



## **Suggested Timetable for Assessment-related Analyses for the South African Hake Resource**

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### **INTRODUCTION**

The purpose of this paper is to clarify deadlines pertinent to hake assessment over the next 30 months until the scheduled adoption of a revised hake OMP by October 2010. Suggestions are also made regarding the various analyses desirably developed during this process and their timelines. The document focuses on requirements for the South African resource, with only passing reference to possible links with the hake resource utilised by the Namibian fishery.

### **SCHEDULE**

Key deadlines over the next 30 months are as follows

I) By mid October 2008

- Implementation of the existing OMP to provide a TAC recommendation for 2009 (which is due by late October).
- Consideration of the results of an in-depth updated assessment (i.e. not only a reference case update, but also sensitivities to determine whether there is any strong evidence that would merit overriding the TAC provided by the OMP, and/or bringing forward the schedule for revising the OMP - as per the agreed OMP implementation Protocol).

II) By end November 2008 or early June 2009

- Preparation of analyses to be considered by an international review panel at a stock assessment workshop to provide prioritised recommendations on future research. This workshop will be held either in the second week of December 2008 or the last week of June/first week of July 2009.

III) By mid-October 2009

- Implementation of the existing OMP to provide a TAC recommendation for 2010 (which is due by late October).
- Consideration of the results of a routine updated assessment (i.e. reference case update only) to determine whether there is any strong evidence that would merit overriding the TAC provided by the

OMP, and/or bringing forward the schedule for revising the OMP (as per the agreed OMP implementation Protocol).

IV) By December 2009

- Finalisation of operating models of hake resource for use in testing a revised OMP.

V) By September 2010

- Finalise consideration of OMP test results for choice of revised OMP, which would be implemented in October 2010 to provide a TAC recommendation for 2011.

## DATA/ANALYSIS REQUIREMENTS

I) To inform input for analyses due no later than early October 2008

### Essential

A major uncertainty needing attention is the basis used to disaggregate the species-split of the catch.

- a) Update of species-split algorithm for the commercial trawl fishery using data obtained from on-board observers, with consequential revision of past species-disaggregated catch and CPUE series which is at present based on inferences drawn from the species ratio at depth provided by scientific surveys. The analysis that Gaylard and Bergh (2007) carried out on this issue needs to be updated given that more data are now available.
- b) Checking ICSEAF reports for any information on the species split of past hake catches. This is a recommendation emerging from the Joint Hake Research Planning Workshop (pg 8, BCLME 2006).

### Desirable

- a) Disaggregation of survey strata open-ocean areas into trawlable/untrawlable components for re-calculation of survey abundances and variances which are to be taken to correspond to trawlable components only.
- b) Provision of data from BCLME cross-boundary hake survey series for analysis to provide a time series of species-specific abundance estimates and variances, as well as catch-at-length by species information, for the South African area covered.
- c) Longline CPUE data - for inclusion in the assessment likelihood (Recommendation B7 of the January 2004 workshop (BENEFIT, 2004)).

II) To inform/provide analyses needed for the December 2008 (or June/July 2009) international review workshop

### Essential

- a) Disaggregation of survey strata open-ocean areas into trawlable/untrawlable components for re-calculation of survey abundances and variances to be taken to correspond to trawlable components only, and updating of assessments to take these results into account. The notable differences of estimates of survey catchability  $q$  by area in the current assessments is a cause for concern, but may be an artefact of differing hake densities in trawlable and untrawlable ground.
- b) Preliminary implementation of species AND GENDER specific assessments which instead of using age-length keys as at present, take species and gender specific age reading data and input such data directly into the likelihood used for model fitting. A further major question concerning current assessments relates to the relatively small proportions of older hake in the catches, which is explained by a decreasing selectivity at age (and hence a "cryptic" biomass). This could however be an artefact of combining the sexes into a single age-length key in circumstances where there are large sex-specific differences in hake growth rate.

- c) Preliminary implementation of an assessment approach which directly models age-specific movements between four spatial areas (west/south coast and inshore/offshore) off South Africa, in place of the current approach which addresses this through area-specific selectivities. (Note that this approach also lays the groundwork for possible extension to allow movement to and from Namibia.) Recommendation A5 of the January 2004 workshop (BENEFIT, 2004).
- d) Further consideration of alternative pre-1978 allocations of catches between species to check whether substantially altered estimates of current *M. paradoxus* depletion can be obtained.

Desirable

- a) Provision of data from BCLME cross-boundary hake survey series for analysis to provide a time series of species-specific abundance estimates and variances for the South African area covered, as well as catch-at-length by species information, and incorporation of these data into preliminary assessments presented.
- b) Description of suggested approaches potentially applied to incorporate the effects of hake cannibalism and inter-hake-species predation into assessment models. Initial attempts at this using GADGET with its underlying length-based selectivity have proved problematic: maintaining numbers-at-age-by length data slowed computations considerably, and a lack of sufficient feeding study data became evident.
- c) Application of a simple two-species production model approach for an initial investigation of the possible implications of the hake resource being shared with Namibia. Note that this would utilise no more information from the Namibian fishery than past catches plausibly split by species (further information than this is not formally available).
- d) Starting assessments for a more recent year (Recommendation A13 of the January 2004 workshop (BENEFIT, 2004))
- e) Longline CPUE data - for inclusion in the assessment likelihood (Recommendation B7 of the January 2004 workshop (BENEFIT, 2004)).
- f) Development of a time series of hake discards to take into account in assessments.
- g) Hake CPUE - environment relationships: progress in the development of such relationships, which could be used to reduce the variance of abundance estimates from surveys and of standardised CPUE for use as an index of abundance.

**REFERENCES**

- BCLME. 2006. Agreed Report of the Joint Hake Research Planning Workshop (Namibian and South Africa). 9-12<sup>th</sup> May 2006, Cape Town.
- BENEFIT. 2004. Formal Report: BENEFIT/NRF/BCLME Stock Assessment Workshop 2004. 12-17 January 2004, University of Cape Town.
- Gaylard J.D. and Bergh M.O. 2007. Further comparison of hake species splits from observer data with the survey-generated splitting algorithm.