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

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I. Agency Overview

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

The Marine Region has adopted a management approach that takes a broad perspective relative to resource issues and problems. This ecosystem approach considers the values of entire biological communities and habitats, as well as the needs of the public, while ensuring a healthy marine environment. The Marine Region employs approximately 140 permanent and 100 seasonal staff that provide technical expertise and policy recommendations to the CDFW, CFGC, PFMC, and other agencies or entities involved with the management, protection, and utilization of finfish, shellfish, invertebrates, and plants in California's ocean waters.

Groundfish project staff are tasked with managing groundfish and providing policy recommendations to the CDFW, CFGC, and PFMC. Other staff work indirectly on groundfish, such as our California Recreational Fisheries Survey (CRFS) staff that sample our recreational fisheries and our Marine Protected Areas (MPA) Project and their remotely operated vehicle (ROV) work that benefits groundfish. Additionally, Pacific States Marine Fisheries Commission (PSMFC) staff sample the state's commercial groundfish fishery. The Marine Region's annual Year in Review provides summary of all its programs, including groundfish.

Contributed by Traci Larinto (Traci.Larinto@wildlife.ca.gov)

II. Surveys

ROV Visual Survey and Analysis for MPA and Fishery Data Needs

Scientists from CDFW's Groundfish and MPA Management Projects continued analysis of ROV survey data collected from 2014 to 2016 to develop methods for estimating fish density and total expanded biomass for select species using design and model-based approaches. In January 2020, these methods were evaluated for use in stock assessments by the PFMC's Scientific and Statistical Committee (SSC). An evaluation of the methods was performed by a committee formed by the SSC and two independent reviewers from the Center of Independent Experts. In February, the reviewers met in person and received presentations from CDFW. In addition, ROV methods developed by the Oregon Department of Fish and Wildlife were evaluated and presented in parallel with CDFW's. The proceedings of the

evaluations were presented for approval by the full SSC at the June 2020 PFMC meeting and were approved for use in management.

As a test case, Gopher Rockfish (*Sebastes carnatus*) was modeled and results indicate that depth, latitude and seafloor terrain attributes provide a suitable model fit. The seafloor mapping data was used as a basis for expansion of modeled Gopher Rockfish abundance and biomass. The estimates derived from the model-based approach are comparable to design-based estimates derived from the same data. CDFW will develop similar models with the 2014-2016 statewide survey data to inform upcoming stock assessments of Copper (*S. caurinus*) and Vermilion (*S. miniatus*) rockfish in 2021.

In addition, density by depth and length frequency by depth are being considered relative to depth restrictions to inform selectivity and catchability parameters informing fully parameterized stock assessments in Stock Synthesis. ROV data collected in 2020 and 2021, as part of long-term MPA monitoring, will also be incorporated into the models where feasible.

The estimates of density and biomass from these models may also be used to measure MPA performance. Preliminary results indicate differences in length compositions and density inside and outside MPAs as a result of site selection or accumulation of biomass in long established locations with protections. Two area models reflecting these differences may provide more representative estimates of status and scale if incorporated in assessments currently only reflecting data from openly fished areas. Future surveys may provide a time series to examine long term trends in abundance to inform fishery and MPA management. Until then, absolute estimates of abundance can be used to inform the scale of the integrated stock assessments in Stock Synthesis.

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## III. Reserves

### Marine Protected Areas Research and Monitoring

Completed in 2012, California's Marine Protected Area (MPA) Network spans the entire California Coast including offshore islands and is comprised of 124 MPAs. The Network is adaptively managed through the MPA Management Program, which is comprised of four focal areas: outreach and education, research and monitoring, enforcement and compliance, and policy and permitting.

A key component of the research and monitoring focal area is the Statewide MPA Monitoring Program. The Program takes a two-phased approach to monitoring: Phase 1, regional baseline monitoring, which concluded in 2018, and Phase 2, statewide long-term monitoring, which is ongoing.

To manage Phase 2, the State developed a MPA Monitoring Action Plan (Action Plan), which prioritizes key measures and metrics, habitats, sites, species, human uses, and management questions to target for long-term monitoring. In 2019, seven

projects were funded to monitor six habitats and human uses. Monitoring activities will span 2019-2021 and reports will be submitted in 2021.

In 2022, the first comprehensive review of the MPA Management Program including an evaluation of the MPA Network performance will take place. Monitoring data from Phase 1 and Phase 2 will be analyzed using a before-after, control-impact approach to measure the effects of protection on the prioritized indicators identified in the Action Plan.

To further inform aspects of the review, the state has convened two external working groups of the Ocean Protection Council's Science Advisory Team. The Climate Resiliency Working Group examined MPA resiliency to climate change and provided recommendations on how to best manage the state's natural resources and leverage the MPA Network under a new climate change regime. The Decadal Evaluation Working Group refined and prioritized Action Plan Network evaluation questions, defined the MLPA goals in scientifically tractable terms, and provided recommendations on how to integrate data streams and fill in knowledge gaps to address Network evaluation for the 2022 review and beyond. Informed by these recommendations, the Department will work closely with monitoring principal investigators and partners at the National Center for Ecological Analysis and Synthesis, or NCEAS, on the integration and synthesis of MPA monitoring data and other data streams for the 2022 review.

To receive updates about the MPA Management Program and other Department programs, click here; archived MPA stories are available here.

Contributed by Sara Worden (sara.worden@wildlife.ca.gov)

## IV. Review of Agency Groundfish Research, Assessment and Management

### A. Hagfish

There are four species of hagfish that exist off California: Black Hagfish (*Eptatretus deani*), Pacific Hagfish (*E. stoutii*), Shorthead Hagfish (*E. mcconnaugheyi*) and Whiteface Hagfish (*Myxine circifrons*). Of the four, the Pacific Hagfish (hagfish) is the preferred species for California's primarily export-only fishery. Using traps, fishermen land hagfish in live condition. Exporters keep hagfish alive dockside until packed for live export to South Korea where they are sold live for human food. There is a small domestic market for live and fresh, dead hagfish. Considered scavengers, hagfish are found over deep, muddy habitat.

1. Assessment
   Little is known about the status or biomass of hagfish stocks. Since 2007, CDFW's Northern and Central California Finfish Research and Management Project has been monitoring the fishery and documenting changes in the average weight and spawning status of landed hagfish through dockside sampling. Sampling activity began with the emergence of the fishery in Moss

Landing (2007), ending there in 2008 due to market changes, occurred in southern California from 2009 to 2011, and began in Morro Bay in 2010 and Eureka in 2012. The Moss Landing fishery reemerged in 2016 with one vessel making landings of hagfish taken with barrel traps, and sampling resumed. Due to the physical impossibility of accurately measuring hagfish in a live condition, staff employs a count-per-pound method to monitor changes in average weight of retained hagfish. Randomly selected hagfish from sampled landings are examined to determine spawning status by sex and length frequency. In 2020, CDFW staff sampled hagfish at the ports of Moss Landing, Morro Bay, and Port San Luis.

For the period 2010-2020, landings have fluctuated between 360 and 967 metric tons (0.8 and 2.1 million pounds) annually with an average of 668 mt. The annual ex-vessel value for this period ranged from $565,000 to $1.84 million with an average of $1.2 million. In 2020 there were 558 metric tons landed with an ex-vessel value of $1.08 million. Typically fishing effort and export demand are market driven by the South Korean economy and fishing activities of Washington and Oregon fishermen. Additional influences on fishing effort include the price and availably of bait, fuel costs, and other fisheries that may be available to hagfish fishermen. In 2020, the COVID-19 pandemic forced market closures and reduced market demand due to additional limits placed on export goods. The pandemic also caused restrictions to be placed on California fishermen and dock infrastructure.

2. Management
The commercial hagfish fishery is open access; all fishery participants are required to have a commercial fishing license and a general trap permit. Hagfish may be taken in 19-liter (5-gallon) bucket traps, Korean traps, or barrel traps with dimensions up to 1.14 m (45 in.) long and 0.64 m (25 in.) outside diameter. The maximum number of traps allowed per vessel is 200 bucket, 500 Korean, or 25 barrel traps. Fishermen must choose one trap type and may not combine hagfish trap types or have non-hagfish traps onboard when fishing with a chosen hagfish trap. To assist in enforcing vessel trap limits, the vessel commercial registration number must be on the trap buoy. There is no limit on the number of groundlines for bucket or Korean traps; however, barrel traps may be attached to no more than three groundlines. All hagfish traps must have a CDFW approved destructive device and all holes, except for the entrance, must have a minimum diameter of 14.2 millimeters (9/16 in.). When in possession of hagfish, no other finfish species may be possessed on board. Logbooks are not required for this fishery. There are no annual quotas or minimum size limits.

Contributed by Travis Tanaka (Travis.Tanaka@wildlife.ca.gov)

B. Groundfish, all species combined

1. Research off California
   Scientific Collecting Permits are issued by CDFW to take, collect, capture, mark, or salvage, for scientific, educational, and non-commercial propagation purposes. Permits are generally issued for three years, except that student permits are for one year. While a complete report of groundfish-related research activities isn't available for this report, the permits fall into four broad categories: 1) public display in aquariums and interpretive centers; 2) environmental monitoring; 3) life history studies that include age and growth, hormone assays and genetics for population structure; and, 4) studies related to changing environmental conditions such as ocean acidification and hypoxia.

   Contributed by Melanie Parker (Melanie.Parker@wildlife.ca.gov)

2. CDFW Research
   Yelloweye Rockfish and Lingcod

   In 2020, CDFW continued its ongoing research on Yelloweye Rockfish (*Sebastes ruberrimus*). The population off the West Coast was designated as an overfished stock in the early 2000s. Commercial and recreational regulations were implemented to minimize gear interactions in combination with a prohibition on retention (or limited retention in designated fishing sectors) and area closures. As a result, there has been limited opportunity to collect biological information for studying age and growth parameters that are crucial components of stock assessment modeling.

   In 2020, state and county health advisories and stay at home orders in response to the COVID-19 pandemic impacted the ability of the CRFS program to collect Yelloweye Rockfish from anglers and resulted in a much lower number of specimens collected in 2020.

   Similarly, collection of carcasses of lingcod (*Ophiodon elongatus*) as well as several other recreationally important species of rockfish were impacted by the pandemic. CDFW shifted efforts to processing and drying over 400 samples of lingcod fin rays for aging. The lingcod fin ray samples were collected during previous years from both the recreational and commercial fisheries and the resulting age data will help inform future lingcod stock assessments.

   CDFW intends to resume field sampling in 2021, as conditions permit.

   Contributed by Andrew Klein (Andrew.Klein@wildlife.ca.gov)

   Yellowtail Rockfish
   Starting in 2013, the PFMC recommended issuance of an Exempted Fishing Permit (EFP) to commercial fishermen to study a method of commercial jig fishing to determine whether it is possible to target Yellowtail Rockfish (*Sebastes flavidus*) inside the Rockfish Conservation Areas (RCA; depth-

based fishing closures) while avoiding overfished rockfish species (e.g. Canary (*S. pinniger*), Yelloweye, and Bocaccio Rockfish (*S. paucispinis*)) from the Oregon/California border to Point San Pedro. The goal of this study has been to determine if targeting species in the midwater column can provide additional fishing opportunities for the commercial fishery in the RCAs while avoiding overfished stocks that are more likely to reside on the bottom. Data from trips taken between 2013 and 2020 indicate that the gear is successfully targeting healthy stocks such as Yellowtail and Widow (*S. entomelas*) Rockfish, and now Canary Rockfish, while avoiding overfished species. Canary Rockfish and Bocaccio have since been rebuild (in 2016 and 2019, respectively), and are currently allowed to be retained and sold under this EFP. Prior to the rebuilding of Canary Rockfish and Bocaccio catch of these species was minimal, and catch of Yelloweye Rockfish continues to be minimal.

In 2015, the geographic extent of the EFP was expanded south to Point Conception and additional vessels were added to allow for additional data collection in more southerly areas. Currently, fishing occurs between 40° 10' N. lat. near Cape Mendocino and Point Conception.

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3. Assessment
   The CDFW contributed to length-based stock assessment efforts for Copper, Squarespot (*Sebastes hopkinsi*) and Quillback (*S. maliger*) Rockfish in 2020 in collaboration with National Marine Fisheries Service (NMFS) assessment authors. Staff also contributed data from CRFS, ROV and historical CDFW data bases for Lingcod, Vermilion/Sunset rockfish (Sunset = *S. crocotulus*), and Spiny Dogfish (*Squalus acanthias*) assessments. CDFW staff will contribute to the 2021 stock assessments as contributing authors, Stock Assessment Review panel members, and reviewers.

   Contributed by John Budrick (John.Budrick@wildlife.ca.gov)

4. Management
   Groundfish management is a complex issue and is conducted by the PFMC with input by CDFW as well as the states of Oregon and Washington and the treaty tribes, and guided by the federal Pacific Coast Groundfish Fishery Management Plan. With the exception of some nearshore species, harvest guidelines, fishery sector allocations, commercial trip limits and recreational management measures (e.g., bag limits, season limits, RCAs) are recommended by the PFMC and implemented by NMFS.

5. Commercial Fishery Monitoring
   CDFW has collected commercial fisheries statistics since 1916 using paper fish tickets. Beginning July 1 2019, CDFW began requiring the submission of electronic fish tickets via PSMFC's E-Tix system instead of the paper fish tickets. Once landed an electronic fish ticket needs to be completed immediately. If that is not possible, a paper dock ticket must be completed

and the electronic fish ticket submitted within 3 business days. Federal electronic reporting requirements for various fisheries, including 24-hour submission, still apply.

Statistical and biological data from landings are continually collected and routinely analyzed by CDFW staff to provide current information on groundfish fisheries and the status of the stocks. California's primary commercial landings database is housed in CDFW's Marine Landings Database System. Outside funding also enables California fishery data to be routinely incorporated into regional databases such as Pacific Coast Fisheries Information Network.

Commercial sampling is conducted by PSMFC staff and occurs at local fish markets where samplers determine species composition of the different market categories, measure and weigh fish and take otoliths for future ageing. Market categories listed on the landing receipt may be single species (e.g., Bocaccio), or species groups (e.g., group shelf rockfish). Samplers need to determine the species composition so that landings of market categories can be split into individual species for management purposes. Biological data are collected for use in stock assessments and for data analyses to inform management decisions.

In 2020, state and county health advisories and stay at home orders in response to the COVID-19 pandemic impacted PSMFC's ability to conduct commercial sampling in California. These orders varied by date and location until the initial statewide stay at home order was issued on March 19, 2020. While commercial fishing was designated an essential business and could continue operations, initially groundfish samplers stayed home per orders. As restrictions eased, staff were allowed back in the field with new safety measures in place (i.e., physical distancing requirements and personal protective equipment), although the actual sampling methods were unchanged. By May 2020, sampling had resumed at all ports.

Inseason monitoring of California commercial species landings is conducted by CDFW biologists. This work is done in conjunction with inseason monitoring, management and regulatory tasks conducted by the PFMC's Groundfish Management Team.

Contributed by Andre Klein (Andrew.Klein@wildlife.ca.gov) and Traci Larinto (Traci.Larinto@wildlife.ca.gov

6. Recreational Fishery Monitoring
As with the commercial groundfish fishery, the COVID-19 pandemic impacted CRFS ability to collect recreational fisheries data in 2020. While the public was told to stay home, outdoor recreational activities, including recreational fishing were allowed in most locations. CRFS interviews with anglers were initially discontinued until safety procedures were developed. In an effort to stay aware of trends in recreational activities, CRFS implemented statewide effort checks at fishing sites, with more than 500 sites surveyed at a distance

to document status (open or closed to the public) and to gauge relative effort. In May when California's party/chart boat fleet began operating under new COVID-19 health guidelines, CRFS resumed tracking the fleet's activities. CRFS resumed sampling in July under newly developed sampling guidelines to comply with COVID-19 health advisories and best practices. The new guidelines reduced CRFS' efficiency at intercepting anglers, but methods were employed to compensate for the loss included doubling the number of party/charter boat dockside surveys, and streamlining the angler interview process at launch ramps, piers, breakwaters and jetties. This allowed CRFS to resume production of monthly estimates, with only a break from April through June.

Contributed by David Hernandez (David.Hernandez@wildlife.ca.gov)

C. Pacific Halibut & International Pacific Halibut Commission activities

1. Research and Assessment
   Research and assessment activities for Pacific Halibut (*Hippoglossus stenolepis*) off the coast of California are conducted by the International Pacific Halibut Commission (IPHC). During 2020 CDFW staff conducted biological field sampling of commercial fishery catches on behalf of the IPHC.
2. Management
   The CDFW collaboratively manages the Pacific Halibut resource off the coast of California with the IPHC, NMFS, PFMC, other west coast states, and the CFGC. Pacific Halibut management activities occur on an annual timeline, with most changes to management occurring through the PFMC's Catch Sharing Plan and federal regulations published by NMFS. Changes to the Catch Sharing Plan for the following year are approved in November by the PFMC.

   Once the federal regulations are adopted, the state can then take action to conform state regulations to federal regulations for the recreational fishery by notifying constituents within 10 days of publication of the regulations in the Federal Register. Notification is done via press release and the CFGC is notified of the action at their next scheduled meeting.
3. Commercial Fishery Monitoring
   The directed commercial fishery for Pacific Halibut is managed under a coastwide (Washington, Oregon and California) quota and operates as a derby fishery. The fishery opened on June 26 and beginning in 2020, is structured based on 56-hour openers that are spaced two weeks apart. The fishery operates on this schedule until the coastwide quota has been met. California effort in this fishery continued in 2020 with six vessels participating in the fishery; landings totaled 2,848 dressed kilograms (6,274 dressed pounds).
4. Recreational Fishery Monitoring

The 2020 recreational Pacific halibut fishery in California was open May 1-August 11 and closed for the year on August 11 at 11:59 p.m., due to projected attainment of the 17,690 net kilogram (39,000 net pound) quota. The California Department of Fish and Wildlife's (CDFW) 2020 preliminary season catch estimate is 29,078 net kilograms (64,107 net pounds), or 164 percent of the quota.

CDFW tracks recreational catch of Pacific halibut on a weekly basis during the open season. For the week ending July 26, projected catch was 38 percent of the quota. The following week of July 27-August 2, an unprecedented 256 Pacific halibut were reported as kept by anglers and catch projections through August 2 indicated the quota had been exceeded. This is a record-high weekly value for California and set new monthly high records as well. Prior to this event, the record monthly high total sampled fish was 198 fish sampled in July 2014. Adding to the unusual nature of this event, in 2019 the California recreational fishery attained only 7,911 net kilograms (17,440 net pounds) of its 17,690 net kilogram (39,000 net pound) quota.

Contributed by Melanie Parker (Melanie.Parker@wildlife.ca.gov)

## V. Publications

Budrick, J, Ryley, L, Prall, M. 2020. Methods for using remotely operated vehicle survey data in assessment of nearshore groundfish stocks along the California coast. 89 p. Available at: ftp://ftp.pcouncil.org/pub/2019%20Nearshore%20ROV%20Surveys%20Methodology%20Review/CA%20Survey/.