SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON
STOCK ASSESSMENTS AND REBUILDING ANALYSES FOR 2004 GROUNDFISH MANAGEMENT

The Scientific and Statistical Committee (SSC) led a joint meeting with the Groundfish Management Team (GMT) and the Groundfish Advisory Subanel (GAP) to facilitate a review of stock assessments, stock assessment review (STAR) reports, and rebuilding updates (where appropriate) for

Widow rockfish
Bocaccio
Pacific ocean perch (POP)
Black rockfish
Darkblotched rockfish
Yellowtail rockfish
Cowcod

The SSC considers these stock assessments to be the best available science and endorses their use by the Council. The updated rebuilding analyses for widow, POP, and darkblotched rockfish are based on assessments reviewed through the STAR process, and the SSC endorses their use by the Council.

The SSC has the following comments on each of the assessments and supporting materials:

Widow Rockfish (Exhibit B.3, Attachments 4, 5, and 6, June 2003)

The 2003 estimate of stock size is 24.6% of B_0, which is similar to the last assessment in 2000. However, stock productivity is estimated to be lower than it was in 2000, which translates into longer rebuilding times than suggested by previous analyses.

Three areas of uncertainty emerged as most important to the 2003 rebuilding analysis:

1. Whether recruits should be prespecified for 2003-2005 based on the NMFS Santa Cruz laboratory midwater trawl survey.

2. Whether projections should be based on sampling recruits per spawner or an estimated stock-recruitment relationship.

3. The use of a power coefficient to represent compensation (juvenile mortality) in translating the midwater trawl survey results into subsequent recruitment.

The SSC discussed, in detail, the procedure of prespecifying recruits versus other approaches. The procedure of prespecifying recruits uses results from the midwater trawl survey to project recruitment for 2003-2005 in the rebuilding program (recruitment after 2005 is based on sampling estimates of recruits in each year prior to 2001). The SSC prefers the approach of sampling recruits per spawner, which is the status quo from earlier analyses. The SSC concluded there is enough confidence in the midwater trawl survey to prespecify recruits, which narrowed discussion to models 7, 8, and 9 in Table 3 and Table 4 (page 5) of Attachment 5.

The SSC also discussed different values for the power coefficients. According to Table 18 (page 57) of the stock assessment document, different values of the power coefficients are equally likely, and there is no statistical basis for choosing among them. After further discussion, the SSC concluded there is a biological basis for determining a range of plausible values, which corresponds to the values used in models 7, 8, and 9. The SSC recommends these models be used as a central case (model 8), with high (model 9) and low (model 7) variants.

Since the nature of the relationship between larvae taken in the survey and subsequent recruitment to the fishery (3 years) is a major source of uncertainty in the widow assessment, the SSC recommends that this issue be thoroughly examined in the next assessment.

POP (Exhibit B.3, Attachments 1, 2 and 3, June 2003)

The 2003 estimate of stock size is 25.3% of B_0. The assessment for POP is complex, utilizing a Bayesian approach (also used in the 2000 POP assessment). While the SSC considers this type of analysis to be state-of-the-art, it raises a key issue about which estimates are best for use in rebuilding analyses. After a discussion about which summary statistics are most appropriate, and which to use as a default, the SSC reached consensus that results of the rebuilding analysis should follow the Bayesian approach as it captures more of the uncertainty.

Discussion by the SSC also considered alternative approaches for projecting future recruitment of POP. Figure 1 of Attachment 2 shows that time series from the 2000 assessment for the ratio of recruits per spawner has an upward trend. This approach was rejected in earlier rebuilding analyses in favor of using time series of recruits as a basis for the rebuilding projections. On the other hand, the 2003 assessment does not show a trend in either series. Since a major component of the POP stock exists in Canadian waters, the rationale for using recruits per spawner as a basis for rebuilding projections is questionable, because it implicitly assumes that future recruitment depends only on spawners in U.S. waters. Consequently, the use of recruits as a basis for rebuilding projections is reasonable.

Thus, the SSC recommends case C in Tables 1-3 (page 4, 6-7) in Attachment 2 be used by the Council.

Bocaccio (Exhibit B.3, Attachments 7, 8, and 9, June 2003)

The 2003 stock assessment for bocaccio is different than the assessment last year, which indicated the 1999 year class was weaker than previously believed. This result was driven by the 2001 Triennial Survey, which showed very low abundance of bocaccio and no sign of the 1999 year class (Figure 26, page 36 of Attachment 7). For the 2003 assessment, additional information in the form of larval abundance data from CalCOFI, and both length and catch per unit effort (CPUE) data from the recreational fisheries were used. The new data indicate a sharp increase in abundance and a much stronger 1999 year class. In fact, Figure 26 indicates that recent CPUE estimates for Northern California are record highs in a time series dating back to 1980. To bracket uncertainty from the apparently conflicting signals in the different data sources, the STAR Panel recommended two models, STAR B1 and STAR B2, which use the survey and recreational CPUE data, respectively. Each of these models de-emphasizes the other data source. The Stock Assessment Team (STAT) considered a third model that included both data sources to be important, but time to complete work on all three models was not possible at the STAR meeting. Subsequent work by the STAT Team produced an intermediate model, STAT C, which includes both survey and CPUE data.

After an in-depth discussion that considered trade offs among alternative approaches and other factors, the SSC concluded that an intermediate alternative is warranted and that model STAT C is a reasonable way to integrate the survey and CPUE data. The SSC recommends a decision table, with models STAR B1, STAR B2, and STAT C, similar to Table 3 (page 6) of Attachment 8, be used by the Council.

The SSC notes the assumed rate of natural mortality was changed from 0.2 in the 2002 assessment to a value of 0.15 in the 2003 assessment. This change is likely to have an influence on OY, but results using data from the 2003 assessment and the 2002 value for natural mortality were not available for review at this meeting.

The SSC also recommends that additional data, based on information in the California commercial passenger fishing vessel (CPFV) logbooks be evaluated for use in future bocaccio assessments.

<u>Black rockfish</u>   (Exhibit B.3, Attachments 10 and 11, June 2003)

The SSC noted that without any clear trend in the four recreational CPUE statistics used by the model, the upturn in biomass and spawning output in the latter part of the 1990s is difficult to interpret. The reason for the increase is apparently due to the strong recruitment of age-two fish in 1996 and 1997, but those recruitments are unlikely to be well-estimated. In addition, the retrospective analysis (Figure 37) is poorly behaved, because the model seems to persistently overestimate biomass. Nonetheless, the SSC supports the conclusions of the STAR Panel that the assessment represents the best available science and is ready for use by the Council.

<u>Cowcod</u> (Exhibit B.3, Attachments 12 and 13, June 2003)

The update indicates that current management action has been effective in keeping cowcod removals within the established OY (Table 2). However, due to the effects of management on the CPFV recreational CPUE statistic (Figure A1), it will be difficult to monitor rebuilding in the future. As the STAR Panel report notes, *in situ* and ichthyoplankton surveys may provide useful fishery-independent information on the status of the stock.

<u>Yellowtail rockfish</u> (Exhibit B.3, Attachments 13 and 14, June 2003)

Results presented in Figure 11 of the assessment document may give the false sense that female spawner biomass is stable. However, due to the decline in recruitment that occurred in the mid-1990s and the relatively late maturity of this species, the model predicts a 25% decline in spawning biomass over the next 10 years, if the stock is harvested at the default harvest rate (Table 26). Even so, the yellowtail rockfish stock is unlikely to be fully harvested due to the constraints imposed by other overfished stocks (e.g., canary and widow rockfish).

<u>Darkblotched rockfish</u> (Exhibit B.3, Attachments 13, 15, and 16, June 2003)

Following the conclusion of the STAR review the assessment author successfully corrected the error in rebuilding projections for scenario (b), i.e., B_0 based on 1963-2000 recruitments and rebuilding recruitments re-sampled from 1983-2000. That scenario now produces results intermediate between scenario (a) and scenario (c), as expected (Table 16). However, results in the table are based on the probability of rebuilding by $T_{MAX} = 0.7$, although the interim rebuilding analysis adopted by the Council was for P = 0.8. A new table will be developed that will include 10-year projections at the higher probability level.

The STAR Panel recommended scenario (b) as the base case, bracketed by scenarios (a) and (c). The panel selected the intermediate result in an attempt to balance the conflicting effects of using the most recent information (i.e., the 2001 recruitment estimate) and the poor statistical precision associated with partial recruitment of the most recent year-classes.

PFMC
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