

Cabezon

STAR Panel Meeting Report

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STAR Panel

Han-Lin Lai, NOAA/Northwest Fisheries Science Center, PFMC SSC (Chair)
Chris Legault, NOAA/Northeast Fisheries Science Center
Mark Maunder, Inter-American Tropical Tuna Commission (CIE Reviewer)
David Smith, Primary Industries Research Victoria, Australia
Tony Smith, CSIRO Marine Research, Australia (Rapporteur)

PFMC

Tom Barnes, California Department of Fish and Game, PFMC GMT
Tom Ghio, PFMC GAP

STAT Team

Kevin Piner, NOAA/Northwest Fisheries Science Center
Jason Cope, University of Washington, School of Aquatic and Fishery Sciences
Carolina Minte-Vera, University of Washington, School of Aquatic and Fishery Sciences
Andre Punt, University of Washington, School of Aquatic and Fishery Sciences

Overview

The STAR Panel (hereafter the Panel) reviewed the draft assessment report for cabezon (*Scorpaenichthys marmoratus*) prepared by the STAT Team and dated September 5, 2003. The entire STAT Team was available to present and discuss aspects of the report. This assessment represents the first quantitative assessment for cabezon, and the first for any of the inshore groundfish species under the PFMC FMP.

Considerable effort had gone into compiling the relevant data and information for this species (Table 1). Nonetheless, the STAT Team stressed the limited amount of data and the uncertainties in the data, and the lack of critical biological information on the species and stocks. For this assessment, two stocks are assumed for the west coast of the US – a northern stock (Washington and Oregon) and a southern stock (California). There is a lot less data for the northern “stock” and the Panel agreed with the STAT Team that the model results for this stock were implausible. The assessment therefore focuses on the status of the southern stock.

A feature of this assessment is that there is no dedicated fishery independent biomass index for this species or any inshore species. The assessment examined several time series of potential abundance indices, including recreational catch rates, larval surveys (CalCOFI), and “impingement” data (a possible index for recruitment). The assessment also used commercial and recreational length composition data. There is considerable uncertainty in all data series, particularly pre-1980 catches (especially recreational). The assessment model is a two-fleet age and sex structured catch at length model with variable recruitment about a Beverton-Holt stock recruitment relationship. Results were presented for two base cases and a range of sensitivity analyses (to uncertainties in data inputs and fixed model parameters). Maximum Posterior Density (MPD) estimates were presented for the sensitivity analyses, and Bayesian results only for the base cases. Results for the base cases were checked by running the model using two independently derived sets of software.

Both base case models involved fitting to recreational CPUE derived from Commercial Passenger Fishing Vessel logbooks (“CPFV Logbook”) and recreational and commercial catch length composition. Base Case A assumed a fixed CV for the CPUE index, while Base Case B estimated the CV scaling parameter. Neither model fitted the data particularly well, but the fit to the CPUE index for Base Case A was not consistent with the assumed confidence intervals for the index. Biomass estimates for Base Case B were more uncertain, but estimates of depletion for Base Case B were less sensitive to data and model assumptions. Base Case B estimated the stock to be less depleted than Base Case A.

For the reasons given above, the Panel asked the STAT Team to re-run and present results for a new Base Case which was a modification of the original Base Case B. The new Base Case involved the addition of two times series of abundance indices (RecFIN CPUE and the CA Impingement Index), a differential weighting on commercial and

recreational length composition data, and setting the stock recruitment steepness parameter to 0.7. A similar set of sensitivity analyses was run for this new Base Case.

The MPD results for the new Base Case were intermediate between the previous Base Cases in terms of level of depletion in 2003 (35% with a standard deviation of 7%), and in general showed less sensitivity to data and assumptions. The greatest sensitivities were to pre-specified values of natural mortality and stock recruitment steepness. The assessment was also sensitive to one of the values for the CV on length at age. The previous high sensitivity to the pre 1980 recreational catch levels was greatly reduced. Initial diagnostics for the Bayesian analysis supported their use in the projections.

The Panel agreed that the new Base Case model could be used for stock projections and as a basis for management decisions about the Californian fisheries. The Panel reiterated the considerable uncertainties in the data and biological information on which this assessment was based, but considered that (with the inclusion of several key uncertainties in the projections, outlined below in recommendations) it represented the best available science for the purpose of providing management advice.

Given the uncertainties, the Panel has provided a list of key recommendations for future research and monitoring for this fishery.

The Panel commended the STAT Team for their efforts in putting together this first assessment for cabezon, and thanked them for their cooperation and assistance during the course of the meeting.

Additional analyses requested by the STAR Panel

1. **Discussion of gear and market selectivity led to the suggestion that a sensitivity test be run to use of dome shaped selectivity (decline at 4 lbs, to half at maximum age).** This change resulted in a worse fit overall to the data, and so was not included in the new Base Case.
2. **Discussion of differences by sex in growth led to the suggestion to test the effect of sex dependent natural mortality (0.2 female, 0.3 male).** This could only be tested using Stock Synthesis software, and the results were not significantly different from the Base Case.
3. **Variability in recruitment was discussed, including the possibility of “regime shift” effects (perhaps evident in impingement data, and thought to occur for some other species along the coast).** It was agreed that high sigma R could capture this effect (if it was present), The Panel suggested reducing steepness to 0.7 (from 1) for the new Base Case, in line with results from meta-analyses.
4. **There was evidence in the preliminary results of differences between commercial and recreational length composition data in effective sample size.** It was suggested that the new Base Case use effective sample sizes of 60 for commercial and 40 for recreational data.

5. **The Panel requested a sensitivity test to the use of increasing CV of length at age in the growth model, for the sake of completeness.** The results were not qualitatively different from the sensitivity tests already conducted.
6. **A request was made to present (for the Base Case runs) a single figure with time series for catch, reproductive output, and recruitment.**
7. **The Panel discussed the large recreational catch in 1980 (approximately double adjacent catches), and its possible validity. The Panel requested a sensitivity test to reducing the large recreational catch in 1980 to the average of catches in 1981 to 1983.** This resulted in a slightly more depleted stock. The Panel examined the catch by fishing mode, and found no basis to reject the 1980 data. It was therefore included in the new Base Case.
8. **The Panel requested the presentation of CVs on output parameters (especially management related quantities such as level of depletion) in output diagnostics.** This was found to be useful in comparing apparent differences in levels of depletion between different scenarios.
9. **The Panel and the meeting discussed the use of the various abundance time series in the new Base Case. The Panel recommended including RecFIN CPUE, and the CA Impingement Index in the Base Case (as well as the CPFV logbook CPUE), but not including the CalCOFI data and the CPFV observer CPUE.** This was based on generally including rather than excluding data, but noting concerns about sample size, including two indices based on the same data source, and representativeness of the data.
10. **The Panel recommended incorporating “model” uncertainty in projections by combining separate posteriors using combinations of fixed levels for steepness and natural mortality.** Due to time constraints, the full set of Bayesian analyses could not be completed during the meeting.
11. **In addition to yield projections based on NMFS decision rules, the Panel requested yield projections based on the decision rule specified in the CA Nearshore Fishery Management Plan (yield at $F_{50\%}$, adjusted using a 60-20 precautionary reduction).** No yield calculations were available for review at the meeting.

Comments on technical issues and remedies

Technical issues were mainly dealt with in the specific requests to the STAT Team, and to some extent in the recommendations for future research. The Panel specifically noted and endorsed the value of conducting and comparing assessments of different levels of complexity, and using independently coded software.

Areas of disagreement

There were no areas of disagreement between the STAR Panel and the STAT Team.

Unresolved problems and major uncertainties

The Panel noted the following unresolved problems and uncertainties:

1. The lack of a credible assessment for the northern stock.
2. Major uncertainties in historical catch levels.
3. Problems with trends in residuals for the fits to the CPUE data.
4. Lack of fishery independent abundance data for this species.
5. Lack of age data for this species.
6. Uncertainties about stock structure, although the panel noted that studies are underway.
7. Different trends in catch rates along the coast.
8. The current ADMB model does not allow for sex specific M.
9. The habitat ratio scalar between the northern and southern areas is highly uncertain. However the Panel questioned the usefulness of this approach, due to inconsistencies in assumptions about productivity versus carrying capacity between areas.

Recommendations

The following recommendations are not given in priority order.

Data and monitoring issues

1. The Panel considered that the highest priority for monitoring is the development of a fishery independent index of abundance for inshore species. Various survey methods should be considered, including use of trap and hook and line gears. In addition, the Panel recommended consideration of a coast wide tagging study for cabezon. Such a study would potentially provide not only an index of abundance, but also additional biological information on growth, movement and stock structure. The Panel strongly endorsed a joint science / industry survey and tagging study.
2. The Panel endorsed the recommendation in the STAT report that improved and accurate accounting of removals for both commercial and recreational sectors was essential to sound assessment. This should include better reporting of location of fishing. Techniques such as electronic card swiping at point of landing could be considered for the commercial sector.
3. The Panel suggested that further investigation of the unusually high estimate of the 1980 recreational catch be undertaken, for example by comparing the catches in the same and adjoining years for other inshore species. This uncertainty was not resolved in this meeting.
4. The Panel noted the potential value of sampling the sex ratio of the catch, but also noted the difficulty of doing so given that the commercial fishery is mainly a live fishery.
5. The Panel endorsed the suggestion for a workshop to understand, analyze and interpret recreational CPUE data, particularly for nearshore species.

Modelling and assessment issues

6. With regard to calculating yield projections in 2003, the Panel recommended incorporating “model” uncertainty in projections by combining separate posteriors using combinations of fixed levels for steepness and natural mortality. The values recommended were (suggested weights shown in square brackets): $M = 0.2$ [0.25], 0.25 [0.5] and 0.3 [0.25]; $h = 0.5, 0.7, 0.9$ with equal weighting for the values of steepness. In the longer term, the Panel recommended including such parameter uncertainty directly in the Bayesian analysis.
7. The Panel endorsed the value of using multiple assessment packages and models (including simple “production” models and SRA) in undertaking stock assessments. The Panel noted and endorsed the suggestion to develop an ADModel Builder version of Stock Synthesis. The Panel was encouraged by the PhD proposal by Jason Cope incorporating the testing of harvest strategies using a wide range of assessment models. The Panel strongly endorsed the approach in this dissertation to evaluate strategies for assessing and managing low information species, and asked for cooperation by agencies in providing data for this study.
8. Noting the (surprising) sensitivity of the cabezon assessment to uncertainty in the CV for length at age, the Panel recommended that this issue be explored in the context of this assessment and others which rely substantially on fitting to length-frequency data.
9. The Panel recommended that further exploration of the spatial structure of this fishery be undertaken, and that consideration be given in the future to the use of spatially explicit models.
10. The Panel suggested that the implications of regime shifts and environmental variability for assessments and management reference points be examined.
11. The Panel endorsed the presentation and use of the range of diagnostics for the Bayesian analyses, and the reporting of CVs on management performance statistics.
12. The Panel suggested that the possibility of sex specific natural mortality should be investigated.

Table 1. Data presented to the STAR Panel Meeting. Highlighted years are the data used in the base case. (*: no assessment undertaken for the northern stock due to data limitations; **: assumed; ***: assume equal to 2002)

CABEZON	Northern Stock*	Southern Stock
Catch Data		
Commercial	1975-2002	1930-2002, 2003***
Recreational	1975-2002	1930-1979**, 1980-2002; 2003 **
Abundance Indices		
CPFV observer	None	1987-1998
CPFV logbook	None	1960-1978; 1980-2001
RecFIN	None	1980-1989; 1993-2001
OR Ocean boat survey	1979-1987; 1999-2002	None
WA Ocean Sampling	1990-2001	None
CalCOFI	None	1979-2002
AFSC WA&OR larval index	1980-1985; 1987	None
Power plant Impingement	None	1972-2002
Catch at Length (sex-aggregated)		
Commercial	OR: 1998-2002	1995-2002
Recreational	OR+WA: 1980-2002	1980-1989; 1993-2002