SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON FINAL PACIFIC MACKEREL STOCK ASSESSMENT AND MANAGEMENT MEASURES

The Scientific and Statistical Committee (SSC) reviewed the report "Pacific mackerel biomass projection estimate for USA management in 2017-18 and 2018-19" by Drs. Paul Crone and Kevin Hill from the Southwest Fisheries Science Center (Agenda Item D.1, Attachment 1, June 2017) along with the SSC Coastal Pelagic Species (CPS) subcommittee report (appended to this report). The Southwest Fisheries Science Center report provides a set of catch-only biomass projections for Pacific mackerel for the purpose of deriving harvest specifications for the 2017-2018 and 2018-2019 fishing years.

All of the biomass projections use the base model from the 2015 full assessment; however, alternative projections were provided to examine sensitivity to assumptions about future catch and recruitment for years beyond the end of the assessment. The SSC concludes that the baseline projection assuming removals equal to the harvest guideline (HG) and estimating recruitment directly from the stock-recruit curve should be used. Assumed recruitment during the projection period should come directly from the stock-recruit curve because recently estimated recruitments have not been consistently far above or below those expected from the stock-recruit curve. Assuming future catches equal to the HG is the default approach.

The SSC endorses the baseline biomass estimate of 143,403 mt of age-1+ fish at the start of the 2017-2018 fishing year, yielding a 2017-2018 overfishing limit (OFL) of 30,115 mt. The SSC recommends carrying forward the Category 2 sigma classification (sigma = 0.72) assigned to the 2015 assessment (Agenda Item G.2.b, Supplemental SSC Report, June 2015), although uncertainty has likely increased since the 2015 full assessment due to the age of the assessment for this short-lived species. The 2017-2018 acceptable biological catch (ABC) will depend on the Council's choice of the overfishing probability (P*), as shown in Appendix B, Table B1A of the biomass projection report.

The SSC also provisionally endorses the 2018-2019 age-1+ biomass estimate of 131,724 mt, resulting in a 2018-2019 OFL of 27,662 mt, conditional on the Council's choice of 2017-2018 ABC. This projection assumes removal of the HG in 2017-2018. If the Council chooses a 2017-2018 ABC (or annual catch limit/annual catch target) lower than 26,293 mt, the 2018-2019 OFL should be recalculated assuming smaller removals in 2017-2018.

In reviewing the last full assessment of Pacific mackerel, both the SSC and the stock assessment team emphasized the value of a fishery-independent survey. The acoustic trawl method (ATM) survey was not previously approved for use in assessing Pacific mackerel. The SSC recommends that the applicability of the ATM to Pacific mackerel be reassessed during the upcoming ATM survey methodology review scheduled for January-February 2018.

Report of the Review of the Pacific Mackerel Catch-Only Projection by the Coastal Pelagic Species Subcommittee of the Scientific and Statistical Committee via Webinar, May 1, 2017.

Dr. André Punt, Chair of the Coastal Pelagic Species Subcommittee of the Scientific and Statistical Committee (Subcommittee) outlined the tasks to be addressed during the review:

1. whether the methodology was correctly applied to project the estimated biomass for the 2017-2018 and 2018-2019 fishing years using new catch estimates; and
2. how recruitment should be estimated for those years that influence the estimates of biomass in the projections years, but for which there is a lack of data to directly inform the estimates.

Determination of the proper assessment category designation to determine σ for the P*-σ scientific uncertainty buffer calculation will be addressed by the full Scientific and Statistical Committee (SSC) in June 2017.

Dr. Paul Crone (SWFSC) presented the catch-only projection, noting that this approach had been used previously for Pacific mackerel, most recently in 2014. The only changes to the 2015 full assessment for the baseline model were:

1. catches for 2014-15 and 2015-16 were revised, and estimated catches for 2016-17 and 2017-18 were included in the projection;
2. recruitments for 2017 and 2018 were taken from the stock-recruitment relationship (recruitment scenario 1, see below), as was done for 2015 and 2016 in the 2015 assessment; and
3. the catch-only projection analysis was conducted using a stand-alone spreadsheet model that approximates the Stock Synthesis (SS) model used for the full assessment.

No additional data nor parameter changes were included in the update.

Sensitivities included two additional recruitment projection scenarios (in addition to scenario 1, above) for the years 2015 through 2018. Those sensitivities set recruitment at a constant level for those four years, equal to either:

2. the average recruitment for 2012-14, the most recent years for which there are data to estimate recruitments (scenario 2); or
3. the average recruitment for 1997-1999, the three-year period representing the lowest average recruitment over the years included in the assessment (scenario 3).

Scenario 2 produced very similar results to those for the baseline scenario (scenario 1).

The Subcommittee made the following requests for additional analyses:

Request 1: Conduct projections in which recruitment is pre-specified, but the projection is based on SS software.
Rationale. While the spreadsheet model is a reasonably close approximation to the SS model, it includes a simplification that causes it to differ somewhat from that model (the total mortality rate is assumed to be known and independent of recruitment, rather than total mortality being calculated within the model). It is better to be completely consistent with the model on which the

original assessment was based. In addition, this is the way other catch-only projections are conducted (e.g. for groundfish).
Response. The runs resulting from this analysis provided new estimates for the sensitivity analyses, slightly different from the original results. These are considered by the Subcommittee to be an improvement over the previous analyses. This request affected only scenarios 2 and 3, results for scenario 1 (the baseline) are unchanged. The updated results will be presented in the document provided for the June Council meeting.

Request 2: Add the results of the catch scenarios to the report.
Rationale: The analysts examined sensitivity to the values used for 2015-16 and 2016-17 catches, but did not report the results.
Response: The table will be in the document provided for the June Council meeting.

The Subcommittee agreed that the baseline scenario was the most appropriate basis for projection, but that the sensitivities to expected recruitment and catch should continue to be presented in future catch-only projections. The SSC may choose another scenario when recent average recruitment is quite different from the baseline (i.e., recent estimated recruitment deviations have been large).

Tables 3 and A1A display harvest control rule values (harvest guidelines [HGs] and acceptable biological catches [ABCs]) reflecting a variety of recruitment parameters and P-star choices. If the Council's choice for P-star results in an ABC value that is substantially smaller than the calculated HG, the OFL for the 2018-19 fishing year could need to be recalculated. The 2018-19 OFL is calculated assuming that removals are equal to the prior year's HG. However, if the ABC value falls below the calculated HG, that would decrease the effective HG, and the assumed catch level for 2017-18 would be lower.

Other comments from the meeting

1. The terms of reference (TOR) for stock assessments should elaborate on the expectations for catch-only projections. The TOR is currently vague in this regard.
2. Consideration should be given to holding a pre-assessment data meeting prior to the next full assessment for Pacific mackerel. Such a workshop could include consideration of potential alternative indices of abundance.
3. The Acoustic Trawl Method survey review in January 2018 should cover the suitability of the survey as an index of abundance for Pacific mackerel.

PFMC
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