPAs each year. Lengths were not significantly different between MPA and non-MPA sites or among years.

The recapture rate for all fishes in the study was low (46 fish or 3 percent), but comparable to other studies that have been conducted in the area. Cabezon comprised 8 percent of recaptured fish. Reports of tag recaptures have continued to arrive in the Department's Monterey field office since the end of field sampling in 2010 and further returns could lead to abundance estimates over the next few years that would be of great value to management.

The second study for age validation was undertaken because previous otolith edge analysis methods were unsuccessful for validating cabezon ages greater than 6 years. 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. Despite this, OTC marks were visible in all fish, and growth increment widths increased with time after injection. In those fish that survived to 11 months, one opaque and one translucent band formed after the OTC mark. This validates the periodicity of annual growth band formation in cabezon.

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

5. Copper rockfish

Copper rockfish (*Sebastes caurinus*) is one of the 19 nearshore finfish species in California's Nearshore Fishery Management Plan (FMP). Successful implementation of the Nearshore FMP requires generating essential fishery information lacking for the species. For copper rockfish, there is limited information available on age and growth in California waters. The CDFG's Groundfish Project initiated a study to estimate age and growth parameters of copper rockfish in California for use in future stock assessments.

Biological sample data (i.e., otoliths) from commercial, recreational and research sectors collected during the 1970s to present have been compiled. To date, approximately 1238 otoliths have been matched with data, with the majority of them from the 1970-1980 time period. A random sub-sample of 465 otoliths representing all available size classes and sexes was selected for ageing purposes. Within the sub-set, females (n = 181) ranged from 150 mm to 565 mm total length. Males (n = 140) ranged from 168 mm to 554 mm total length. Samples where sex was unavailable (n = 144) ranged from 79 mm to 542 mm total length. Otoliths were weighed to determine whether there was a significant difference between left and right otolith; none was found.

This study is still in progress and projected to be completed by late 2012. Although ages have been estimated for some samples, estimates of growth parameters have not been completed. Once ages have been estimated for the initial 476 otoliths, additional samples can be added if necessary to reduce uncertainty in growth parameters.

Contributed by Caroline Mcknight (cmcknight@dfg.ca.gov)

D. OTHER RELATED ACTIVITIES AND STUDIES

1. Implementation of the Marine Life Protection Act

Overview: The Marine Life Protection Act (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. 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 4). Four of five regional MPA planning processes have been completed thus far; and MPAs in three regions have been adopted by the CFGC and are currently in effect. The fourth region (north coast region) is pending CFGC adoption and the fifth (San Francisco Bay region) has yet to undergo a planning process. This section includes:

a) description of the MPA classification system used in California,
b) update regarding the status of each region and an overview of its MPAs,
c) description of current MPA research and monitoring efforts, and
d) other information related to adopted MPAs in California.

(a) Classifications:

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

- 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[1].
- State Marine Conservation Area (SMCA): May allow select recreational and commercial harvest to continue. Access for research and non-consumptive uses is encouraged.

[1] In the MLPA planning process SMPs are designated as SMCAs that are designed with the intent to match an SMP in allowed regulations, goals and objectives. They can only be formally adopted as an SMP by the State Parks Commission in a separate action which takes the MPA designation intent into account. After the State Parks Commission adopts the SMP, then the area will have dual designation in statute as both an SMCA and SMP.

- State Marine Recreational Management Area (SMRMA): Provides subtidal protection equivalent to an SMR, while still allowing legal waterfowl hunting to continue.
- Special Closures: A geographically specific area that prohibits human entry. Special closures are generally smaller in size than MPAs and are designed to seasonally protect breeding seabird and marine mammal populations from human disturbance.

Figure 4. Marine Life Protection Act Study Regions.

(b) Chronological overview of regional Marine Protected Area planning:
Central Coast Region: This region extends from Pigeon Point (San Mateo County) south to Point Conception (Santa Barbara County) (Figure 4). A network of 29 MPAs covering approximately 204 square miles of state waters or about 18 percent of the study region has been in place since September 2007 (Table 3; Figure 5).

Table 3. 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 (15)	117	10
State Marine Park (0)	N/A	N/A
State Marine Recreational Managed Area (1)	3	< 1
Total (29)	**204**	**18**

North Central Coast Region: This region extends from Alder Creek near Point Arena (Mendocino County) south to Pigeon Point (San Mateo County) (Figure 4). A network of 25 MPAs and six special closures covering approximately 152 square miles of state waters and representing approximately 20 percent of the study region has been in effect since May 2010 (Table 4; Figure 5).

Table 4. 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 (6)[2]	1	<1
Total (25)	**152**	**20**

South Coast Region: This region extends from Point Conception (Santa Barbara County) south to the U.S. /Mexico border, including state waters around the Channel Islands (Figure 4). A network of 50 MPAs and two special closures (including 13 MPAs and two special closures previously established at the northern Channel Islands) covering approximately 355 square miles of state waters and representing approximately 15 percent of the study region has been in effect since January 1, 2012 (Table 5; Figure 5).

[2] Totals do not include special closures

Table 5. 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 (21)	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 (2)[2]	2	< 1
Total (50)	**355**	**15**

North Coast Region: This region extends from the California/Oregon border south to Alder Creek near Point Arena (Mendocino County) (Figure 4). The CFGC selected a preferred MPA alternative for the regulatory process in June 2011. The preferred alternative includes 19 MPAs, one SMRMA and seven special closures covering approximately 137 square miles of state waters or about 13 percent of the north coast region (Table 6, Figure 5). The preferred alternative includes regulatory text for take of living marine resources from an area with area-specific take restrictions by federally recognized tribes consistent with existing regulations.

Table 6. Proposed north coast region marine protected areas, pending final adoption by the CFGC.

Type of Marine Protected Area (number)	Area (square miles)	Region (Percentage)
State Marine Reserve (6)	51	5
State Marine Conservation Area (13)	85	8
No-take State Marine Conservation Area (0)	N/A	N/A
State Marine Park (0)	N/A	N/A
State Marine Recreational Managed Area (1)	< 1	< 1
Special Closures (7)[2]	< 1	< 1
Total (20)	**137**	**13**

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 4) is the fifth and final study region for consideration under the MLPA. The MLPA Initiative is currently developing a feasibility report for how a MPA planning process might be approached in the San Francisco Bay Study Region. This report will also consider other planning processes that have taken place within the study region, as well as lessons learned from previous regional MLPA Initiative planning processes.

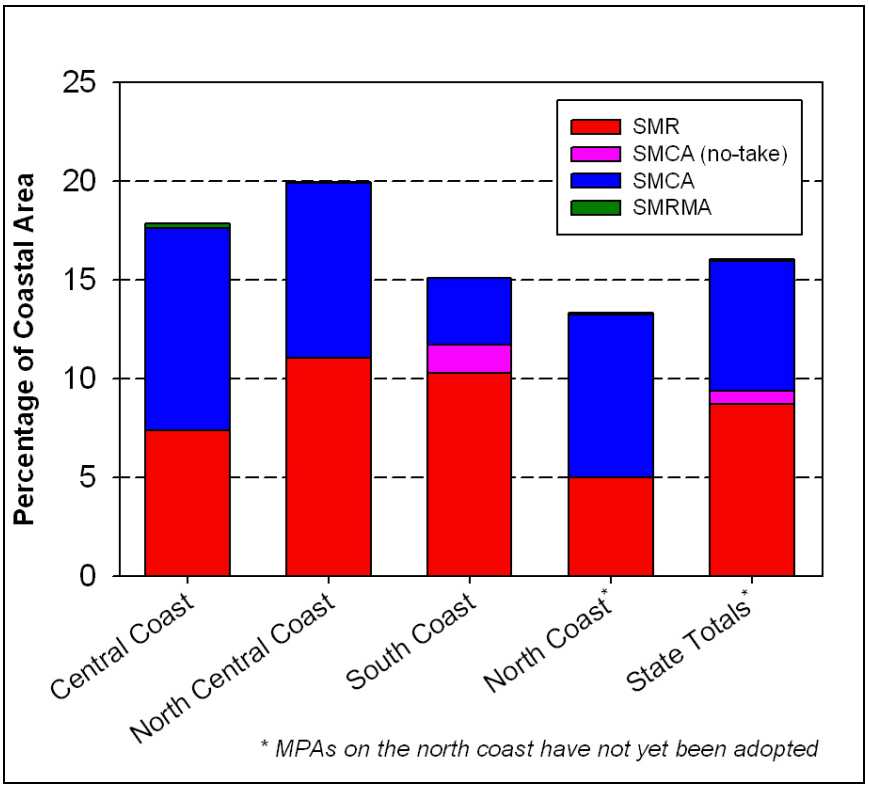

Figure 5. Marine protected area designation percentage by coastal region[3].

Linking to the National System of MPAs: After regional implementation, CDFG nominated MPAs developed under the MLPA Initiative planning process to the National MPA Center. Created by Executive Order, the National MPA Center is a division of NOAA that receives nominations by other federal, state, tribal and local governments for inclusion into a comprehensive nationwide listing of MPAs. Nominated MPAs must meet federal requirements for inclusion in the national network and database of information maintained by the National MPA Center. To date a total of 54 MPAs (29 in the central coast, 25 in the north central coast), and all six north central coast special closures have been nominated to the national system of MPAs. All nominations have been accepted and are now officially listed as part of the national system of MPAs. South coast MPAs will be nominated during the next call for nominations in fall 2012.

2. Marine Protected Areas Monitoring and Research Efforts

Overview: The planning and design process for the MPA network along the entire coastline (excluding San Francisco Bay) has been completed, and the CDFG is now focusing on MPA implementation, monitoring, research, and long-term management. In addition, one of the primary requirements of the MLPA is adaptive management. To facilitate adaptive management, a comprehensive monitoring

[3] Found in the central coast, Cambria SMCA is currently the only MPA designed in the MLPA process that has also been designated as an SMP by the State Parks Commission. For purposes of reporting it is shown in this document as an SMCA only.

program to measure performance of MPAs relative to stated regional objectives and MLPA goals is being developed through collaboration between the MPA Monitoring Enterprise and the CDFG. The MPA Monitoring Enterprise (ME) was created through the State's Ocean Protection Council and the Ocean Science 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 ME 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 ME, CDFG and collaborators are preparing for the release of baseline monitoring results for the MPAs established in this region, and an update on these efforts to the CFGC is anticipated in 2013. The baseline monitoring report will rely on information collected from baseline monitoring studies conducted since 2007. For additional information go to: http://www.dfg.ca.gov/mlpa/monitoring_phase1.asp.

- *North Central Coast MPA Monitoring Program:* A comprehensive monitoring plan for MPAs in this region was developed through the ME in partnership with the CDFG, and baseline monitoring projects for this region are currently completing their second field season. For additional information go to: http://monitoringenterprise.org/where/northcentralcoast.php.

- *South Coast MPA Monitoring Program*: A comprehensive monitoring plan for MPAs in this region was developed through the ME in partnership with the CDFG, and 10 baseline monitoring projects for this region are currently underway in their first field season. For more information go to: http://monitoringenterprise.org/where/southcoast.php.

- *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 multi-year planning process, the Channel Islands MPAs were implemented in 2003. Though not created under the MLPA, the CFGC chose to include the Channel Islands MPAs in the MLPA Initiative process along with the rest of the MPAs adopted in the South Coast Region. A special session dedicated to the five-year evaluation of Channel Islands MPAs monitoring was held at the California Islands Symposium in February 2008. Monitoring projects included biophysical and socioeconomic-human use investigations. For more information go to: http://www.dfg.ca.gov/marine/channel percent5Fislands/.

- *Remotely Operated Vehicle (ROV) MPA Monitoring:* Since 2003, the CDFG and its partners have performed 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 CDFG program works closely with the ME 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 – 2011). The CDFG plans to continue ROV surveys in MPAs in the North Central Coast and South Coast regions in 2012 and 2013.

3. Other Information Related to Marine Protected Areas Adopted in California

MPA Mobile Website: In September 2011, the CDFG unveiled a MPA mobile website allowing anglers, divers and other ocean users to look up current information about restricted areas and boundaries from land-based computers, smartphones, tablets and other portable Internet-enabled devices. This mobile website allows the public to:

- Search for any current MPA by name, county or general area to find information about the MPA's boundaries and regulations (the site will be updated as new MPAs go into effect, with no effect on the end user).
- Use an interactive map to locate any MPA and learn about its boundaries and regulations.
- Find and track the user's current location using the GPS on a mobile device, locate the closest MPA(s) and determine whether or not the user is currently located within an MPA.
- Read a summary of regulations or complete regulations for any MPA.

To access the mobile MPA website, go to: www.dfg.ca.gov/m/MPA

Marine Protected Areas and Fisheries Integration: it is expected that the statewide MPA network will result in various biological, ecological, and socioeconomic effects that may have broad implications for fisheries. Consequently, it is important to understand how this network of MPAs affects California's fishery resources, and how this information can then be used to inform fisheries management. The CDFG convened a workshop in March 2011 titled "Marine Protected Areas and Fisheries Integration Workshop". The purpose of this workshop was to elicit input from scientists representing a wide range of disciplines on the utility and practicality of using a redesigned statewide network of MPAs to inform fisheries management. Discussions focused on three main topics: possible effects of the MPA network on California's marine fisheries; potential management changes in response to the network of MPAs; and the potential for incorporating the presence of an MPA network into processes that define fishery yields. The Department expects these workshop results will serve to catalyze further discussion on the subject of MPAs and fisheries integration, and welcomes additional input including ideas not expressed within last year's workshop. To access the entire workshop proceedings, including outcomes and next steps, please go to http://www.dfg.ca.gov/mlpa/mfig.asp.

For more information on California's MPAs, visit the MLPA website: http://www.dfg.ca.gov/mlpa.

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4. 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, there was limited data on fish populations at this site. Over a three year period from 2008 through 2010, information on nearshore groundfish abundance, size, catch rates, and movements inside this MPA and in a nearby reference site at Carmel Point were collected. Fish were caught using hook-and-line and trap gear aboard chartered CPFVs, commercial fishing vessels and CDFG vessels. 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, 87 volunteer anglers using hook-and-line gear caught 3449 fish of 18 species, 2878 of which were tagged and released. 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 most frequently at Carmel Point, while gopher, China and kelp rockfish were most common at Pinnacles. 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 of 745 traps were deployed over the three year period yielding 1237 fish of 12 species, 1156 of which were tagged and released. 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 the dominant fish caught at both sites making up 74 percent of the catch at Carmel Point and 80 percent at Pinnacles. More fish were trapped inside the MPA than outside, and fish inside the MPA were typically larger.

To date, 59 tagged fish were recaptured and re-released during CDFG sampling days; and 22 tagged fish have been recaptured by the public (recreational anglers and divers, and commercial fishermen), yielding a 2 percent overall recapture rate. To date, all fish have been recaptured in the same general area where originally released.

We compared the lengths of the 13 most commonly caught species to known lengths at 50 percent maturity. For most species the 75th percentile length was above the reported length at 50 percent maturity; however black rockfish and yellowtail rockfish lengths were below their 50 percent maturity lengths at both sites. At the non-MPA site, blue rockfish and olive rockfish 75th percentile lengths were also less than the length at 50 percent maturity.

These baseline data on fish communities at Carmel Pinnacles State Marine Reserve 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:

2011 CALIFORNIA GROUNDFISH COMMERCIAL FISHERY REVIEW

The 2011 California commercial groundfish harvest (Table 7) was approximately 8253 metric tons, with an ex-vessel value of $28.1 million. Total harvest was 18 percent lower in 2011 compared to 2010; however, that was mostly due to a sharp decline in Pacific whiting landings, a high volume fishery. This decline was a result of the advent of the trawl individual quota program where fishermen were given individual quotas for some groundfish species, including Pacific whiting. California fishermen leased their Pacific whiting quota shares to out-of-state fishermen in exchange for sablefish quota shares. This turned out to be a smart move because an earthquake-driven tsunami hit Crescent City in March 2011, destroying much of the harbor and docks used for offloading and processing Pacific whiting. Groundfish revenue increased 37 percent in 2011, compared to 2010, due primarily to the higher price per pound paid for sablefish compared to Pacific whiting. In 2010, the average price per pound for Pacific whiting and sablefish was $0.08 and $2.13 per pound, respectively.

In 2011, 63 percent of the groundfish landed were taken by bottom and mid-water trawl gear, a decrease from the 76 percent observed in 2010. Line and trap gears were the second and third most common gear types in 2011 at 26 and 10 percent, respectively; both gears saw increased use compared to 2010 (19 and 4 percent, respectively). Gill and trammel net landings were minimal, accounting for less that 0.2 percent of the groundfish catch. Since 2001, there has been a 49 percent decrease in trawl landings due to increased restrictions and a vessel buyback program. Gill and trammel net gear decreased 87 percent due in large part to increased state and federal regulations. On the other hand, trap landings and hook-and-line gear landings increased 275 and 70 percent, respectively, between 2001 and 2011 as fishermen sought alternate ways to catch groundfish.

Dover sole, sablefish, and thornyheads dominated California's 2011 groundfish harvest, making up approximately 80 percent of the state's landings (83 percent of groundfish revenue). Landings of Dover sole increased slightly (6.6 percent) in 2011. Sablefish landings increased by 12 percent while thornyheads declined 22 percent compared to 2010. Rockfish landings decreased 7 percent between 2010 and 2011. The major decrease (50 percent) in rockfish landings occurred between 2001 and 2011, due to increased restrictions aimed at protecting overfished rockfish species (e.g., canary and yelloweye rockfish) resulting in low trip limits coastwide.

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Table 7. California commercial groundfish landings (metric tons) for 2009-2011.

		2009	2010	2011[1]	2001	Percent change between 2001 and 2011
ROUNDFISH	Cabezon	18	23	37	72	-49.0
	Kelp greenling	1	2	3	11	-76.6
	Lingcod	57	47	34	62	-44.7
	Grenadiers	71	95	107	212	-49.7
	Longnose skate[2]	78	142	195	--[3]	--
	Pacific whiting	1792	2427	5	2306	-99.8
	Sablefish	2249	2450	2735	1508	81.4
	Spiny dogfish	45	6	1	3	-71.9
	Other fish	72	31	37	673	-94.5
FLATFISH	Arrowtooth flounder	45	68	105	9	1023.7
	Dover sole	3167	2622	2797	2407	16.2
	English sole	73	24	19	421	-95.4
	Pacific sanddab	11	0[3]	4	8	-53.6
	Petrale sole	532	213	193	560	-65.5
	Sanddabs	96	56	45	777	-94.2
	Starry flounder	17	13	10	42	-76.8
	Other flatfish	114	66	97	326	-70.4
ROCKFISH	Bocaccio	6	4	8	22	-63.3
	Bronzespotted	0	0	0	0	-100.0
	Canary	1	0	0	14	-97.7
	Chilipepper	241	342	293	346	-15.2
	Darkblotched	46	17	4	17	-78.9
	Pacific ocean perch	1	0	0	1	-92.2
	Shortbelly	0	0	0	5	-91.7
	Widow	4	10	1	332	-99.6
	Yellowtail	2	1	1	42	-96.7
	Minor shelf	22	18	25	138	-81.9
	Minor slope	278	246	242	333	-27.3
	Black (North of 40° 10')	90	50	25	93	-73.1
	Minor nearshore (north of 40° 10')	5	3	10	28	-64.3
	Shallow nearshore (south of 40° 10')	52	55	66	82	-19.5
	Deeper nearshore (south of 40° 10')	39	36	49	71	-31.0
	Unspecified rockfish[4]	1	0	0	15	-97.1
	California scorpionfish	3	3	5	20	-74.5
	Longspine thornyhead	540	552	541	596	-9.2
	Shortspine thornyhead	485	462	557	204	173.4
	Unspecified thornyhead[4]	2	13	1	48	-97.3
TOTAL		**10,256**	**10,098**	**8,253**	**11,805**	**-30.1**

Notes:

1. Landings data for 2011 are preliminary.
2. Longnose skate market category was added in 2009. Prior to that, longnose skates were included in the unspecified skate category.
3. Zero (0) indicates that less than 1 metric ton was landed; -- indicates no landings occurred.
4. Unspecified rockfish and unspecified thornyhead market categories were discontinued in 2001.

Source: California Fisheries Information System.

APPENDIX 2:

2011 CALIFORNIA GROUNDFISH RECREATIONAL FISHERY REVIEW

The 2011 California recreational fishery caught approximately 1666 metric tons of groundfish and nearshore species (Table 8), according to estimates generated by the Recreational Fisheries Information Network (RecFIN) that are based on data collected by California Recreational Fisheries Survey (CRFS) samplers using both sampler examined catch and fish observed discarded dead. Recreational groundfish catch in 2011 was approximately 37 percent higher than in 2010 and was due to increased catch of lingcod and rockfishes. Lingcod catch doubled in 2011 due to longer fishing seasons in most regions and a smaller size limit. Rockfish catch increased 28 percent in 2011 due to longer fishing seasons in most regions. Changes to the sampling protocol instituted in 2004 prevent a direct comparison between 2001 and 2011 recreational catch. However, given that the recreational fishery has seen increased restrictions since 2001, much like the commercial fishery, the overall catch is likely lower.

Rockfishes made up 72 percent of the recreational groundfish and state nearshore species catch in 2011, down slightly from 2009 and 2010 (77 percent both years). The slight decline can be attributed to the large increase in lingcod catch in 2011. That rockfish make up the majority of the recreational groundfish catch is not surprising given that anglers most commonly reported bottomfish as the target species when asked by CRFS samplers. Of the rockfish, vermilion, black and bocaccio were the most frequently caught rockfish in 2011, followed by brown, gopher and copper rockfishes. California scorpionfish, a closely related species in southern California, accounted for 6 percent of the rockfish catch in 2011. Of the non-rockfish groundfish, lingcod was most frequently caught (14 percent) in 2011. Lingcod was followed by sanddabs, California sheephead (not a groundfish species, but a state nearshore species), cabezon and leopard shark. While the ranking of the non-rockfish species changed slightly between 2010 and 2011, these same species continue to be popular with recreational anglers and account for the majority of the groundfish catch.

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Table 8. California recreational groundfish catch[1] (metric tons) for 2010-2011.

	2010	2011[2]		2010	2011[2]
Flatfish					
Butter sole	0.0[3]	0.0	Rock sole	0.4	1.3
Dover sole	--[3]	0.0	Sand sole	0.5	1.1
English sole	0.0	0.0	Starry Flounder	0.6	1.2
Pacific sanddab	42.6	81.1	Unspecified sanddabs	0.9	8.0
Petrale sole	0.4	0.6	**Flatfish total**	**45.0**	**92.9**
Rockfish					
Bank rockfish	0.1	0.2	Honeycomb rockfish	4.8	9.5
Black and Yellow rockfish	20.3	14.1	Kelp rockfish	6.4	17.6
Black rockfish	218.6	178.1	Mexican rockfish	0.0	--
Blue rockfish	52.3	61.4	Olive rockfish	12.1	23.5
Bocaccio	56.6	103.3	Pinkrose rockfish	--	0.0
Brown rockfish	72.9	86.2	Quillback rockfish	2.9	4.3
Calico rockfish	0.3	1.9	Rosethorn rockfish	0.1	--
California scorpionfish	63.1	99.7	Rosy rockfish	6.0	6.8
Canary rockfish	12.9	15.7	Speckled rockfish	7.1	8.1
Chilipepper	2.8	5.3	Squarespot rockfish	1.9	5.7
China rockfish	18.0	15.3	Starry rockfish	19.3	24.4
Copper rockfish	48.5	66.9	Stripetail rockfish	0.0	0.0
Cowcod	0.2	0.8	Swordspine rockfish	--	0.0
Flag rockfish	5.1	9.0	Tiger rockfish	0.1	0.4
Freckled rockfish	0.1	0.1	Treefish	5.3	11.7
Gopher rockfish	91.1	72.2	Unspecified rockfish	24.0	82.5
Grass rockfish	5.7	10.5	Vermilion rockfish	140.7	195.2
Greenblotched rockfish	0.2	1.3	Widow rockfish	0.7	1.4
Greenspotted rockfish	11.4	17.9	Yelloweye rockfish	1.4	1.9
Greenstriped rockfish	0.8	1.1	Yellowtail rockfish	24.4	45.9
Halfbanded rockfish	0.6	1.6	**Rockfish total**	**938.8**	**1201.7**
Roundfish					
Cabezon	28.4	40.1	Pacific whiting	0.0	--
California sheephead	35.7	46.2	Rock greenling	1.6	0.7
Kelp greenling	15.8	22.6	Sablefish	--	0.0
Lingcod	106.3	226.0	Unspecified greenling	--	0.0
Monkeyface prickleback	4.3	1.1	**Roundfish total**	**192.1**	**336.8**
Sharks and skates					
Big skate	0.0	0.1	Soupfin shark	1.2	0.1
California skate	0.0	0.0	Spiny dogfish	1.5	9.7
Leopard shark	34.7	24.6	**Sharks and skates total**	**37.4**	**34.5**
			GRAND TOTAL	**1213**	**1666**

Notes:

1. Recreational catch includes sampler examined catch and observed discarded dead catch.
2. Catch data for 2011 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).