MARINE
Management News

A newsletter for everyone interested in the management and conservation of California's living marine resources.

California Department of Fish and Game
20 Lower Ragsdale Drive, Suite 100
Monterey, CA 93940

October 2003
Volume 4 No. 4

Closing a Fishery: The Case for San Francisco Bay Herring

by ***DFG Marine Region Staff***

More often than not, the California Department of Fish and Game (DFG) finds itself charged with balancing the health and survival of fishes and other sea creatures with the livelihoods of commercial fishermen and opportunities for sport fishing– a tall order indeed! Suggesting the closure of a fishery, which represents the most drastic of management actions, often stirs controversy. A lot is at stake, for all concerned.

Just how does DFG go about developing a recommendation for closing a fishery? Recently, DFG recommended closing the San Francisco Bay commercial herring fishery to the Fish and Game Commission for the 2003-2004 season. The DFG also provided a second option for the Commission to consider, which allowed for a fishery with a reduced quota and shortened season.

The closure recommendation and the reduced fishery alternative were based on DFG's analysis of detailed information it had collected on the San Francisco Bay herring population over the last 30 years. That information ranks among the best for any marine fish population in California, and here's why: Unlike most species, which are distributed coastwide, over 90 percent of California's Pacific herring congregate in San Francisco Bay to spawn from November through March each year, offering a unique and less difficult opportunity to collect high quality information on an annual basis.

While less difficult, it is by no means easy. The November through March spawning period marks an intense field season for DFG staff, who are on the water conducting two

"Herring Fishery" continued on page 8

Inside This Issue

Ryan Bartling, DFG Scientific Aide, processes herring spawn survey samples. DFG file photo

The "Jig is Up" for Cabezon, Greenlings, and CA Sheephead

by ***Chamois L. Andersen, Information Officer***

Annual sport harvest limits have been met for three fish— cabezon, greenlings, and California sheephead (the "CGS complex")— prompting marine managers to close those fisheries effective midnight on Wed. Oct. 8 for the remainder of the year.

Ocean sport fisheries that remain open include lingcod, sculpin (scorpionfish), ocean whitefish, sanddabs, sand bass, kelp bass, yellowtail, several tuna species, California halibut, and rockfish species not prohibited. Rockfish species and ocean whitefish are available in water depths up to 120 ft from Cape Mendocino to Pt. Conception, and in water depths up to 180 ft south of Pt. Conception.

Due to the closure of the CGS-complex fisheries, the current sport bag limit of 10 fish in the rockfish-cabezon-greenling complex can now only include rockfish species. Within the 10-fish bag limit, anglers can keep only two "shallow" nearshore rockfish species (defined as black-and-yellow, gopher, kelp, grass, and

"Jig is Up" continued on page 14

Abalone Report Cards Provide Vital Information for Abalone Fishery Management

by ***Jerry Kashiwada, Marine Biologist,*** *and*
Mary Patyten, Research Writer

As the last splutters of fresh abalone steaks die away in frying pans all along the northern California coast, it's time to once again do your part to take care of this delicious marine resource: turn in your abalone report cards!

The abalone report card is a valuable tool that helps DFG manage the sport-only red abalone fishery in northern California, which closes Nov. 30. In addition to helping DFG regulate a fisherman's annual catch of abalone, the abalone report card provides important data used to estimate the red abalone catch, both for the fishery as a whole and for specific sites along the coast. Abalone fishermen 16 years or older are required to purchase both a fishing license and an abalone report card. Fishermen must fill in the date, time, and location code on the card for each abalone taken (see sample card, right). Abalone report cards are required to be returned before the end of the year to the address on the back of the card.

Not turning in this card impairs DFG's efforts to monitor the fishery by limiting the information needed to estimate the total abalone catch. Fishermen can return their cards early if they do not plan on catching abalone all season, or if they complete their report cards before season's end.

Low report card return rates cause problems for DFG biologists trying to estimate the size of the abalone catch. For example, people who return report cards may have different catch rates, on average, than those who do not return report cards, which can throw estimates off (to everyone's detriment). The low return rates for 2001 report cards prompted DFG biologists to mail post cards out reminding fishermen to return their 2002 report cards. Even though the mailings greatly increased number of abalone report cards returned, less than half of the 2002 report cards made their way back to DFG.

A random telephone survey using the 2001 database of abalone card purchasers helped to correct inaccurate catch estimates caused by low return rates, but surveys cannot substitute for having all the cards returned. So, regardless of whether you caught your limit, or bought a report card and then did not try to catch a single abalone, DFG needs your abalone report cards returned before the end of the year!

For additional information on California abalones and on the abalone report card program, contact Mr. Jerry Kashiwada, marine biologist, at (707) 964-5791. Information is also available on the DFG Web site at ***www.dfg.ca.gov/mrd/abalone***.


2003 California
ABALONE REPORT CARD
(Valid January 1, 2003 - December 31, 2003)

DATE OF ISSUE
HOME PHONE
NAME
STREET ADDRESS
CITY
STATE
ZIP
CALIFORNIA FISHING LICENSE NUMBER
DRIVER'S LICENSE/ID # NUMBER/DATE OF BIRTH

	MONTH	DAY	TIME	LOCATION CODE	MONTH	DAY	TIME	LOCATION CODE	
1									13
2									14
3									15
4									16
5									17
6									18
7									19
8									20
9									21
10									22
11									23
12									24

COUNTY	SITE	CODE	COUNTY	SITE	CODE
Del Norte	Crescent City	01	Mendocino	Navarro Ridge	47
Del Norte	Other Del Norte County	09	Mendocino	Elk	48
Humboldt	Patrick's Point	11	Mendocino	Point Arena Lighthouse	51
Humboldt	Trinidad	14	Mendocino	Point Arena (Arena Cove)	53
Humboldt	Pedra Gorda	15	Mendocino	Manchester	53
Humboldt	Stelter Cove	18	Mendocino	Schooner Gulch	53
Humboldt	Other Humboldt County	19	Mendocino	Saunders Landing	54
Mendocino	Bear Harbor	20	Mendocino	Anchor Bay	56
Mendocino	Usal	21	Mendocino	Robinson Point	58
Mendocino	Hardy Creek	22	Sonoma	Gualala Point	60
Mendocino	Abalone Point	24	Sonoma	Sea Ranch	62
Mendocino	Westport	25	Sonoma	Black Point	64
Mendocino	Kibesillah	27	Sonoma	Stewarts Point	66
Mendocino	MacKerricher State Park	29	Sonoma	Rocky Point	68
Mendocino	Glass Beach	30	Sonoma	Horseshoe Cove	70
Mendocino	Georgia Pacific Mill	31	Sonoma	Fish Hill Cove	72
Mendocino	Todd's Point	33	Sonoma	Salt Point State Park	74
Mendocino	Hare Creek	34	Sonoma	Ocean Cove	76
Mendocino	Jughandle State Reserve	35	Sonoma	Stillwater Cove	78
Mendocino	Caspar Cove	36	Sonoma	Timber Cove	80
Mendocino	Russian Gulch State Park	38	Sonoma	Fort Ross	82
Mendocino	Jack Peters Gulch	39	Sonoma	Reef Campground (Portion)	84
Mendocino	Mendocino Headlands	40	Sonoma	Jenner	85
Mendocino	Gordon Lure (Spring Ranch)	41	Sonoma	Bodega Head	88
Mendocino	Van Damme State Park	42	Marin	Tomales Point	91
Mendocino	Dark Gulch	44	Marin	Point Reyes	93
Mendocino	Albion Head	45	Marin	Other Marin County	99

THIS CARD IS NONTRANSFERABLE
ONLY ONE ABALONE REPORT CARD MAY BE PURCHASED PER YEAR
CARDS MUST BE RETURNED TO DFG ADDRESS ON BACK

Abalone report card

Proposed Changes to Recreational Bottom-Fishing Regulations for 2004

by ***DFG Staff***

Changes in California's ocean sport fishing regulations for federally-designated groundfish (rockfish, lingcod, cabezon, kelp greenling, and California scorpionfish), and associated state-managed species (rock greenling, ocean whitefish and California sheephead) have been proposed by DFG for consideration by the Fish and Game Commission for the 2004 calendar year. These regulatory changes are needed to help achieve groundfish management goals, including the rebuilding of "overfished" stocks of rockfish and lingcod, and will help achieve consistency between state regulations and federal groundfish rules for the 2004 calendar year. The federal Pacific Fishery Management Council adopted changes to groundfish rules on Sept. 12. The Commission is expected to take final action at its Nov. 7 meeting in San Diego.

The proposed changes would expand the fishing season (open period) for most species from six to ten months in the area south of 40º10' N. latitude (near Cape Mendocino). The proposed changes would also expand fishing areas in the central and southern management areas. The tables below summarize proposed and existing regulations for 2004; all proposed changes are subject to the Commission's approval.

Proposed Recreational Bottom-Fishing Regulations* for 2004

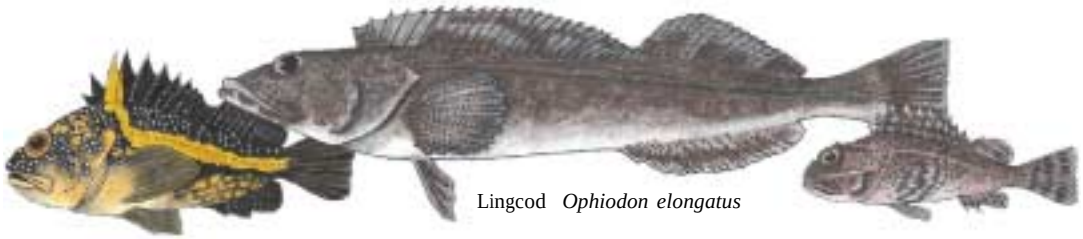
Northern Management Area
Ocean waters between the California-Oregon Border and 40°10' N. latitude (near Cape Mendocino)

Species	Time Period	Depth Limit	Daily Bag Limit	Size Limit[1]
Rockfish (except canary, cowcod, yelloweye and bocaccio rockfishes)	Open all year	no depth restrictions	10 fish in combination; see sub-limits for bocaccio, canary, and yelloweye rockfishes	see individual species below
Canary, Cowcod, and Yelloweye Rockfishes	CLOSED all year; NO RETENTION		NO RETENTION (zero)	
Bocaccio	Open all year	no depth restrictions	2 per person; also included in the 10-fish aggregate rockfish bag limit.	10" total length or greater
Cabezon	Open all year	no depth restrictions	10 per person	15" total length or greater
Kelp and Rock Greenlings	Open all year	no depth restrictions	10 kelp greenling per person; 10 rock greenling per person	12" total length or greater
Lingcod	Open all year	no depth restrictions	2 per person	24" total length or greater

*** Subject to Fish and Game Commission approval**

1 See regulations for information on gear restrictions and fillet lengths

"Proposed Regulations" continued on page 10



China rockfish *Sebastes nebulosus*

Lingcod *Ophiodon elongatus*

California scorpionfish *Scorpaena guttata*

Fish sketches by Miller and Lea, 2000; Sinclair 2000

The frilly reproductive structure of Undaria *sets it apart from most native California kelps.*

Undaria
Exotic Catalyst of Change

by ***John Ugoretz****,* ***Marine Biologist*** *DFG file photo*

Invasive species, or non-native species that become established in new areas, are rapidly becoming one of the greatest concerns to the health of both marine and terrestrial environments. These species may compete with native species for food or habitat, consume native species, and can fundamentally alter whole ecosystems. They pose threats to both the environment and the economy. The rate of invasive species introduction has risen dramatically in recent years and shows no signs of leveling off. In San Francisco Bay alone there are an estimated 175 or more species of non-native marine invertebrates, fish, algae, and higher plants.

Although the rate of introductions is rising, invasive species have long been present in California. Some species have become part of what most would consider the "normal" environment. A good example is the striped bass, a popular sport fish found throughout the West Coast. Many people don't realize that striped bass were intentionally introduced to California waters in two small shipments in the late 1800s. Their current abundance and range shows how well established an introduced species can become.

In the case of the striped bass, resource managers decided to let the introduced species remain. Striped bass are not displacing local species and are popular with fishermen. In other cases, introduced species are actively controlled and removed. These species pose a threat to native species or otherwise damage the local environment.

With few or no natural predators in their new environment, invasive species can rapidly become predominant, leading to changes that may have serious environmental consequences. In the Great Lakes an estimated $5 billion has been spent battling the invasive zebra mussel. In the worst case, as with the green algae *Caulerpa taxifolia* in the Mediterranean, invasive species can completely displace natives and permanently alter the ecosystem.

The brown alga *Undaria pinnatifida* has recently become established in California. *Undaria* occurs naturally in Japan and is used as a food product, *wakame*, in sushi and miso soup. It was first seen in Los Angeles Harbor in March, 2000. It spread to other southern California harbors and by August 2001 was found as far north as Monterey. *Undaria* probably arrived in ballast water and can spread on ship hulls, fishing gear, or even pleasure craft. *Undaria*

"Undaria" *continued on page 5*

Undaria pinnatifida
DFG file photo

"Undaria" *continued from page 5*

does have the potential to spread to the open coast, and in New Zealand has covered large areas outside of bays and harbors. In California it is mostly in harbors but unfortunately has been observed in open waters at Catalina Island.

The primary concern with *Undaria* is that it may displace important local species like giant kelp, or cause shifts in the abundance of marine fish and invertebrates that use native algae for food or shelter.

Undaria is unlike most native California algae in appearance, having a highly lobed blade with a prominent midrib. The blade itself is very thin and more fragile than other algae. The biggest difference, however, is found at the base of the blade where a unique reproductive structure called a *sporophyll* forms. This structure is deeply frilled and when fully developed almost resembles a pine cone. *Undaria*, like some other algaes, has a microscopic reproductive stage (called a *gametophyte*) that is difficult to detect. For this reason, ongoing monitoring and management is required even if the larger, visible stage has been removed.

The key to preventing the further spread of *Undaria*, or any invasive species, is prompt detection and control. The boating and fishing public can play a major part in this effort by notifying DFG of *Undaria* populations, properly maintaining vessels, and keeping boat hulls and other in-water gear clean and free of fouling. *Undaria* is being removed wherever possible, although considering its current spread it is unlikely that it can be completely eradicated from state waters.

DFG is currently working with other agencies and the public to develop an aquatic invasive species plan, likely to be completed in 2004. For a recent survey of non-native marine and brackish California plants, go to ***www.dfg.ca.gov/ospr/organizational/scientific/exotic/exotic%20report.htm.*** For more information on *Undaria* or other invasive species, contact Susan Ellis, DFG invasive species coordinator at (916) 653-8983 or by e-mail at *sellis@dfg.ca.gov*.

Author John Ugoretz with Undaria *from Santa Barbara Harbor. DFG file photo*

DFG Biologist Finds Rare Fish

by ***Mary Patyten, Research Writer***

photo by R.N. Lea

Hmmm… it's a sculpin, yes, but exactly what species?

You could almost hear the wheels whirring as Bob Lea, DFG marine biologist, puzzled over his first glimpse of the fish from the research submersible *Delta*, 250 m (750 ft) down in the Cypress Arm of Carmel Submarine Canyon. With those blazing-white "eyebrows," delicate white "feelers" extending from the head and sides, and a huge mouth, it was quite unlike anything he'd seen on previous submersible dives.

He found the fish resting on a soft-silt bottom within the Arm. At first, Lea thought it might be a dusky sculpin, but he realized after closer examination that he had found a rare **frogmouth**

"Marine Rarity" continued on page 15

UPDATES
Marine Management News

Commercial Lobster Fishery Lottery Ends, Regulatory Changes In the Works

by ***Kristine Barsky, Senior Marine Biologist Specialist***

Entry into California's commercial lobster fishery has been restricted since 1996. Last year, representatives from the lobster fishery went to the Fish and Game Commission and requested that fishing permits be made transferable and that the size of the fishery (capacity goal) be reduced. The DFG agreed that a review of the lobster restricted access program was needed, but projected that changes could not be implemented any time soon. In the meantime, a moratorium on the lobster lottery (for new entrants into the fishery) was proposed and approved by the Commission in July 2003.

In July, lobster industry representatives told the Marine Subcommittee that they had held industry meetings and reached agreement on criteria for transferable permits that they'd like to see implemented as soon as possible. Acknowledging that DFG is having to reduce its workload because of staffing limitations, the industry suggested that they hire a consultant to prepare the paperwork for regulatory changes. The commissioners encouraged their efforts, provided they work with DFG to insure that the regulatory package addresses all areas of concern and includes a complete range of options.

Spiny lobster, *Panulirus interruptus*
photo courtesy S. Barsky. All rights reserved.

2004 Regulations Evolving for Cabezon, Sheephead, Greenlings

by ***Deb Wilson-Vandenberg, Research Manager***
and ***Mary Patyten, Research Writer***

Harvest limits and allocations have been adopted by the Fish and Game Commission for the cabezon-greenlings-sheephead complex (CGS complex) for 2004.

The new allocation ratios will increase the proportion of the landings that can be harvested by the recreational fisheries for all three species, while lowering the proportion for commercial fisheries. Region-based harvest limits were considered, but were ultimately rejected by the Commission.

The Commission adopted conservative interim harvest guidelines for the CGS complex in 2000 to address concerns that recent landings would not be sustainable. This concern, coupled with limited information on the status of the stocks, prompted Commission action.

When the *Nearshore Fishery Management Plan* was adopted in 2002, DFG was asked to review the interim harvest guidelines for the CGS complex using refined recreational and commercial landings data, and to produce appropriate, precautionary harvest limits that were not to exceed 50 percent of recent landings. The Commission also asked DFG to re-evaluate the recreational-commercial allocation ratios adopted in 2000 using the refined landings information.

In Aug. 2003, the Commission adopted revised harvest guidelines that changed the total harvest limits slightly, and adjusted the 2000 allocation ratios (see table, page 7). The Commission also adopted two-month trip limits for the commercial fishery.

DFG will continue to conduct in-season monitoring of the fisheries to keep landings

"CGS complex" continued on page 7

"CGS Complex" continued from page 6

sustainable, and to close fisheries early when projections indicate harvest limits will be reached prior to the end of the fishing season.

The recently completed cabezon stock assessment rated that population as "precautionary," but found that it was not overfished. The Pacific Fishery Management Council's (PFMC) Science and Statistical Committee will review the assessment results, which should be adopted in November. At that time, future harvest limits will be set by PFMC and the state.

Species	Commercial Allocation	Recreational Allocation	Total Statewide Harvest Limits
California sheephead	75,200	130,300	205,500
Cabezon	75,600	118,300	193,900
Greenlings (genus *Hexagrammos*)	3,400	34,200	37,600

2004 Allocations and Harvest Limits (in pounds) for the CGS complex

The CGS-complex fishery, a derby-style commercial fishery where fishermen rush to catch fish before allocations are met, has been a problem ever since interim regulations were adopted in 2000. DFG and the Commission have adopted management measures to address the derby-fishery problem, including trip limits. Unfortunately, these trip limits will impact the top-producing individuals who have the most invested in the fishery, and whose landings have been well above the established trip limits. Alternatives to help minimize this impact have been or will be presented to the Commission for consideration. Among the options being discussed are permit stacking, tiered permit systems, and individual transferable quotas (also known as ITQs).

Interested constituents will be provided with opportunities to comment on proposed regulations at future Commission meetings (the full set of CGS complex regulations has not yet been developed). For more information, contact Ms. Deb Wilson-Vandenberg, research manager, at (831) 649-2892, or e-mail *dwilsonv@dfg.ca.gov*.

Since the tide is right...

Try surfing on the Marine Region Web site
www.dfg.ca.gov/mrd

Changes in Commercial Sea Urchin Season, Regulations Give Fishermen a Break

by ***Peter Kalvass, Senior Marine Biologist***

Several changes to the commercial sea urchin regulations (Title 14, Sec. 120.7) became effective on Sept. 2. The most significant of these from a management perspective is the elimination of the once-monthly, week-long closures in May, June, Aug. and Sept. that have been a fixture of the fishery since 1992. The closures were intended to reduce effort during the period when fishery value was lowest and opportunity greatest. The industry has argued that the closures made it difficult to maintain a consistent market presence during the summer months and that overall effort has declined. In addition to eliminating the weekly closures, the month of July was opened to fishing in northern California, providing for a statewide uniform season.

The minimum landing requirement for renewal of a sea urchin permit, established in 1990, was also repealed. This provision, intended as a tool to reduce the number of fishery participants, was ineffective and caused some permittees to fish for sea urchins when they otherwise would not have, in order to meet the requirement.

The existing procedure for issuing new permits via a random drawing among qualified sea urchin crewmember permittees was modified to give greater opportunity for obtaining a permit to crewmembers that have been active in the fishery for a longer period of time. The change gives crewmember permittees one additional drawing entry for each year of participation in the fishery above a minimum of two years, to a maximum of five entries per drawing. There are several other changes pending administrative review.

The due date for sea urchin fishing activity records was modified from the fifth day of the month to the tenth day in order to make this regulation consistent with Section 190 and with other fisheries.

"Sea Urchin" continued on page 14

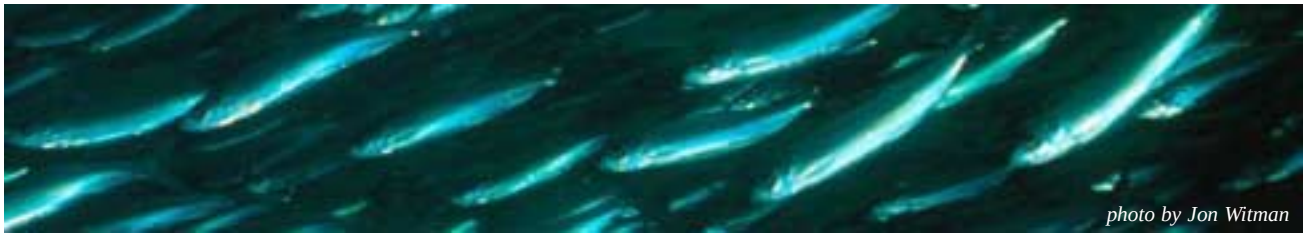


photo by Jon Witman

"Herring Fishery" continued from page 1

independent surveys and sampling schools of herring throughout the five-month period.

One of DFG's annual surveys, the hydroacoustic survey, measures herring schools with depth-sounding gear which draws, or "marks," the schools on paper. This survey is conducted from a 32-foot aluminum vessel that is also used to collect samples of herring from each school with a mid-water trawl.

To minimize the effect of school movement, the hydroacoustic survey is conducted at slack tide. Transects are run across a school and its dimensions are recorded. At the DFG laboratory in Belmont, these dimensions are measured to calculate the surface area of the school. The marks on paper are then compared to a standard that DFG created by chartering a purse-seine vessel to actually catch and weigh herring that had been marked hydroacoustically. DFG biologists use this standard each season to estimate the schools' weight as represented by marks of varying density and area. This is one way that DFG biologists estimate the total tonnage of a herring school.

Samples of herring scooped up in mid-water trawls are used to determine the age composition of the school, as well as its sex ratio (males to females) and readiness to spawn. At the Belmont lab, otoliths (ear bones) are removed from the fish and examined under a microscope to determine age. The herring are also measured and weighed to determine their condition as an indicator of growth and general well-being.

Another survey, the spawn survey, estimates herring school size by measuring spawning areas. Spawning occurs in the intertidal and shallow subtidal zones of the bay when female herring lay sticky eggs on vegetation, rocks, pier pilings, and boat bottoms. Spawn surveys are conducted from an 18-foot aluminum skiff, which is ideal for getting into shallow areas (2 ft deep), nosing into rocky shorelines, or even beaching, which is sometimes necessary to collect egg samples. The total number of eggs spawned is estimated by determining the number of eggs in smaller sample areas, then averaging and expanding the number to cover the entire spawning area.

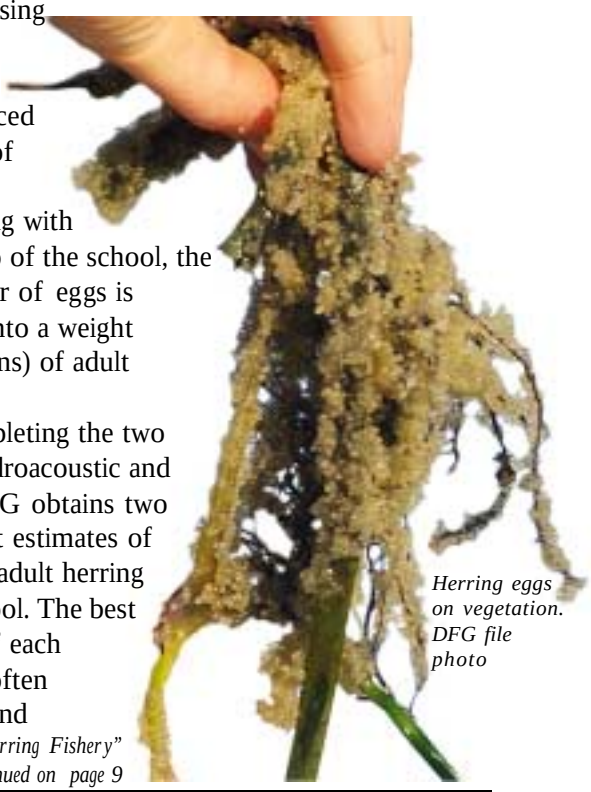
DFG biologists measure spawning areas and take samples using a variety of techniques depending on where the spawning occurs. For example, subtidal spawnings typically occur on vegetation, and samples are collected by dragging a rake from a skiff. Back in the Belmont lab, egg samples are cleaned, weighed, separated from vegetation, and the number of eggs are counted or estimated by weight.

At the beginning of each season, DFG divers sample subtidal vegetation to determine how densely the vegetation is growing. Vegetation density, along with the number of eggs in samples and the total area measurement, is used to calculate the total number of eggs spawned on vegetation. When herring spawn on pier pilings, DFG's inventory of the pilings along the San Francisco waterfront and the Sausalito marinas is used to estimate the number of eggs covering the pilings.

The total number of eggs spawned is used to calculate how many tons of adult herring have spawned. Using the average number of eggs produced per ounce of adult body weight, along with the sex ratio of the school, the total number of eggs is converted into a weight estimate (tons) of adult spawners.

By completing the two surveys (hydroacoustic and spawn), DFG obtains two independent estimates of the tons of adult herring in each school. The best estimates of each school are often combined and

"Herring Fishery" continued on page 9



Herring eggs on vegetation. DFG file photo

"Herring Fishery" continued from page 8

averaged to produce the season's total estimate of stock size (or *biomass*). Along the way, DFG also estimates the age structure of the stock from sampling as well as the "strength" of ages present. Of all the essential fisheries information needed to manage populations, stock size and age structure are the most valuable. The San Francisco Bay herring population is one of the few marine fish populations for which DFG has such extensive information.

With this data, DFG sets the upcoming season's fishing quotas. The quota is set annually at no more than 15 percent of the previous season's spawning biomass estimate. This harvest rate also takes into consideration ocean conditions, population size and structure, and the importance of Pacific herring as a food fish for other species.

Herring fishermen on San Francisco Bay. DFG file photo

For San Francisco Bay herring, these survey methods have served management purposes quite well. Over the past several years, however, DFG has become concerned about an increasing disparity between the two surveys' biomass estimates. While both estimates have been lower than the long-term average, hydroacoustic survey estimates have fluctuated and been higher, and spawn survey estimates have remained consistently low. Although the 2002-2003 surveys would normally have been used to set the quotas for the 2003-2004 season, DFG decided not to use them because of the increased potential for an inaccurate biomass estimate.

This situation spurred DFG to embark on an in-depth analysis of the status of the San Francisco Bay herring population, using data it had collected for the past 30 years. The results of the analysis raised a number of concerns about the current population's ability to support a fishery.

The population has seen a marked decline in the number of age four and older herring since the 1997-1998 El Niño event. Age four and older herring are needed to support the fishery, since the management strategy is to avoid the harvest of age two and three herring, most of which are first-time spawners. A reduced number of age four and older herring means that there are fewer herring available to support the fishery.

This decline caused documented changes in the commercial catch. Even thought the number of age six and older herring in the total population is typically low, they comprised the largest portion of the commercial catch until the early 1990s. These ages now comprise less than ten percent of the catch. Age five herring, which had been the staple of the catch, has also fallen below ten percent of landings in recent years. Of particular concern is an increase in the number of age three herring in the commercial catch, many of which are first-time spawners. Age three herring have comprised as much as 50 percent of the catch in the last three seasons.

Another concern has been biomass estimates that have remained well below the long-term average from the 1997-1998 El Niño through the 2001-2002 season. (The 2002-2003 biomass estimate was never completed because of concern over disparate survey results.) Also, despite reduced quotas since the 1997-1998 El Niño and an increased amount of time spent fishing, the fleet has been unable to catch its full quota for five of the last six fishing seasons.

To further assess the status of the herring population, DFG processed its data using a Coleraine stock assessment model, an analysis tool developed by the University of Washington's School of Fisheries. The results of this assessment also indicated that the population biomass was at a low level, and that the age structure of the population was compressed, with fewer older herring.

Next, DFG sought an independent peer review of its use of the Coleraine model and its survey methods. California Sea Grant administered the peer review, selecting a panel of scientists with expertise in fish population dynamics. In addition to reviewing DFG's survey methods and use of the Coleraine model, the

"Herring Fishery" continued on page 13

"Proposed Regulations" continued from page 3

Proposed Recreational Bottom-Fishing Regulations* for 2004-Continued

Central Management Area

Ocean waters between 40°10' N. latitude (near Cape Mendocino) and 34°27' N. latitude (Point Conception)

Species	Time Period[1]	Depth Limit	Daily Bag Limit	Size Limit[2]
RCG Complex (including all species of Rockfish, Cabezon and Greenlings as defined in Section 1.91, Title 14)	Open Jan, Feb, and May-Dec Closed Mar-April	• Jan, Feb, and Sep-Dec may only be taken in less than 180 feet (30 fathoms)[3]; • May-Aug may only be taken in less than 120 feet (20 fathoms)[3]	10 fish in combination; see sub-limits for shallow nearshore rockfish, cabezon, greenlings, and bocaccio, cowcod, canary and yelloweye rockfishes	see individual species and groups below
Shallow Nearshore Rockfish (as defined in Section 1.90, Title 14; includes Black-and-yellow, China, Grass, Gopher and Kelp Rockfishes)	Open Jan, Feb, and May-Dec Closed Mar-April	• Jan, Feb, and Sep-Dec may only be taken in less than 180 feet (30 fathoms)[3]; • May-Aug may only be taken in less than 120 feet (20 fathoms)[3]	2 fish in combination; also included in the 10-fish aggregate RCG complex bag limit	
Cabezon	Open Jan, Feb, and May-Dec; Closed Mar-April	• Jan, Feb, and Sep-Dec may only be taken in less than 180 feet (30 fathoms)[3]; • May-Aug may only be taken in less than 120 feet (20 fathoms)[3]	3 fish; also included in the 10-fish aggregate RCG complex bag limit	15" total length or greater
Kelp and Rock Greenlings	Open Jan, Feb, and May-Dec; Closed Mar-April	• Jan, Feb, and Sep-Dec may only be taken in less than 180 feet (30 fathoms)[3]; • May-Aug may only be taken in less than 120 feet (20 fathoms)[3]	2 fish in combination; also included in the 10-fish aggregate RCG complex bag limit	12" total length or greater
Canary, Cowcod, and Yelloweye Rockfishes	CLOSED all year; NO RETENTION		NO RETENTION (zero)	
Bocaccio	Open Jan, Feb, and May-Dec; Closed Mar-April	• Jan, Feb, and Sep-Dec may only be taken in less than 180 feet (30 fathoms)[3]; • May-Aug may only be taken in less than 120 feet (20 fathoms)[3]	1 fish; also included in the 10-fish aggregate RCG complex bag limit	10" total length or greater
Lingcod	Open Jan, Feb, and May-Dec; Closed Mar-April	• Jan, Feb, and Sep-Dec may only be taken in less than 180 feet (30 fathoms)[3]; • May-Aug may only be taken in less than 120 feet (20 fathoms)[3]	2 per person	24" total length or greater
California Scorpionfish	Open Jan, Feb, and May-Dec; Closed Mar-April	• Jan, Feb, and Sep-Dec may only be taken in less than 180 feet (30 fathoms)[3]; • May-Aug may only be taken in less than 120 feet (20 fathoms)[3]	5 per person	10" total length or greater
Ocean Whitefish	Same as the rockfish and lingcod seasons[4]	Same as the rockfish and lingcod seasons[4]	10 per person	
California Sheephead	Same as the rockfish and lingcod seasons[4]	Same as the rockfish and lingcod seasons[4]	5 per person	12" total length or greater

***Subject to Fish and Game Commission approval**

1 Fish and Game Commission is considering a proposed exemption to closed periods for shore-based divers and anglers

2 See regulations for information on gear restrictions and fillet lengths

3 In the Cowcod Conservation Areas fishing is prohibited in waters greater than 120 ft (20 fathoms)

4 The Fish and Game Commission is considering three other options: open all year and may only be taken in less than 120 ft (20 fathoms)[3]; open all year and may only be taken in less than 360 ft (60 fathoms)[3]; open all year and no depth restrictions[3]

Proposed Recreational Bottom-Fishing Regulations* for 2004-Continued

Southern Management Area

Ocean waters between 34°27' N. latitude (Point Conception) and the U.S.-Mexican Border

Species	Time Period[1]	Depth Limit	Daily Bag Limit	Size Limit[2]
RCG Complex (including all species of Rockfish, Cabezon and Greenlings as defined in Section 1.91, Title 14)	Open Mar-Dec; Closed Jan-Feb	may only be taken in less than 360 feet (60 fathoms)[3]	10 fish in combination; see sub-limits for shallow nearshore rockfish, cabezon, greenlings, and bocaccio, cowcod, canary and yelloweye rockfishes	See individual species and groups below
Shallow Nearshore Rockfish (as defined in Section 1.90, Title 14; includes Black-and-yellow, China, Grass, Gopher and Kelp Rockfishes)	Open Mar-Dec; Closed Jan-Feb	may only be taken in less than 360 feet (60 fathoms)[3]	2 fish in combination; also included in the 10-fish aggregate RCG complex bag limit	
Cabezon	Open Mar-Dec; Closed Jan-Feb	may only be taken in less than 360 feet (60 fathoms)[3]	3 fish; also included in the 10-fish aggregate RCG complex bag limit	15" total length or greater
Kelp and Rock Greenlings	Open Mar-Dec; Closed Jan-Feb	may only be taken in less than 360 feet (60 fathoms)[3]	2 fish in combination; also included in the 10-fish aggregate RCG complex bag limit	12" total length or greater
Canary, Cowcod, and Yelloweye Rockfishes	CLOSED all year; NO RETENTION		NO RETENTION (zero)	
Bocaccio	Open Mar-Dec; Closed Jan-Feb	may only be taken in less than 360 feet (60 fathoms)[3]	1 fish; also included in the 10-fish aggregate RCG complex bag limit	10" total length or greater
Lingcod	Open Mar-Dec; Closed Jan-Feb	may only be taken in less than 360 feet (60 fathoms)[3]	2 per person	24" total length or greater
California Scorpionfish	Open Mar, April, Nov, and Dec; Closed Jan, Feb, and May-Oct	may only be taken in less than 360 feet (60 fathoms)[3]	5 per person	10" total length or greater
Ocean Whitefish	Same as the rockfish and lingcod seasons[3]	Same as the rockfish and lingcod fishing depths[3]	10 per person	
California Sheephead	Same as the rockfish and lingcod seasons[3]	Same as the rockfish and lingcod fishing depths[3]	5 per person	12" total length or greater

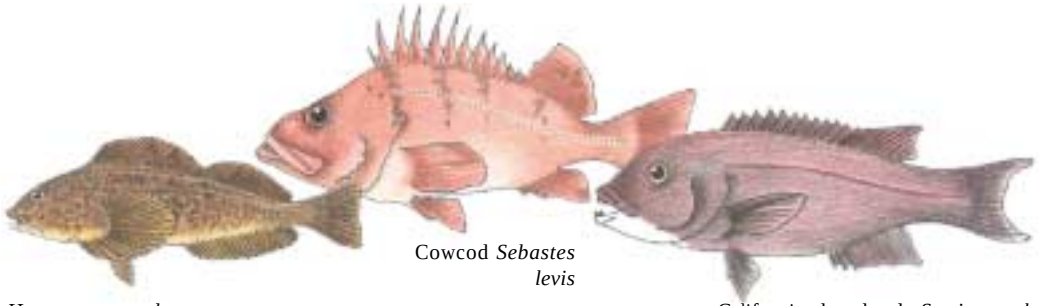
***Subject to Fish and Game Commission approval**

1 Fish and Game Commission is considering a proposed exemption to closed periods for shore-based divers and anglers

2 See regulations for information on gear restrictions and fillet lengths

3 The Fish and Game Commission is considering three other options: open all year and may only be taken in less than 120 feet (20 fathoms)[4]; open all year and may only be taken in less than 360 feet (60 fathoms)[4]; open all year and no depth restrictions[4]

4 In the Cowcod Conservation Areas fishing is prohibited in waters greater than 120 feet (20 fathoms)



Kelp greenling *Hexagrammos decagrammus* (female)

Cowcod *Sebastes levis*

California sheephead *Semicossyphus pulcher* (female)

Fish sketches by Miller and Lea, 2000; Sinclair 2000

White Sharks: Commonly Asked Questions About a Top Marine Predator

by ***Carrie Wilson, Marine Biologist and Mary Patyten, Research Writer***

White sharks, also called great white sharks (*Carcharodon carcharias*), are one of the ocean's primary predators, and fascinating creatures to many. Yet, white sharks remain one of the least understood of the sea's creatures, despite the enormous popular and scientific interest in them. We've listed below some common questions about white sharks, with answers from DFG experts:

Q: What do white sharks typically eat?

Juveniles typically feed on fishes, small sharks, and rays. Both adults and juveniles are ambush predators. Adults have a wider menu than juveniles which includes fishes, seals, sea lions, dolphins, whale blubber (scavenged), seabirds, marine turtles, rays, and other sharks.

Q: How often do white sharks reproduce?

White sharks are long-lived, and not very abundant. Male white sharks become sexually mature at around 9-10 yrs. of age. Females become mature at around 14-16 yrs. of age, and can have between two and 14 "pups" per litter. Birthing is thought to occur in the spring and summer months. Each pup is around 4-5 feet long at birth, and comes equipped with a full set of teeth. White sharks, as with most long-lived ocean creatures, suffer from high mortality rates during their first year of life. Scientists believe white shark gestation periods last about 12 months, which means that female white sharks may breed only once every two years. This indicates that it would take a long time for white shark populations to recover if they became severely depleted.

image courtesy of NOAA

Q: How do you tell white sharks from other species?

According to Dr. Robert Lea, associate marine biologist and shark expert for DFG, "If you see a shark greater than 15 ft. in California waters, chances are it's a white shark." White sharks have heavy spindle-shaped bodies with conical snouts and a narrow tail stalk supported by stout lateral keels. Their coloration reflects a sharp demarcation between dark upper surfaces and white lower surfaces. Their jaws are loaded with large, triangular, serrated teeth.

Q: How can people avoid white shark attacks?

There is only one foolproof method for avoiding a white shark attack: stay out of the ocean. If this is not an option, try to avoid places known for white sharks, such as the Farallon Islands, Año Nuevo, and Bird Rock near Point Reyes. Avoid swimming in areas where marine mammals are congregating. Don't swim in or near areas frequented by sea lions, harbor seals, and elephant seals, etc. or near their rookeries.

Wearing a wetsuit and fins, or lying on a surfboard, creates the silhouette of a seal from below. Shark attacks are often believed to be cases of mistaken identity, with surfing or swimming humans mistaken for seals or sea lions. Times of reduced sunlight, such as foggy mornings or dusk, are ideal times to be mistaken for a seal.

Q: How common are shark attacks on humans?

While they don't typically prey upon humans, white sharks do pose an extreme threat if you meet them on their "turf ", or maybe in this case "surf." Since 1950, there have been 93 white shark attacks on humans in all of California. Of those, 10 have now been fatal.

Until this August's incident involving a swimmer near Avila Beach, it had been nearly nine years since a fatal white shark attack occurred in California. Only 19 of the 93 shark attacks on humans in California have been south of Point Conception within the past 53-year period.

Even though human use of the water over the years has greatly increased with the growing human population and the popularity of surfing, swimming, and scuba diving, white shark incidents have not increased in a parallel manner.

Q: Where do white sharks live?

White sharks are widely distributed around the world. They live mostly in cold, temperate seas, only occasionally occuring in tropical seas. White sharks prefer waters with sea surface temperatures between 50-72° F. White sharks have been known to range as deep as 6,150 ft.

Q: Is fishing for white sharks illegal?

White sharks are indeed illegal to take and have been protected in all California waters since Jan. 1, 1994. Regulations state that white sharks many not be taken under a sport fishing license. Commercial fishing operations may not target white sharks, either.

For more information, log on to ***www.dfg.ca.gov/mrd/whiteshark.html***

"Herring Fishery" continued from page 9

review panel applied two additional stock assessment models to DFG's herring data. The results from the three models were very similar. The peer review panel found that the San Francisco Bay herring population has been reduced to a level equal to roughly 20 percent of the "unfished" population. In other words, if herring had never been fished in San Francisco Bay at all, *ever*, only 20 percent of that population would be left today. The panel found that the herring population is presently at or near the lowest abundance observed since the early 1970s, and recommended that a rebuilding policy be implemented.

The results of the peer review confirmed DFG's concerns about the San Francisco Bay herring population, and supported the recommendation for fishery closure for the 2003-2004 season. DFG believed that the herring population in San Francisco Bay, in its present state, would be hard pressed to support a fishery. However, the Commissin chose DFG's second option for the fishery, a reduced quota and shortened season, based on its assessment of both biological and socio-economic impacts. This decision is likely to maintain the stock at its present level rather than help it to rebuild.

Continued concerns about the San Francisco Bay herring population will fuel further reviews of DFG's herring management plan. The past few months of in-depth data analysis and the peer review process are important first steps in an ongoing, thorough evaluation of management strategies. DFG is committed to continue this evaluation and to gather industry and public input throughout the upcoming herring season. The Director's Herring Advisory Committee, which is composed of industry members, meets with DFG annually to provide input. In addition, DFG holds an informal town hall meeting during the fishing season and a public meeting at the end of the season to discuss herring fishery management.

With so much at stake, the recommendation to close a fishery is never made without a tremendous amount of work and careful analysis. For the herring fishery, as with any California fishery, DFG staff put in many long hours obtaining and sifting through data and examining the results before deciding to recommend that last serious management step, if necessary.

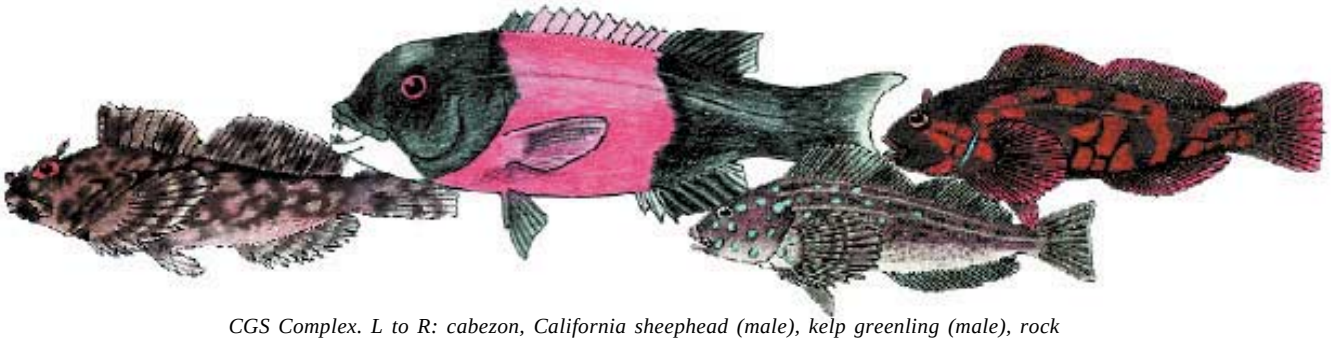
More information about the herring fishery, the regulatory process, and the peer review findings mentioned in this article can be found on the Marine Region Web site, ***www.dfg.ca.gov/mrd/herring/index***.

Special Public Meeting Set to Review Abalone Recovery and Management Plan

by ***Mary Patyten, Research Writer***

The first in a series of special Fish and Game Commission meetings to receive public input on the draft Abalone Recovery and Management Plan (ARMP) has been set for Wed., Nov. 19 from 6 to 9 p.m. at Monterey Beach Resort (The Bay View Room) 2600 Sand Dunes Drive, in Monterey.

Once completed, the ARMP will provide guidelines for the recovery and management of seven species of California abalone. The plan aims to recover depleted species in central and southern California, while continuing to closely manage the sport fishery for red abalone in northern California. For more information, contact Ian Taniguchi, marine biologist, at (562) 342-7182, or go to the Marine Region Web site at ***ww.dfg.ca.gov/mrd/abalone***.



CGS Complex. L to R: cabezon, California sheephead (male), kelp greenling (male), rock greenling. Miller and Lea, 2000; Sinclair 2000

"Jig is Up" continued from page 1

China rockfishes). For a complete list of open ocean sport fisheries, log onto DFG's Web site at ***www.dfg.ca.gov/mrd***.

The CGS-complex fishery closure applies coastwide to all recreational angling and diving activities in all waters, at all depths, and includes all methods of take. The year-round sport fishing season for these species north of Cape Mendocino is now also closed.

"Our sampling efforts reveal that a large number of anglers caught an unusually high number of fish just after the season opened," said Fred Wendell, DFG's nearshore fishery manager.

While southern and central California sport anglers were subject to a six-month season for rockfishes, CGS-complex species, and other species whose fisheries opened July 1, unanticipated high landings prompted early closures. DFG's marine managers explained that this is the result of several key factors. Anglers who typically target salmon and albacore found that those fisheries were not very productive in the early part of the season, unlike last year when ocean conditions were excellent. Some of those anglers switched to fishing for rockfish instead. Because of the sheer number of anglers who experienced successful catches, the quotas were met during what many consider the prime fishing season.

Depth regulations and bag and possession limits are key to managing the resource. "Anglers and the hundreds of boat captains along the coast who take out paying patrons really need to understand the regulations in order to ensure that the right fish are being caught during the open fishing season," Wendell said.

"We do have a lot of regulations that sport anglers need to follow, and regulations have become more complex as fishery managers struggle to provide as much fishing opportunity as possible while avoiding fishing for overfished ocean stocks such as bocaccio and canary rockfish."

Other shallow nearshore species catches are also high, which may lead DFG to close those fisheries in November. Reaching the harvest limits for cabezon so quickly is an indication that shallow rockfish limits will be met soon, because those fish occupy the same nearshore waters and are caught in conjunction with the CGS complex. During October, marine managers will review harvest data for nearshore species. Based upon their findings, DFG will notify anglers prior to any scheduled closure if shallow nearshore rockfish fisheries require closing.

For more information, check the Marine Region Web site, or contact Ms. Deb Wilson-Vandenberg, research manager, at (831) 649-2892.

"Sea Urchin" continued from page 7

In order to provide an economic incentive for divers to participate in a cooperative program to gather data for a long-term time series that will assist in the stock assessment of sea urchins, the proposed regulations would allow DFG to authorize a sea urchin diving permit holder to take, possess, land and/or sell red sea urchins during a closed season or in a closed area, subject to terms and conditions DFG may specify.

Any data collected during fishing activity conducted under this authority would be provided to DFG.

Proposed regulatory changes may be found on the Fish and Game Commission Web site at ***www.dfg.ca.gov/fg_comm/2003/120_7ntc.pdf***.

For more information, contact Mr. Peter Kalvass, Senior Marine Biologist, at (707) 964-0642.

"Marine Rarity" continued from page 5

sculpin, *Icelinus oclatus.* Only about a handful of preserved specimens are housed in museums and research collections worldwide. Although little is known about their biology, it's believed that their maximum length is about 185 mm, or slightly over 7 in. Our best guess regarding their diet is that they probably eat small crustaceans and other bottom-dwelling invertebrates.

It wasn't the "elusive" frogmouth sculpin that lured Lea into his first-ever dive at Cypress Arm, however. He was participating in a cooperative, long-term effort led by the Monterey Bay National Marine Sanctuary to document the types and abundances of rockfishes and larger invertebrates on the central coast. With submersibles such as the *Delta*, researchers can directly observe creatures and habitats at depth of over one thousand feet, which would be impossible with scuba gear. Submersibles offer an opportunity to escape the crushing pressures found at great depths and learn more about the deeper marine ecosystems and biological communities off our coast.

Due to State budget restraints, the *Marine Managemenent News* will only be published electronically until further notice. Sign up for automatic, electronic notification of new issues at:

www.dfg.ca.gov/mrd/subscribe.html

Copies are available for viewing or printing from the Marine Region Web site, at:

www.dfg.ca.gov/mrd/index_newsletter.html

Newsletter's New Editor

DFG file photo

As a long-time fishing enthusiast and marine naturalist, I take great pleasure in assuming my new post as editor of the *Marine Management News* newsletter.

My background covers all kinds of fishing – from bass fishing with my father on California lakes when I was a child, to commercial fishing for salmon and sport free-diving for red abalone. I have worked with DFG since 1995 as a scientific aide, editorial technician, and now as a research writer. I know how important the communication lines are between DFG and millions of California residents, especially with today's constantly changing regulations and environmental concerns. As DFG works to strike a balance between conservation and fishing opportunities, it will be my duty to bring you the latest news concerning recent actions and interesting developments. It's a job I take seriously. My hope is that, even with the state's budget woes, DFG will be able to continuously provide and even increase the types of communications that illustrate state actions and intents for our constituency. My personal belief is that communication is extremely important, even crucial, if we want to further develop and improve ocean fisheries management. Everyone, from biologists to managers to fishermen, must be on board and ready to work towards that improvement. Good communication can play a big role in making sure that happens.

All the best in years ahead,

Mary Patyten

Calendar of Events

2003 Fish and Game Commission Meetings
www.dfg.ca.gov/fg_comm/2003mtgs.html

Nov. 6-7 San Diego
Dec. 4-5 Sacramento

2003 Pacific Fishery Management Council
www.pcouncil.org/events/future.html

Nov. 3-7 San Diego

For the latest information on upcoming Marine Region meetings, please check out our Calendar of Events at ***www.dfg.ca.gov/mrd/calendar/index.html*** or contact our DFG office in Monterey at (831) 649-2870.

MARINE
Management News

Marine Management News is published quarterly by the Marine Region of the California Department of Fish and Game for everyone interested in the management and conservation of California's living marine resources. Through this newsletter we hope to keep all associates and constituents interested in participating in and/or tracking the progress of the Marine Life Management Act (MLMA) informed of developments. The MLMA strongly emphasizes an open decision-making process that involves people interested in or affected by management measures.

For more information on the MLMA or to sign up to become more involved, please visit our web site at *www.dfg.ca.gov/mrd.*

Editor, Graphic Layout and Design
Mary C. Patyten

Staff Writers and Contributors to This Issue
Chamois Andersen, Kristine Barsky, Pete Kalvass, Jerry Kashiwada, Becky Ota, Mary Patyten, Connie Ryan, John Ugoretz, Diana Watters, Carrie Wilson, Deb Wilson-Vandenberg

Please direct all correspondence to:
California Department of Fish and Game
20 Lower Ragsdale Drive, Suite 100
Monterey, California 93940

The Marine Life Management Act

California's 1998 Marine Life Management Act (MLMA) is an innovative, collaborative, science-based approach to managing all of California's living marine resources. One of its major goals is the long-term sustainability of our resources and our fisheries. The MLMA recognizes and values the non-consumptive benefits of healthy marine life as well as the interests of those who are economically dependent upon them. Implementation and enforcement of the MLMA is the responsibility of the California Department of Fish and Game, whose mission is to conserve wildlife and the habitats upon which they depend through good science and informed citizen involvement. For more information visit *www.dfg.ca.gov/mrd.*

California Department of Fish and Game's Marine Region Mission:

"To protect, maintain, enhance, and restore California's marine ecosystems for their ecological values and their use and enjoyment by the public"