Report of the Pre-Assessment Workshop for the 2025 Groundfish Stock Assessment of Chilipepper Rockfish and California Quillback Rockfish

Pacific Fishery Management Council
Online Meeting

January 23, 2025

A pre-assessment workshop for the 2025 chilipepper rockfish and California quillback rockfish stock assessments was convened via webinar on January 23, 2025. The overarching goal of the workshop was to promote a shared understanding about the best available data, analytical techniques, and modeling approaches for each stock assessment.

Specific workshop objectives were to:

1) review and critically evaluate proposed data sources for each stock assessment,
2) discuss planned modeling approaches, and
3) solicit input from data stewards, stakeholders, and resource managers.

The chilipepper rockfish stock assessment team (STAT) includes E.J. Dick (Southwest Fisheries Science Center, NOAA), Nick Grunloh (Southwest Fisheries Science Center, NOAA), Tanya Rogers (Southwest Fisheries Science Center, NOAA), and John Field (Southwest Fisheries Science Center, NOAA). The California quillback rockfish STAT consists of Brian Langseth (Northwest Fisheries Science Center, NOAA), Melissa Monk (Southwest Fisheries Science Center, NOAA), and Julia Coates (California Department of Fish and Wildlife [CDFW]). Cheryl Barnes (Scientific and Statistical Committee [SSC], Pacific Fishery Management Council [PFMC]) is serving as chair of the stock assessment review (STAR) panel, which is scheduled for June 23-27, 2025. Thompson Banez is the Groundfish Management Team (GMT) representative and Tim Klassen is the Groundfish Advisory Subpanel (GAP) representative for the STAR panel.

Chilipepper Rockfish

The STAT provided an overview of chilipepper rockfish biology, available data, previous stock assessments, and initial modeling approaches for the upcoming assessment. The most recent stock assessment for chilipepper rockfish was a catch-only update in 2017 (Field 2017). An update assessment was conducted in 2015 (Field et al. 2016) and the last benchmark assessment was conducted in 2007 (Field 2007). The model for the benchmark assessment was length-based, age-structured, and included waters from the US-Mexico border to the Columbia River (OR-WA). Relative spawning biomass has been above the management target since the last benchmark assessment. Recent increases in chilipepper rockfish biomass are likely due to a strong 1999 year-class and subsequent decreases in fishing effort (Field 2017). Previous recommendations for model improvement include an exploration into various selectivity functions for all fleets, a reevaluation of conflicting fits to length data and indices of abundance (based on different steepness values), and an examination of spatial and/or temporal variation in

key life history traits (e.g., growth, maturity, fecundity). The STAT plans to address each of these recommendations as well as update sex-specific estimates of natural mortality following current best practices (e.g., using conditional age-at-length compositions) and evaluate alternative hypotheses for time-varying growth and selectivity.

Commercial data that are available for the upcoming stock assessment include recent landings (trawl, line, and net gear; California: 1978-2024 and Oregon 1929-2024), catch ratio estimates (trawl, line, and net gear; California: 1969-1977), historical landings from the Southwest Fisheries Science Center (SWFSC) California Catch Reconstruction (1916-1968; trawl and non-trawl; Ralston et al. 2010), and pre-1916 estimates from the previous assessment (California; assumed to be non-trawl). Due to limited taxonomic resolution for rockfishes in commercial trawl logbooks, these data will likely not be included in the 2025 assessment. The STAT will, however, conduct sensitivity analyses to quantify the effect of excluding this information from the model. Data from the West Coast Groundfish Observer Program (WCGOP) may be used to inform discards of chilipepper rockfish by commercial sectors. One participant suggested inquiring with trawlers about recent changes in cod end gear. Some trawlers have begun to use square mesh cod ends to reduce the catch of smaller fish, which may have impacts on estimates of selectivity.

Recreational data sources for California include the Marine Recreational Fisheries Statistics Survey (MRFSS; 1981-2003), California Recreational Fisheries Survey (CRFS; 2004-2024), SWFSC California Catch Reconstruction (1928-1980). California catch reconstructions suggest little to no recreational catch prior to 1928. The STAT will also explore year- and gear-specific catch and discard data from Oregon's recreational fisheries (1929-2024), bycatch from the at-sea hake fishery (1975-2024), and landings from foreign fleets (1965-1976). Recreational Fisheries Information Network (RecFIN) data may also be used to inform discards of chilipepper rockfish by recreational sectors.

The STAT solicited input about the considerable increases in recreational catch of chilipepper rockfish in 2023. One workshop participant suggested that there was an unusually high number of 10-14 mm chilipepper rockfish retained by recreational fisheries along the Southern California Bight that year (this size class is often discarded). CDFW staff indicated that the state promoted more targeted fishing of relatively healthy stocks in midwater shelf habitats as an alternative to nearshore and other bottom-dwelling shelf species. These in-season regulatory changes made previously closed areas off southern California accessible to the recreational fleet and shifted effort into deeper waters further offshore.

The Northwest Fisheries Science Center's (NWFSC) trawl (California and Oregon; 2003-2024) and hook-and-line (southern California; 2004-2024) surveys generate fishery-independent lengths, ages, and indices of abundance for chilipepper rockfish. The triennial trawl survey provides additional length data and a standardized index of abundance prior to the implementation of the trawl and hook-and-line surveys (1980-2004). The SWFSC Rockfish Recruitment and Ecosystem Assessment Survey (RREAS) is used to evaluate temporal variation in recruitment strength via an index of age-0 abundance (2001-2024). Although excluded from previous assessments, the STAT will explore the California Cooperative Oceanic Fisheries Investigations (CalCOFI) ichthyoplankton survey as a potential index of spawning output, given

that chilipepper rockfish larval can be positively identified to species without genetic analyses. Workshop participants also suggested an exploration into young-of-the-year data from oil platforms off southern California (source: M. Love).

NWFSC staff are currently subsampling age structures from 2017 to 2023 to supply new fishery-dependent ages for the upcoming assessment. The STAT will explore converting age composition data to conditional age-at-length and using smaller size bins (i.e., 1 cm instead of 2 cm) to improve estimates of growth and natural mortality. Although there is limited information about genetics, larval dispersal, or adult movement to inform stock structure for chilipepper rockfish, the STAT will examine potential spatial differences in growth, size compositions, and exploitation history. If considerable differences exist, the STAT may consider a "fleets as areas" approach in the upcoming assessment.

Workshop participants discussed potential improvements to the treatment of fecundity data. One suggestion was to evaluate age-fecundity relationships in addition to length-fecundity relationships. The STAT indicated a lack of strong evidence for age effects, which may be due to a lack of representative samples across the range of reproductive ages. Another suggestion was to conduct a sensitivity analysis using time blocks for relative fecundity. Although time is an important explanatory variable for fecundity in other *Sebastes* species, the STAT indicated that time has a lesser effect on chilipepper rockfish fecundity in the California Current.

California Quillback Rockfish

The STAT reviewed the stock assessment history for California quillback rockfish, noting that past assessments were either data-poor (Dick and MacCall 2010) or data-moderate (Langseth et al. 2021). The 2021 stock assessment resulted in an estimate of stock size that was 14% of the unfished biomass in that year. In 2025, a full benchmark assessment will be developed using Stock Synthesis. The upcoming assessment will include an evaluation of all previously used data and potential new data sources. The STAT provided an overview of commercial and recreational data sources for catch history and length compositions. New age data may enable the estimation of growth within the model. Fleet structure will likely consist of one commercial fleet and one recreational fleet. Discards will be modeled with landings. The STAT intends to reevaluate all model assumptions used in the 2021 assessment as part of the upcoming assessment.

The STAT noted that recreational logbooks are not likely to be informative for this assessment because they typically do not report rockfishes to species. Although some information on commercial passenger fishing vessel (CPFV) logs is species-specific, most rockfishes are reported to the genus level (e.g., "rockfish"). There was discussion about how to make logbook data more useful in the future, but this will require discussions with state representatives, given that recreational logbooks are state-managed. There was also discussion about how dockside samplers interview anglers about their catch rather than asking captains or crew. Although captains and crew may be more knowledgeable about species identification, current sampling protocols limit dockside discussions about catch to individual anglers. More robust species composition data (for catches and discards) are collected by onboard observers.

The STAT presented commercial landings data and reminded participants that variability and uncertainty in catches are relatively high for less common species. The particularly high catches in 1991 were discussed in detail. The STAT also noted that there were many years between 1969 and 1980 without estimates of commercial catch. Some meeting participants noted that they do not recall catching quillback rockfish during that time period and that the species was not considered desirable prior to the start of the live-fish fishery. The STAT suggested that there could be some exploration of catches from 1969 to 1980, but that the effect on model results would likely be minimal.

The STAT plans to use discard mortality estimates from the Groundfish Expanded Mortality Multi-year (GEMM) database for the commercial fleet (2002 to 2023) and apply the long-term mean (0.25%) prior to 2002. During open discussion, some workshop participants noted that discards of quillback rockfish were likely minimal prior to 2002 (when the WCGOP began) and that relatively high discards in recent years are atypical for the time series. The STAT asked for feedback on the most appropriate treatment of data from 2024. Meeting participants suggested that 2024 was more similar to 2023 than to 2022. The expectation is that there will be fewer discards in 2024 due to regulatory changes. It was noted that WCGOP only has jurisdiction in federal waters and that observers will no longer provide observations from trips that operate solely within state waters.

The STAT provided an overview of available length data, noting that the recreational fishery provides the majority of lengths and that few observations are sex-specific across data sources. The STAT plans to combine length data from commercial sectors, pooling all gear types and fish dispositions (i.e., live vs dead). GMT representatives asked about the potential for differences in selectivity of live vs. dead fish in the commercial fleet. The STAT responded that length frequencies are comparable, which justifies the decision to combine catches from the two sectors. Most commercial lengths were collected after 1991 and few live fish were measured before 1998 or after 2010. The strong 1999 year-class seen in many other rockfish species may have occurred for quillback rockfish, driving increases in size between 2004 and 2014. There was some indication that more quillback rockfish are caught in shallower waters and that larger fish are more frequently encountered to the north. Although habitat quality and/or temperature may be among the factors that drive quillback distributions and densities, fishers prefer to fish as close to shore as possible. One participant noted that quillback rockfish are frequently caught closer to shore (e.g., off jetties) in Canadian waters.

The STAT plans to combine data from the two recreational modes (i.e., party/charter and private/rental) because of similar length compositions across time and space. Any differences appear to be region-specific, though the STAT plans to explore these dynamics further. CDFW noted that it is often more difficult to sample the party/charter fleet in the northern districts because the majority of vessels in that region have a limited capacity of six people. It was also noted that depth restrictions have varied more in the north relative to central areas in recent years.

The STAT discussed plans to explore selectivity time blocks that correspond with changes in depth restrictions for the commercial fishery: 1916-2002, 2003-2013, 2014-2021, and 2022+. The STAT will also explore 1928-2000, 2001-2016, 2017-2022, and 2023+ selectivity time

blocks for the recreational fleet. For fishery-dependent indices of abundance, the STAT will evaluate historical and recent onboard observer data. The STAT will also evaluate the potential development of dockside survey indices for party/charter and private/rental modes. The sparseness of quillback rockfish sampled (or positively identified) represents a considerable challenge for developing relative indices of abundance from fishery-dependent data. Fishery-independent indices of abundance originate from the California Collaborative Fisheries Research Program (CCFRP) for the time period when sampling expanded north of San Francisco (2017-2024). Other NOAA-directed surveys do not sufficiently sample quillback rockfish (e.g., only 6 positive tows with a total of 26 fish sampled from the West Coast Groundfish Bottom Trawl Survey) and thus are informative for relative indices of abundance.

Age data will be used to estimate growth, with an exploration of using conditional age-at-length data to inform estimates internal to the model. The STAT will use maximum age to inform a prior for natural mortality, which is consistent with the PFMC's Accepted Practices Guidelines for Groundfish Stock Assessments in 2025 and 2026. Maximum age for quillback rockfish is estimated at 90 yr in Southeast Alaska (Munk 2001) and 95 yr in British Columbia (Yamanaka and Lacko 2001). Otoliths sampled further south suggest a maximum age of 73 yr off Washington and 57 yr off California (Langseth et al. 2021). There was some discussion about why quillback rockfish ages may be younger at lower latitudes, and what the most appropriate estimate of longevity may be for California. It was recognized that removals from fishing tend to alter the age structure of harvested populations, which leads to a decreased probability of encountering older fish. Recent collaborative and cooperative research efforts have generated considerably more age data for the 2025 stock assessment, which will aid internal model estimations of growth for California quillback rockfish. The 2021 assessment had more limited age data and fixed growth based on data from fish that were primarily caught off Oregon and Washington (Langseth et al. 2021). Preliminary results suggest that maximum sizes are slightly smaller and growth is slightly slower relative to parameters used in the 2021 model. Additional samples were recently collected by the SWFSC off California to improve estimates of maturity (n = 66) and fecundity (n = 28) for this assessment.

The STAT indicated that they are planning to conduct two additional engagement calls, one with a recreational fisheries focus and another with a commercial fisheries focus.

References

Dick EJ and AD MacCall. 2010. Estimates of sustainable yield for 50 data-poor stocks in the Pacific Coast Groundfish Fishery Management Plan. NOAA Technical Memorandum. US Dept. of Commerce. 208 pp.

Field JC. 2007. Status of the chilipepper rockfish, *Sebastes goodei*, in 2007. Pacific Fishery Management Council. Portland, OR. 227 pp.

Field JC, SG Beyer, and X He. 2016. Status of the chilipepper rockfish, *Sebastes goodei*, in the California Current for 2015. Pacific Fishery Management Council. Portland, OR. 186 pp.

Field JC. 2017. A catch-only update of the status of the chilipepper rockfish, *Sebastes goodei*, in the California Current for 2017. Pacific Fishery Management Council. Portland, OR. 14 pp.

Langseth BJ, CR Wetzel, JM Cope, and JE Budrick. 2021. Status of quillback rockfish (*Sebastes maliger*) in US waters off the coast of California in 2021 using catch and length data. Pacific Fisheries Management Council. Portland, Oregon. 127 pp.

Munk KM. 2001. Maximum ages of groundfishes in waters off Alaska and British Columbia and considerations of age determination. Alaska Fishery Research Bulletin. 8(1):12-21.

Ralston S, DE Pearson, JC Field, and M Key. 2010. Documentation of the California Catch Reconstruction Project. NOAA Technical Memorandum. US Dept. of Commerce. 83 pp.

Yamanaka KL and LC Lacko. 2001. Inshore rockfish (*Sebastes ruberrimus*, *S. maliger*, *S. caurinus*, *S. melanops*, *S. nigrocinctus*, and *S. nebulosus*) stock assessment for the west coast of canada and recommendations for management. Canadian Science Advisory Secretariat, Research Document 2001/139.