

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON APPROVE STOCK ASSESSMENTS

The Scientific and Statistical Committee (SSC) reviewed the six assessments which were reviewed at Stock Assessment Review (STAR) panels this summer, along with reports from those STAR panels. In addition, the SSC discussed the Council's request for further work on the China, brown and copper rockfish data-moderate assessments.

Aurora Rockfish

The first full assessment of aurora rockfish was conducted in 2013. The assessment estimates that the spawning stock biomass of aurora rockfish at the start of 2013 was 1673 metric tons and was depleted to 64% of its unfished level. There is little chance that the stock's spawning biomass has ever been below the Council's target level (40% of unfished). Natural mortality was used as the axis of uncertainty to bracket the states of nature in the decision table.

The SSC notes that the assessment results were very sensitive to the assumed value of natural mortality, and unresolved areas of uncertainty included: 1) an unusual pattern in the estimated recruitment deviations, and 2) unexpectedly strong dome-shaped survey selectivity, while fishery selectivity was asymptotic.

The SSC endorses the use of the 2013 aurora rockfish assessment as the best scientific information available for status determination and management in the Council process. The SSC recommends that aurora rockfish should be treated as a category 1 stock because the assessment is based on a fully developed age-structured model. The SSC recommends using the sigma value of 0.39 for aurora rockfish, and that the next stock assessment should be a full stock assessment to more fully explore model structure and data issues (e.g., the likely availability of more age composition data).

Rougheye and Blackspotted Rockfish

Rougheye rockfish and blackspotted rockfish are two closely related species of slope rockfish, which have only recently been recognized as separate species. The assessment treats them as a single complex of species (hereafter referred to as rougheye rockfish) because most data sets available for stock assessment do not distinguish between them. This is the first full assessment of rougheye rockfish. Overfishing limit (OFL) estimates for rougheye rockfish were previously obtained using catch-only methods (depletion based stock reduction analysis (DB-SRA)).

Assessment results indicate that the west coast stock is currently at 47 percent of the unexploited level, and therefore remains above the B_{MSY} proxy of $B_{40\%}$. Harvest rates of rougheye rockfish have been close to or above the F_{MSY} proxy of $F_{50\%}$ for rockfish since the mid-1980s, including four of the last 10 years, suggesting that harvest of rougheye rockfish needs to be more closely monitored in the future.

Major uncertainties in the rougheye rockfish assessment include possible differences in the life

histories and abundance trends of two species in the complex, uncertainty in natural mortality, and sensitivity in model results to alternative methods of weighting composition data. Natural mortality was used to bracket uncertainty in the states of nature in the decision table. The SSC notes that a small error was found in the decision table and that the corrected version will be included in the final document.

The SSC endorses the use of the 2013 roughey rockfish assessment as the best scientific information available for status determination and management in the Council process. The SSC recommends that roughey rockfish be treated as a category 1 stock because the assessment is based on a fully developed age-structured model. The SSC recommends that the next assessment be a full assessment, with the expectation that progress can be made in addressing major assessment uncertainties, such as determining the biology and distribution of roughey rockfish and blackspotted rockfish individually, and increasing the amount of age data available for the assessment.

Shortspine Thornyhead

The previous full assessment of shortspine thornyhead was conducted in 2005. The 2005 assessment estimated the stock to be above the management threshold of $B_{40\%}$ and that overfishing had never occurred. The new assessment estimates the stock depletion (B_{2013}/B_0) to be 74% with overfishing never having occurred. The equilibrium recruitment parameter (R_0) was used to bracket uncertainty in the states of nature.

The SSC notes that 1) important fishery data (historical catches and discards) and key population vital rates (maturity, age and growth) are highly uncertain, 2) the surveys did not cover the entire depth distributions of the species, 3) key parameters (e.g., M and h) are fixed, and 4) models are sensitive to small changes in assumptions.

The SSC endorses the use of 2013 shortspine thornyhead assessment as the best scientific information available for status determination and management in the Council process. The SSC recommends that shortspine thornyhead be treated as a category 2 stock because of the lack of age data and inability to discern year class strength. The SSC recommends exploring data-moderate approaches before scheduling the next assessment.

Longspine Thornyhead

The previous full assessment of longspine thornyhead was conducted in 2005. The 2005 assessment estimated the stock to be above the management threshold of $B_{40\%}$ and that overfishing had never occurred. The new assessment estimates the stock depletion (B_{2013}/B_0) to be 75% with overfishing never having occurred. The equilibrium recruitment parameter (R_0) was used to bracket uncertainty in the states of nature.

The SSC notes that 1) important fishery data (historical catches and discards) and key population vital rates (maturity, age and growth) are highly uncertain, 2) the surveys did not cover the entire depth distributions of the species, 3) key parameters (e.g., M and h) are fixed, and 4) models are sensitive to small changes in assumptions.

The SSC endorses the use of 2013 longspine thornyhead assessment as the best scientific information available for status determination and management in the Council process. The SSC recommends that longspine thornyhead be treated as a category 2 stock because of the lack of age data and inability to discern year class strength. The SSC recommends exploring data-moderate approaches before scheduling the next assessment.

Cowcod

Full assessments of cowcod south of Point Conception were conducted during 1999, 2005, and 2007, with the latter two assessments based on the Stock Synthesis framework. The 2009 assessment was an update to the 2007 assessment, which included revised historical recreational catch data for California, along with updated indexes. The 2013 full assessment for cowcod was based on Extended Depletion-Based Stock Reduction Analysis (XDB-SRA), unlike the earlier assessments. The 2007 and 2009 assessments used Stock Synthesis but did not include age and length data, so were similar to an XDB-SRA assessment. The 2013 assessment included data from five indices, but excluded the commercial passenger fishing vessel (CPFV) index which had been used in previous assessments. This index had suggested a more depleted stock and was excluded because of difficulties identifying effort directed towards cowcod.

The stock is estimated to be 34 percent of its unfished level at the start of 2013. However, the estimate of depletion is highly uncertain (95% credibility interval from 15 to 66 percent of the unfished level). All of the indices used in the assessment are sources of considerable uncertainty, particularly due to the spatial distribution of survey effort, the age classes sampled, and/or the high unexplained variance between the model predictions and the data. However, all indices are showing qualitatively similar increasing trends. The lack of survey information from the core area in which cowcod are located remains a key source of uncertainty.

The SSC endorses the use of the 2013 cowcod assessment as the best scientific information available for status determination and management in the Council process. The SSC recommends that cowcod be treated as a category 2 stock because the assessment is based on a data-moderate method of stock assessment. A rebuilding analysis needs to be conducted for this stock, which will be reviewed by the SSC Groundfish Subcommittee before the November Council meeting. The SSC recommends that the next assessment of cowcod be a full assessment, and ideally that the stock be assessed once an index of abundance from the remotely operated vehicle (ROV) survey of cowcod habitat in the Southern California Bight becomes available and has been reviewed. Finally, the SSC recommends that the decision not to conduct extractive surveys in the Cowcod Conservation Areas (CCAs) should be re-evaluated given the need for reliable indices of abundance for cowcod. The hook and line survey, in particular, could be conducted within the CCAs with minimal mortality impacts through the use of descending devices.

Pacific Sanddab

The first full assessment for Pacific sanddabs was conducted in 2013. Management advice for Pacific sanddabs has previously been based on application of DB-SRA.

The base model from the 2013 stock assessment predicts that the spawning biomass was 96

percent of the unfished level at the start of 2013, well above the target biomass for flatfish stocks of 25 percent. However, there are major inconsistencies between the estimates of biomass from the triennial and NWFSC surveys and the estimates of biomass from the assessment, with the assessment inferring that catchability for the surveys is substantially larger than 1 (>19 for the NWFSC survey), which the Stock Assessment Team (STAT) and STAR panel agreed was implausible.

The SSC recommends that this assessment not be used for deciding harvest specifications. However, the information included in the assessment document is sufficient to conclude that the stock is well above the B_{MSY} proxy of 25 percent of the unfished level. Pacific sanddab should remain as a category 3 stock and the OFL be based on DB-SRA. The SSC notes that Pacific sanddab should not be a high priority for a future full assessment given the magnitude of the catch relative to survey estimates of abundance. Pacific sanddab could be considered for data-moderate assessment the next time it is assessed.

Reconsideration of data-moderate assessments for nearshore rockfish species

The SSC met with the Groundfish Management Team (GMT) to discuss the Council's request that the data-moderate assessments for three nearshore species be re-considered at a mop-up STAR Panel meeting prior to the November Council meeting (Council's June Decision Summary Document). Specifically the Council requested consideration of area stratification north and south of 42° N latitude for the data-moderate stock assessments for brown rockfish, copper rockfish, and China rockfish. Dr. E.J. Dick (SWFSC, Data-Moderate STAT member) and John DeVore were available to answer questions and contribute to the discussions.

Brown rockfish

The SSC notes that the data-moderate STAR Panel explored XDB-SRA assessment models for brown rockfish in the southern and central regions (split at Point Conception) but reverted to a combined region model because conflicting trends in the catch per unit effort (CPUE) indices produced implausible results. No model was attempted for the portion of the population north of Cape Mendocino (40°10' N latitude) because no CPUE index could be derived. Only about 1% of the coastwide landings of brown rockfish are taken north of Cape Mendocino. It is not feasible to conduct an XDB-SRA assessment for brown rockfish north of 42° N latitude.

Copper rockfish

The lack of survey or CPUE data for copper rockfish also restricts the ability to apply data-moderate assessment methods for copper rockfish north of 42° N latitude. The region north of Cape Mendocino accounts for only about 4% of the landings of copper rockfish. It is not feasible to conduct an XDB-SRA assessment for copper rockfish north of 42° N latitude.

China rockfish

China rockfish is the only of these three nearshore species for which an appreciable proportion of the landed catch is taken north of 42° N latitude. Further, a CPUE abundance index was developed for the XDB-SRA assessment for the portion of the population north of Cape Mendocino at 40°10' N latitude. However, developing a CPUE index that corresponds only to

the region north of 42° N latitude is not feasible to accomplish in the near-term. The SSC recommends 1) that an XDB-SRA assessment for the portion of the population north of 42° N latitude be conducted using the existing northern CPUE abundance index, applied to catch data series restricted to north of 42° N latitude and 2) that a separate XDB-SRA assessment for the portion of the population south of 42° N latitude be conducted using the existing southern CPUE abundance index, applied to catch data series restricted to south of 42° N latitude. The SSC's expectation is that the net result of these new assessments will be to move some of the biomass from the northern portion to the southern portion of the population.

The SSC notes that results from a set of assessments structured with a north-south boundary at 42° N latitude will require further analysis to develop OFL values corresponding to the management boundary at 40°10' N latitude.

Update of Oregon recreational catch data

The recreational catch data series used in the assessments reviewed by the Data-Moderate STAR Panel were taken directly from the Recreational Fisheries Information Network (RecFIN) database. The Oregon data in RecFIN prior to 1993 were based on catch rates (fish per angler day) obtained from angler interviews conducted by the Marine Recreational Fisheries Statistics Survey (MRFSS) and then expanded by MRFSS estimates of angler-days derived from telephone interviews. The Oregon Recreational Boat Survey (ORBS) provides more accurate estimates of recreational landings of groundfish species. The SSC recommends that the additional XDB-SRA analyses of the China rockfish (described above) be conducted using the historic (pre-1993) estimates of China rockfish landings from the ORBS program rather than the MRFSS estimates. Also, the current XDB-SRA assessment for China rockfish North of Cape Mendocino should be redone using the revised Oregon landings data.

The SSC anticipates that revisions to the Oregon catch series for copper and brown rockfish will be so small as to have inconsequential effects on the existing XDB-SRA coastwide assessment for brown rockfish and the existing XDB-SRA assessment for copper rockfish north of Point Conception. The SSC will confirm this at its November meeting.

Summary

The process for revising the data-moderate assessment for China rockfish will result in three new assessments: 1) for the population north of 40°10' N latitude; 2) for the population north of 42° N latitude; and 3) for the population south of 42° N latitude, the first two of which will be affected by the revised Oregon catch data series. The existing assessment for the population south of 40°10' N latitude is unaffected by the revised Oregon catch data (and does not involve a boundary change). The SSC will review the results of these assessments and provide recommendations to the Council regarding China rockfish at the November meeting.