

PROPOSED WAY FORWARD IF THE WORKING GROUP DECISION IS TO PERFORM A SIMPLE OMP UPDATE FOR 2010

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Background

At the last meeting of the Scientific Working Group, three options were advanced for decision amongst at the next meeting:

- 1) Continue with the current OMP for two years (2010 and 2011) as the basis for TAC recommendations.
- 2) Continue with the current OMP for this year, and bring forward the major four-yearly review one year for finalization next year (2011).
- 3) Carry out a simple update of the OMP this year, followed by the major review for finalization in two years time (2012).

Assuming option 3) is the one chosen at the coming SWG meeting, specific proposals for the way forward are set out below.

First, however, for further background it should be noted that the existing OMP had the following objectives evaluated in terms of the MARAM operating model (Model 3) as a base case at the time:

- To achieve median expected spawning biomass recovery of 20% by 2025 relative to the level estimated for 2006, i.e. $B_{2025}^{sp} / B_{2006}^{sp} = 1.20$.
- To restrict the maximum inter-annual TAC change to 5%.

Furthermore the OMP was tested against a number of robustness tests which included:

- Catch-at-length data down-weighted in the base case.
- Allowance for an effort saturation effect for the base case.
- An alternative model for changes in selectivity over time (Model 4 – the OLRAC time-varying selectivity model).
- Changes to stock-recruitment steepness h for the base case.
- Changes to natural mortality M for the base case.
- Changes to the then current estimate of B^{sp} for the base case.
- The base case with recruitment halved over the 2002-2011 period.

Update of base case model

On the basis of work conducted this year, it is proposed that Model 3, updated given new monitoring data and revised as set out below, be used as the base case operating model:

- 1) Programming glitch corrected.
- 2) Convergence ensured.
- 3) Somatic growth parameters estimated during fitting procedure to be used for all length-at-weight relationships.
- 4) Mean of recruit residuals over 1974-2000 period forced to zero
- 5) CPUE series variability (the σ parameter) be constrained to be at least 0.1 in the likelihood maximization process, because of potential problems of overfitting given models with large numbers of estimable parameters (Johnston and Butterworth, 2010).

Furthermore, for future projections, the catch will not be split by area according to the average over 2004-2008 as previously, but instead under the assumption that this split amongst the areas is proportional to the average F value calculated for each area over the 2004-2008 period \bar{F}_A , i.e.:

$$C_A = C_{total} \frac{\bar{F}_A B_A^{exp}}{\sum_A \bar{F}_A B_A^{exp}}$$

Robustness Tests

The following robustness test OMs will be updated on the basis set out above:

- I) BC with CAL down-weighted 0.1.
- II) BC with effort saturation.
- III) Model 4 (OLRAC selectivity).
- IV) BC with steepness $h = 0.8$ (for BC this is close to 1.0).

This excludes other robustness tests pursued in 2008 and listed above for reasons of time and because they did not indicate appreciable changes in anticipated performance in the 2008 analyses.

OMP and re-tuning

The structural form of the OMP will not be changed, but control parameter values may be adjusted. The re-tuning will ensure that a recovery target no lower than that agreed for the 2008 OMP is to be achieved for the new BC operating model, viz: $B_{2025}^{sp} / B_{2006}^{sp} \geq 1.20$.

Future work

The retrospective analyses in Johnston and Butterworth (2010) point to possible poor precision of assessment results (perhaps a consequence of over-parametrised models), as well as poor estimability (with possibly unrealistic estimates) of stock-recruitment steepness h .

In longer term OMP revisions, these aspects need to be taken into account. They could mean that operating models based on best fits of these models alone are under-representing uncertainties, so that estimation variance should be taken into account. Furthermore the use of stock-recruitment relationships in addition to the Beverton-Holt form should be explored.

Reference

Johnston, S.J. and Butterworth, D.S. 2010. Further updated South Coast rock lobster stock assessments for 2010 and comparisons to the 2008 and 2009 assessments. Document Fisheries/2010/MAY/SWG-SCRL/??