

# **COWCOD ROCKFISH**

## **STAR Panel Report**

Southwest Fisheries Science Center  
LaJolla, CA  
May 24-28, 1999

### **STAR Panel Members:**

Richard Methot, NMFS Northwest Fisheries Science Center, STAR Chair  
Robert Mohn, Fisheries and Oceans, Canada  
Ray Conser, NMFS Northwest Fisheries Science Center, SSC Representative

Sam Herrick, Groundfish Management Team Representative  
Tom Ghio, Groundfish Advisory Panel Representative

### **STAT Team Members Present:**

John Butler, NMFS Southwest Fisheries Science Center  
Larry Jacobson, NMFS Southwest Fisheries Science Center  
H. Geoffrey Moser, NMFS Southwest Fisheries Science Center



## **Overview**

The STAR Panel reviewed the first assessment for cowcod, a rockfish which has been important to both commercial and recreational fisheries off southern California. The review took place during the week of May 24-28, 1999 at the Southwest Fisheries Science Center in LaJolla, California.

The panel agrees with the findings in the report, although several technical issues noted below were raised during the meeting. Many of these issues were handled during the meeting, whereas others are research issues which need to be addressed in a longer time frame.

The consensus of the STAR Panel is that the assessment is sufficient for determining the relative status of this species in the Conception INPFC area and can serve as a basis for adjusting harvest management. In this regard, there is no doubt that this stock has experienced an extreme decline in abundance in this area. This decline is evident in a spawning biomass index developed from larval catch in the CalCOFI plankton survey, a fishable biomass index developed from catch per angler data in the recreational charter boat fishery, a recruitment index developed from the catch of juvenile cowcod in nearshore bottom trawl surveys, and from the decline in the percentage of large cowcod. Analysis of these trends indicate that fishing mortality rates were quite high during the 1970s, although it is likely that the decline in recruitment and abundance has been exacerbated by the warmer and less productive ocean conditions that have been prevalent since about 1977.

The report and presentation given to the panel was overall considered to constitute a comprehensive treatment of the data, and the modeling exercise was considered to encapsulate most of the biological concerns. The STAR Panel commends the STAT Team, composed of scientists from the NMFS Southwest Fisheries Science Center and the California Department of Fish and Game, for the quality of their work, especially because this was the first assessment for cowcod, and their cooperative spirit and willingness to respond to the Panel's comments and requests for additional analyses.

## **Questions and requests made during the meeting**

The following issues were raised during the meeting and were handled to the panel's satisfaction.

1. The catch data and the analysis should be restricted to the Conception INPFC area. Although some cowcod catch comes from north of this area, the surveys and fishery CPUE are only relevant for the Conception area.
2. The depth distribution of cowcod should be reexamined on the basis of fishery and survey data to better determine the primary adult habitat of this species. The amount of the each statistical block that is within this depth range habitat should be calculated and used to weight the recreational logbook data from that statistical block.

3. The age at recruitment in the population model should be adjusted to age 10 to more closely match the age at which the fish attain the minimum size prevalent in the fishery. This adjustment affects the timelag for inclusion of the LA and Orange County trawl survey data, which is an index of age 3 recruits.
4. The NMFS triennial trawl survey data should be examined for evidence of trends in cowcod abundance in the area north of the Conception INPFC area.
5. The population model should be extended from 1950 back to the early 1900s. This will allow a fuller examination of the consistency between model's estimate of initial biomass, the recruitment level necessary to produce that biomass, and the level of recruitment estimated during the 1950s.
6. The LA&Orange County trawl survey data should be used directly in the model as an index of recruitment.

### **Comments on the Technical Merits and/or Deficiencies of the Document**

Unlike most assessments, the time series of total catch for cowcod is not known with high accuracy in all years, especially because the time series must extend back to the early 1950s to account for major fishery impacts on this species. The STAT team made innovative use of various data sources to derive a reasonable database to use in the assessment, including a long time series of reported catch published in the LA Times. Some further refinement of this catch time series occurred after the STAR panel meeting so was not closely reviewed by the panel. The panel is confident that a sufficiently accurate catch time series has been used in the analysis. However, because of the complications in this catch analysis, the STAR panel recommends that this portion of the assessment be closely examined in any future review.

The CalCOFI larval abundance data has been used to develop an index of the abundance of spawners that produced these larvae. Because cowcod larvae are rare, this index is based on the percentage of positive tows. The STAT team is commended for their work in developing this index.

The STAT team is also commended for their careful work in developing an index of cowcod abundance from the recreational charter boat logbook data. The availability of this long-term logbook database allowed the analysis of catch per angler hour to account for the shift in effort from nearshore to offshore statistical areas over time.

### **Unresolved problems and major uncertainties**

The geographic structure of the cowcod stock is not well known. Although larval data from the 1950s show that spawning was strongly concentrated in the Southern California Bight, it is also clear from catch data and the NMFS triennial trawl survey data that cowcod occur off central and northern California in the 1980s to present. The restriction of the current analysis to the

Conception INPFC area is reasonable given the available data, but collection of genetic stock identification data should be a high priority.

The CalCOFI larval data are properly used as an index of adult spawner abundance, as noted above. However, as the index has declined substantially, there is an implication that future recruitment from these larvae also will decline. A fuller comparison of the trends in larval abundance (lagged to indicate recruitment), the LA and Orange County trawl survey indices of recruitment, and the model estimates of recruitment should be considered.

Model scenario - Three types of data (CalCOFI larval data, recreational catch per angler hour, and trawl survey for recruits) and several model constraints contribute to the calibration of the assessment model and selection of the best model fit. As the weighting on different model components was varied, two model scenarios emerged as reasonable representations of the stock's history. In one scenario, the initial biomass was quite high and subsequent recruitment was low. In the other case, the initial biomass was moderate and the degree of decline in recruitment was less than in the first scenario. In both cases the decline in the population during the late 1970s is extreme, but it is difficult to determine the "best" of these two scenarios strictly on the basis of goodness of fit to available data. Examination of additional ancillary data may be necessary in order to better understand the detailed history of the stock.

### **Recommendations for research and data collection**

The analysis of the recreational logbook data made excellent use of available information. An improvement in the precision of this analysis may be possible by using spatially contiguous statistical blocks for determination of habitat areas and aggregation of the data.

The extreme decline in recruitment and abundance of cowcod is probably due to a combination of a climate shift (increasing water temperature and decreased ocean productivity beginning in 1977) and the high levels of catch. In order to better distinguish the relative contribution from these two causes and to predict time frames for rebuilding, further research is needed on the effect of the ocean climate on the distribution and recruitment of cowcod.

An assessment for cowcod in the areas north of the Conception INPFC area should be conducted, especially to improve understanding of the possible climate effects on cowcod in the southern area.

Cowcod occur in a mixed species fishery, and are rare components of this fishery. In order to better determine the current level of fishery impacts on this stock, there should be improved species differentiation in the catch, either through increased sampling for species proportions, or by requiring more complete sorting of the catch.

