IMPLICATIONS OF A COMPARISON OF PROJECTIONS OF THE REFERENCE SET OF OPERATING MODELS BEING USED FOR HAKE OMP DEVELOPMENT WITH ABUNDANCE INDEX DATA FOR TWO SUBSEQUENT YEARS

D S Butterworth and R A Rademeyer

MARAM (Marine Resource Assessment and Management Group)
Department of Mathematics and Applied Mathematics
University of Cape Town
Rondebosch 7701

Under the **"**PROPOSED PROCEDURES FOR DEVIATING FROM THE HAKE OMP OUTPUT FOR THE RECOMMENDATION FOR A TAC, AND FOR INITIATING AN OMP REVIEW" (WG/06/07/D:H:22), the core criterion given for establishing whether exceptional circumstances exist (so that deviation from the TAC output by an OMP need to be considered) is stated as follows:

> "The primary focus for concluding that exceptional circumstances exist is if the stock assessment/indicator review process provides results substantially outside the range of simulated stock and/other indicator trajectories considered in OMP evaluations."

Though the planned new hake OMP is not yet in place, this criterion can be applied at this time as the Reference Set of Operating Models that has been used for OMP testing was based on data to 2003 (plus the summer 2004 survey), and now a further two years of data are available.

Fig. 1 plots resource abundance index data as used to fit the Operating Models, together with the median and 90% probability intervals projected under the Reference Set and OMP1b (the actual catches for 2004 and 2005 have been slightly different from what OMP1b would set, but this difference will be small and not sufficient to invalidate the comparisons to follow). Note that for CPUE these probability intervals are somewhat wider than shown in the corresponding plots of Fig. 2 of WG/06/07/D:H:23 – the reason is that those plots referred to expected results, whereas what is shown here includes also the uncertainty associated with the observation error for the index concerned.

Fig. 1 also shows the two further data points now available for each index. These plots show that the *M. paradoxus* results are well within predictions for two of the three indices, though perhaps marginal for the south coast autumn survey. However, results for *M. capensis* are less "satisfactory": three of the four new data points from surveys are "marginal" in the context of compatibility with projections, as is the 2004 CPUE value; more importantly the 2005 CPUE value is appreciably outside the range predicted.

In our view, considering these *M. capensis* results in their totality, the "exceptional circumstances" provision above is met, and the current Reference Set should thus be deemed to cover an insufficient range of possibilities to be considered as a totally reliable basis for selecting a new OMP.

Had this situation not arisen, our plan had been to present results to allow a final selection of the new hake OMP based on projections under the existing Reference Set, but with a re-weighting of the SR1/SR2 scenarios to reflect updated indications of recent recruitment strength, given the results from assessments taking these new data into account. Given our view expressed above however, we no longer consider this an adequate approach. Therefore, although this view must await formal confirmation by the Demersal WG, but anticipating such confirmation, we are pursuing the following approach:

i) the Operating Models within the Reference Set are being refit taking account of these new data;
ii) by the time of the DWG meeting of Tuesday 29, we hope to be able to present the fits to two of the most probable scenarios (in likelihood terms) of an updated Reference Set, showing the associated diagnostics; and
iii) we hope also to then present constant catch and OMP1b projections for these updated Operating Models, comparing them to the earlier corresponding results that contributed to the summaries shown in WG/06/07/D:H:23, so that the (unfortunately negative) quantitative implications of the updated data for TAC and CPUE projections relative to previous indications are reasonably and readily evident.

Subsequent to the meeting on Tuesday 29, should agreement on this plan be then reached, a complete updated Reference Set will be developed, and candidate OMPs of the form of OMP1b (though naturally with adjusted control parameter values) evaluated to allow eventual selection.

Such a change of plan clearly requires additional work, but we consider that it remains possible to complete finalisation and agreement of the OMP (and hence to use this to provide the 2007 hake TAC recommendation), if not by the original deadline of end October, nevertheless by mid-November at the latest.

Although the status of the hake resource is unfortunately worse than would have been anticipated two years previously, and thus does have important analysis implications, these are nevertheless reasonably limited. The further computations now required are not anticipated to indicate a need for any major structural change to the existing OMP1, which indeed would in all likelihood have performed reasonably given its feedback mechanisms in providing appropriate TAC adjustments to correct the recent downward trends in abundance now indicated. Rather the need now to update the Operating Models is to provide a more accurate basis for future projections, and hence facilitate better selection amongst various OMP1-type candidates when taking account of short- and medium-term catch *vs* catch rate trade-offs.

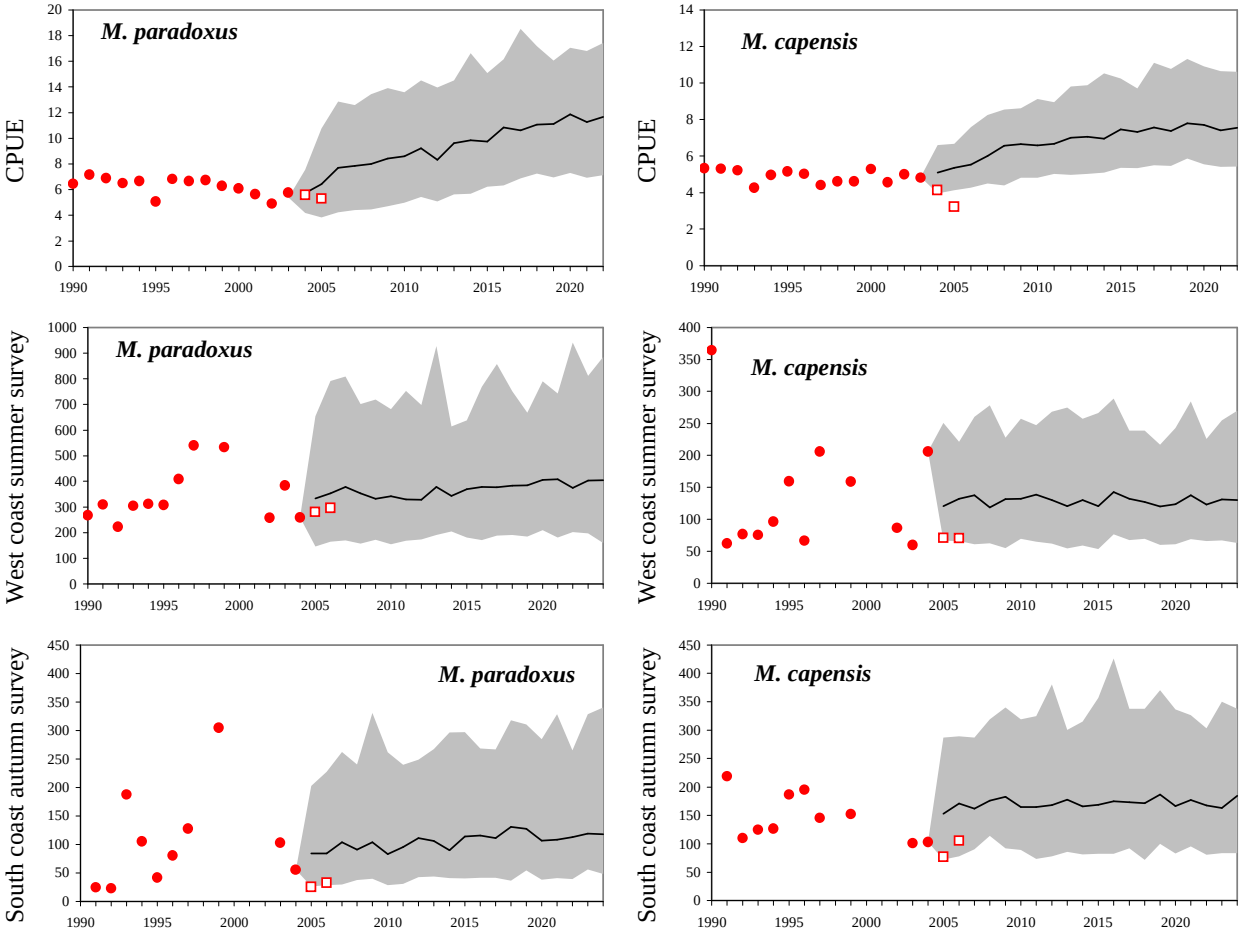

Fig. 1: Projections under the Reference Set of Operating Models used for hake OMP testing compared to the most recent two years' resource abundance index data (which were not used in fitting the Reference Set models). The solid circles show CPUE or survey abundance data as used in fitting the Operating Models, while the white squares show the new data points. The lines are the projected medians under the existing Reference Set for OMP1b, and the shaded areas the corresponding 90% probability intervals.