

MARINE REGION

2015 YEAR IN REVIEW



Mackerel swim through giant kelp in Southern California waters
CDFW photo by A. Maguire

A Message From Craig Shuman, Marine Region Manager

I will remember 2015 as a year characterized by unusual ocean conditions, uncommon events and some very rare circumstances. What started off as a relatively “normal” year quickly changed in mid-April with the closing of the West Coast sardine fishery. Just over a month later the Refugio oil spill occurred, resulting in widespread ecological damage and a six-week fishing closure along the Gaviota coast in the Santa Barbara Channel.

As abnormally warm ocean waters blanketed the coast throughout summer and fall, semi-tropical and tropical species were observed off our shores. The warm water brought not only red crabs and sea snakes to Southern California beaches, but some great fishing. Of the 31 recreationally caught wahoo sampled by California Department of Fish and Wildlife (CDFW) staff over the last 10 years, 29 were caught in 2015. The bluefin tuna diving record was broken not once, but twice, besting the old record by almost 100 pounds.

Unfortunately, brewing beneath the surface was a massive toxic algal bloom that stretched from Southern California to the Gulf of Alaska, resulting in high domoic acid levels in a number of species and the closure of the rock crab and Dungeness crab fisheries. These closures caused devastating economic impacts to fishermen and coastal communities, not to mention the extreme disappointment

of recreational crabbers. In addition, CDFW scuba surveys revealed dramatically changed ecosystems off California’s north coast, and the one-two punch of El Niño and the prolonged drought resulted in poor fishing seasons for market squid, salmon, and other species.

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 through good science and effective communication.

Through it all, Marine Region staff led the charge, collecting and analyzing data, developing and implementing policy, and communicating with stakeholders and policy makers. Our administrative team was more crucial than ever, maintaining smooth operations and supporting all our efforts during long days in the field, and often even longer days in meetings with the Pacific Fishery Management Council and Fish and Game Commission.

Resilience is often cited as a primary biological mechanism for marine ecosystems to cope with a changing climate. Through the ups and downs of a crazy 2015, Marine Region staff demonstrated their resilience, commitment, and flexibility in adapting to new conditions. I wish to congratulate our staff for a job well done during a very difficult year, and extend my appreciation to California’s Tribes and tribal communities, our ocean-focused constituents, and partners for their constructive input and dedication to California’s marine resources.

Table of Contents

1. State-Managed Marine Species Program.....	3
2. State-Federal Marine Species Program.....	8
3. Resource Assessment Program.....	13
4. Habitat Conservation Program.....	15
5. Administration.....	20

About the Marine Region...

The Marine Region extends along the entire California coastline from the Oregon-California border to the border with Mexico, and approximately three nautical miles out to sea, including offshore islands. The five programs listed in the Table of Contents above illustrate the breadth and depth of Marine Region commitment to monitoring and protecting California's marine environment, and our commitment to providing each resident and visitor with the opportunity to use and enjoy California's marine resources.

2015 Region-Wide Accomplishments, By The Numbers...

Processed **263** Scientific Collecting Permit applications and issued **172** permits

Submitted **9** regulatory packages to the Fish and Game Commission for consideration

Entered over **56,000** commercial landing receipts

Worked with partners to install **195** MPA interpretive and regulatory signs

Sampled **49,300** salmon in the sport and commercial ocean salmon fisheries and collected **11,500** tags to determine the age and origin of hatchery fish

Rebuilt **2** overfished groundfish species to healthy levels - canary rockfish and petrale sole - in conjunction with federal partners.

Contacted over **58,000** saltwater angling parties. Observed and identified over **222,000** fish and invertebrates, and measured over **126,000** fish

Reviewed nearly **700** environmental documents, and submitted **33** comment letters and permits

Submitted **31** reports on federal regulatory issues

Reviewed and approved **175** aquaculture registration permits

1. State-Managed Marine Species Program

This program is responsible for fisheries managed by the State alone.

Abalone – In northern California, data from all 2014 abalone report cards received in the Fort Bragg office (over 9,100) were entered into the Automated License Data System. CDFW Natural Resource Volunteer Program members throughout the State completed over 450 abalone diver and rock picker interviews as part of a telephone survey to collect data that will help determine the economic value of the fishery, as well as gather catch data from those who did not return their cards.

In Southern California, 48 baby abalone recruitment traps divided between Catalina Island, La Jolla, Santa Cruz Island (Yellowbanks), and Palos Verdes sites were surveyed by scientific divers. Nine transects were surveyed at three sites off San Nicolas Island, where staff measured 349 black abalone.

Staff continued development of the Red Abalone Fishery Management Plan. The development process will build upon the Abalone Recovery and Management Plan's fishery management framework and goals. During 2015, staff conducted an online abalone diver and rock picker survey, held an essential fisheries information webinar with experts, and began drafting the management plan.

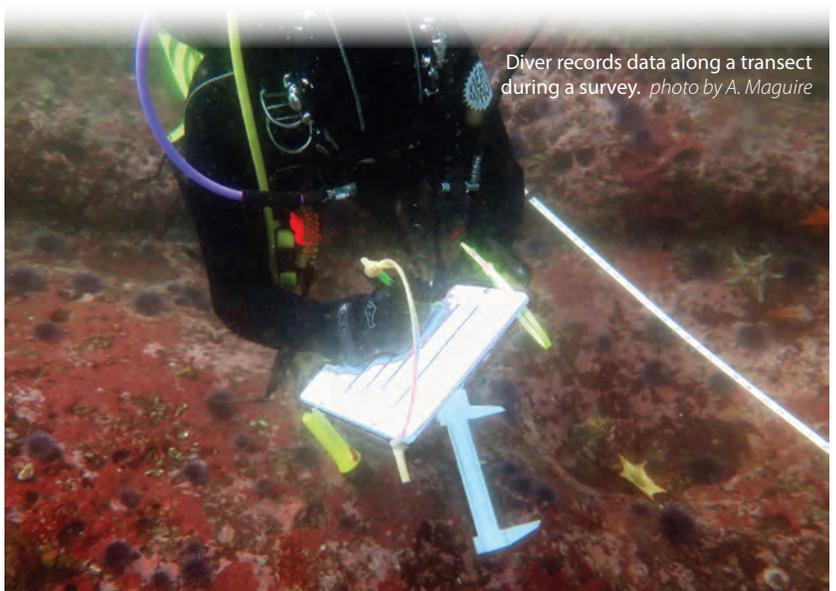
Staff participated as part of the NOAA Fisheries Black Abalone Recovery Team to develop a draft recovery plan for the endangered black abalone. Staff submitted another multi-year endangered species restoration grant proposal to NOAA Fisheries to continue work on restoring white abalone in the wild, and continued coordinating and collaborating with partners on various restoration efforts for green abalone. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/Invertebrates/Abalone for more information about abalone.*

Aquaculture – Staff participated in stakeholder meetings and field visits with Fish and Game Commission staff and Commissioners, other State agency regulators, and shellfish growers to address concerns regarding aquaculture debris in Tomales Bay from state water bottom aquaculture leases. Staff discussed best management practices for shellfish aquaculture

and helped develop options for the Fish and Game Commission to address the marine debris issue.

Staff prepared, processed, reviewed or approved 42 live importation permits, 175 aquaculture registrations, one wild broodstock collecting permit, three letters of authorization, nine restricted species permits, and one private stocking permit. Staff prepared recommendations to the Fish and Game Commission on requests to renew five state water bottom aquaculture leases and one sub-lease. Staff participated on an internal mariculture core working group to evaluate an application for a new state water bottom aquaculture lease off the coast at Santa Barbara. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/ABMP/Aquaculture for more information about California marine aquaculture.*

Bay Management - Staff completed the first year of a multi-year ecological study in Drakes Estero at Point Reyes National Seashore focused on gauging impacts to the benthic ecosystem associated with the decades-long oyster aquaculture operation that recently ceased in Drakes Estero. Staff are surveying densities of eelgrass, man-made debris, and the invasive tunicate *Didemnum vexillum*, as well as the abundance of fish and motile invertebrates before and after removal of the wooden rack structures by the National Parks Service. Staff presented results from the study's first year surveys at the October 2015 meeting of the Western Society of Naturalists in Sacramento.



Diver records data along a transect during a survey. *photo by A. Maguire*

Staff applied for and received \$50,112 in funds through the State Wildlife Grants Program to evaluate the spawning and larval distribution of longfin smelt in Humboldt Bay. The project aims to acquire fundamental ecological information essential for management of the Humboldt Bay population of longfin smelt, and will directly support recovery planning for this threatened species. This is a collaborative effort between staff, Humboldt State University, and the NMFS Southwest Fisheries Science Center. Sampling will begin in 2016. Visit the CDFW website at www.wildlife.ca.gov/Conservation/Marine/ABMP for more information about California ocean bay management.

Barred Sand Bass and Kelp Bass - To help evaluate the 2013 sport fishing regulation change for the basses, staff completed 42 sampling trips aboard commercial passenger fishing vessels to collect information on numbers, sizes, and the survival rate (mortality) of released fish; data were collected on 750 kelp bass and 75 barred sand bass.

Bass age and growth studies continued in 2015. A total of 100 barred sand bass otoliths (“ear bones”) were collected, bringing the grand total to over 800; over 700

otoliths were aged. A total of 275 kelp bass otoliths were collected, bringing the grand total to 1,230; kelp bass ageing will begin in 2016.

Hormone assays were completed on over 400 kelp bass blood samples to determine daily and monthly peaks in spawning activity. These samples will also be used along with other data to estimate the number of eggs a female kelp bass produces annually. Staff presented preliminary results at the Southern California Academy of Sciences annual meeting. Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/SCFRMP#28087298-current-studies for more information about bass research and management.

California Halibut – Staff obtained information critical for improving the understanding of California halibut biology and life history, which will also improve stock assessment analyses. Sampling continued for the commercial and recreational California halibut fisheries in central California. Data were collected on length, sex, spawning condition, and age. Staff surpassed the 2,800 mark in number of halibut aged since 2007, using thin-sectioned otoliths. CDFW’s Bay Delta study determined that the preliminary juvenile California halibut abundance index for 2015 was a record for the study period (1980-2015). California Recreational Fisheries Survey samplers continued using a non-invasive method developed by staff to obtain information on the sex of California halibut.

Staff completed the final version of a “how-to” video for external sex determination, which was posted on the CDFW YouTube channel (www.youtube.com/watch?v=10nFNagcLKs). Work began on the second statewide halibut stock assessment using data collected since 2011, when the first assessment was completed. Staff co-authored a manuscript for California Cooperative Oceanic Fisheries Investigations (CalCOFI) Reports with Cheryl Barnes et al. entitled *Growth, Mortality, and Reproductive Seasonality of California Halibut (Paralichthys californicus): A Biogeographic Approach*. Staff completed a paper about a comprehensive 2-year study of California halibut length and age at maturity in central California based on histological examinations and thin-section otolith ageing; the manuscript will be submitted to *California Fish and Game* (scientific journal) in 2016. Staff made over 25 trips to launch ramps, fishing derbies, and aboard CPFVs in Southern California to sample sport-caught halibut. A total of 60 sport-caught and 13 commercially caught halibut were sampled, with 49 pairs of otoliths taken; the largest halibut weighed over 32 pounds.



Staff co-authored an article entitled *Testing a non-lethal method for determining the sex of California halibut, Paralichthys californicus, in non-spawning condition*. The article was written in collaboration with the Santa Monica Bay Foundation, and published in *Fisheries Management and Ecology* (scientific journal). Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/NCCFRMP/Halibut-Studies/Halibut-Assessment for more information about California halibut.



California halibut, *Paralichthys californicus*
CDFW photo

Diving Safety Program – Seven new diver candidates were certified during CDFW’s week-long diver certification program at Catalina Island in 2015. Collaboration with other agencies and universities continued to leverage CDFW’s underwater efforts, with 51 visiting divers assisting on CDFW or joint projects. Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/Diving-Safety for more information about the Diving Safety Program.

Dungeness Crab – Reports of whale entanglements with Dungeness crab commercial fishing gear have increased in recent years. In collaboration with NOAA Fisheries and the Ocean Protection Council, staff held a public meeting in August to discuss and share information on ways to reduce the risk of entanglements in the California Dungeness crab fishery. Commercial and recreational fishermen, environmental non-governmental agencies, and interested members of the public were in attendance to discuss the current issues regarding recent whale entanglement reports and dynamics of the commercial fishery.

Following this meeting, a collaborative working group was established comprised of federal and state agency staff, commercial fishermen representing eight major ports, two recreational fishermen, and representatives from several environmental non-profit organizations. Over the course of two meetings held in the fall, the group developed short- and long-term strategies to reduce the risk of whale entanglements with fishing gear. In addition to these discussions, staff also continued to work with industry on developing a long-term lost gear recovery program for the fishery.

The start of the 2015-2016 recreational and commercial fishing seasons were delayed due to domoic acid concentrations exceeding the federal alert level in Dungeness crabs sampled from the eight major ports in

California. By the end of the calendar year, the recreational fishery had opened south of Monterey County.

As part of the effort to understand the population dynamics of the crab fishery, staff continued to monitor and count Dungeness crab larvae in the spring months at two locations in northern and central California to assess its value as a predictive tool for future catches. In 2015, the total counts at Humboldt Bay ranked fifth out of the last eight years of sampling, while Bodega Bay ranked near the bottom of the nine years of sampling there. This was also the third year of sampling at Moss Landing in collaboration with California State University, Monterey Bay students. The total count was very similar to 2014: it was several orders of magnitude lower than the first year of sampling in 2013, which has been the highest year for all three sites. Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/Invertebrates/Crabs for more information about Dungeness crab.

Green Sturgeon – A collaborative study between CDFW, National Marine Fisheries Service, West Coast Groundfish trawl observers, and commercial California halibut trawl fishermen was initiated to satellite tag and monitor the survivability of any green sturgeon (a threatened species) caught incidentally in the central California halibut trawl fishery in the Gulf of the Farallones. In 2015, 30 satellite tags were deployed; most began transmitting data when the tags automatically released from the fish. Some of the tags released in the San Francisco Bay area, indicating that these green sturgeon had moved into the estuary. The study will continue in 2016. Visit the CDFW website at dfg.ca.gov/fish/Resources/Sturgeon/ for more information about green sturgeon.

Hagfish – Staff continued to examine and analyze barrel traps as alternative gear for the commercial hagfish fishery. After consultation with experimental gear permittees and others in the fishery, regulations were adopted by the Fish and Game Commission to allow the use of this gear, with an effective date of January 1, 2016. The number of ground lines attached to the barrels was limited to two per vessel to minimize potential gear interactions with whales. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/NCCFRMP#29429329-hagfish for more information about hagfish.*

Kelp and Other Marine Algae - Staff reviewed and provided recommendations to the Fish and Game Commission for two kelp harvest plans to mechanically harvest giant kelp from 12 kelp beds.

The 2014 aerial kelp survey data files were processed and are now available on Marine Region's historical kelp survey webpage (ftp://ftp.dfg.ca.gov/R7_MR/BIOLOGICAL/Kelp/) and MarineBIOS (wildlife.ca.gov/MarineBIOS). Staff completed the 2015 aerial survey of the kelp canopy along the entire mainland coast and Channel Islands, and the imagery is currently being processed.

Staff amended the *Informational Digest to the Regulations Governing the Harvest of Kelp and other Marine Algae in California*, a document designed to provide up-to-date information for commercial harvesters of kelp and other marine algae. Staff revised/updated maps depicting administrative kelp beds and edible seaweed maps. A Marine Management News blog post was published on the three-phase process to update regulations for the commercial harvest of marine algae (bit.ly/1T4odyg). A new *Kelp and Other Marine Algae* web page that contains maps, information, and regulations governing the commercial harvest of algae was added to the Marine Region

website. *Visit the CDFW website at wildlife.ca.gov/Fishing/Commercial/Kelp for more information about kelp and other marine algae.*

Ocean Resources Enhancement and Hatchery Program (OREHP) - CDFW's multi-year evaluation of the White Seabass Experimental Enhancement Program, coordinated by California Sea Grant, continued throughout 2015. A Scientific Advisory Committee (SAC) was assembled early in the year to develop scientific criteria for use in assessing the program's success in meeting its objectives. Through California Sea Grant, staff provided the SAC with over 30 years of reports, publications, and other documents associated with the program for review. Sub-panels were also formed to assist the SAC members with the comprehensive assessments of each core program area (population biology, genetics, etc.).

The oldest hatchery-raised white seabass was recaptured in June off the coast between Santa Barbara and Ventura. The 15-year-old female was released from the Marina del Rey growout pen in July 2001. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/ABMP/OREHP for further information.*

Pacific Herring - Staff completed sampling and population estimates for Pacific herring in San Francisco Bay. The season ended with 12 spawning events and a final season estimate of 16,700 tons of herring. This is a significant reduction from the 2013-2014 season estimate of 60,600 tons. Staff completed a final supplemental environmental document and rulemaking package to review and evaluate the proposed regulatory changes for the 2015-2016 fishing season. Due to the below average biomass estimate, a reduced quota recommendation was forwarded to the Fish and Game Commission. Staff also worked closely with the Herring Fishery Management Plan Steering Committee to continue laying the groundwork for development of a fishery management plan for this fishery. *Visit the [Pacific Herring Management News](http://PacificHerringManagementNews.cdfwherring.wordpress.com) blog at cdfwherring.wordpress.com, or the CDFW website at wildlife.ca.gov/Fishing/Commercial/Herring for more information about Pacific herring.*



CDFW Environmental Scientist Travis Tanaka samples hagfish. CDFW file photo

Refugio Oil Spill Response - Staff assisted in the Refugio oil spill response. Staff participated on teams that developed sampling protocols for the fishery closure, collected and processed biological samples, provided research equipment,

and helped with safe delivery of oiled animals to rehabilitation sites. *Visit the CDFW website at wildlife.ca.gov/ospr/nrda/refugio for more information about this oil spill.*

Saltwater Angling and Diving Records - Staff worked closely with the CDFW Forms Branch to update angling and diving records forms. Two saltwater diving records were accepted (old values in parenthesis) in 2015:

- Bluefin Tuna (diving): 178 lbs, 1 oz. (98 lbs) – June 11, 2015
- Bluefin Tuna (diving): 185 lbs, 1 oz. (178 lbs, 1 oz.) – July 3, 2015

Visit the CDFW website at wildlife.ca.gov/Fishing/Ocean/Records for more information about saltwater record fish and invertebrates.

Sea Cucumber – Staff continued dive and laboratory research to collect essential fishery information for warty sea cucumber populations at the northern Channel Islands. Seasonal dive surveys were performed at six different locations (inside and outside of marine protected areas) to measure changes in densities and to characterize size distributions. A total of 402 sea cucumbers were collected and dissected to determine spawning condition, sex ratio, fecundity, and length/weight relationships. *Download the CDFW document at nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=34418 (PDF) for more information about sea cucumber.*

Spiny Lobster – The 2014-2015 lobster fishing season saw the third highest commercial lobster landings on record, at nearly 960,000 pounds. The recreational fishing season also saw the highest rate of lobster report card returns, at 54 percent (nearly 20,000 report cards).

After completing a multi-year process that involved working with a Lobster Advisory Committee and scientific peer reviewers, a CEQA analysis, and the crafting of proposed regulations, the California Spiny Lobster Fishery Management Plan was submitted to the Fish and Game Commission in December 2015. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/Lobster-FMP for*



Yellowfin croaker tagged and ready for release. *photo by Mike Romo*

more information about the California Spiny Lobster Fishery Management Plan process.

Surf Fishes – Staff continued the analysis of spatial and temporal abundances of surf fishes in Southern California from study data that spanned 2007-2009, when over 400 beach seine hauls were completed. Preliminary results were presented at the CDFW Science Symposium in December. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/SCFRMP/Surf-Fish for more information about surf fish studies.*

True Smelts - Staff submitted a manuscript to CalCOFI Reports on the status and life history of true smelts. A final report on the 2014 collaborative night smelt life history study was completed and submitted to Collaborative Fisheries Research West. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/NCCFRMP/True-Smelts for more information about smelt.*

White Seabass - Staff collected and analyzed commercial and recreational data for white seabass as part of the annual review of the White Seabass Fishery Management Plan for the 2013-2014 season. The number and size of white seabass landed, information on forage fish availability, and socio-economic data were evaluated to determine if points of concern were met. The results were presented to the White Seabass Scientific and Constituent Advisory Panel and a report was sent to the Fish and Game Commission. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/NCCFRMP/White-Seabass for more information about white seabass.*

2. State-Federal Marine Species Program

This program is responsible for fisheries jointly managed by state and federal entities.

Bluefin Tuna – Staff coordinated with NOAA Fisheries and the Pacific Fishery Management Council to analyze and develop management measures that reduce recreational take of Pacific bluefin tuna off the West Coast in accordance with international treaty goals for this overfished species.

Staff implemented conforming state regulations to reduce recreational Pacific bluefin tuna bag and possession limits, and modify fillet regulations for tunas with input from the public and fishing industry.

Staff coordinated on outreach to the angling public with NOAA Fisheries and the Sportfishing Association of California, including development of fliers and handouts, Marine Management News blog articles (bit.ly/1ZCmcNA), a press release, and participation in a panel discussion at the 2015 Fred Hall Fishing, Tackle, Boat and Travel Show in Long Beach.

Staff worked with federal and industry partners to expand and improve commercial and recreational fishery monitoring programs that track landings and biological data for bluefin tuna.

Staff conducted a pilot aerial survey with support from California Wetfish Producers Association to document bluefin tuna abundance off Southern California.

Staff attended NOAA Fisheries' annual tuna workshop and presented a poster. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/CPS-HMS/Tunas for more information about bluefin tuna.*

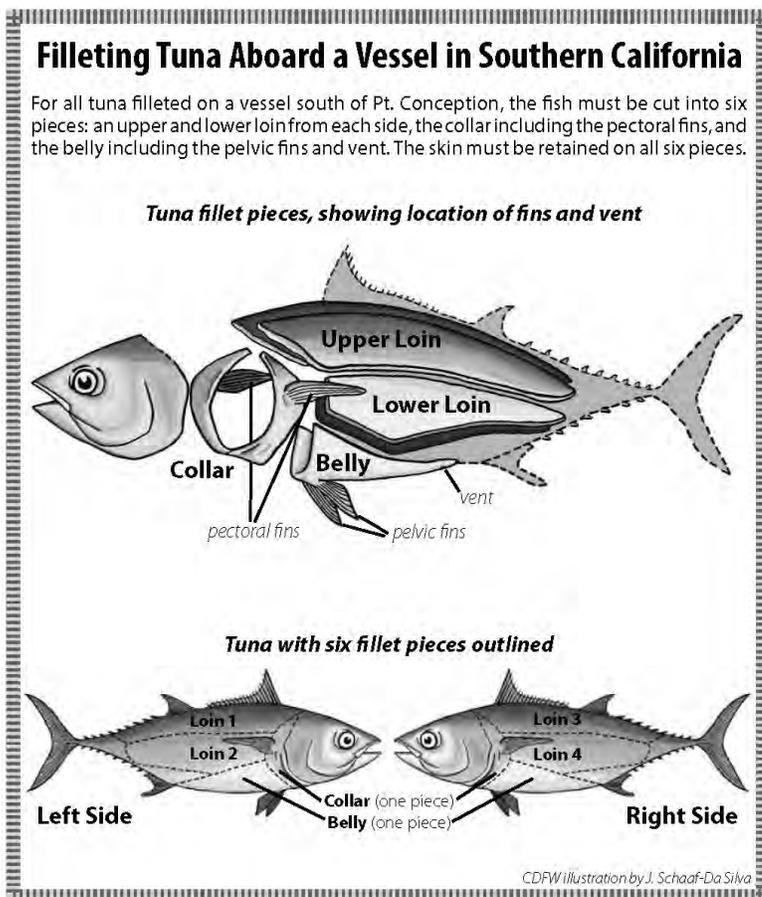
Coastal Pelagic Species (market squid, anchovy, mackerel, sardine) – Staff amended California Code of Regulations Title 14, Section 149(e) to update and reorganize existing market squid logbook forms. Amended regulations are expected to go into effect on April 1, 2016.

CDFW continued to closely monitor market squid landings to ensure that the seasonal catch limit was not exceeded; the seasonal catch limit was not attained during the 2015-2016 season, likely due to the onset of El Niño.

One hundred twenty-nine northern anchovy biological samples collected from the commercial fishery in 2014 and 2015 were processed in preparation for a future federal stock assessment. Length, weight, sex, and sexual maturity were recorded for each sampled fish. Otoliths were also extracted for ageing purposes.

Aerial surveys continued to record fish school biomass and distribution and develop biomass estimates for sardine, anchovy, and mackerel in Southern California in collaboration with the California Wetfish Producers Association.

Staff held a public meeting for live bait fishery participants, including both private fishing vessel and commercial passenger fishing vessel operators. Information was exchanged on the CDFW voluntary



Tuna fillet illustration for the annual Ocean Sport Fishing Regulations booklet.

logbook program and fishery operations to improve data collection and monitoring efforts.

Staff participated in the Tri-national Sardine Forum, an annual meeting of scientists from Canada, the U.S., and Mexico, to review current research on West Coast sardines. This year, the forum was held in La Jolla and staff gave a presentation on the 2015 California sardine fishery.

Staff estimated the ages of Pacific sardine and mackerel taken in the fisheries for use in annual stock assessments. In 2015, staff aged 2,550 pairs of sardine and 1,300 pairs of mackerel otoliths. Staff also participated in an ageing workshop after the Tri-national Sardine Forum with Southwest Fisheries Science Center and other forum participants to review methods.

Staff contributed market squid and coastal pelagic species fishery update reports to the CalCOFI (scientific) journal and prepared presentations for the CalCOFI conference, including a poster presentation on the recent fishery and biological trends of market squid in response to warm water.

Staff evaluated and used stock status information on Pacific sardine and mackerel to develop its recommendation for 2015 West Coast fishery harvest levels in collaboration with other state and federal agency representatives.

Staff visited the docks 12 days per month at more than six different ports to digitally enter catch information and track the quotas for squid, sardine, anchovy, Pacific mackerel, and jack mackerel. Staff also took biological samples of these species to use in annual stock assessments. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/CPS-HMS for more information about coastal pelagic species.*

Ecosystem – In collaboration with West Coast state and federal agency partners, staff completed a multi-year effort to increase protections in federal waters for unmanaged forage fish, as part of increased attention by the Pacific Fishery Management Council on ecosystem management. The effort was initiated after requests by the environmental community and others, and advanced by working with partners to support a prohibition on developing new fisheries for a comprehensive suite of forage fish, while continuing to allow existing activities.



The overfished canary rockfish stock was pronounced rebuilt to a healthy level ahead of schedule in 2015. CDFW/MARE photo

This effort resulted in the Pacific Fishery Management Council recommending adoption of appropriate regulations to the National Marine Fisheries Service at their September 2015 meeting. The National Marine Fisheries Service will publish the proposed regulations for public review in early January 2016. CDFW will pursue similar conforming regulations for state waters in 2016.

Endangered Species Act – Staff assisted in updating the federal Endangered Species Act Section 6 agreement to include all marine Endangered Species Act-listed species that occur in California. Staff provided expertise in determining potential CDFW activities that could benefit listed species, and communicated with National Marine Fisheries Service staff to determine activities that would qualify for Section 6 funding. This new agreement will allow CDFW to request grant funding from the National Marine Fisheries Service for CDFW work that benefits listed species.

Groundfish – California’s sport and commercial groundfish fisheries (which include over 90 species of rockfish, roundfish, flatfish, skates and sharks) remained within prescribed annual catch limits and accountability measures in 2015 for most species, due to active monitoring and management by staff and partner agencies and stakeholders.

Two important West Coast groundfish stocks that were designated “overfished”—canary rockfish and petrale sole—have rebuilt to healthy levels ahead of schedule.

Rebuilding of other overfished groundfish stocks is proceeding more quickly than projected in part due to strict protections, favorable ocean conditions that have resulted in good recruitment, and management and outreach efforts by staff and partners to avoid and care for species of concern.

In collaboration with federal agency partners, staff analyzed a range of alternatives to re-allocate blackgill rockfish between the trawl and non-trawl sectors to allow for more refined management and to address conservation concerns. Removing blackgill rockfish from the southern slope rockfish complex and reallocating it and the remaining species in the complex was ultimately chosen as the best alternative to meet these objectives, and a final rule is expected to be effective in early 2018.

In collaboration with federal agency partners, staff examined alternatives to develop proposed incidental catch levels of Endangered Species Act-listed Chinook salmon stocks caught in the Pacific coast groundfish fishery. Recommendations are being developed regarding the threshold for incidental catch levels and mitigation measures, including those that can be implemented in-season to prevent thresholds from being exceeded.

In collaboration with federal agency partners and non-governmental agencies, staff assisted with developing a range of alternatives to evaluate modifications to essential fish habitat for groundfish, and adjust the trawl rockfish conservation area, with the goal of minimizing adverse effects on sensitive habitats that can occur when fishing with trawl gear, allowing increased access to productive fishing grounds, and increasing efficiency in resource utilization.

CDFW conducted five statewide public workshops to solicit public input on development of groundfish management measures for 2017 and 2018.

In collaboration with other agencies and partners, staff provided guidance for developing whiting fishery electronic monitoring program regulations, which are expected to be finalized in 2016. This would allow for use of video cameras in lieu of the mandatory 100 percent

human observer requirement in the groundfish catch share program, and is expected to reduce operating costs for some of the fleet while still achieving overall program monitoring goals. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/Groundfish for more information about groundfish.*

Pacific Halibut – California’s recreational Pacific halibut allocation increased from one percent to four percent of the West Coast’s non-tribal allocation in 2015. This was the direct result of staff-led, collaborative efforts between northern California coastal community fishing groups and West Coast government agencies to evaluate and revise allocations in the West Coast catch sharing plan. As a result, CDFW agreed to monitor the fishery during the season and revise its management measures to manage the catch to the new, higher allocation/quota.

The new in-season tracking and projection methodology worked well during 2015 to monitor progression of the fishery on a weekly basis. The season was scheduled to begin on May 1 and end on October 31, with periodic closed dates during May, June, July and August, with the fishery remaining open until its scheduled end or until the quota was reached. However, following discussions with the International Pacific Halibut Commission and National Marine Fisheries Service, an in-season fishery closure was implemented on August 13 based on projected early attainment of the 2015 California quota. Final 2015 catch estimates totaled 24,906 net pounds—just below the 25,200 net pound quota. The average net weight per fish in 2015 was approximately 25 pounds.

California sent a delegation to the International Pacific Halibut Commission annual meeting for the first time ever in January 2015 and plans to send a delegation in 2016 as well. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/Pacific-Halibut for more information about Pacific halibut.*

Salmon – Staff monitored recreational and commercial ocean salmon fisheries at approximately 20 ports along the California coast in 2015. In the commercial fishery, staff sampled approximately 37,700 salmon and collected snouts from 8,200 adipose fin-clipped salmon for subsequent coded-wire tag (CWT) processing. In the recreational fishery, staff coordinated with California Recreational Fisheries Survey staff to interview 23,200 anglers, sample 11,600 Chinook and collect 3,329 heads from adipose fin-clipped salmon. Staff utilized these sample data to produce annual ocean catch and effort estimates by fishery, management area, and half-month period.



10 CRFS sampler Dani Shaut posts notice of the recreational Pacific halibut fishery closure as attainment of the quota draws near in August, 2015. CDFW photo by S. Walkenhauer

Staff processed approximately 11,500 CWTs and uploaded these data, along with their respective catch-sample data, to the Regional Mark Processing Center. These data are used to determine stock contributions and fishery impacts needed to sustainably manage West Coast fisheries and protect California salmon stocks. Approximately two-thirds of the salmon caught in California ocean fisheries originated from hatcheries, with almost all of these fish produced, raised, and released from California hatcheries located in the Central Valley and Klamath-Trinity River Basin. The majority of these fish (75 percent) were Sacramento River fall Chinook.

Staff responded to nearly 300 public inquiries received through the Ocean Salmon Courtesy Request Program. On request, the program sends information to commercial trollers and recreational anglers about the salmon they landed. CWTs extracted from the fish provide fishermen with the fish's hatchery of origin, brood year, stock, run type, and date and location of release.

Staff recorded escapement data and collected scales and salmon heads at Central Valley salmon hatcheries. Roughly 4,600 heads from adipose fin-clipped salmon collected by Central Valley monitoring surveys were processed at the Santa Rosa office.

Staff worked alongside federal, tribal, and other state agencies to produce the *Review of 2014 Ocean Salmon Fisheries* and several pre-season reports for use in drafting ocean salmon seasons in 2015. These documents report on ocean harvest, inland escapement, abundance forecasts, regulatory season alternatives, and final ocean regulations.

One hundred and twenty stakeholders attended CDFW's annual Ocean Salmon Information Meeting. Staff provided information on 2014 ocean salmon fisheries, spawning escapement, and the outlook for 2015 sport and commercial ocean salmon fisheries, and received input from stakeholders for consideration in the development of 2015 ocean salmon regulations.

In response to industry requests, staff worked with the National Fisheries Management Council to evaluate the merits of adding additional management lines at Point Reyes and Point Sur. CWT and genetic stock identification data was reviewed to evaluate potential impacts of spatial stratification on Klamath River and Sacramento River Chinook stocks. Due to limited available data for certain stocks and the implications for stock assessment precision, it was determined that additional management



PSMFC Fisheries Technician Adam Stewart prepares to remove the snout from a tagged salmon landed in Fort Bragg. CDFW photo by A. Letvin

lines at Point Reyes and Point Sur are not advisable. The CDFW and Pacific Fishery Management Council worked together to take additional actions to protect endangered Sacramento River winter Chinook, which have been impacted by California's severe drought. Commercial and recreational industry representatives on the Council's salmon advisory subpanel also recognized the need for additional protections. As a result of this cooperation between industry representatives and regulatory bodies, fishing seasons were curtailed to reduce fishery impact rates on this endangered stock.

Staff wrote the *Recovery of Coded-Wire Tags from Chinook Salmon in California's Central Valley Escapement, Inland Harvest, and Ocean Harvest in 2012* administrative report (bit.ly/246odCX). This report documents relative hatchery contributions to salmon fisheries and inland escapement and also evaluates various hatchery release strategies.

Klamath River technical team collaboration continued with tribes, federal agencies and other state programs to consolidate and summarize catch and other survey information on Klamath River fall Chinook for use in the 2015 management cycle.

In collaboration with partner agencies, staff continued to implement the Central Valley Scale Age Project. The goal of this project is to improve management of Sacramento River fall Chinook, which supports approximately 90 percent of California's ocean and river salmon fisheries. Visit the CDFW website at wildlife.ca.gov/Fishing/Ocean/Regulations/Salmon for more information about ocean salmon.



In 2015, CRFS samplers documented catches of warmwater fish rarely seen off California, such as this bluestripe chub caught off La Jolla. *CDFW photo by A. Antonio/I. Su*

Swordfish – Staff participated in the Pacific Offshore Cetacean Take Reduction Team. The team met in March 2015 to make recommendations on the use of alternative methodologies for modeling strategic stocks (marine mammals) and to coordinate management of bycatch reduction in the California drift gillnet fishery under the Magnuson-Stevens Fishery Conservation and Management Act and Marine Mammal Protection Act authority of NOAA Fisheries.

Staff participated in the 2015 West Coast Swordfish Meeting sponsored by NOAA Fisheries. Over 50 participants attended the workshop, including fishery

managers, commercial fishermen, seafood suppliers, non-governmental agencies, and academics. The group discussed ways to optimize swordfish fisheries off the West Coast while addressing concerns to reduced bycatch and create innovative new fishing methods.

Staff represented CDFW on the Pacific Fishery Management Council and Highly Migratory Species Management Team. Staff proposed and developed bycatch hard caps for the California drift gillnet fishery targeting sharks and swordfish, and led the Council's adoption of a two-year hard cap management scheme designed to further reduced bycatch of Endangered Species Act-listed marine mammals and turtles.

Staff supported the development and research of alternative gears targeting swordfish such as deep-set buoy gear by providing recommendations and analysis on research proposals submitted through the Pacific Fishery Management Council Experimental Fishing Gear Permit process. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/CPS-HMS/Billfishes for more information about swordfish.*

3. Resource Assessment Program

California Recreational Fisheries Survey (CRFS) – CRFS field operations were supported by 11 permanent staff and 55 temporary Fish and Wildlife Scientific Aids in 2015. Staff contacted over 58,000 angling parties targeting fish in state marine waters. Anglers reported catching over 541,000 fish and invertebrates, of which staff were able to observe 222,000 of the retained catch for species identification. In addition, staff measured over 126,000 fish. CRFS and CDFW’s Ocean Salmon Project staff together recovered 3,329 salmon heads from the ocean salmon recreational fishery.

Warmer than usual tropical currents associated with an El Niño event resulted in some unusual recreational catches in Southern California. Species sampled by staff included Colorado snapper, Pacific tripletail, bluestripe sea chub and wahoo. Of the 31 recreationally caught wahoo sampled by staff over the last ten years, 29 were landed in 2015. Field staff entered the data collected during their field surveys into the CRFS data system. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/CRFS for more information about CRFS.*

California Recreational Fisheries Survey (CRFS) Outreach - Staff provided information to the recreational fishing community including sportfishing regulation booklets, species identification flyers, and barotrauma brochures that included instructions on the use of fish descending devices. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/CRFS/Additional-Information#fliers to see information CRFS staff distribute to the recreational fishing community.*

Recreational Fisheries Data Project - Staff published an article, *CDFW Celebrates More Than 10 Years of Improvements to the California Recreational Fisheries Survey*, in the Marine Management News blog (bit.ly/21aRFqQ). Staff presented two posters at the American Fisheries Society Annual Meeting highlighting improvements to CRFS over the last decade. Improvements include:

- Developing a state-of-the-art data system to manage CRFS data and improved estimation algorithms.

- Using commercial passenger fishing vessel (CPFV) logbooks submitted by vessel skippers in tandem with a supplemental field survey to estimate CPFV fishing effort. Previously, CPFV effort estimates came from a telephone survey. The new method better leverages available data, and represents a significant cost savings.
- Redesigning two surveys to improve efficiency and accuracy.
- Designing a remote data-entry system that can be accessed from any computer.
- Developing an online system for drawing monthly sample assignments and tracking assignments.

Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/CRFS/Background#improvements for more information about the evolution of CRFS.

Improving Data Systems – Data and Technology Division and Marine Region staff continued development of two very important commercial fishery data systems: the Marine Log System and the Marine Landings Data System. These data systems are expected to be completed in 2017 and will provide CDFW with modern fisheries-dependent data systems that will ensure secure, centralized and easily accessible data. The goal is to move towards electronic reporting such that near real-time data will be available for fisheries managers for use in decision making. *Visit the CDFW website at apps.wildlife.ca.gov/marinelogs/ for more information about CDFW electronic logs.*

Recreational Fisheries Data System – In addition to the recreational fisheries data systems described earlier,

In 2015, CRFS samplers documented catches of warmwater fish rarely seen off California, such as this Colorado snapper. *CDFW photo by R. Denton*



Data and Technology Division and Marine Region staff continued development and maintenance of a data system for CRFS catch, effort, biological and spatial data, and estimates. The system includes a centralized relational database to store information, a data entry system with built-in error checks, validation routines to improve data accuracy, and automated reports. The data system has increased efficiency, improved data accuracy and provided the flexibility to align data capture with changing management needs. CDFW, California Fish and Game Commission, Pacific Fishery Management Council, International Pacific Halibut Commission, and National Marine Fisheries Service all used CRFS data and estimates for fisheries management during 2015. Applications included in-season monitoring for species of concern, developing harvest guidelines, stock assessments, and regulatory analyses, and making other critical management decisions.

Staff completed the last major hurdle in transitioning CRFS from the Pacific States Marine Fisheries Commission by producing estimates for beaches and banks. Staff are now calculating CRFS estimates for all modes. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/Recreational-Fisheries-Data for more information about recreational fishery data analysis and survey development.*

Marine Fisheries Statistical Unit – Staff collected, processed, and audited commercial fishery landings data, including landing receipts, commercial passenger fishing vessel logbooks, spiny lobster logbooks, and transportation receipts. Approximately 56,000 commercial landing receipts were received and processed in 2015. This is approximately 15 percent fewer than in previous years. Data have not yet been fully analyzed to determine the cause(s) of the decline, however fewer landings of Dungeness crab, market squid, and Pacific sardine probably caused the downturn. Staff produced and posted the 2014 California commercial landings report on the CDFW website.

Staff designed, ordered, and distributed all paper landing receipt and commercial passenger fishing vessel (CPFV) logs for constituent use. In addition, staff processed commercial fishery data requests received from commercial fishing license holders and other authorized requestors.

In 2015, staff were actively involved in developing an electronic log for CPFVs. This web-based log application

allows CPFV operators to complete and submit the required logs electronically. The testing and subsequent pilot program for the CPFV electronic logs resulted in 13,059 logs being successfully submitted. This represents approximately 35 percent of the 37,700 CPFV logs submitted for 2015. A regulatory package is expected to be completed and approved in mid-April 2016 that authorizes the use of electronic logs. Staff also recorded and produced tutorial training videos for using the electronic log application. These videos are available online (bit.ly/1OUAOro). *Visit the CDFW website at apps.wildlife.ca.gov/marinelogs/ for more information about CDFW electronic logs.*

Pacific Recreational Fisheries Information Network (RecFIN) – Staff submitted all CRFS estimates to RecFIN on a monthly basis (RecFIN provides a centralized data system to house recreational fisheries information from California, Oregon and Washington). Staff represented California on the RecFIN's technical committee, data and technology sub-committee, and chaired the statistical sub-committee. Through these committees, staff support RecFIN efforts to coordinate coastwide on the collection of marine recreational finfish data and procedures for estimating catch, effort, and participation. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/CRFS/Additional-Information#data for more information about RecFIN.*

Statistical and Technical Support – Staff provided statistical and technical support to various projects related to the management and restoration of fish stocks. Support included:

- A review of sampling design for collecting bluefin tuna length and weight data
- Advice on use of CRFS data and estimates
- Reviewing a number of publications that used CRFS data and estimates
- GIS analyses of CRFS spatial data for yellowtail and giant sea bass
- Statistical advice on analyzing aerial survey data
- Designing a study to test the impact of a pre-notice on response rates for a telephone survey

Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/Recreational-Fisheries-Data for more information about fisheries statistics and analyses.

4. Habitat Conservation Program

Advisory Groups – Staff represented West Coast fishery managers on the California Current Acidification Network steering committee, and provided input to the organization on the informational needs of state managers regarding ocean acidification. Staff also participated on the Resources Agency Sea Grant Advisory Panel.

Agreements for Sharing Confidential Data – Six non-disclosure agreements were developed to allow non-government fishery and socioeconomics scientists to incorporate confidential state fisheries data into their project analyses. In addition, staff continued to provide confidential data to NOAA Fisheries scientists for use in the management of West Coast fisheries by the Pacific Fishery Management Council.

Climate Change Activities – Staff participated on the Climate-Smart Adaptation Working Group of the Greater Farallones National Marine Sanctuary to develop strategies for addressing climate change in several ecosystems along the north-central California coast. The resulting report including these strategies will be presented to the Greater Farallones National Marine Sanctuary Advisory Council in March 2016. In addition, staff worked with California Ocean Science Trust staff to produce a work plan for an Ocean Protection Council-funded project that will, through the efforts of an Ocean Protection Council Science Advisory Panel working group, develop a climate and fisheries guidance document for the Marine Region. Information from this document will be used to incorporate climate considerations into the Marine Life Management Act Master Plan amendment. Staff gave a presentation about climate change impacts on natural resources at a University of California Irvine workshop on fostering climate resilient coastal communities. *Visit the CDFW website at wildlife.ca.gov/Conservation/Climate-Science/Activities for more information about CDFW climate change activities.*

Environmental Review – Staff worked on a wide variety of projects, permits, and statewide plans in 2015. Staff participated in over 60 pre-project review meetings

and reviewed over 600 environmental documents. The review effort included over 75 CEQA documents, 200 U.S. Army Corps of Engineers public notices, 200 monitoring reports, 35 invasive species survey reports, and 50 permits from various agencies. Topics reviewed included: wave energy, desalination plant impacts, power plant impacts, dredging impacts, beach nourishment projects, contaminant site remediation, mitigation projects, California Endangered Species Act impacts including incidental take permits, tribal concerns, State Water Resources Control Board policy review, artificial reefs, mitigation proposals, eelgrass restoration, invasive species control projects, scientific collection permits, aquaculture projects, and dock and pier construction impacts. In addition, staff participated in the review and development of several U.S. Navy and U.S. Air Force Integrated Natural Resource Management Plans for locations including San Diego Bay Naval Base, Vandenberg Air Force Base, and Camp Pendleton. *Visit the CDFW website at www.wildlife.ca.gov/Conservation/Environmental-Review for more information about statewide environmental review.*

Environmental Review Coordination and Collaboration – Staff worked closely with other agencies, applicants, and CDFW regions to coordinate environmental review activities. Review activities included:

- Surveying eelgrass in the Albion River watershed, Humboldt Bay, Freshwater Slough, Smith River Estuary and Morro Bay
- Collecting water quality data in Morro Bay, Smith River Estuary, and Humboldt Bay



Seagrass survey under way in Humboldt Bay
CDFW photo by R. Garwood



Staff wrote an incidental take permit amendment that would ensure the environmental effects from the implosion of pier E3 (San Francisco Bay Bridge) were monitored and that appropriate mitigation actions were identified.

CDFW photo by A. Aarreberg

plan to determine impacts to longfin smelt from hydraulic dredging operations in San Francisco Bay. Visit the CDFW website at wildlife.ca.gov/Conservation/Environmental-Review for information about statewide environmental review.

Marine Protected Area (MPA)

Outreach – Staff provided information about California’s network of marine protected areas (MPAs) to the public while coordinating with other CDFW projects and

- Drafting a manuscript on all known longfin smelt data for areas north of San Francisco Bay
- Participating in multiple interagency meetings on the proposed Broad Beach Shoreline Protection and Dune Restoration Project in Malibu
- Assisting in the development of a statewide policy for desalination plant impacts as part of the State Water Board’s Interagency Panel
- Providing input to assist in the finalization of a comprehensive eelgrass management plan proposed by the city of Newport Beach for lower Newport Bay
- Participating as a CDFW Mitigation Banking Team member
- Collaborating with representatives from academia to develop beach nourishment impact assessment tools for grunion, beach wrack, rocky intertidal and subtidal habitats, eelgrass, surf grass and Pismo clams
- Participating on the statewide and regional Coastal Sediment Management Workgroup teams
- Participating on the Los Angeles Dredge Material Management Team
- Drafting and finalizing a major amendment to the CalTrans Bay Bridge Incidental Take Permit for the implosion of Pier E3. This amendment included the development and implementation of a comprehensive monitoring plan and the identification of appropriate mitigation for potential project impacts
- Submitting comprehensive comments and recommendations for a proposed aquaculture expansion project in Humboldt/Arcata Bay
- Participating in the review of proposed offshore aquaculture projects
- Participating in the development of a monitoring

partner organizations on similar efforts to explain MPA regulations, boundary coordinates, and the science behind the MPA network design. Outreach occurred in a number of ways, including during presentations and forums, distribution of printed materials, informational panels and signage, email correspondence, Web content, one-on-one discussions, and classroom curricula.

Staff worked at large sports shows and ocean-related public events from Trinidad to San Diego, such as the Fred Hall Fishing, Tackle, Boat and Travel shows, and gave presentations at MPA Collaborative forums in the northern and southern parts of the state, and other venues. Staff answered MPA-related questions, and responded directly to public inquiries by phone and through two dedicated email accounts, AskMarine@wildlife.ca.gov and AskMPA@wildlife.ca.gov.

To help ensure compliance with regulations in effect since October 1, 2014, staff applied corrective stickers to 11,827 MPA guide books. Staff updated and arranged for printing of 10,000 posters, 16,000 guide books, and 45,000 brochures. In addition to making these materials available online and at events, staff canvassed likely distributors and supplied 370 offices, stores, harbors and other appropriate locations throughout California with 27,258 guide books, 31,811 brochures, and 1,600 posters for public display and distribution. Distribution centers included CDFW offices; other local, state, and federal government offices; tribes; sporting goods stores; non-profit businesses; commercial fishing enterprises; scuba and ecotourism groups; harbors, and individuals, among others.

In coordination with CDFW’s Law Enforcement Division and the Office of Communication, Education and Outreach, staff contributed MPA content to the annual

ocean sport fishing regulations booklet and commercial fishing regulations digest. Staff also reviewed printed materials, signage, and other outreach materials created by non-CDFW organizations, and coordinated with CDFW Law Enforcement Division and the Statewide MPA Management Project to provide input and guidance for Marine Life Management Act outreach, and Master Plan updates for the Marine Life Protection Act. Working closely with the CDFW Data and Technology Division, staff also streamlined and improved MPA content for migration to CDFW's newly formatted website. Downloadable PDF copies of all guides, brochures, MPA overview sheets and the poster were included in the comprehensive website migration, along with all MPA regulatory, management, research, and other information.

Staff organized and guided the design and installation of four informational panels in a kiosk that included information about fishing regulations, fish identification, MPAs, and the local harbor at Pillar Point Harbor in San Mateo County.

A statewide MPA signage project installed 195 interpretive and regulatory panels along the coast from Del Norte to San Diego counties. Staff coordinated with partners, other agencies and non-government organizations to review and refine the signage, as well as other interpretive panels, online tools, and docent guides.

The first full year of partnership between CDFW and California State Parks to teach students about MPAs was achieved with the Parks Online Resources for Teachers and Students (PORTS) program. This program uses video-conference technology to connect content experts in parks with California classrooms. In the 2014-2015 academic year, PORTS delivered MPA-related programming to 14,000 California students. In 2015, staff worked with State Parks to develop curriculum featuring a new location, Point Lobos State Marine Reserve. *Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/MPAs for more information about California MPA outreach.*

State Wildlife Action Plan Update - Staff finalized their targets, goals, and strategies for the Marine Province section of the State Wildlife Action Plan update, and worked with contractors to develop text for this section. The final Plan was provided to the U.S. Fish and Wildlife Service in October 2015. Staff also participated in a collaborative effort with other agencies and

non-government organizations to develop a Marine Resource companion plan to help coordinate agency and constituent actions needed to implement the Marine Province section of the State Wildlife Action Plan. *Visit the CDFW website at wildlife.ca.gov/swap for more information about the State Wildlife Action Plan and associated companion plans.*

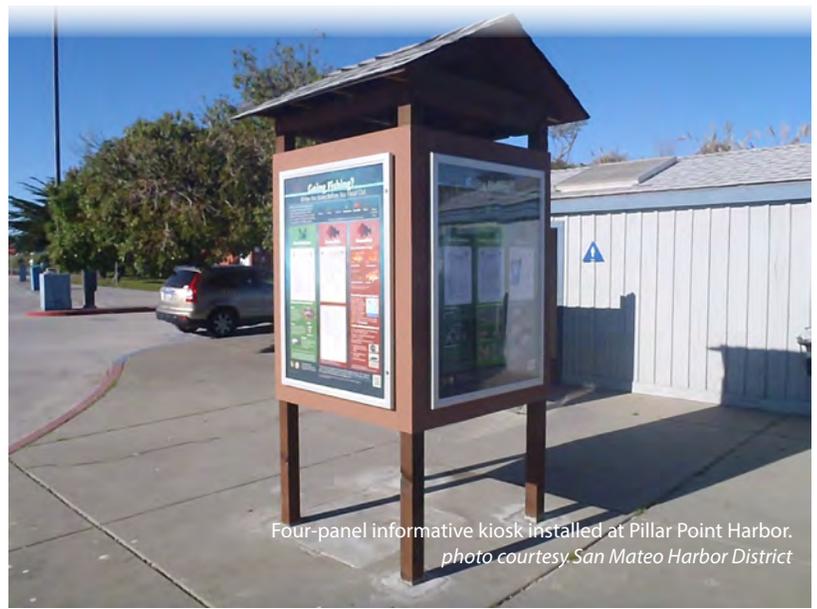
Statewide Marine Protected Area (MPA) Management and Monitoring – Staff continued management of the largest science-guided and stakeholder-driven network of MPAs in North America, utilizing a partnership-based approach for monitoring and research, outreach and education, enforcement and compliance, and policy and permitting.

Partnership-based Coordination Activities – Staff continue to work closely with the Fish and Game Commission, Ocean Protection Council, Ocean Science Trust, and other state, federal, and public partners.

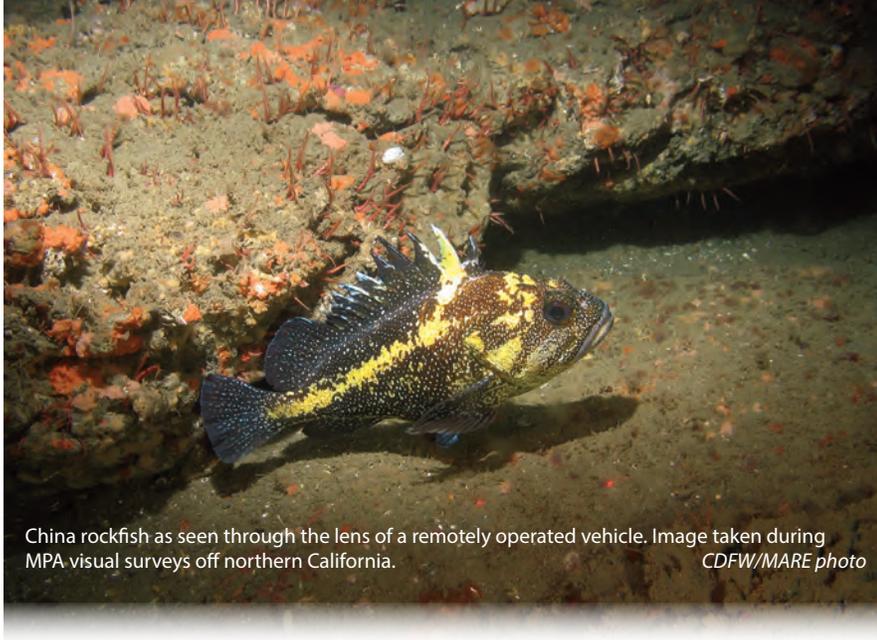
Staff contributed to the development of the *MPA Statewide Leadership Team Work Plan for 2015-2018* (bit.ly/1XjUJBF) as part of the Ocean Protection Council's MPA Statewide Leadership Team.

Staff and the Ocean Protection Council's Science Advisory Team continued to develop an ecological impact assessment model that will assist in understanding and estimating ecological impacts from scientific collecting in MPAs, with a goal of shielding MPAs against cumulative impacts from research activities or projects. Staff are planning a June 2016 pilot study using the new assessment tool.

Staff continued to update the Master Plan for MPAs. Since 2013, CDFW has worked closely with other state and federal partners to update the 2008 Master Plan by



Four-panel informative kiosk installed at Pillar Point Harbor. *photo courtesy San Mateo Harbor District*



China rockfish as seen through the lens of a remotely operated vehicle. Image taken during MPA visual surveys off northern California. CDFW/MARE photo

Title 14. The proposed regulations will be presented for public comment in late 2016.

Following an extensive review process by the Baseline MPA Monitoring Program management team (comprised of state, federal and other partners) and a scientific review panel, final technical documents for the nine distinct South Coast Baseline MPA Monitoring Program projects were made available in April 2015 (bit.ly/1rF3wC9). The baseline data gathered from the projects were available prior to the Refugio oil spill, and proved invaluable during the assessment of pre-impact conditions to help assess damages.

setting a statewide foundation for MPA management. The updated Master Plan is a forward-looking programmatic guidance document which operationalizes the tasks and activities the Marine Life Protection Program will undertake to meet statutory goals of the Marine Life Protection Act. The Fish and Game Commission has scheduled an adoption hearing for the updated Master Plan in April 2016.

MPA Monitoring and Research Activities - Staff deployed a remotely operated vehicle to conduct visual underwater surveys of the MPAs and rocky reefs off north central California, resulting in high definition video covering 76 kilometers of quantitative transects from 24 sites inside and outside of MPAs. This was the fourth survey funded by the Coastal Impact Assistance Program. Staff presented select results of the four surveys at the annual meeting of the American Fisheries Society in Portland, Oregon and at the Western Society of Naturalist meeting in Sacramento. Preliminary results from the most recent north central California survey show sharp increases in abundance of several rockfish species (brown, quillback, china and canary) across all sites compared to 2011 surveys. There also appears to be increased abundance of giant red sea cucumbers and both red and purple sea urchin in all locations. Further analysis of the survey data will test for MPA effects as well as additional changes in abundance.

Specific Management Activities – Staff is engaged in CDFW’s effort to overhaul the antiquated scientific collecting permit program. This effort has involved numerous internal meetings, and a series of external public scoping meetings throughout the state to solicit input on the proposed approaches for overhauling the program. The programmatic changes will involve re-drafting regulations in California Code of Regulations

Staff collaborated with state, federal, and other partners, and principle investigators involved in north central California MPA baseline monitoring to complete the *State of the California North Central Coast* report in November 2015 (bit.ly/24J69RI).

To more precisely align MPA boundaries with our coastline, staff completed site visits and GPS surveys for all coastal MPAs statewide. In total, 122 coordinates were refined for accuracy, retaining the original extent of most MPAs. However, in some cases improvements were made to accommodate tricky sections of coastline (e.g. realign boundary to anchor on originally intended offshore rock, etc.). In addition to surveying coordinate positions, an annotated photo library and database was created to document the boundary locations visually. In August 2015, CDFW proposed regulation amendments to the Fish and Game Commission to reflect the refined MPA boundaries and to clarify regulatory language to improve network compliance and enforceability. The Commission adopted the proposed regulations in December 2015, with an anticipated effective date of March 1, 2016.

Scientific Presentations and Public Outreach – Staff gave two oral presentations, hosted three poster presentations, and answered questions at an exhibitors booth at the Western Society of Naturalists annual meeting. Topics for presentations included: *Status of California’s Redesigned Marine Protected Areas Network*, and *Survey of Rocky Habitats Inside and Outside of California’s Marine Protected Areas Using a Remotely Operated Vehicle*. Topics for posters included: *Violations for the North Central Coast Marine Protected Areas 2010-2014*, *Managing California’s Marine Protected Area Network*, and *MarineBIOS: An Interactive Web Mapping Tool for California Marine Protected Area*

Management, Monitoring, and Enforcement. Abstracts for the presentations and posters are located online at bit.ly/1T2W3an.

Staff completed an 80-page informational report titled *Overview of Alternative MPA Proposals: Marine Life Protection Act Initiative 2004-2012* (bit.ly/1VSgl8S). This report provides important historical information regarding the range of alternative MPA proposals along with the recommendations considered and reviewed by the California Fish and Game Commission (but not ultimately selected) during the MPA design and siting process from 2004-2012.

Staff began writing articles for a new series called *Exploring California's Marine Protected Areas*, published

in the Marine Management News blog (bit.ly/1T4IWTD). Articles highlight MPAs throughout the statewide network. The first article, featuring South La Jolla State Marine Reserve, was published in August 2015. Anacapa Island and Point Reyes marine reserves were also featured in 2015.

Staff completed 72 different maps for inclusion on informational signs posted along the entire coast in collaboration with the California Sanctuary Foundation. Visit the CDFW website at wildlife.ca.gov/Conservation/Marine/MPAs for more information about California MPA management and monitoring.



5. Administration

Marine Region administrative staff bind together all the working parts of the expansive Marine Region, which extends from the border with Mexico all the way to Oregon, through administrative guidance and support. It's no easy task. Administrative staff work tirelessly behind the scenes to support Region staff, making sure they have the tools to get the job done.

Administrative staff help to hire all of the Marine Region's temporary and permanent staff, manage storage and office facilities for staff and vessels, procure supplies for field work, scientific cruises, offices, and laboratories,

and track and process all out-of-state travel and training requests, while managing and staying within the Regional budget – and that hardly scratches the surface.

Administrative staff also help various staff conform to State laws and CDFW policies as they work to achieve their project goals. From San Diego to Crescent City, Marine Region scientists, biologists, and others rely on the services provided by Marine Region administrative staff – without whose help it would be a much tougher job to protect, maintain, enhance, and restore California's marine ecosystems for all to enjoy.



For more information about CDFW's Marine Region,
visit the CDFW website at wildlife.ca.gov/regions/marine

MARINE REGION

2015 BY THE NUMBERS



Marine Region: Area, Staff, Funding

- The Marine Region encompasses approximately **5,767 square statute miles of state waters**, including San Francisco Bay and San Pablo Bay to the Carquinez Bridge.
- As of Dec. 31, 2015 there were **141 permanent and 122 temporary staff positions** within the Marine Region.
- For the 2015-2016 fiscal year, the Marine Region's **total annual budget** was \$19,812,483

2015 Commercial Fishing

Weight and Ex-Vessel Value of California Commercial Landings in 2015		
Port Area	Pounds	Value
Eureka	15,569,359	\$17,922,284
Fort Bragg	6,625,960	\$11,174,134
Bodega Bay	2,160,982	\$3,913,560
San Francisco	15,735,360	\$16,590,343
Monterey	73,962,146	\$17,339,414
Morro Bay	3,980,099	\$10,097,417
Santa Barbara	49,855,832	\$34,621,433
Los Angeles	15,072,694	\$11,673,325
San Diego	2,542,269	\$9,266,354
Total	185,504,701	\$132,598,263

Total Number of Licensed Commercial Vessels and License Fees for April 2015 - March 2016		
	Number Sold	Revenue
Resident Vessel	2,891	\$1,007,514
Resident License	5,542	\$735,701
Non-Resident Vessel	316	\$110,126
Non-Resident License	907	\$120,404
Passenger Fishing Vessel	480	\$167,280
Total	10,136	\$2,141,024

2015 Commercial Fishing, cont.

- Commercial **landing tax** collected in 2015¹: \$594,070
- Top commercial fishery by **ex-vessel value** for 2015: Market Squid - \$23,714,701 (in 2014: \$72,511,069)
- Top commercial fishery by **weight** for 2015: Market Squid - 78,724,810 lb. (in 2014: 226,946,286 lb.)

Top California Commercial Fisheries by Value in 2015		
	Ex-Vessel Value	Pounds
Market squid	\$23,706,608	78,562,944
Dungeness crab	\$17,075,088	3,112,963
Spiny lobster	\$15,802,738	767,322
Sablefish (black cod)	\$8,888,308	3,705,961
Ocean (pink) shrimp	\$8,621,180	7,646,695
Chinook salmon	\$8,060,410	1,174,044
Red sea urchin	\$6,869,391	8,089,232
Spot prawn	\$6,324,426	491,799
Swordfish	\$3,615,474	942,547
Bigeye tuna	\$3,127,909	949,562

Top California Commercial Fisheries by Weight in 2015		
	Pounds	Ex-Vessel Value
Market squid	78,562,944	\$23,706,608
Northern anchovy	38,108,953	\$2,006,452
Pacific mackerel	12,342,472	\$1,178,280
Red sea urchin	8,089,232	\$6,869,391
Ocean (pink) shrimp	7,646,695	\$8,621,180
Dover sole	4,147,177	\$1,857,371
Pacific sardine	3,747,446	\$342,949
Sablefish (black cod)	3,705,961	\$8,888,308
Dungeness crab	3,112,963	\$17,075,088
Jack mackerel	2,831,812	\$214,409

¹ This figure is approximately half the taxes collected in 2014, primarily due to the drop in the number of Dungeness crab, market squid, and Pacific sardine landings in 2015. The Dungeness crab fishery did not open in Fall/Winter 2015 due to health concerns (domoic acid in crab). The market squid industry voluntarily curtailed fishing activity in early 2015 as the landing total neared the quota; environmental conditions may have been a factor in reduced landings later in the year. The Pacific sardine fishery closed early in 2015.

California Commercial Landings of Key Groundfish Species (All Gear Types)		
Species	Pounds	Ex-Vessel Value
Nearshore ¹	636,004	\$3,086,789
Shelf and Slope Rockfish	924,117	\$984,454
Dover Sole, Thornyhead, Sablefish (black cod)	9,987,216	\$13,385,568
Remaining Flatfish ²	1,953,507	\$1,904,791
Other	996,168	\$997,539
Total	14,421,080	\$20,002,794

¹ Includes nearshore rockfish, California scorpionfish, cabezon, greenling, and California sheephead

² Does not include California halibut

Data Source: Pacific Fisheries Information Network database, extracted 05/11/2016

2015 Recreational Fishing

Total Recreational Fishing Licenses Sold and Fees Collected in 2015¹		
	Number Sold	Value
All Sport Fishing Licenses ²	1,782,0700	\$57,246,975
Abalone Report Card	25,542	\$529,997
Lobster Report Card	32,640	\$285,863
Ocean Enhancement Validation	265,816	\$ 1,262,626

¹ Does not include 5% handling fee and 3% processing fee. Total as of 12/31/2015

² Sport fishing licenses provide the privilege to fish in either saltwater or freshwater

- Estimated number of recreational fishing trips: approximately **4 million fishing trips in marine waters**
- Estimated number of fish caught: approximately **11.7 million**
- Number of angling parties contacted by California Recreational Fisheries Survey staff: over **58,000 parties**
- Number of fish that anglers reported catching: over **541,000 fish and invertebrates**
- Number of fish and invertebrates examined by California Recreational Fisheries Survey staff: over **222,000 fish and invertebrates**

2015 Recreational Fishing, cont.

Top Five Types of Fish Targeted by Recreational Anglers in California During 2015		
Rank	Trip Target and Top Species Caught ¹	Estimated Number of Angler Trips (thousands)
1	Bottomfish: Rockfish, Basses (Kelp/Calico Bass, Barred Sand Bass), Lingcod, California Scorpionfish	890
2	Inshore Fish: Surfperch, California Halibut, Leopard Shark, Jacksmelt	806
3	Coastal Migratory Fish: Yellowtail, Chub (Pacific) Mackerel, Pacific Bonito, and Pacific Barracuda	432
4	Anadromous* Fish Other Than Salmon: Striped Bass, White Sturgeon	202
5	Highly Migratory Fish: Tunas (Bluefin, Yellowfin, Albacore), Thresher Shark, Wahoo, Dolphinfinch (dorado)	150

*fish that migrate between the ocean and fresh water

Data Sources: CDFW California Recreational Fisheries Survey estimates and data were extracted from the RecFIN database at www.recfin.org/data/estimates/tabulate-recent-estimate-2004-current. Supplemental data and estimates were provided by the CDFW Recreational Fisheries Data Project.

Top 10 Types of Fish Commonly Caught by Recreational Anglers in California During 2015		
Rank	Fish Type	Estimated Pounds of Fish Harvested
1	Rockfish	2,899,079
2	Tunas	2,373,497
3	Yellowtail	1,640,239
4	Lingcod	1,428,596
5	Chub (Pacific) Mackerel	649,261
6	Surfperches	568,793
7	Salmon ¹	378,251
8	Basses (Kelp/Calico Bass, Barred Sand Bass, and Spotted Sand Bass)	292,154
9	Flatfish (California Halibut, Sanddab, Pacific Halibut, Sole, Starry Flounder)	245,154
10	California Scorpionfish	213,848

¹The Pacific Fisheries Management Council uses numbers of salmon harvested for fishery management. Numbers were converted to weight in pounds using the RecFIN average weight of 10.4 pounds per fish.

Data Sources: CRFS data extracted from RecFin database at www.recfin.org/data/estimates/tabulate-recent-estimate-2004-current. Supplemental data and estimates were provided by the Recreational Fisheries Data Project. The salmon numbers are from the Pacific Fishery Management Council website at www.pcouncil.org/salmon/stock-assessment-and-fishery-evaluation-safe-documents/review-of-2015-ocean-salmon-fisheries/.

2015 Regulatory Activity

- **9 state regulatory packages** completed
- **31 reports** submitted for federal regulatory actions

2015 Permitting and Environmental Review

- Number of marine **Scientific Collecting Permits** issued: **172**
- Number of **environmental documents** reviewed (plans, permits, public notices, etc.): **681**
- Number of **comment letters** submitted: **30**
- **Other permitting/environmental review documents** issued or submitted: **140**

2015 Marine Protected Area Outreach Coordination

- Number of **marine protected area guidebooks** distributed: **27, 258**
- Number of **marine protected area brochures** distributed: **31,811**
- Number of **marine protected area posters** distributed: **1,600**
- Number of students receiving **marine protected area classroom information** through the Parks Online Resources for Teachers and Students program: **14,000**
- Number of **marine protected area interpretive and regulatory signs** installed statewide: **195**



For about a month in the summer of 2015, Mark Mayeda held the new state diving record for bluefin tuna with this 178 lb, 1 oz. fish. His record was broken less than a month later when an even larger fish was speared.

CDFW file photo



CDFW Biologists on High Alert for Signs of White-Nose Syndrome in Bats

[April 29, 2016](#)

The California Department of Fish and Wildlife (CDFW) is monitoring developments following the recent detection of white-nose syndrome (WNS) in a bat in Washington state. The disease has been responsible for killing millions of America's bats, and CDFW scientists are enlisting the public to help prevent its spread.

Part of CDFW's effort to educate the public is the launch of a new WNS webpage (www.wildlife.ca.gov/wns). News of the first WNS case in Washington State, announced in March, prompted CDFW to make this information available as quickly as possible, since many species of bats in California could be affected if the disease spreads south.

Senior Environmental Scientist Scott Osborn is CDFW's Statewide Coordinator for Small Mammal Conservation. "White-nose syndrome has killed more than six million bats in the eastern U.S. and Canada, in some cases wiping out entire colonies of hibernating bats," he said. "It had spread gradually over ten years from New York into northeastern states and Canada, south to Mississippi and Arkansas, and as far west as Nebraska and Minnesota."

Osborn said we don't know yet how the disease moved more than 1,300 miles to Washington. It may have spread undetected by bat-to-bat contact across the Great Plains and Rocky Mountains. But it is also possible that the fungus was inadvertently carried by a person whose clothing or gear was contaminated, perhaps while exploring caves in eastern states.

The fungus *Pseudogymnoascus destructans* grows on and in the skin of bats during winter hibernation, in some cases giving them a white, fuzzy appearance on the muzzle, wings and ears. The fungus invades deep skin tissues and causes extensive damage. Affected bats awaken more often than normal during hibernation, causing them to burn up fat reserves needed to sustain them through winter, which leads to

starvation and death. Wing damage may also cause problems with physiological processes such as blood circulation and the bat's ability to regulate its body temperature. Impairment of any of these processes may also lead to death.

“Bats provide tremendous pest control services, eating as much as their own body weight in insects every night,” Osborn said. “The national value of pest control by bats has been conservatively estimated at more than \$3 billion per year. No doubt California agriculture benefits greatly from healthy bat populations. Some bat species pollinate plants such as agaves and large cacti. And all bats are important to the ecosystems in which they occur and play a large role in controlling insect populations and converting insects into fertilizer used by plants. Of the 25 bat species in California, two are known to have been killed in other states by WNS and another 12 are likely to be at risk due to their similarity to affected species.”

CDFW asks that the public take several simple precautions to help avoid the potential spread of WNS:

- Please report any bats you see showing signs consistent with WNS, or if you see bats flying outside during very cold or freezing temperatures. Please refer to the [online reporting form](#) for information if you have found a sick or dead bat with signs indicating possible infection with WNS.
- Avoid entering caves, mines or other areas used by bats, unless absolutely necessary, to avoid disturbing bats and potentially spreading the disease to unaffected areas.
- If you must enter a cave, mine or bat roost, decontaminate all equipment and clothing immediately after visiting. Do not allow dogs or other pets in caves, as they may act as carriers of the fungus to new sites.
- Do not handle live bats; they can carry rabies.

For more information on bats and White Nose Syndrome, please see wildlife.ca.gov/WNS, www.whitenosesyndrome.org or [Bat Conservation International](#)'s website.

Signs of WNS include:

- White or gray powdery fungus seen around the muzzle, ears, wings, limbs or tail of bats;
- Unusual winter behavior, such as bats on the ground (either inside or outside a hibernation roost), roosting near the entrance to or increased bat activity outside a hibernation roost, or premature return to a summer roost during freezing weather;
- Thin body condition or dehydrated appearance (wrinkled and flaky appearance of furless areas);
- Moderate to severe wing damage, including membrane thinning, depigmentation, stickiness, holes, tears or flaky appearance on bats found outside of a hibernation roost or at a summer roost;
- Bats exhibiting yellow-orange fluorescence on hairless skin under long-wave UV light; and
- Excessive or unexplained mortality or population decline at a winter hibernation roost.

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<https://cdfgnews.wordpress.com/2016/04/29/cdfw-biologists-on-high-alert-for-signs-of-white-nose-syndrome-in-bats/>

CDFW News

Map-based Sport Fishing Regulations Offers Ease of Use for Anglers

April 27, 2016

The California Department of Fish and Wildlife (CDFW) has launched a beta release of an online location-based Freshwater Sport Fishing Regulations tool to help anglers identify those regulations that relate to the area they plan to fish. The new tool provides an easy way for anglers to find the sections of the regulations that are relevant to them.



The new fishing regulations tool can be found at <https://map.dfg.ca.gov/sportfishingregs/>. It is designed to work on a smart phone, tablet or desktop computer.

When accessed from a smart phone or a tablet with GPS, the map-based tool will automatically present the angler with the sport fishing regulations that apply to their current location based on the GPS in the device. When accessed from a tablet without GPS or from a desktop computer, the user can click anywhere on the map to discover the regulations for that area.

The new tool includes the Freshwater Sport Fishing Regulations booklet, found on our Regulations webpage at www.wildlife.ca.gov/regulations.

The regulations are also now available in the existing Fishing Guide, available at www.wildlife.ca.gov/fishing/guide.

“This is a big step forward in making the complex fishing regulations more accessible to the angling community,” said CDFW Acting Fisheries Branch Chief Roger Bloom. “As we continue to simplify our fishing regulations, they will be kept up-to-date within this new tool.”

This is a beta release that CDFW staff will be actively working to improve. CDFW welcomes comments or suggestions for improvement. Please send feedback to fishingguide@wildlife.ca.gov.

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<https://cdfgnews.wordpress.com/2016/04/27/map-based-sport-fishing-regulations-offers-ease-of-use-for-anglers/>