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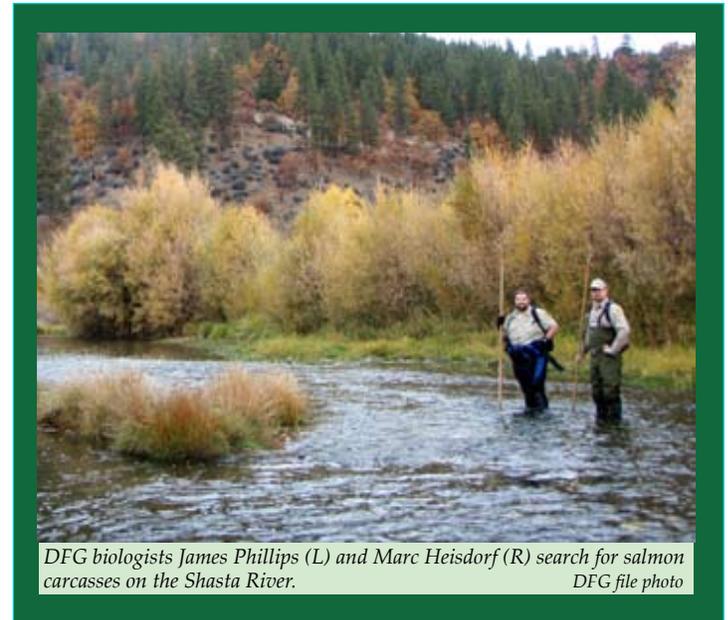


## Rising to the Challenge Collaborative Research Improves Management of California's

**Chinook Salmon** by Jennifer Simon, Marine Biologist  
 and James Phillips, Marine Biologist

Chinook salmon are one of California's most valued natural resources; they are prized by recreational anglers, commercial fishermen, and Native American tribes alike. Chinook are also a crucial part of the State's freshwater and ocean ecosystems. Because of their anadromous lifestyle – beginning life in fresh water, eating and growing in the ocean and then returning to their natal freshwater streams to spawn – Pacific salmon present unique management challenges that require the involvement of diverse and committed resource stewards.

Salmon fishery management is a complex multi-state, multi-agency public process, of which California is only one part. Staff from the Department of Fish and Game (DFG) Ocean Salmon Project (OSP) participate on the Salmon Technical Team – a group of scientific advisors to the Pacific Fishery



DFG biologists James Phillips (L) and Marc Heisdorf (R) search for salmon carcasses on the Shasta River. DFG file photo

Management Council. Their role is to analyze ocean catch data and the number of fish returning to spawn each year. The Team uses this information to predict the number of

"Salmon" continued on page 8

## The Marine Life Protection Act

**The North-Central Coast: A Study Region in Review**

by Elizabeth Pope-Smith, Marine Biologist

With the planning and design of marine protected areas (MPAs) in the North-Central Coast Region (Alder Creek/Pt. Arena to Pigeon Point) now completed, California is one step closer to fully implementing a statewide network of MPAs, as mandated by the Marine Life Protection Act (MLPA). Since 2004, the state has been working in a public-private partnership known as the Marine Life Protection Act-Initiative (MLPA-Initia-

tive) to create this statewide network of MPAs.

For the purposes of MPA design and planning on a regional scale, California was split into five study regions: the North Coast, North-Central Coast, Central Coast, South Coast and San Francisco Bay, each region having its own planning and implementation timeline. This approach allows for individual MPAs within each region to be designed with local input, eventually leading to a full statewide network. Input is gathered through members of a regional stakeholder group (RSG) who are publicly nominated and represent a broad array of stakeholder interests such as recreational and commercial fishing, conservation, education, and the general public.

The Central Coast Study Region (CCSR) was the first to be completed, when the California Fish and Game Commission (Commission) adopted 29 MPAs for the CCSR in April 2007.

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# Landing Seventy-Two Years of Sport Fishing History

*Commercial Passenger Fishing Vessel log books 1936 – 2009*

*by Alex Vejar, Associate Marine Biologist*

It's the end of a fun and rewarding sport fishing trip on your favorite party boat. You've caught your limit of rockfish and are enjoying the boat ride back to port when you notice the captain inspecting each bag of fish.

Have you ever wondered why the captain needs to know what you've caught, and how this information is used?

Owners or operators of commercial passenger fishing vessels (also known as CPFVs or party boats) are required to keep and submit a complete and accurate record of daily fishing activities. The Department of Fish and Game (DFG) has supplied logbooks to owners and operators of CPFVs for decades, and gathered extremely useful data on regional catch and effort for sport-caught marine finfish.

California has provided a Skipper's Logbook to CPFV captains since 1936.

The records are continuous except for six years during World War II (1941-1946) when CPFV activity was curtailed. These historical data provide long-term trend information about the distribution, relative abundance, and diversity of many ecologically and economically important fish species off California's coast. Spanning almost three-quarters of a century, this database is invaluable in understanding long-term fishery catch trends by species, areas fished, and fishing effort.

The CPFV log forms have changed over time, but consistently recorded the boat name, Fish and Game number (a fishing vessel registration requirement), port of landing, fishing location (recorded within 10 minute latitude by 10 minute longitude "blocks"), angler effort, and number of fish kept by species. The log forms for the Central-Northern and Southern California regions differ only by the species listed.

The current versions of the logbook form have been in use since 1994. In addition to the information captured on the earlier forms, today's logbooks meet current fishery management requirements by capturing information on the trip type

(single or multi-day), targeted species, fishing method, bait used, bird interactions, departure and return times, depth, sea surface temperature, number of fish thrown back, and number of fish lost to marine mammals.

The reliability of the data from fishing logs depends on CPFV captains recording daily catches accurately.

Accurate information gathered from these fishing logs

can be confidently used in stock assessments and fishery management plans to manage California's fish stocks and the fishing opportunities they support.

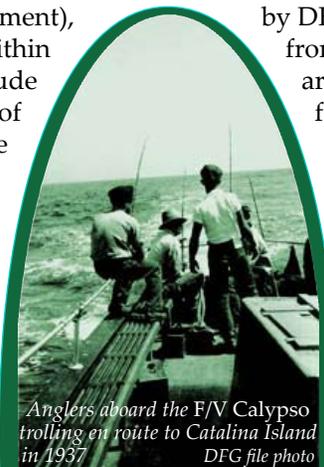
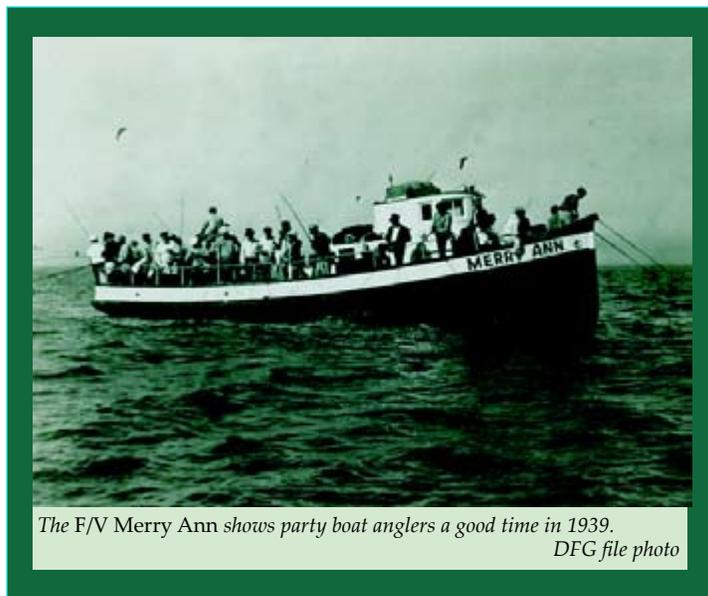
Log data have recently been used in stock assessments for blue rockfish, cabezon, California scorpionfish and California sheephead. The data have also been used to help develop and review fishery management plans for white seabass, nearshore fishes, and highly migratory species such as albacore, striped marlin,

dolphinfish (dorado), and mako shark.

CPFV logbook data are entered into a database by the DFG's Marine Fisheries Statistical Unit in Los Alamitos, edited by DFG biologists, and uploaded to the DFG Commercial Fisheries Information System. Electronic records of individual trip logs have been maintained by the DFG since 1980, but records of individual trips contain confidential vessel information and are not available to the general public.

Even so, a lot of information is available for public review. Monthly summaries of CPFV catch and effort by DFG blocks are available in electronic format from 1936 to 2007. Annual state and port landings are available as hard copy reports for most years from 1949 through 2009. Interested parties may contact the Marine Fisheries Statistical Unit at (562) 342-7130 for information.

Summaries of annual catches for the CPFV fleet from 2000 through 2007 are available as part of the California commercial fish landing reports on the DFG Web site at [www.dfg.ca.gov/marinelfishing.asp#Commercial](http://www.dfg.ca.gov/marinelfishing.asp#Commercial). Reports are posted to the site as soon as they are finalized. 🐟



# Marine Management News Fish Identification Quiz!

by Mary Patyten, Research Writer and Ed Roberts, Associate Marine Biologist



Welcome to the Marine Management News Fish Identification Quiz for May 2009! Here's your chance to show off your knowledge and win an official Department of Fish and Game (DFG) fish tagging cap (left). To win, simply send the correct answer via e-mail to [AskMarine@dfg.ca.gov](mailto:AskMarine@dfg.ca.gov) before May 31, 2009 correctly identifying:

- The **species of fish** pictured below (scientific name **and** an accepted common name)
- The current daily bag limit for California-caught fish, as given in the 2009-2010 recreational fishing regulations booklet for California.

For this quiz, we're challenging you to identify an immature fish (1 ft. long in the photo below); this species changes shape and color as it matures. Be sure to type "May 2009 MMN Fish Quiz" as the "Subject" of your e-mail. The winner will be selected during a random drawing from all correct answers received by May 31, 2009.

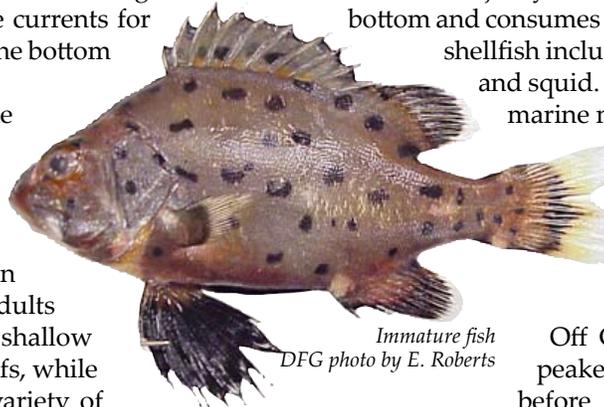
Although there are no published scientific studies that provide detailed information about the habits of this fish, biologists believe it migrates to specific areas to spawn each year from July through September. Females are capable of producing millions of eggs annually. The eggs float at the sea surface for 24 to 36 hours before hatching; afterwards, the tiny hatchlings drift with the currents for about a month before settling to the bottom as young fish.

This species ranges from the tip of Baja California, Mexico to Humboldt Bay in northern California although it is rare north of Point Conception. It may also be found in the northern half of the Gulf of California. Adults prefer to live near the edges of shallow (35 to 130 ft.) nearshore rocky reefs, while young fish may be found in a variety of habitats. Young fish have been caught over sandy bottom, sand-mud bottom, and over rocks and deep ridges by anglers targeting rockfish, at depths from 20 to 265 ft.

This species can reach over 500 lb. and 7 ft. in length; adults are nearly as big around as they are long. Males reach sexual maturity at around 40 lb., while females reach maturity at 50 to 60 lb. Young fish are perch-shaped, orange, with large pelvic fins and big black spots. As they grow they become bass-shaped with large tail fins; young adults are bronzy-purple to brown with large black spots, and adults are dark brown, black, or gray, with white bellies.

Some researchers believe this species has the ability to change color patterns at will; the large black spots may be present at any age. Biologists estimate this fish takes six years to reach 30 lb., 10 years to reach 100 lb., and 15 years to reach 150 lb.

For the majority of its life, this fish lives close to the bottom and consumes mostly bottom-dwelling fish and shellfish including rays, skates, crabs, shrimps, and squid. When young, it is eaten by many marine mammals and fish.



Both commercial and sport fisheries existed for this species in California, but because it grows slowly and matures at a relatively old age, it is easily overfished.

Off California, commercial landings peaked near 200,000 lb. in 1932 before declining. The later-developing recreational fishery for this fish peaked in 1973 after which landings also declined, partly because fishing excursions often targeted spawning aggregations.

If you think you know this species of fish, enter the prize drawing by sending an e-mail to the DFG at [AskMarine@dfg.ca.gov](mailto:AskMarine@dfg.ca.gov) with a common name and the correct scientific name, and the current daily bag limit for California-caught fish. Again, be sure to type "May 2009 MMN Fish Quiz" in the "Subject" portion of your e-mail. Answers to the quiz and the winner's name will be published in the next issue of *Marine Management News*.

## January 2009 "Mystery" Fish: Redtail Surfperch



Congratulations go out to Mr. Darrell Ticehurst for identifying the January 2009 mystery fish as a redtail surfperch, *Amphistichus rhodoterus*. The special daily bag and possession limit for redtail surfperch in San Pablo and San Francisco bays is 5 fish, while outside the bays the limit is 10 redtail surfperch (see Section 28.59).

Mr. Ticehurst served on the Pacific Fisheries Management Council from 2003 through 2006, and currently serves on Coastside Fishing Club's Board of Directors. He also writes the occasional fishing article, mostly on big game fishing, and fishes out of Half Moon Bay aboard his boat, the *Noosacat*.

# HAGFISH

A Re-Emerging Commercial Fishery

by Sabrina Bell, Marine Biologist

Lurking in the depths below dwells a creature few have ever seen and many would consider disgusting: the hagfish. Hagfish are like no other saltwater finfish and represent an ancient form of life. Despite its unusual (some would say *weird* and *repulsive*) characteristics, the Pacific hagfish (*Eptatretus stoutii*) is the target of a re-emerging commercial fishery in California that is being carefully monitored by Department of Fish and Game (DFG) biologists.

## Hagfish Biology

The hagfish has four hearts and one to 16 pairs of gill pores along its body. It lacks scales, paired fins, a stomach, and jaws, and has a skeleton made of cartilage. This fish has rudimentary eyes (eye spots) that are only able to detect light, and relies on its keen sense of smell and touch to get around (using a single

The hagfish is mostly known for its ability to produce large quantities of slime when agitated, giving it the common name “slime eel.” Amazingly, a single hagfish can turn an entire 5-gallon bucket of water into viscous slime. Even hagfish have a tough time getting rid of the slime; they have to tie their bodies into knots, and pass the knots down their bodies to slough it off, and “sneeze” to clear it from their sinus cavities. This knot-tying motion is also used by hagfish to escape from predators, and in their feeding behavior.

Considered a scavenger, the hagfish feeds mostly on dead and dying fish and marine mammals, thereby playing an important role in the ecosystem. It uses its acute sense of smell and touch to identify food sources, and then either burrows into its prey by making a hole with its rasping teeth, or enters through an existing opening (for example the mouth, gills, or anus) to



Pacific hagfish (*Eptatretus stoutii*) specimen. Ruler is in centimeters.  
photo courtesy of A. Clark

nostril and six to eight barbels, respectively). The hagfish’s jawless mouth contains two parallel rows of pointed keratinous teeth, which are secured to rasping dental plates. Its coloration ranges from pink to light brown to black depending on the species. Sixty-seven species have been identified in the world’s oceans.

Hagfish move with a snakelike motion, using their paddle-shaped tails. The hagfish’s slender, elongated body most closely resembles an eel’s, but they are not related. The average hagfish landed in the California commercial fishery measures 12 to 18 in. long according to DFG sampling data.

consume its prey from the inside, leaving only skin and bones when it is done. Due to its slow metabolism, the hagfish may survive for up to seven months without eating. When other food sources are not available, it subsists on worms and other bottom fauna. The hagfish is preyed upon by some marine mammals and large invertebrates, but most stay away due to the risk of slime suffocation.

Hagfish live primarily in muddy substrates and have been found at depths ranging from 30 ft. to 5,600 ft., but are more common at depths exceeding 300 ft. Though our current knowledge of this fish is limited,

“Hagfish” continued on page 5



*Pacific hagfish are offloaded from a commercial fishing vessel, showing characteristic slime.  
DFG photo by T. Tanaka*

“Hagfish” continued from page 4

studies indicate that the sexes are separate based on differences in internal body structure. In general, female hagfish reach sexual maturity at around 12 in. long, while males become sexually identifiable at 11 in. long. Females lay small clutches of 20 to 30 eggs per reproductive cycle. There is no specific spawning season, which means females may produce viable eggs at any time of the year.

### **The Re-emerging Fishery**

In California, the primary hagfish species sought by fishermen is the Pacific hagfish, one of three species known to occur in offshore waters of the state. It is only fished commercially. Hagfish are not consumed or used in the United States, but are instead shipped to Korea and other Asian countries where they are in great demand. Koreans eat hagfish and use hagfish skin to produce “leather” products (commonly sold as “eel-skin” wallets and belts).

The California fishery first emerged in 1982, when Koreans began looking for outside sources of hagfish due to local depletions. Prior to this, California fishermen had only considered hagfish a nuisance because they would eat and destroy their bait and catch.

California has seen two peaks in hagfish fishing effort and landings, from 1988 to 1992 and from 2007 to the present, with few landings in between. In 1990 hagfish fishery landings peaked at 2,490 tons. The subsequent lack of demand from 1993 to 2006 may have been due to a combination of factors, including poor skin quality, flesh that was unsafe to eat after applying anesthetic

to calm the fish, and market competition from hagfish caught along the East Coast. The new surge in the fishery targets hagfish primarily for human consumption (anesthetic is no longer used); hagfish are now landed and exported alive to Korea.

Commercial fishermen usually fish for hagfish at depths between 300 and 1,800 ft. using strings of baited Korean traps (cylindrical plastic tubes 5 in. wide by 24 in. long) or 5-gallon bucket traps. By law, fishermen may use up to 500 Korean traps or 200 buckets traps, which must have approved destructive devices that cause lost traps to free fish after a certain length of time. Fishermen are also required to possess a valid general trap permit. No other fishing gear or fish species may be on board when hagfish are targeted.

The DFG’s State Finfish Management Project has recently begun monitoring the hagfish fishery at Moss Landing, Santa Barbara, and San Pedro port areas. Project staff are currently sampling and collecting fish to improve life history and maturity information, as well as general knowledge about hagfish and the hagfish fishery. Due to the difficulty of measuring live hagfish in the field, the primary sampling statistic collected is the average number of hagfish per pound.

For more information about hagfish and DFG hagfish monitoring and research, contact Mr. Travis Tanaka, DFG Associate Marine Biologist, at (831) 649-2881 or e-mail [ttanaka@dfg.ca.gov](mailto:ttanaka@dfg.ca.gov).

*Commercial hagfish 5-gallon bucket traps (below) and a Korean trap (right)  
Hagfish traps are baited and deployed in strings at depths usually ranging from 300-1,800 ft.*



*DFG photo by J. Suchil*



*DFG photo by S. Bell*

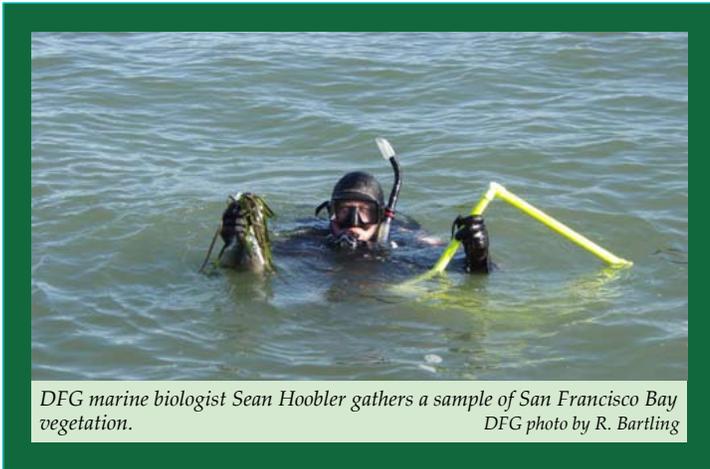


# UPDATES

## Marine Management News

### DFG Divers Survey San Francisco Bay's Underwater Vegetation

by Ryan Bartling, Marine Biologist and Mary Patyten, Research Writer



DFG marine biologist Sean Hoobler gathers a sample of San Francisco Bay vegetation. DFG photo by R. Bartling

In Dec. 2008 Department of Fish and Game (DFG) marine biologists completed the annual eelgrass and red algae (*Gracilaria* spp.) density survey in northern San Francisco Bay. Pacific herring and many other fish and shellfish species depend on adequate eelgrass and red algae densities for spawning, nurseries, and other important uses.

Using scuba and other gear, biologists randomly sampled small, quarter-meter square patches of the bay bottom, weighing the plant life encountered. Eelgrass in the areas sampled appeared healthy and abundant, while *Gracilaria* spp. were not found as frequently as last year. Vegetation density naturally varies from year to year based on salinity levels, water clarity, available sunlight, nutrients, and freshwater input from the Delta.

The survey results will be used along with other data to develop spawning biomass (total amount of spawning fish) estimates for the commercial herring fishery, as well as provide a snapshot of the relative health of eelgrass beds in San Francisco Bay.

Pacific herring prefer to spawn on eelgrass and red algae. Eelgrass also provides important habitat for juvenile salmon, lingcod, rockfish, and Dungeness crab. Various clams, shrimp, and migratory waterfowl all depend on healthy bay vegetation.

For more information about DFG's annual San Francisco Bay vegetation surveys, contact Mr. Ryan Bartling, DFG marine biologist, at (650) 631-2530 or e-mail [rbartling@dfg.ca.gov](mailto:rbartling@dfg.ca.gov).

### New Publications



Have you ever wanted to try surf fishing, but didn't know where to start? These new brochures, developed with California Sea Grant, provide novice surf fishermen with basic information

about fishing gear, best times and tides to fish, how to find likely surf fishing spots, and much more. Fish identification illustrations of the most popular species caught in central and southern California are included. The brochures were conceived as a "thank you" gift for beach anglers who provide valuable fishing information to biologists during beach surveys conducted by the DFG State Finfish Management Project. The brochures may be viewed and downloaded from the DFG Web site at [www.dfg.ca.gov/marine/beachfishing.asp](http://www.dfg.ca.gov/marine/beachfishing.asp), and are available in limited quantities by e-mailing a request to [AskMarine@dfg.ca.gov](mailto:AskMarine@dfg.ca.gov).



So, you think if you've seen one eelgrass blade, you've seen them all? Better take a closer look! There's an invader in our midst, creeping down from the Pacific Northwest: dwarf eelgrass, a native of Asia that is noticeably narrower than our native eelgrasses. Dwarf eelgrass invades mudflats and changes them into inhospitable habitat for shrimp and other invertebrates that live there,

crimping the food chain for shorebirds and other creatures. This brochure, developed with California Sea Grant, provides instructions for how to avoid spreading dwarf eelgrass. The brochure can be viewed and downloaded from the DFG Web site at [www.dfg.ca.gov/invasives/dwarfeelgrass](http://www.dfg.ca.gov/invasives/dwarfeelgrass), and is available by e-mailing a request to [AskMarine@dfg.ca.gov](mailto:AskMarine@dfg.ca.gov) or calling Ms. Kirsten Ramey, DFG marine biologist, at (707) 445-5365.

# Get Hooked on the Marine Region and MLPA Initiative Web Sites!

by Aaron Del Monte, Assistant Information Systems Analyst and Marine Region Webmaster

For the latest information on fishing regulations, marine resources, and news affecting our California coastline, your first stop should be the Department of Fish and Game Marine Region Web site, located at [www.dfg.ca.gov/marine](http://www.dfg.ca.gov/marine). This comprehensive information source currently contains well over 2,000 Web pages readily available to the public. If you are new to this Web site, we invite you to explore the valuable resources we have created. For those who have already visited the site, be sure to check back regularly, since new features, updates, and press releases are added every week. Here are some recent, noteworthy updates:

**What is the Marine Region?** [www.dfg.ca.gov/marine/marineregion.asp](http://www.dfg.ca.gov/marine/marineregion.asp) When visiting our site, one of your very first questions might be: "Where exactly is the Marine Region and what does the Marine Region do?" This newly developed page will answer these questions. In addition to an overview of the Marine Region, you will find a description of 14 current projects within the Region. In the near future, these descriptions will also include links to in-depth information for each of the projects.

**Summary of 2009 California Ocean Salmon Seasons** [www.dfg.ca.gov/marine/oceansalmon.asp](http://www.dfg.ca.gov/marine/oceansalmon.asp)

In April 2009, the Pacific Fishery Management Council, the National Marine Fisheries Service, and the California Fish and Game Commission adopted a limited recreational ocean salmon season in the Klamath Management Zone (Humbug Mountain, Oregon to Horse Mountain, California). Ocean salmon fishing south of Horse Mountain is closed to protect Sacramento River fall Chinook. Please see this page for more detailed information.

**Groundfish Central** [www.dfg.ca.gov/marine/groundfishcentral](http://www.dfg.ca.gov/marine/groundfishcentral) This newly enhanced site is a hub with links to groundfish information, including federal groundfish, associated state-managed species, and the commercial and recreational fisheries for these species.

**Red Abalone Frequently Asked Questions (FAQs)**

[www.dfg.ca.gov/marine/faqindx.asp#redabalone](http://www.dfg.ca.gov/marine/faqindx.asp#redabalone)

Since the recreational fishery for red abalone opened on April 1, do you have questions about regulations, including the requirements regarding tags and report cards? This section provides answers to the most frequently asked questions.

Here are some of our most popular pages:

**California Ocean Sport Fishing Regulations Map**

[www.dfg.ca.gov/marine/fishing\\_map.asp](http://www.dfg.ca.gov/marine/fishing_map.asp)

"Marine Region Website" continued on page 12

## The Marine Life Protection Act (MLPA) Initiative Web Site

[www.dfg.ca.gov/mlpa](http://www.dfg.ca.gov/mlpa)

This partnership between government agencies and private entities is striving to achieve the original MLPA goals. The 1999 MLPA directed the state to design and manage a network of marine protected areas (MPAs) in order to, among other things, protect marine life and habitats, marine ecosystems, and marine natural heritage, as well as improve recreational, educational and study opportunities provided by marine ecosystems. This Web site contains up-to-date information about this exciting endeavor, including meeting information, public comments and documents for review. The entire site was recently enhanced, making it even easier to locate specific information. Current popular resources on the site include:

**South Coast Region** [www.dfg.ca.gov/mlpa/meetings\\_sc.asp](http://www.dfg.ca.gov/mlpa/meetings_sc.asp) The planning process for the South Coast Region (Point Conception to the California-Mexico border) is currently underway. Meetings related to this process have been planned through the end of 2009. Use this page as a resource for meeting dates and locations, meeting agendas and meeting materials. In addition, meetings can be viewed in real time via Internet webcasting, or

you can view prior meetings in the video archive. Recent additions to the site include proposed MPA arrays that have been developed within the planning process.

**North-Central Coast Region** [www.dfg.ca.gov/mlpa/northcentralhome.asp](http://www.dfg.ca.gov/mlpa/northcentralhome.asp)

The North-Central Coast Region (Alder Creek near Point Arena (Mendocino County) to Pigeon Point (San Mateo County)) was the second of the five MLPA study regions to undergo the regional marine protected area planning and design process. Adoption of new MPAs by the Fish and Game Commission is expected in summer 2009 with an effective date in January 2010. The public can provide comments to the Commission on proposals in advance of their decision.

**Central Coast Marine Protected Areas (MPAs)**

[www.dfg.ca.gov/mlpa/ccmpas\\_list.asp](http://www.dfg.ca.gov/mlpa/ccmpas_list.asp)

California's Central Coast MPAs took effect on September 21, 2007. From Pigeon Point (San Mateo County) south to Point Conception (Santa Barbara County), this series of 29 MPAs represent approximately 204 square miles of state waters. This page contains descriptions of all 29 MPAs, including maps, and also contains links to a printer-friendly guide and brochure. 

stock-specific Chinook remaining in the ocean and whether ocean harvest can occur in the upcoming season while still meeting the Salmon Fishery Management Plan's conservation objectives.

For successful salmon conservation and scientifically-based management decisions, information on all salmon life stages is needed. Without accurate data from both freshwater and ocean environments, the Team is unable to make reliable fisheries management recommendations to the Pacific Fishery Management Council and the California Fish and Game Commission.

Because of the salmon's multi-faceted life strategy, it is particularly important to ensure effective coordination among DFG's Regions and Branches, other agencies, and external organizations involved in salmon management. The OSP is primarily responsible for monitoring ocean recreational and commercial salmon fisheries, while the DFG Fisheries Branch and staff from other DFG Regions are responsible for monitoring and managing inland salmonid habitat, river harvests, watersheds and hatcheries.

With last year's collapse of Sacramento River fall Chinook and the resulting closure of ocean salmon fishing in California, OSP was given an opportunity to expand its understanding of DFG's inland salmon responsibilities by assisting in-field monitoring and hatchery data collection efforts primarily undertaken by inland fisheries staff. These experiences have led to improved coordination and collaboration between OSP and other DFG projects in support of the overall goal of ensuring healthy and sustainable California salmon runs.

### ***Klamath Basin Carcass Surveys***

Chinook salmon are *semelparous*, which means the adults die very quickly after spawning. A common method to determine how many fish returned to spawn is by conducting a carcass survey. These surveys are labor intensive and expensive. When the current economic crisis severely curtailed the DFG's budget, the seasonal staff that normally conduct the surveys could not be hired.

Two OSP biologists, James Phillips and Marc Heisdorf, traveled up the coast from Santa Rosa to Yreka to help Northern California biologists conduct the Scott and Shasta river carcass surveys. This presented the pair with a unique opportunity to collect salmon spawning data that ultimately are used each year to manage the ocean fisheries. "It was a good experience seeing the logistics and how it's done," said Heisdorf. "Anyone that works with escapement data should participate in this type of survey." Phillips and Heisdorf also had an opportunity to work with representatives from other



DFG staff hard at work in the spawning area of the Feather River Hatchery. DFG photo by M. Heisdorf

organizations that regularly help with the surveys, including the U.S. Forest Service, the Department of Water Resources, the Yurok and Hoopa tribes, AmeriCorp and numerous community volunteers.

Participating as part of the carcass survey crew gave these OSP staff members a deeper insight and appreciation for the efforts of their inland counterparts, as well as a better understanding of the information that OSP uses for salmon management each year.

### ***Feather River Hatchery***

In 1968, the Oroville Dam was constructed on the Feather River. Shortly thereafter, the Feather River Hatchery was built to mitigate for both the loss of habitat and subsequent reduction in naturally-occurring salmon populations.

During the early years of the dam's operation, spring and fall runs of Chinook salmon may have experienced elevated rates of interbreeding not present before the dam was constructed. With the unprecedented collapse of Sacramento River fall Chinook and concerns over the Endangered Species Act-listed Central Valley spring-run Chinook, every possible effort must be taken to preserve the respective genetics of each run. So today, in addition to mitigation, the hatchery has a second conservation goal: to preserve the unique genetic identity of each run.

When adult fish return to the hatchery, DFG hatchery staff are responsible for spawning the fish and then rearing the eggs to smolt size (approximately 3 to 6 in. long) prior to release about six months later. Historically, spring- and fall-run Chinook have been segregated simply by the time of arrival at the hatchery, with fish arriving early at the hatchery each year considered spring-run, and fish arriving at the hatchery after a certain date considered fall-run.

However, because the timing of spring and fall runs can overlap, it is necessary to find ways to ensure that fish returning with the "spring run" are

"Salmon" continued on page 9

conclusively of spring-run origin. Tiny coded-wire tags embedded in the fish before release from the hatchery can be removed from the spawning fish and examined to make this determination, though due to time and logistical constraints this cross-check had never before been undertaken.

In fall 2008, OSP staff participated in spawning operations to help quantify and improve the effectiveness of hatchery operations in meeting this new goal of preserving the unique genetic identity of each run. New methods needed to be developed to track individual fish, spawned pairs and their progeny. Real-time coded-wire tag information was needed to determine if spring-run males were being spawned with spring-run females. When the project began, doubts were raised if spawned pairs could be tracked at production pace and if coded-wire tags could be processed in real-time. The OSP and hatchery staff worked closely together to successfully work out logistical challenges involved with the tagging and tracking of individual fish and their progeny. This project gave OSP staff further insight into hatchery operations and promoted partnership between the individuals who tag fish (hatchery staff) and those who process the coded-wire tags (OSP). The cooperative effort provided an opportunity for each project to see how the other operates and helped foster understanding and insight into how the system can be improved through a collaborative partnership.

Results of this collaborative effort suggested that returning Chinook could be spawned differentially to maintain genetic run timing. It was the first time this method had been attempted and it shows promising results. In addition, the Feather River Hatchery was able to meet its mitigation goals without compromising any of the added conservation objectives.

### ***Chinook Scale Age Project***

The OSP oversees and helps coordinate the Chinook Scale Age Project, a pilot study funded by the CALFED Bay-Delta Program. The project investigates the use of scale age analysis as part of the management approach for Central Valley salmon stocks. Salmon scales have rings, which are similar to the rings of a tree. During winter months, the salmon

scales grow more slowly than they do in summer, creating a band on the scale. Counting these winter bands reveals the age of a fish just as counting tree rings tells the age of a tree.

The scale project's goal is to representatively sample all Chinook runs – fall, late fall, winter and spring – in Central Valley rivers and tributaries. To do this, the project joins forces with five Central Valley hatcheries, the Department of Water Resources, East Bay Municipal Utility District, U.S. Fish and Wildlife Service, and DFG inland regions to collect scales during natural and hatchery spawning surveys. Preliminary results suggest differences in the age structure of hatchery and natural Chinook, and age structure differences among runs in the Central Valley. The methods used to collect and read scale samples, and preliminary results have broad implications for the future of Chinook salmon fishery management and restoration efforts throughout the Central Valley.

The project again exemplifies the spirit of collaboration and unity needed to effectively manage diverse and wide-ranging species like salmon. The results from the project are interesting and promising with respect to the benefits the data can provide to inland and ocean management of Central Valley Chinook salmon stocks.

Because Chinook salmon are anadromous they need healthy fresh- and salt-water environments to thrive. These fish are also multi-national – crossing borders, political boundaries and jurisdictions. This creates challenges for fishery managers, but these hurdles can be overcome by effective collaboration.

The recent collapse of Sacramento River fall Chinook underscores the need to work together and improve the management of this valuable species. The OSP collaborates with other DFG Regions, hatcheries and river surveys because it is an effective means to meet the DFG's mission of managing California's diverse resources. Finding new and innovative ways to work together within DFG and teaming up with organizations outside of the DFG broadens our experiences, networks, and abilities. Collaborative research allows the DFG to manage California's natural resource heritage more effectively today and to protect California's Chinook salmon for future generations. 🌿



*Equipment used to read chinook salmon scales.*

*photo courtesy of B. Kormos*



*Collecting a scale sample from a Chinook salmon*

*DFG photo by J. Simon*

## Creature Feature

# Jacksmelt

by DFG Staff



The jacksmelt is a member of the silversides family. It is among the most common fishes taken by pier anglers, and is also caught in the surf. Jacksmelt may be found statewide, and is common in bays, sloughs, and other inshore areas.

### Distinguishing Characteristics

The jacksmelt is easily confused with topsmelt, another member of the silversides family. Any silversides over 14½ in. long may be assumed to be jacksmelt. The two species can be distinguished by noting the location of the first dorsal fin: In jacksmelt, the first dorsal fin is placed ahead of the vent (anus); in topsmelt the first dorsal fin is just about directly over the vent. Both are long, silvery fish with a midline stripe; jacksmelt tend to be greenish-blue above the stripe, whereas topsmelt are bright green.

### Life History and Other Notes

Jacksmelt spawn from October through March, attaching large masses of eggs to shallow water vegetation. They feed on small crustaceans and fishes. Larger jacksmelt will take small spinners or artificial flies. Try using small hooks baited with squid, suspended beneath a bobber. Jacksmelt are excellent fighters. 🐟

*This Creature Feature is an excerpt from the California Finfish and Shellfish Identification Book available from the DFG Publications Office (contact (916) 322-8978 or publications@dfg.ca.gov). The book was created as part of the California Fishing Passport Program, which showcases different species of fish available to California anglers. The California Fishing Passport, a free fishing journal, is the basis of the program. For more information, visit: [www.fishingpassport.org](http://www.fishingpassport.org)*

### Jacksmelt

#### SCIENTIFIC NAME

*Atherinopsis californiensis*

#### OTHER COMMON NAME

silversides

#### RANGE & HABITAT

Statewide in bays, sloughs, and surf

#### LENGTH

To 22 inches

#### DIET & SUGGESTED BAIT/LURES

Eats small crustaceans such as shrimp, and clams, and plant matter.

Try fishing with artificial flies, spinners, shrimp or squid.

*"North-Central Coast MLPA" continued from page 1*

Planning for the North-Central Coast Study Region (NCCSR) began shortly afterwards.

### Overview of the North-Central Coast Region Planning Process

*How ten MPA network proposals became four and when a final proposal will be selected by the Commission and go into effect*

Beginning in May 2007, the North-Central Coast Regional Stakeholder Group (NCCRSR) convened for a series of meetings and work sessions to develop MPA proposals. In three distinct rounds over a period of ten months, the NCCRSR held eight meetings, three formal work sessions, and numerous informal work sessions, which resulted in the development of three final MPA proposals. "Round One" proposals were developed by three cross-interest NCCRSR work teams, with each work team developing two initial separate proposals. In addition, four "external" proposals were developed and submitted by groups outside the NCCRSR planning process. Once completed, all "Round One" proposals underwent a series of evaluations to see how well they addressed scientific guidelines, followed DFG feasibility criteria (for example, were the regulations easily understood and boundaries easily found), goals and objectives, and identified possible socio-economic impacts (More information on MPA evaluations can be found on the Marine Life Protection Act Web site at [www.dfg.ca.gov/mlpa](http://www.dfg.ca.gov/mlpa)).

"Round One" evaluations were reviewed by the Blue Ribbon Task Force (BRTF), an independent policy oversight body to the MLPA Initiative process and ultimately the body to recommend alternatives to the Commission. Based on evaluations, the BRTF directed the NCCRSR to modify their proposals to better meet science and design guidelines while minimizing socio-

*"North-Central Coast MLPA" continued on page 11*

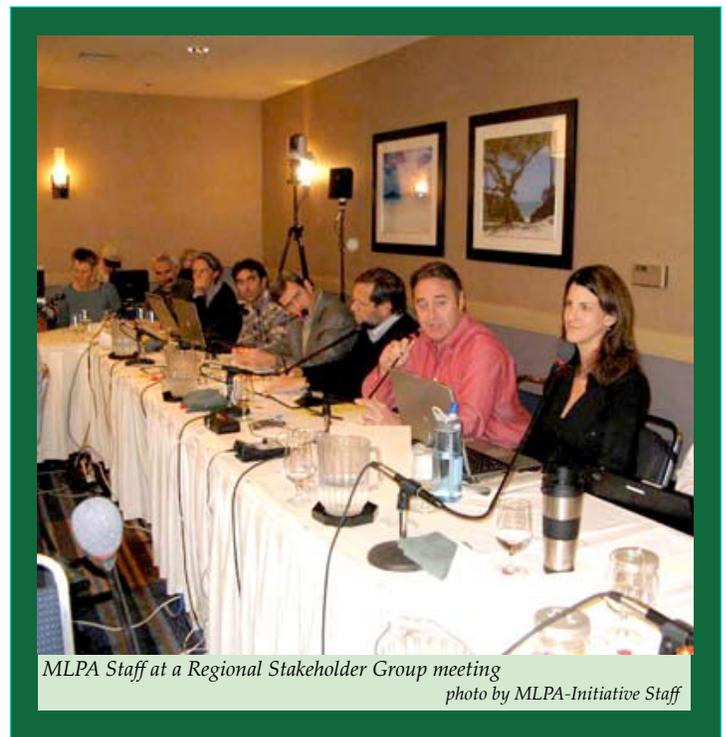


*“North-Central Coast MLPA” continued from page 10*

economic impacts. NCCRSG members were also instructed to reduce to no more than five the number of proposals that would move forward for a “Round Two” evaluation.

In response to this direction, the NCCRSG refined proposals by narrowing six work group proposals down to four and incorporating two of the external proposals. The third external proposal was revised and resubmitted, and the fourth external proposal was retracted. After “Round Two” evaluations, the BRTF directed the NCCRSG to return again for a third round of evaluations and to reduce the final number of MPA proposals to no more than three. The BRTF also emphasized to the NCCRSG that greater weight would be given to cross-interest proposals. This direction motivated NCCRSG members to incorporate broader interests. Ultimately, the one remaining external proposal was combined with an internal proposal, two internal proposals were combined, and a third internal proposal was refined and retained, resulting in three final MPA proposals.

These three final proposals were formally presented by the NCCRSG to the BRTF during a joint meeting on April 22-23, 2008. After formal presentations of the proposals and public comment, the BRTF decided to forward all three NCCRSG proposals as well as a BRTF-generated recommendation for a preferred alternative to the Commission. The BRTF preferred alternative was crafted by integrating proposals and ideas from all three NCCRSG final proposals and is known as the



*MLPA Staff at a Regional Stakeholder Group meeting  
photo by MLPA-Initiative Staff*

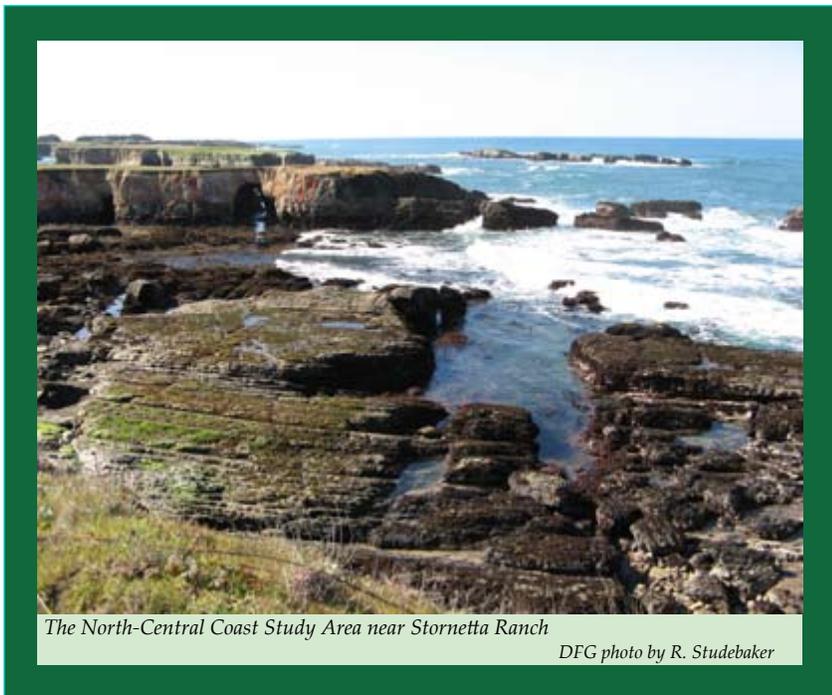
Integrated Preferred Alternative (IPA).

The Commission is the final decision-making body in the MLPA process and has the authority to adopt or reject proposed MPAs after conducting its own public regulatory process and California Environmental Quality Act (CEQA) review. On Oct. 2, 2008 the Commission held its first hearing on the final North-Central Coast MPA proposals. At that time the Commission identified the IPA as its preferred alternative for regulatory review. This started the CEQA process and the development of an Environmental Impact Report (EIR).

A Draft EIR for the North-Central Coast was published on Friday March 20, 2009 through the State Clearinghouse to commence a 45-day public comment period on the Draft EIR. Print copies are available at most public libraries, DFG offices, and Sea Grant Extension Programs throughout the state. CD copies are also available at various harbor master offices. The Draft EIR may also be downloaded from the MLPA Web site.

The Commission is currently considering adoption of MPAs proposed for the NCCSR. Specific information on MPA proposals and the location of proposed MPAs under Commission consideration are currently available online at

*“North-Central Coast MLPA”  
continued on page 12*



*The North-Central Coast Study Area near Stornetta Ranch  
DFG photo by R. Studebaker*



and to examine the timeline and meeting schedule for Commission adoption of MPAs in the North-Central Coast Region, visit the Commission Web site at [www.fgc.ca.gov](http://www.fgc.ca.gov).

*"Marine Region Web Site" continued from page 7*

Going ocean fishing? This should be your first stop. Simply click the marine location where you plan to fish and you will access a compact list of sport fishing regulations for that area. The pages are printer-friendly, so you can print the regulations and take them with you on your next fishing trip. These pages are updated frequently, so you can be assured that they contain the most up-to-date information.

**Ocean Sport Fishing Regulations** [www.dfg.ca.gov/marine/sportfishing\\_regs2009.asp](http://www.dfg.ca.gov/marine/sportfishing_regs2009.asp)

This page features the Ocean Sport Fishing regulations booklet that was printed and distributed in February, 2009. This bookmarked PDF file features bolded, italicized bookmark headings which denote sections that have changed or are new. In addition to the booklet, you will find links to in-season regulations changes, helpful illustrations and more.

**Fishing Page** [www.dfg.ca.gov/marine/fishing.asp](http://www.dfg.ca.gov/marine/fishing.asp)

One of our most popular pages of all, this page contains links to the two resources listed above, as well as information on specific species, laws and regulations, permits and licenses, record fish and invertebrate trophies, fish identification guides, and a number of annual reports and sets of data. Whether you are a recreational or commercial fisherman, you're sure to find some useful information on this page.

Thank you for using the Marine Region Web site as a resource for news, information and regulations. We hope you will visit our site again soon!

*"North-Central Coast MLPA" continued from page 11*

[www.dfg.ca.gov/mlpa/ncc\\_recommendations.asp](http://www.dfg.ca.gov/mlpa/ncc_recommendations.asp). The public may provide comment to the Commission in advance of its final decision regarding MPAs proposed in the North-Central Coast Region. The Commission will hold a discussion hearing on May 14, and adoption is expected in August 2009. Any adopted MPAs will not go into effect until January 2010. To find out more about how and when you may provide comments to the Commission on the proposed MPAs,

## Upcoming Commission and Council Meetings

### 2009 Fish and Game Commission

[www.fgc.ca.gov/meetings/2009/2009mtgs.asp](http://www.fgc.ca.gov/meetings/2009/2009mtgs.asp)

May 13 - 14  
Sacramento

June 24 - 25  
Woodland

August 5 - 6  
TBD

September 2 - 3  
TBD

Sept. 30 - Oct. 1  
TBD

November 4 - 5  
TBD

### 2009-2010 Pacific Fishery Management

Council California-based Meetings

[www.pcouncil.org/events/future.html](http://www.pcouncil.org/events/future.html)

September 12 - 17, 2009  
Foster City

October 31 - November 5  
Costa Mesa, 2009

March 6 - 12, 2010  
Sacramento

For the latest information on upcoming fishery-related meetings, please go to our Calendar of Events at [www.dfg.ca.gov/marine/calendar.asp](http://www.dfg.ca.gov/marine/calendar.asp) or contact the Monterey DFG office at (831) 649-2870.

## **MARINE Management News**

**M**arine Management News is published three times per year 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/marine](http://www.dfg.ca.gov/marine).

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### **The Marine Life Management Act**

**C**alifornia's Marine Life Management Act (MLMA) of 1998 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/marine](http://www.dfg.ca.gov/marine).

**DFG 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"*

*Alternate communication formats of this document are available upon request. If reasonable accommodation is needed, call DFG at (707) 964-5026. The California Relay Service for the deaf or hearing impaired can be utilized from TDD phones at (800) 733-2929.*