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 staff that sample our recreational fisheries and our Marine Protected Areas 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.

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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 is being prepared for approval by the full SSC at the June 2020 PFMC meeting.

Preliminary results of modeling Gopher Rockfish (*Sebastes carnatus*) as a test case, indicate that depth, latitude and seafloor terrain attributes provide a suitable model fit. 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. Following full SSC approval, CDFW will develop similar models with the 2014-2016 statewide survey data to inform upcoming stock assessments of Brown, Copper and Vermilion rockfish in 2021. ROV data collected in 2020 and 2021, as part of long-term MPA monitoring, will also be incorporated into the models where feasible. The projected estimates of density and biomass from these models may also be used to measure MPA performance. Future surveys may provide a time series to examine long term trends in abundance to inform fishery and MPA management.

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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, 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 2019-2020 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 analyzed using a before-after, control-impact approach to measure the networks performance since 2012.

In October 2019, the MPAs around the Northern Channel Islands earned the prestigious international Blue Park Award for meeting the highest science-based standards for marine life protection and management. The Northern Channel Islands are some of the oldest in California's comprehensive statewide network.

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

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IV. Review of Agency Groundfish Research, Assessment and Management

A. Hagfish

There are two species of hagfish that reside off California, Pacific Hagfish (*Eptatretus stoutii*) and Black Hagfish (*E. deani*). Of the two, the Pacific Hagfish (hagfish) is the preferred species for California's primarily export-only fishery. Using traps, fishermen land hagfish in live condition. The hagfish are usually maintained dockside until packaged for live export to South Korea where they are sold live for human food. Considered scavengers, hagfish are found over deep, muddy habitat.

1. **Assessmen**t

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. For the period of 2010-2018, landings have fluctuated between 360 and 976 metric tons (0.8 and 2.1 million pounds) annually with an average of 688 mt (1.5 million pounds). The annual ex-vessel value for this period ranged from $565,000 to $1.84 million with an average of $1.21 million. In 2019 there were 576 metric tons (1.3 million pounds) landed with an ex-vessel value of $1.10 million. Fishing effort and export demand is market driven by the South Korean economy and fishing activities of Washington and Oregon fishermen. California fishermen fishing effort can be influenced by the price and availably of bait, fuel costs, and other fisheries that may be available to hagfish fishermen.

2. Management

The commercial hagfish fishery is open access; only a commercial fishing license and a general trap permit are required. 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 traps must have a CDFW approved destructive device and all holes, except for the entrance, in any hagfish trap 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. Currently logbooks are not required for this fishery. There are no annual quotas or minimum size limits.

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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.

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2. CDFW Research
In 2019, Marine Region 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 coordination with the California Recreational Fisheries Survey Program (CRFS) CDFW collected 75 Yelloweye Rockfish from the recreational fishing sector in 2019. Length, weight, sex, and otoliths were collected from specimens. Fish ranged in length from 188-585 mm in total length (7.4-23.0 in.), and were approximately 45 percent male, 52 percent female, and 3 percent unknown. Data from these fish will be used to inform future stock assessments on Yelloweye Rockfish.

CDFW continued its statewide collection of carcasses of Lingcod (*Ophiodon elongatus*) along with several recreationally important species of rockfish during 2019 to inform upcoming stock assessments for those species. Carcasses were primarily collected from Commercial Passenger Fishing Vessels (CPFVs) after the fish had been filleted by deckhands. The carcasses were returned to CDFW offices where length, sex and otoliths were

collected. Over 50 Lingcod carcasses and 800 rockfish carcasses were collected in 2019. Collection activities will continue in 2020.

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3. 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) while avoiding overfished rockfish species (e.g. Canary (*S. pinniger*), Yelloweye, and Bocaccio rockfishes (*S. paucispinis*)). The goal of this study is 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 2019 indicate that the gear is successfully targeting healthy stocks such as Yellowtail and Widow (*S. entomelas*) rockfishes, and now Canary Rockfish, while avoiding overfished species. Canary Rockfish and Bocaccio have since been rebuild, Canary rockfish in 2016 and Bocaccio in 2019, 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 to Point Conception and additional vessels were added to allow for additional data collection in more southerly areas. In 2019, the PFMC recommended this item be considered for future regulation implementation.

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3. Assessment
   The CDFW did not independently conduct any stock assessments in 2019 for groundfish species but did contribute to STAT teams for Gopher/Black-and-Yellow Rockfish (*Sebastes chrysomelas*) complex and for Cowcod (*S. levis*). CDFW was involved in the formal STAR panel review process of several full stock assessments conducted in 2019, including Cowcod, Gopher/Black-and-Yellow Rockfish complex, Sablefish (*Anoplopoma fimbria*), cabezon (Scorpaenichthys mamoratus), and Big (*Raja binoculata*) and Longnose Skate (*R. inornata*). The new stock assessment for Cowcod determined that the stock has rebuilt however, the new stock assessment is highly uncertain, and the stock had been overfished for two decades according to the previous four prior assessments.

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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 National Marine Fisheries Service (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 (MLDS). 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.

   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.

   In addition to the standardized commercial sampling conducted by PSMFC, CDFW conducted a biological sampling project obtaining commercially landed fish from February through June 2019. CDFW staff, in consultation with NMFS stock assessors, prioritized species based on those identified as potential stock assessment candidates in the near term that would benefit from additional data collection. In addition to age structures, data collected included port of landing, gear type, length, weight, sex, and maturity. Random sampling protocols were developed to reduce bias in the age data, and samples were stratified geographically across the state. Over 2,000 samples from 14 different species were obtained in port complexes from

Crescent City to Santa Barbara, with the majority coming from Morro Bay. Most samples were landed utilizing hook-and-line gear, though some trawl caught samples were also obtained.

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6. Recreational Fishery Monitoring
CDFW conducts weekly recreational fishery monitoring for several species of concern, including Yelloweye Rockfish, Cowcod, Canary Rockfish, and Black Rockfish (*Sebastes melanops*). To track catches inseason, CDFW generated an Anticipated Catch Value by using sample information directly from CRFS weekly field reports to approximate interim catch during the six week time lag until monthly CRFS catch estimates are available. Recreational regulations in 2019 differed slightly from those in place in 2018. Relaxed depth restrictions in the Southern Management Area and the Cowcod Conservation area increased fishing depth from 110 to 137 m (60 fm to 75 fm) and from 36 to 73 m (20 fm to 40 fm), respectively. The season for California scorpionfish (*Scorpaena guttata*) also returned to a year-round fishery in the Southern Management Area which opened on March 1 for all other boat-based groundfish species. Inseason increases to the Canary Rockfish sub-bag limit from two to three fish, Black Rockfish sub-bag limit increases from three to four fish, and Lingcod bag limit increases in all management areas south of Cape Mendocino (40° 10' N. lat.) from one to two fish also occurred, and were effective June 1, 2019.

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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 2019 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.

In 2018, new regulations allowed for CDFW 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. Previously, a full CFGC rulemaking was required to conform state regulations to federal.

3. Commercial Fishery Monitoring
   The directed commercial fishery for Pacific Halibut is managed under a coastwide (WA, OR and CA) quota and operates as a derby fishery. The fishery opened on June 26 and is structured based on 10-hour openers that are spaced two weeks apart. The fishery operates on this schedule until the coastwide quota has been met, which usually allows for two to three fishery openings per year. California effort in this fishery continued in 2019 with nine vessels participating in the fishery; landings totaled 4,620 dressed kilograms (10,186 dressed pounds).

4. Recreational Fishery Monitoring
   The recreational Pacific halibut fishery was scheduled to be open May 1 through October 31, or until the quota was met, whichever was earlier.

   To track Pacific halibut catch, CDFW generated an interim preliminary projected catch value using sample information directly from CRFS weekly field reports to approximate catch during the lag time until monthly CRFS catch estimates are available. This information was made available online so the public could track the progress of the fishery. Final season catch estimates were 17,440 net pounds (7,919 net kilograms), 45 percent of the 39,000 net pound (17,690 net kilogram) 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/.