

Review of length-based stock assessment methods for coral reef fish stocks in Hawaii and other U.S. Pacific territories

Project Description:

The Pacific Islands Fisheries Science Center (PIFSC) is conducting stock assessments on exploited coral reef fish species in Hawaii, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands which are listed in the Western Pacific Regional Fishery Management Council's Fishery Ecosystem Plans. These stocks are generally classified as data-poor due to a lack of reliable, long-term, catch and fishing effort data. However, some parsimonious assessment models rely on more easily obtainable length composition data and certain key population demographic parameters related to growth, maturity, and longevity. PIFSC scientists have been implementing an approach that uses the average length in the exploited phase of the population (L_{bar}) to obtain an estimate of total and fishing mortality rates for coral reef fish stocks (Beverton & Holt 1956; Ehrhardt & Ault 1992). These rates, combined with population demographic parameters, are used in numerical population models to obtain stock sustainability metrics (e.g., spawning potential ratio, F/F_{msy} , B/B_{msy} ; see Ault et al. 1998, 2008). Acceptable Biological Catches (ABCs) can be generated by obtaining recent total catch estimates and specifying new ABCs based on the results of the population sustainability analyses. Furthermore, a novel meta-analytical approach using stochastic simulations was developed at PIFSC to obtain demographic parameter estimates for species with even less data than data-poor species ("data-less" species). These scientific analyses have not previously been applied for management purposes in the Pacific Islands Region, so there is a need to conduct an independent peer review of the analyses to improve the scientific basis for management.

Terms of Reference

1. Review the assessment methods used: determine if they are reliable, properly applied, and adequate and appropriate for the species, fisheries, and available data considering that the data itself have been accepted for management purposes.
2. Evaluate the implementation of the assessment methods: determine if data in its current form are properly used, if choice of input parameters seems reasonable, if models are appropriately specified and configured, assumptions are reasonably satisfied, and primary sources of uncertainty accounted for.
3. Comment on the scientific soundness of the estimated population benchmarks and management parameters (e.g., spawning potential ratio, F/F_{msy} , B/B_{msy} , stock status) and their potential efficacy in addressing the management goals stated in the relevant FEP or other documents provided to the review panel.
4. Determine whether the results (such as SPR-based reference points, stock status) in their current form from the assessment methods can be used for management

purposes without further analyses or changes considering that the data itself have been accepted for management purposes.

5. Suggest research priorities to improve our understanding of essential population and fishery dynamics necessary to formulate best management practices. Comment on alternative data sources and modeling.

6. Draft a report of the WPSAR Panel conclusions and findings, addressing each Term of Reference.

Format and Contents of CIE Independent Peer Review Report

1. The CIE independent report shall be prefaced with an Executive Summary providing a concise summary of the findings and recommendations following Annex 2 Terms of Reference questions.

2. The main body of the reviewer report shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Summary of Findings for each ToR in which the weaknesses and strengths are described, and Conclusions and Recommendations in accordance with the ToRs.

a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including providing a brief summary of findings, of the science, conclusions, and recommendations.

b. Reviewers should discuss their independent views on each ToR even if these were consistent with those of other panelists, and especially where there were divergent views.

c. Reviewers shall provide a critique of the NMFS review process, including suggestions for improvements of both process and products.

d. The CIE independent report shall be a stand-alone document for others to understand the weaknesses and strengths of the science reviewed. The CIE independent report shall be an independent peer review of each ToRs.

3. The reviewer report shall include the following appendices:

Appendix 1: Bibliography of materials provided for review

Appendix 2: A copy of the CIE Statement of Work

Appendix 3: Panel Membership or other pertinent information from the panel review meeting.