

YELLOWEYE ROCKFISH
STAR Panel Meeting Report

NOAA/NMFS Northwest Fisheries Science Center
2725 Montlake Blvd., E
Seattle, Washington
August 11-14, 2002

STAR Panel Members

Dave Carlile, Alaska Department of Fish and Game
Chris Francis, National Institute of Water and Atmospheric Research
Han-Lin Lai, NOAA/NMFS Northwest Fisheries Science Center (Chair, SSC)

PFMC Committee Representatives

Brian Culver, Groundfish Management Team (Rapporteur)
Rod Moore, Groundfish Advisory Panel

STAT Team Members

Rick Methot, NOAA/NMFS Northwest Fisheries Science Center
Kevin Piner, NOAA/NMFS Northwest Fisheries Science Center
Farron Wallace, Washington Department of Fish and Wildlife (absent)

Overview

The STAR panel reviewed the stock assessment of yelloweye rockfish at the Northwest Fisheries Science Center, Seattle, Washington on August 11-14, 2002. This is the second assessment of the yelloweye rockfish stock on the US west coast. The first assessment was done in 2001 and reviewed in June 25-29, 2001 at Santa Cruz Laboratory, California. The 2001 assessment was carried out by using Stock Synthesis Model (SSMOD) to assess the northern California and Oregon stocks separately. The Washington state portion of the stock was not assessed in 2001.

In the 2002 stock assessment, the main differences in model configurations from the 2001 assessment are

- (1) The Washington data were included;
- (2) Combined area models were included;
- (3) The California sport CPUE data were re-analyzed to evaluate the influence of port group and depth effects;
- (4) The available age compositions were included;
- (5) The length compositions from the three states were updated;
- (6) The mean length-at-age data from the available ageing data were included to facilitate the estimation of growth parameters and size-selectivity in the model;
- (7) The dome-shape selectivity curves were used for all sectors of fisheries;
- (8) The extra term was included in the likelihood function to constrain recruitments from deviating too far from the spawner-recruitment curve, and also to allow estimation of its steepness parameter;
- (9) The time period covered by the model started at 1955 rather than 1970 to better describe the long-term recruitment pattern.

Although there is substantial uncertainty associated with model estimates, due mainly to data limitations (e.g., short time series), the panel believes that the model provides convincing evidence of a considerable decline in yelloweye rockfish abundance. The panel notes that although some parameters (e.g., the steepness of the stock-recruitment curve) were not well determined, the estimated extent of biomass depletion was little affected by many of the sources of uncertainty.

The model estimates of substantial population decline are consistent with declines of yelloweye rockfish catch prior to recent specific yelloweye rockfish catch restrictions. The increasing proportion of immature fish in the catch over time is also consistent with this decline.

The panel believes that the modeling approach is consistent with international best practice, and that results from this assessment are sufficient to provide management advice to the Council.

The STAR panel commends the STAT team for their excellent work in conducting the stock assessment and for their cooperative spirit and willingness to respond to the panel comments and requests.

Changes Requested and Completed During STAR Panel Meeting

1. Analysis of Washington sport CPUE data

Because of the substantial number of zero catches observed, the panel requested the STAT team use the delta-GLM to re-analyze Washington sport CPUE data with year, month and port effects. The results revealed a more substantial decline of the predicted annual CPUE than the original GLM.

2. Analysis of Northern California sport CPUE data

Following the analysis in the 2001 stock assessment, analysis of Commercial-Passenger Fishing Vessel (CPFV) CPUE data was carried out by delta-GLM with year, month and port effects. Because data are sparsely distributed over the three factor-levels, the panel requested that the months be grouped into quarter, and ports into port groups (based on the likely fishing grounds for boats from a port group). Based on the advice of the GAP advisor and other knowledgeable sources, four port groups were formed along the California coast. During the exploratory data analyses, depth was found to be an important factor. CPUE information from depths less than 19 fathoms and greater than 100 fathoms were removed from the model. Yelloweye rockfish are rarely encountered in these depth strata and changes in sampling efforts within them over time could introduce bias into the CPUE index.

3. Sample sizes for size and age data

The panel requested that the assumed sample sizes for the size and age data be reduced. The model uses these sample sizes as an indication of how precise these data are, and thus how much emphasis to put on them. Initially, the sample sizes were set equal to the actual sample sizes. This is not appropriate because of the structure of these samples. Typically the fish in one sample come from just a few trips, and fish caught in the same trip tend to be more similar to each other - in size and age and age - than they are to fish from different trips. Thus the effective sample size is less than the actual sample size. The suggested procedure for reducing the sample sizes was seen as a temporary *ad hoc* solution. A better approach, using bootstrap resampling, is suggested below.

4. High California line catch in 1981

The high catch of the Southern California line+others fisheries in 1981 was primarily contributed from line fisheries. The STAT team investigated the data and concluded that there was no irregularity in this reported catch, and thus, has no reason to exclude it from the data. However, the stock assessment model assumed that there was no high catch prior to 1981 (because the model started from 1950). The panel requested that sensitivity

analyses be conducted to evaluate the influence of possible high catches before 1981 in Southern California.

Suggestions for Future Assessments

1. Sample sizes for size and age data

The panel requested that bootstrap resampling be used to calculate more accurate error distributions for the size and age data. These data are currently assumed to have a multinomial error structure. This assumption is not strictly correct because the samples are not simple random. The aims of the resampling would be to determine: (a) whether the multinomial distribution provides a reasonable approximation for the error distribution for these data; (b) if so, what are the effective sample sizes; and (c) if not, what is the best alternative parametric form for the error distribution, and what are appropriate parameter values. The resampling should use only data from the largest samples. However, it should be possible to use these data to infer appropriate error distributions for all age and size samples, regardless of whether they are large or small.

2. Ageing error

The panel requested that the replicate ageing data (see Table 13 and Figure 10 in the 2001 assessment report) be further analyzed to check the ageing-error assumptions used in the assessment (which were the same as in 2001) and to obtain estimates of possible bias. When these data were briefly examined during the STAR process there was some doubt as to whether the current ageing-error assumptions were correctly derived from them. This should be checked. Also, these data should be used to estimate the likely extent of bias in the age estimates (it is apparent from the plotted data that at least one of the two sets of age estimates must be biased). The effect of this degree of bias could be estimated as a sensitivity analysis in the next yelloweye rockfish assessment.

Areas of Uncertainty

Catch data

Undocumented catch of yelloweye rockfish, for example the bycatch from the commercial halibut fishery, would cause the model to under-estimate the virgin biomass.

CPUE data

1. The Oregon sport CPUE data were received by the STAT team in an aggregated form without sample size information. Without access to the raw data, the STAT team could not investigate sources of variation. It is not known whether the raw data still exist.

2. The panel discussed the apparently contradictory trends in California CPUE: increasing frequency of sport fishing trips with no yelloweye rockfish catches but increasing catch rate on trips where yelloweye rockfish was caught. Although this phenomenon is not inconsistent with the model output, it is unsettling.

3. The sport CPUE data from the three states did not consistently record target species, which is an important factor in CPUE analyses. For example, the Washington CPUE data did not include the sport halibut trips, even though the majority of the state sport yelloweye rockfish catch came from halibut trips.
4. Fishery attributes critical to the understanding of the CPUE time series remain unknown. Potential changes in factors such as fishing locations, fishing targets and vessel sizes contribute to uncertainty in CPUE time series.

Model Components

1. The assumed proportionality between CPUE and stock size is unproven.
2. Combining small length and age samples across years, and presenting the same data in many years, was intended to reflect average conditions. However, the effects of this procedure on the model estimates are not fully understood.

Editorial Comments

1. More extensive documentation of CPUE analyses (i.e., delta-GLM) is essential for the future assessment of yelloweye rockfish. Items such as model structure, sequential percent of variation explained by additional factors, list of estimates of coefficients and standard errors, documentation of other factors in the models that have been examined should be tabulated in the tables or figures. This would reduce unnecessary effort for the STAT team to resolve many unknowns of the past analyses.
2. Better documentation of raw data is required, for example, methods of collection, what is collected, and data sources. Incomplete documentation in the 2001 assessment caused difficulties in this assessment.
3. Evidence of the validity of the very high 1981 Southern California line catch should be provided.
4. Better labels and captions of tables and figures, including units of measurement, are necessary.

Research Needs

1. Fishery-independent surveys using tools such as manned submersibles and remotely operated vehicles (ROV) will improve the stock assessment.
2. Better understanding of stock structure and degrees of mixing would help to model stock dynamics accurately.
3. The states should develop a standardized sport CPUE data collection system, including fishing location data.

4. More age data and more accurate estimation of age would improve the stock assessment.

Appendix: List of Attendees

Name	Affiliation	Email/Phone	Dates Attended
Richard Methot	NMFS/NWFSC	Richard.Methot@noaa.gov	Aug.11-14
Kevin Piner	NMFS/NWFSC	Kevin.Piner@noaa.gov	Aug.11-14
Dave Carlile	ADFG	dave_carlile@fishgame. state.ak.us	Aug.11-14
Chris Francis	NIWA	c.francis@niwa.co.nz	Aug.11-14
Han-Lin Lai	NMFS/NWFSC	Han-Lin.Lai@noaa.gov	Aug.11-14
Rod Moore	GAP	seafood@attglobal.net	Aug.11-14
Brain Culver	GMT	culverbnc@dfw.wa.gov	Aug.11-14
Rob Jones	NWIFC/GMT	Rjones@nwifc.org	Aug.11-14
Alan Hicks		a.hicks@earthlink.net	Aug.11-12
Ian Stewart	UW, NWFSC	istewart@u.washington.edu	Aug.11-14
Steve Joiner	Makah Tribe	360-645-3157	Aug.13-14

