

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON  
FINAL APPROVAL OF STOCK ASSESSMENTS

Dr. Andi Stephens of the National Marine Fisheries Service (NMFS) Northwest Fisheries Science Center (NWFSC) presented the draft Oregon black rockfish assessment to the Scientific and Statistical Committee (SSC). A coastwide assessment of black rockfish was conducted this year, with independent assessment models developed for black rockfish in coastal waters in California, Oregon, and Washington. The black rockfish assessments were reviewed by a Stock Assessment Review (STAR) Panel during the week of July 20-24, but only the California and Washington assessments were recommended by the STAR Panel. An acceptable Oregon black rockfish assessment could not be developed during the STAR Panel meeting. In September, the SSC recommended that the Oregon assessment be sent to the mop-up review panel. The SSC also delayed final approval of the California and Washington assessments to allow for potential changes to provide consistency among all three assessments.

The mop-up panel met September 28-October 2. Two draft assessment models for Oregon were reviewed, a model developed by the Stock Assessment Team (STAT) lead Dr. Jason Cope, and an alternative assessment developed by Dr. David Sampson, a member of the STAT. Development of an acceptable model proved challenging, not only because of the two draft assessment models, but also because the data available for assessment of Oregon black rockfish, such as age-composition data and catch per unit of effort (CPUE) indices, were not informative concerning the stock trend and overall abundance. Major issues dealt with by the panel included treatment of natural mortality for the males and females, whether or not recruitment deviations are estimated, dome-shaped vs asymptotic selectivity for various fisheries, treatment of catchability for the Oregon Department of Fish and Wildlife (ODFW) tagging study, and data weighting for age-composition data.

The final model included both a step increase in female natural mortality at the age of maturity and dome-shaped age-based fisheries selectivity, and thus applies both the “kill them” and “hide them” approaches simultaneously. Male and immature female natural mortality was assumed to be equal to the mean of the California and Washington estimates (0.17), while natural mortality for the mature females was increased to 0.20. Alternative estimates of natural mortality, such as those estimated by the tagging study, were not considered plausible by the panel, given the longevity of black rockfish (>35 years). The catchability for the ODFW tagging study (tag Q) was considered the most important aspect of uncertainty, and a decision table was developed where the low state of nature was a model with tag Q estimated, the base case model assumed tag Q = 0.25, and the high state of nature assumed tag Q = 0.125 (the point estimate of a habitat-based prior). It was not possible to assign specific probabilities to these states of nature, but they were intended to subjectively span the range of uncertainty in assessment results.

The SSC notes a number of concerns regarding the Oregon black rockfish assessment. Fits to some indices and to the composition data are relatively poor, suggesting that there may be model misspecification. Model results were highly sensitive to assumptions about natural mortality, selectivity patterns, catchability for the tagging study, and data-weighting for composition data. During the course of the mop-up panel there was extensive exploration of alternative model configurations, and it was not obvious what changes could be made to the model to improve model

fits and reduce sensitivity. Assessment results for Oregon indicate that the stock has been relatively stable, and above the  $B_{MSY}$  proxy levels throughout the exploitation history of the stock. No changes were made to either the California or Washington assessments during the mop-up panel meeting.

The SSC endorses the use of the 2015 black rockfish assessments for California, Oregon, and Washington as the best scientific information available for status determination and management. The California and Washington black rockfish assessments are considered to be category 1 assessments, while the Oregon black rockfish is considered to be a category 2 assessment. The category 2 designation is because recruitment deviations were not estimated in the model, as well as the greater overall uncertainty associated with the Oregon black rockfish assessment. The spawning stock biomass for black rockfish in 2015 is estimated to be above the  $B_{MSY}$  proxy of  $B_{40\%}$  in both Washington and Oregon, and in the precautionary zone (below the  $B_{MSY}$  proxy but above the limit of  $B_{25\%}$ ) in California, but with an increasing trend in recent years. The SSC recommends that the next assessment of black rockfish be a full assessment.

PFMC  
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*SSC notes:*

*Recruitment deviations for the Oregon model were not estimated because 1) there was a strong unexplained autocorrelation in recruitment on a decadal scale, 2) the stock abundance showed a dip downwards at the end of the assessed period that was difficult to explain, 3) turning on recruitment deviations did not markedly improve fits to the composition data, but instead improved fits to indices and mean weight data, 4) turning on recruitment deviations created a strong residual pattern when data were sequentially deleted.*