1. SCS Fleet 3 year 2000 mean weight datum: The STAR panel recommended further exploration of the effects of the mean weight datum for the SCS for 2000. This request was met and lead to examination of model fits with and without the mean weight datum for 2000, specifically to the length-composition data for the PBR fleet (the only fleet with length fits post-1999). Fits with and without the mean weight datum for the PBR fleet in 2000 are included in Figure 62 and lead to greater confidence in the existence of a large 2000 year-class in the SCS.

2. TENERA adult survey: The NCS model was sensitive to the exclusion of the TENERA adult survey so the STAR panel requested to see the model fits when this survey was included. This request was met and model fits with and without the TENERA adult survey are shown in Figure 60. The STAR panel also suggested comparing the trend in abundance indicated by the TENERA survey to the CPFV CPUE trend for Morro Bay. This request was met (Figure 26).

3. Effective sample sizes: The STAR panel expressed concerns over the method used to determine the effective samples sizes for the length-composition data. Specifically, there were orders of magnitude differences in effective samples sizes among years within some fleets. An alternate method of calculating effective samples sizes was defined. This request was met by an additional sensitivity run for each substock (Table 19) that found no notable differences in model outputs between the two methods for calculating effective sample sizes.

4. Local minima in the steepness profiles: The STAR panel felt that the likelihood profiles for steepness needed additional work to address the lack of smoothness and suggested finer increments when calculating these profiles. This request was met, but the profiles remained clunky (Figs. 62 and 63), suggesting local minima.

5. One sex model: The STAR panel suggested the exploratory development of a one-sex model because the nest-guarding behavior of males should increase their contribution to future reproductive output and thus their value in the population dynamics. This request was met and a one-sex model was produced, but it ultimately just combined the male and female spawning biomasses. It did highlight, however, the issue of what population metric, instead of spawning biomass, should be used when males contribute more than just sperm to reproductive output.

6. Location-specific CPUE analysis: In addition to the IRI spatial catch analysis, the STAR panel suggested the STAT team produce CPUE trends for each location within a substock and compare trends among areas. This analysis was completed and its results are presented in Figs 26 and 27.

Research Recommendations

1. Accurate accounting of removals, especially from the recreational and live-fish fisheries: Fisheries primarily exploited by recreational and live-fish commercial fisheries are traditionally hard to monitor. More effort to monitor these fishery sectors may be necessary to accurately monitor fishing mortality.

2. A fishery-independent survey of cabezon population abundance: The current fishery-independent survey being developed in the Morro Bay area will become an important input into future assessments of cabezon. Expansion of this survey will increase its usefulness as an index of abundance for central and northern California.

3. A study of the stock structure of cabezon: This assessment assumes two substocks of cabezon along the California coast. Current work on cabezon stock structure should be included in the next assessment.

4. Age validation/ age determination: Catch age-composition data were not available for this assessment. Accurate ageing is crucial to understand the population dynamics of a species, especially those for which there is limited survey information. Information on the age-structure of the catches for each fishery sector would substantially improve some aspects of the assessment.

5. A better understanding of the relationship between CPUE and population size: Changes in recreational CPUE indices are assumed to reflect changes in population size in a linearly proportional manner. The results of the assessment would be severely in error if this assumption were substantially violated. Therefore, if future assessments depend on CPUE data, it is vital that the relationship between CPUE and population size be quantified.

6. Alternative assessment procedures: The need for greater spatial resolution in the management of nearshore fisheries also increases the amount of data required to perform traditional stock assessments. Alternative assessment procedures that are less data-hungry, but still provide relevant management outputs should be developed to address this need. In addition, the nest-guarding behavior of males gives new value to males in the cabezon population. A metric other than spawning biomass may be needed to account for the male portion of the population in reference points.

7. Effect of climate on cabezon: Several of the data sources in this assessment (*e.g.* the power-plant impingement and CalCOFI indices, and some length-composition data) indicate that there was potentially good recruitment after 1999 (and before 1977 for the impingement data) whereas these same sources indicate that recruitment was very poor prior to 1999 in the SCS. Cabezon may be influenced by climatic/oceanic regimes. A better understanding of the relationship between cabezon population dynamics and climate would reduce the uncertainty of future assessments.

8. Sex-specific data: Given the strong correlation of color to gender in cabezon (O'Connell 1953; Lauth 1987; Grebel 2003), collection of sex-specific information (at least recording fish color) would greatly enhance future assessments.