

## CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE REPORT ON ADDITIONAL DATA PROVIDED FOR STOCK ASSESSMENTS

The California Department of Fish and Wildlife (CDFW) thanks the Stock Assessment Teams (STAT), ageing staff and stock assessment review panel reviewers for their efforts during the 2021 stock assessment process, despite having to make adjustments and work through challenges due to the COVID-19 pandemic.

At its June 2021 meeting, the Council made requests for additional analyses to be conducted in consideration of adopting length-based data-moderate stock assessments for copper, quillback and squarespot rockfish. In response to this Council request, the National Marine Fisheries Service (NMFS) Science Centers, submitted a [Draft NMFS Plan for Additional Summer 2021 Assessment Activity Relating to Council Requests Concerning the Dogfish and Data-Moderate Assessments](#) requesting additional information from CDFW. Our CDFW staff were able to provide most of the data requested by mid-July 2021, with some otoliths being supplied by mid-August 2021.

CDFW appreciates NMFS' efforts in taking on these additional analyses. Additionally, CDFW thanks Northwest Fisheries Science Center (NWFSC) staff for their ageing efforts as CDFW, Pacific States Marine Fisheries Commission (PSMFC) and the California Collaborative Fisheries Research Program (CCFRP) provided over 500 otoliths to be aged by the NWFSC. This additional information will help to better inform these data-moderate stock assessments.

### Length Data

CDFW provided the stock assessment authors with data from three different CDFW sampling programs along with metadata describing the various surveys. The data for each species was extracted and sent to the appropriate stock assessment author by mid-July. The first sampling program was a CDFW Commercial Passenger Fishing Vessel (CPFV) survey in southern California from 1975-79, the second from another CPFV survey in southern California from 1986-89, and the third from a central/northern California recreational fishing survey 1978-89. Combined, these three surveys resulted in an additional 9,850 copper rockfish, 750 quillback rockfish and 5,640 squarespot rockfish lengths.

### Age Structures

For the 2021 assessment cycle, the NMFS-NWFSC prioritized the ageing of species for which full assessments were being conducted. For data-moderate assessments, limited ageing of available samples was performed for samples from California. CDFW acknowledges that COVID-19 restrictions impacted the ability of NMFS staff to age the full complement of age structures available to support the 2021 stock assessments. Concerns were expressed over using proxy data from Oregon and Washington in the California Data-Moderate assessments, when age structures from California were available but not prioritized for ageing. CDFW appreciates the quick work of NMFS' Newport Ageing Lab to produce some ageing information from California to better inform the Data-Moderate assessments late in the process.

CDFW was able to provide age structures to the NWFSC for copper and quillback rockfish from a CDFW pilot commercial sampling program, as well as a CDFW recreational carcass collection program. Additionally, otoliths from the California Cooperative Groundfish Survey (PSMFC Survey), a commercial sampling program conducted by PSMFC, were sent to the NWFSC. Finally, CDFW identified two additional collections with copper and quillback otoliths. The first is from Humboldt State University Master’s Thesis work by Jeff Abrams, Science Center (SWFSC) in Santa Cruz. The second is from the California Collaborative Fisheries Research Program (CCFRP), which has been conducting research inside and outside of Marine Protected Areas all of which were sent to the Newport NWFSC laboratory for ageing. Additionally, otoliths were provided from SWFSC’s ecological survey, and NWFSC’s bottom trawl survey. A summary of ages structures available is included in Table 1. Both CDFW and PSMFC surveys continue to collect age structures for these and other species to support stock assessments.

Table 1. Sources of age structures supplied to NWFSC.

Source	Copper rockfish	Quillback rockfish
CDFW commercial sampling	45	6
CDFW recreational carcass	58	29
PSMFC Survey – estimated	108	57
Abrams collection @ SWFSC	82	123
CCFRP collection	38	48
Pearson Surveys @ SWFSC	430	unk
NWFSC bottom trawl survey	200	unk
Total	961	263

Use of the results to either compare the growth rates from Oregon and Washington that were used in the assessments to provide proxy estimates in California assessments, or to produce California-specific growth curves will help address concerns regarding potential regional differences in growth parameters and resulting uncertainty in the results. This is of particular importance given the observed sensitivity of the California assessments to the choice of growth parameters. Initial comparison of 74 quillback rockfish otoliths aged to date suggest a difference in the inflection of the growth curve, with additional ageing work is ongoing. CDFW appreciates the efforts to examine a California-specific growth curve to compare with those available for northern areas, and looks forward to the additional results at the mop-up meeting.

#### Quillback Catch Estimates

CDFW requested changes to the California catch data stream via email to the stock assessment author in June, just before the June 2021 Council meeting. This correspondence was intended to document CDFW’s concerns with a few clear outliers, and to offer rationale to replace these outliers with average values from adjacent years. CDFW expected the STAT to incorporate these proposed changes. CDFW provides additional information below on each of these outliers, and the suggested method for determining a replacement value, looking at adjacent years.

*Commercial* – CDFW believes that the estimate of 1991 commercial quillback rockfish landings is exceptionally high at 51.17 mt, which is 38.8 and 8.3 times the 1990 and 1992 landings, respectively. Instead of using this exceptionally high value, CDFW recommends using a value of 2.91 mt, which is the five-year average of commercial landings surrounding 1991 (1988-1990 and

1992-1993). The year 1994 should not be included in the average because a Quillback Rockfish market category (CDFW code 970) was established in 1994, which resulted in fewer quillback rockfish sorted into the Unspecified Rockfish market category.

The high estimate for 1991 commercial landings is likely the result of the expansion process that converts market categories of mixed species into single species based on the PSMFC Survey species composition data. In 1991 an unusual event occurred in which there were two landings sampled in the Fort Bragg port complex of Unspecified Rockfish market category (CDFW code 250) that were 100% quillback rockfish. It should be noted that there was no Quillback Rockfish market category in 1991, and quillback rockfish were generally sorted into Unspecified Rockfish or other group rockfish market categories (e.g., Group Red Rockfish, Group Bolina Rockfish). Because Unspecified Rockfish accounted for almost 50% of all rockfish landings in 1991, these two samples of 100% quillback rockfish resulted in a higher than normal proportion of Unspecified Rockfish that was ascribed to quillback rockfish in 1991. This was compounded by the established practice of “borrowing” species compositions from adjacent ports during the expansion process if insufficient sample data were available. The 1991 expansion program borrowed the species composition of Unspecified Rockfish landings from Fort Bragg and applied them to Unspecified Rockfish landings in both Eureka and Crescent City port complexes, further compounding the issue. Given potential differences in species composition above and below Cape Mendocino, borrowing between port complexes north and south of the 40° 10' N. Lat. line should be done with caution.

*Recreational* – The Marine Recreational Fisheries Statistical Survey (MRFSS) began in 1981 and sampling was suspended from 1990 through 1992 due to funding issues, then resumed in 1993. The MRFSS estimate for quillback rockfish was 35.76 mt in 1993, the second highest catch in the history of the program (1983 catch estimate was the highest at 40 mt). Both effort estimates and CPUE were at the high end of variability in some strata, but still comparable to values for each in other strata for each fishing mode. Similar results were observed in 1983, in the first few years of the survey’s history. The MRFSS program was subject to greater uncertainty and variability than the current methods, due to lower sampling rates in the field and use of telephone survey for effort estimates. This results in greater variability and potential for more extreme values in the estimates, both high and low. There was no evidence of expansion issues or other considerations that would cause the values themselves from being excluded outright. That said, the value for 1993 has implications for other years based on the use of ramping methods instead of averages for proxy estimates for 1990-1992 when sampling ceased.

CDFW believes that the ramping approach used to estimate recreational quillback rockfish catch for years when there was no recreational sampling (1990-1992) is not the best approach because catch before and after the break in sampling did not show a marked trend in the magnitude of catch, with the exception of 1993 catch. While such ramps may be appropriate in contexts where a cline is expected, that is not the case in this instance. Instead of using a ramping approach interpolating between single values, CDFW recommends using a value of 9.98 mt for each year between 1990 and 1992, based on average landings for the six-year average (1987-1989 and 1993-1995) in the period surrounding the 1990-1992 break.

CDFW supports the SSC recommendations for continued work on the Data-Moderate assessments and looks forward to participating in the mop-up review. CDFW hopes that this additional work will reduce uncertainty in the assessments. Once a full assessment is scheduled, CDFW agrees that detailed review of the catch streams should be prioritized before the input data is finalized.