

Presenting IOTC stock status advice from multiple models to the broader fisheries community

Prepared by IOTC Secretariat

Summary

The IOTC Working Parties regularly receive stock assessment advice on the basis of a range of models, e.g. from the WPTT 2010 advice on Yellowfin tuna:

“155. Moreover, the WPTT agreed that is always a useful exercise to examine the results from a range of models in order to assess the conflicts and consistencies of the different data used in the models. The group acknowledged that in the current WPTT session several different models were presented, which allowed the contrasting of model results and the simulation of different dynamics and hypothesis. To this end, the WPTT suggested that a range of stock assessments approaches continues to be conducted, integrated or not, in the future.”

Inevitably, the models tend to conflict to some degree. To date, the Working Parties have been able to use careful language to reach a written consensus on the stock status. However, there are two important ways in which the use of multiple models becomes problematic for the IOTC:

- 1) Simplistic summary statements and graphics for managers. There is no generally agreed process for conveying the uncertainty within and among analyses in a Kobe Plot, Kobe-2 Strategy Matrix, or executive summary ‘traffic light’ indicator. The working parties may have a difficult time agreeing that a single model is preferable, or suitably representative, for illustrative purposes. Conversely, attempting to represent the results from all models might be very confusing.
- 2) Parties not associated with the IOTC often request ‘best estimate’ descriptors of each fishery, typically for meta-analyses or similar purposes. e.g. The RAM legacy database has recently requested a number of time series (spawning biomass, recruitment, fishing mortality, depletion, etc.), in addition to life history parameters for each of the assessed IOTC species. The secretariat is not in a position to provide such best estimates if they are not defined by the working parties. To date, the parties requesting the data have been invited to review the working papers and reports and to choose which results they want. They have been advised to make clear that their selection may not be consistent with the views of the IOTC. However, the IOTC has no control over how those data will be subsequently used, and it may appear that the selected time series have the implicit endorsement of the IOTC.

These issues have been referred to the Working Party on Methods, to see if a general approach to the issue of multiple models can be agreed. Three general approaches are proposed for consideration:

- Keep the status quo. Perhaps every piece of information from the IOTC should be carefully vetted to reach consensus. This may be the responsible way to prevent the uncertainty in the stock status from being misrepresented and abused in meta-analyses. However, it has been noted that the IOTC is the only tuna-RFMO that does not have all of its main stocks represented in the RAM legacy database.
- Model averaging. All of the results could be combined, and some sort of measure of central tendency could be employed. Several problems arise here:
 - It may be appropriate, but difficult, to identify weighting factors that reflect the relative credibility of the different approaches. In the event of a failure to reach consensus, the chair of the WP might be asked to choose, or a vote could be taken.
 - Using percentiles from a distribution could lead to erratic results in a time series, as consecutive points might represent different models (representing the temporal covariance may be a problem).
 - Not all model results are presented in comparable units.
- Choose a representative model. This is the simplest approach, and similar to what most RFMOs do. However, this also could require a ballot, or decision from the chair if consensus cannot be reached.