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

April 2019

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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.

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

II. Surveys

ROV Visual Survey and Analysis for MPA and Fishery Data Needs

From 2014 to 2016, CDFW's Marine Protected Area (MPA) Management Project collaborated with Marine Applied Research and Exploration to complete a statewide visual survey using a remotely operated vehicle (ROV) (see 2015, 2016, and 2017 TSC reports for description of the program). In February 2017, CDFW entered a partnership with University of California Davis, funded by the Ocean Protection Council, creating a postdoctoral fellowship to develop and integrate spatial modeling techniques for MPA monitoring using CDFW's ROV survey data. Dr. Nicholas Perkins, from the University of Tasmania, completed an 18-month fellowship in September 2018. Manuscripts on the analysis of ROV data using spatial point process models and sampling effort simulations for long term MPA monitoring will be submitted for publication in 2019. Findings from this work are being utilized to inform

ongoing visual surveys of deep water habitats (20-600 meters) of California's MPA network.

In 2018, scientists from CDFW's Groundfish Management Project and MPA Management Project developed methods for estimating fish density as an index of abundance and total biomass from expansions for select species using design and model-based approaches. In 2019, these methods will be evaluated by PFMC's Scientific and Statistical Committee. The survey methodology will be evaluated for use in stock assessments for: 1) density estimates as an index of relative abundance, 2) estimates of abundance from habitat area expansions as an index of absolute abundance, 3) absolute estimates of abundance used to scale integrated assessments, and 4) independent estimates of absolute abundance multiplied by current F_{MSY} proxies to derive overfishing limits.

Preliminary results of modeling Gopher Rockfish indicate that depth, latitude and seafloor terrain attributes provide a suitable model fit. With these models, courser resolution seafloor mapping data can then be used as a basis for expansion of abundance and biomass. The estimates from the modeling are comparable to design-based estimates that validate the models. The resulting biomass estimates may be used to inform the upcoming stock assessments of Rockfish (Brown, Copper and Vermilion) in 2021. The projected estimates of density and biomass 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.

Contributed by Michael Prall (michael.prall@wildlife.ca.gov) and John Budrick

III. Reserves

Marine Protected Areas Research and Monitoring

California Legislature passed the Marine Life Protection Act (MLPA) in 1999, requiring California to redesign its then existing system of marine protected areas (MPAs) into a more coherent network. Completed in 2012, California's MPA Network is comprised of 124 MPAs along the entire California Coast and protects approximately 16 percent of state waters.

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 Statewide MPA Monitoring Program takes a two-phased approach to monitoring: Phase 1, regional baseline monitoring, which concluded in early 2018, and Phase 2, statewide long-term monitoring, which began in 2016 and is ongoing.

To guide Phase 2 implementation the State developed a MPA Monitoring Action Plan (Action Plan). Approved by both the Ocean Protection Council and CFGC in October 2018, the Action Plan informs next steps for long-term MPA monitoring by compiling work to date, as well as incorporating novel, quantitative, and expert informed approaches to monitoring. Additionally, the Action Plan prioritizes key measures and metrics, habitats, sites, species, human uses, and management questions to target for long-term monitoring.

Guided by the Action Plan the state released a solicitation for qualifications and proposals request in November 2018. Projects funded through this solicitation will encompass a range of ecosystems onshore and offshore, including human uses. Data collection will begin in May 2019 and continue into 2021. This Phase 2 monitoring data will then be combined with Phase 1 monitoring data, as well as historical data preceding the Network redesign to aid in the evaluation of MPA Network performance at meeting the six goals of the MLPA and to informing adaptive management. The first comprehensive evaluation will take place in 2012.

For those interested, you can sign up for the MPA Management Program mailing list to receive updates about the program; archived newsletters are available here.

Contributed by Amanda Van Diggelen (Amanda.VanDiggelen@wildlife.ca.gov)

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 stored 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. **Assessment**

Little is known about the status or biomass of Pacific 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, ended 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 retained to determine spawning status by sex and length frequency. Landings have been relatively stable from 2010 to 2017, fluctuating between 360 and 952 metric tons (0.8 and 2.1 million pounds) annually with an ex-vessel value of $565,000 to $1.80 million. In 2018 there were 976 metric tons landed for an ex-vessel value of $1.84 million. Fishing effort and export demand is market driven by the South Korean economy and can be influenced by the price and availably of bait and by the fishing activities of Oregon 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 is 200 bucket, 500 Korean, or 25 barrel traps. Fishermen must choose one trap type and may not combine hagfish trap types or have other non-hagfish traps onboard when fishing with a chosen hagfish trap. 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.

   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. During 2018, Marine Region staff reviewed 56 Scientific Collecting Permits requesting to take groundfish species; a slight decrease compared to the recent annual average number of permits reviewed. 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 2018, 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 69 Yelloweye Rockfish from the recreational fishing sector in 2018. Length, weight, sex, and otoliths were collected from

specimens. Fish ranged in length from 228-604 mm in total length, and were approximately 42 percent male, 25 percent female, and 33 percent unknown. Data from these fish will be used to inform future stock assessments on Yelloweye Rockfish.

Beginning in late 2017, CDFW began collecting ageing structures from recreationally caught Lingcod (*Ophiodon elongatus*) south of Cape Mendocino for use in the next Lingcod stock assessment. This effort continued in 2018 and expanded to include statewide collection of carcasses of several recreationally important species of rockfish 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 100 lingcod carcasses and 1,000 rockfish carcasses were collected in 2018. Collection activities will continue in 2019.

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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; spatial closures to protect overfished species) while avoiding overfished rockfish species. 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 2015 indicate that the gear is successfully targeting healthy stocks (Yellowtail and Widow (*S. entomelas*) rockfishes) while avoiding overfished species. Catch of overfished species Bocaccio (*S. paucispinis*), Canary (*S. pinniger*) and Yelloweye Rockfish was 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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4. Assessment
The CDFW did not conduct any stock assessments in 2018 for groundfish species.

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5. 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 established by the PFMC and implemented by National Marine Fisheries Service (NMFS).

6. Commercial Fishery Monitoring
   CDFW has collected commercial fisheries statistics since 1916 using paper fish tickets. Beginning July 1 2018, CDFW began accepting electronic fish tickets via PSMFC's E-Tix system instead of the paper fish tickets. Electronic reporting for most species is voluntary until July 1, 2019 when it becomes mandatory for all species. 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 Commercial Fisheries Information System (CFIS). Outside funding also enables California fishery data to be routinely incorporated into regional databases such as Pacific Coast Fisheries Information Network.

   Commercial sampling 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.

7. Recreational Fishery Monitoring
   CDFW conducts weekly recreational fishery monitoring for several species of concern, including Yelloweye Rockfish, Cowcod (*Sebastes levis*), Canary Rockfish, and Black Rockfish (*S. 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 2018 were much the same as in 2017, except for an increase to the Canary Rockfish bag limit from one to two fish, effective April 14, 2018.

Catches of Yelloweye Rockfish were higher than anticipated, prompting the need to implement more restrictive fishing depths north of Point Conception on August 25, 2018. This change allowed the fishery to remain open through the remainder of the calendar year, but constrained anglers to depths where encounters with Yelloweye Rockfish would be reduced.

Contributed by Melanie Parker (Melanie.Parker@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 2018 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 quota and operates as a derby fishery. The fishery opened on June 27 and is structured based on 10 hour openers that are spaced two weeks apart. The fishery continues to operate 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 2018 with four vessels participating in the fishery and 2,457 dressed pounds (1,114 dressed kilograms).

4. Recreational Fishery Monitoring
   The recreational Pacific halibut fishery was scheduled to be open May 1-June 15, July 1-15, August 1-15, and September 1 through October 31, or until the quota was met, whichever was earlier. This was the same scheduled season dates as in 2017.

   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. Using this inseason tracking methodology, the fishery closed early on September 21, 2018. Final season catch estimates were 31,156 net pounds (14,136 net kilograms), 101 percent of the 30,580 net pound (13,871 net kilogram) quota.

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

V. Publications

CDFW. 2019. 2018 California Department of Fish and Wildlife (CDFW) report to the International Pacific Halibut Commission. 15 p. Available at: https://iphc.int/uploads/pdf/am/2019am/iphc-2019-am095-ar08.pdf.