WPSAR Panel Review of
2019 Benchmark Stock Assessments for the Bottomfish Management Unit Species of American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam

Prepared For
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Western Pacific Regional Fisheries Management Council

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Background

This document is a Western Pacific Stock Assessment Review (WPSAR) for the territorial bottomfish fisheries in Guam, Commonwealth of the Northern Mariana Islands (CNMI) and American Samoa. The review was conducted from April 15-18, 2019 at the offices of the Western Pacific Fisheries Management Council.

Terms of Reference

1. *Is the uncertainty with respect to input data quality and filtering methods well documented, including its potential effect on results?*

   The panel all concurred that **Yes** the methods for filtering the data were well documented, and repeatable. The panel also notes that with sparse and disparate datasets, analysts often have to make assumptions and judgement calls.

   For this assessment a bottomfishing trip was defined in the boat-based creel survey as a trip that used bottom fishing gear. The previous assessment was based on a different definition; a bottomfishing trip was defined as a trip with more than 50% by weight of BMUS. This change in definition now allow's for 0's to be included in the data. This change in trip definition has a marked effect on the relative depletion level in the CPUE series for Guam and American Samoa.

   The review panel concurred that the change in definition is appropriate as it seems reasonable to assume that a vessel was targeting bottomfish when using bottomfishing gear, and that its possible that the previous definition may contain trips with troll caught BMUS, that are now excluded under the new filter.

   Based on the information available and the number of sensitivity analysis that were conducted, the review panel was not able to justify making any changes to the necessary assumptions to proceed with this assessment.

2. *Is the CPUE standardization properly applied and appropriate for this species, fishery, and available data?*

   Yes the CPUE standardization was properly applied. The CPUE index for this fishery is from a species complex. The primary assumption is that trends in abundance for each species in the

complex are exactly the same. These data cannot be used to interpret the trends of any one member of the complex. Therefore, increases in abundance of one species in the complex can mask severe declines in another.

The results of the CPUE standardization did not result in large changes in trends in comparison to the nominal CPUE.

The review panel notes that the change in trip definition has had a bigger effect on CPUE trends between the 2016 and this assessment.

3. *Are the assessment models used reliable, properly applied, adequate, and appropriate for the species, fishery, and available data?*

    Yes. Biomass production models conditioned on catch and fit to a relative abundance index are widely used in stock assessments. These models are very amenable to these types of data; however, sufficient contrast is required in the data to resolve the production function for this stock.

    The review panel felt that if scale the observed catch is known, than estimates of MSY from these models are much more robust than estimates of FMSY.

    The data in American Samoa and Guam are much more informative than data from CNMI. MSY estimates from CNMI are highly informed by the prior density function.

4. *Are decision points and input parameters reasonably chosen?*

    Based on the limited available life-history information for these species and that the assessment is based on a species complex, it is difficult to determine if the priors for the maximum intrinsic rate of growth are appropriate.

    The review panel also notes that the priors for the population carrying capacity were based on the OLO MSY estimates were sensitive in the CNMI and American Samoa. The methods for developing the OLO MSY estimates are not described, and there is concern the OLO estimates are not repeatable.

    The review panel was also concerned how the informative priors for m and r interact (are somewhat confounded). Misspecification of a prior for m, or r, is likely to result in biased estimates of FMSY.

    Yes, the review panel felt that decision points and prior distributions were reasonably chose, and further vetted via sensitivity analyses.

5. *Are primary sources of uncertainty documented and presented?*

    Yes, this assessment does a great job of documenting sources of uncertainty, and quantifies the uncertainty. However, we also note that the addition of uncertainty to catch observations does not address potential bias with the estimation of catch.

6. *Are model assumptions reasonably satisfied?*

    The major assumptions behind this model are that CPUE is proportional to abundance of the sock complex, and that all species in the complex have the same underlying production function and are subject to the same annual process errors. Without independent information on the abundance of each species, there is no way to validate the assumptions.

    The review panel did examine proportions of each species in the complex over time. There were no significant trends in the catch proportions indicating that the relative proportions appear stable. No species seems to have disappeared in the catch from the species complex.

    Yes, the underlying assumptions used in the data filtering, model fitting, and the prior densities are reasonably satisfied.

7. *Are the final results scientifically sound, including estimated stock status in relation to the estimated biological reference points, and can the results be used to address management goals stated in the relevant FEP or other documents provided to the review panel?*

    For American Samoa and Guam, the data appear to be informative to provide information about the underlying production function. However, there is insufficient contrast in the data for CNMI to resolve the production function. Moreover, in the CNMI assessment the underlying production function was based on the simpler Schaefer production function (ie., m=2).

    Yes, the review panel felt that all three models were suitable for providing scientifically sound advice using the Best Available Scientific Information. However, the data for CNMI may not warrant a tier 3 assessment and a tier 5 approach may be more appropriate.

8. Are the methods used to project future population state adequate and appropriately applied for meeting management goals as stated in the relevant FEP?

    Yes the projection methods are appropriate. The review panel notes that the projection methods were carried out through 2025 to match the administrative assessment schedule. Periodic updates with the current assessment should be carried out prior to the next planned benchmark assessment currently scheduled for 2025.

9. If any results of these models should not be applied for management purposes with or without minor short-term further analyses (in other words, if any responses to any parts of questions 1-8 are "no"), indicate:

    Yes the panel felt that all of the results were suitable and that no minor changes are required in the assessment document.

10. As needed, suggest recommendations for future improvements and research priorities. Indicate whether each recommendation should be addressed in the short/immediate term (2 months), mid-term (3-5 years) and long-term (5-10 years). Also indicate whether each recommendation is high priority (likely most affecting results and/or interpretation), mid priority, or low priority.

The review panel would like to see the addition of the effects of each step to the changes in filtering methods and the effect it has on CPUE trends. This should be included as an appendix to the document.

11. Draft a report (individual reports from each of the panel members and an additional Summary Report from Chair) addressing the above TOR questions.