

## SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON STOCK ASSESSMENTS

The Scientific and Statistical Committee (SSC) was briefed by its groundfish subcommittee regarding five items pertaining to groundfish stock assessments and Stock Assessment Review (STAR) Panel reviews for the 2015-2016 management cycle. These items included: 1) a report regarding assessments for data-moderate species, 2) an updated bocaccio rockfish assessment, 3) catch reports for three rockfish species, 4) a full assessment for petrale sole, and 5) a full assessment for darkblotched rockfish.

The data-moderate process produced successful assessments for eight species, none of which were estimated to be overfished. The full assessments for petrale sole and darkblotched rockfish, and the assessment-update for bocaccio rockfish, show that all three species are still rebuilding, and all are predicted to be rebuilt by 2015. Rebuilding analyses are not needed for these three species, given the 1 to 2-year timeframe for rebuilding. The catch reports for Pacific ocean perch, canary, and yelloweye rockfish show catches have been below the annual catch limit (ACL) for the last three years, and no new rebuilding analyses are needed for these three species. The SSC reiterates the importance of conducting data methodology review meetings in advance of STAR Panel reviews.

Key points following from the full SSC discussion, along with associated SSC recommendations follow.

### **Data-moderate Assessments**

The Stock Assessment Team (STAT) considered applying one or both of the data-moderate assessment methods (XDB-SRA and exSSS) to each of the nine groundfish stocks that were recommended for data-moderate assessment: brown rockfish, China rockfish, copper rockfish, English sole, sharpchin rockfish, stripetail rockfish, rex sole, vermilion rockfish, and yellowtail rockfish; but this task proved to be overly ambitious. During the STAR Panel meeting it was agreed that the STAT would focus its efforts and apply the XDB-SRA method to the nearshore species (brown, China, and copper rockfish) and apply the exSSS method to the offshore species (sharpchin, stripetail, and yellowtail rockfish; and English and rex sole).

The assessment for vermilion rockfish was abandoned due to time-constraints and because recent research has established that the species previously known as vermilion rockfish is in fact a complex of two species with geographic overlap south of 40°10' N. lat. There is potential for developing separate data-moderate assessments for the vermilion stock complex in future assessment cycles based on indices from the Northwest Fisheries Science Center (NWFSC) hook-and-line survey. The STAT also attempted, but abandoned, a data-moderate assessment for yellowtail rockfish south of 40°10' N. lat., because the index data for this stock are too limited.

A document summarizing the compositional data available for the nine stocks that were assessed with data-moderate methods in 2013 is not yet complete. This document is intended to evaluate

the availability of information to conduct full assessments for data-moderate stocks. A revised document will be reviewed at the September SSC meeting.

The SSC views the data-moderate assessment methods as being very useful tools for assisting the Council's groundfish management process and a substantial improvement over the Council's data-poor methods. The SSC concludes that 1) the assessments described in the table below represent the best available science, 2) they should be accepted as valid data-moderate stock assessments, and 3) they should be used as the basis for management decisions in the 2015-2016 groundfish management cycle.

**Summary table of data-moderate stock assessment results.**

Stock	Depletion <sup>a</sup>	Status		OFL <sup>b</sup>
<i>Nearshore stocks:</i>				
Brown rockfish (coastwide)	40%	Above target		Yes
China rockfish (N of 40°10')	33%	Below target, not overfished		Yes
China rockfish (S of 40°10')	72%	Above target		Yes
Copper rockfish (N of 34°27')	42%	Above target		Yes
Copper rockfish (S of 34°27')	84%	Above target		Yes
<i>Shelf-slope stocks:</i>				
Sharpchin rockfish (coastwide)	73%	Above target		Yes
Stripetail rockfish (coastwide)	> 77%	Above target		No
Yellowtail rockfish (N of 40°10')	69%	Above target		Yes
English sole (coastwide)	88%	Above target		Yes

Rex sole (coastwide)	80%	Above target	Yes
----------------------	-----	--------------	-----

<sup>a</sup> Estimates for start of 2013; percentages reflect proportion of unfished spawning biomass.

<sup>b</sup> The assessment can be used to calculate OFL or OFL contribution.

The assessment for striptail rockfish did not produce a reliable estimate for the scale of the stock’s biomass. As a consequence, an OFL could not be estimated. However, the SSC agrees with the STAT and STAR Panel that the available data provide strong evidence that the stock is not below the biomass target and can be used for status determination.

In conclusion, the SSC regards the process of developing and reviewing the data-moderate assessments in the current assessment cycle has been highly successful. Data-moderate assessments fill an important gap in the assessment tools available to assessment scientists, and improve the Council’s ability to assess and manage the stocks in the Council’s groundfish FMP. These stocks have varying economic and ecological importance, and different types of data available for assessment. A range of assessment tools gives the Council and National Marine Fisheries Service (NMFS) the flexibility to set priorities for assessment and at the same time ensure that there is some minimal level of assessment that can be conducted for all stocks.

### **Bocaccio Rockfish**

The most recent full assessment of bocaccio rockfish was conducted in 2009. Subsequently, updated assessments have been prepared in 2011 and again in 2013. The present assessment estimates depletion in 2013 of 31.4 percent; an improvement over that forecasted by the 2011 assessment (approximately 28 percent). Improvement in stock status is attributed to higher estimates of 2010 recruitment.

Bocaccio is predicted to be rebuilt by 2015; however, the SSC recommends that this be confirmed with a full assessment during 2015. For 2015 and 2016 management, the SSC recommends continuing to use the current rebuilding spawning potential ratio (SPR) to define the ACL. A rebuilding analysis is unnecessary and would provide no new information given the projected two-year timeframe for rebuilding.

The bocaccio update complies with the terms of references for assessment updates and represents the best available science for use in developing 2015-2016 management measures as a category 1 assessment.

### **Groundfish Catch Reports**

The SSC discussed the groundfish subcommittee’s review of catch reports that update the overfishing status of canary rockfish, Pacific ocean perch, and yelloweye rockfish off the US Pacific coast using data through 2012. Fishing mortality was reported in the West Coast Groundfish Observer Program total mortality reports for 2010 and 2011, and was based on the scorecards developed by the Groundfish Management Team for 2012. The scorecards for yelloweye and canary rockfish are based on harvest guidelines and probably are the upper bound

of potential catch. The 2010-2012 fishing mortalities for all three species are estimated to be less than the annual catch limits (ACLs) as set by PFMC and approved by NMFS.

Given these results, and the lack of new information on biomass and recruitment, updated rebuilding analyses are not necessary for these three species.

### **Petrale Sole**

Full assessments of petrale sole were conducted in 2009, 2011, and again in 2013. The 2009 assessment found the stock to be overfished; while the 2011 and present (2013) assessments concluded that the stock is above the Minimum Stock Size Threshold (MSST), but not yet rebuilt to  $B_{MSY}$ .

The base model from the 2013 stock assessment predicts that the stock will be rebuilt in 2014. Depletion in spawning biomass is estimated to be 22 percent at the start of 2013, above the 12.5 percent MSST for flatfish, but below the 25 percent  $B_{MSY}$  proxy. Compared to the 2011 assessment, which estimated that depletion was 18 percent in 2011, the new stock assessment indicates a less optimistic view (depletion of 13 percent in 2011).

The catch per unit of effort (CPUE) data are a key input to the assessment. The 2013 STAR Panel made two recommendations which reduced the weight assigned to these data. This down-weighting was in part due to the STAR Panel's lack of confidence in the CPUE data as an index of abundance; however, this was not explicitly stated in either the assessment document or the report of the STAR Panel. By contrast, the STAR Panel for the 2011 petrale sole assessment recommended that the CPUE index be included in the assessment. Use of CPUE indices in stock assessments is a topic where there is a range of scientific opinion, and STAR Panels may differ in what they consider to be the best approach. The SSC recommends that the CPUE index and its use in the assessment should be a major focus for the next assessment; any decision to not assume constant catchability and the coefficients of variation implied by the fit of the model to the data must be very clearly specified. Although the Panel justified its recommendation regarding the CPUE index, the SSC wishes this matter to be explored in more detail as part of the next assessment.

The SSC endorses the use of the 2013 petrale sole assessment as the best scientific information available for status determination and management in the Council process. The petrale sole spawning stock biomass is projected to be above the  $B_{MSY}$  proxy by 2014 under the "base case" and by 2016 under the "low" state of nature. However, the SSC recommends that this change in status should be confirmed by a new full assessment.

The SSC recommends that petrale sole be treated as a category 1 stock because the assessment is based on a fully developed age-structured model. There is no reason to conduct a rebuilding analysis for petrale sole this year given that it is predicted to rebuild to  $B_{MSY}$  in 2014 under current management.

### **Darkblotched Rockfish**

A new full assessment of darkblotched rockfish was conducted in 2013. The most recent prior full assessment was conducted in 2007, which was subsequently updated in 2009 and again in 2011.

The new assessment results indicate that the west coast stock is currently at 36 percent of the unexploited level. This assessment estimates that the 2012 SPR is 86 percent, while the SPR-based management fishing mortality target is 50 percent. Overfishing has not occurred in the last 10 years. Natural mortality was used to bracket uncertainty in the states of nature in the decision table.

The SSC notes that the estimate of current depletion is highly uncertain and the assessment likely underestimates the extent of this uncertainty. The NWFSC trawl survey indices are relatively variable for darkblotched and show no overall trend over the past 10 years in contrast to the sharp increase in stock status estimated in the model over that period. It appears that the modeled improvement in stock status can be attributed primarily to: 1) reduced fishing mortality since the onset of the rebuilding program in 2000, 2) inferences that follow from more favorable perceptions of steepness, fecundity, and age at maturity of the stock, and 3) length and age data indicating relatively large recruitments in 1999, 2000 and 2008.

The SSC endorses the use of the 2013 darkblotched rockfish assessment as the best scientific information available for status determination and management in the Council process. The SSC recommends that darkblotched rockfish should be treated as a category 1 stock because the assessment is based on a fully developed age-structured model. The SSC is currently evaluating whether the default category 1 sigma value (vs. another approach) is appropriate for darkblotched rockfish.

Because the darkblotched rockfish assessment indicates that the stock will be rebuilt within 2 years (by 2015), the SSC recommends that the next assessment be a full assessment. The SSC notes that a new rebuilding analysis is not needed at this time, as the current assessment already provides the population projections needed to forecast population status through the next two years, and a new formal rebuilding analysis would be redundant. For 2015 and 2016 management, the SSC recommends continuing to use the current rebuilding SPR to define the ACL.

PFMC  
06/22/13