

Key questions for the Panel to address

Hake – predation modelling

- 1) Lack of fit to historical CPUE data:
 - a. In terms of fisheries standards for fitting to data, is the lack of fit to historical CPUE data an indication of a serious model mis-specification? Are there any suggestions for areas to investigate that could improve the fit?
 - b. The *M. paradoxus* population trajectory from the predation and cannibalism model does not show the same decreasing trend as for the no-predation model, resulting in a bad fit to the decreasing trend indicated by the historical CPUE data. This is likely due to the predation and cannibalism interaction with hake predators, but could also be exacerbated by a high natural mortality rate. Should constraints be placed on the magnitude of the natural mortality?
 - c. Alternatively, given that the older (ICSEAF) CPUE data are not well documented, and possibly not that reliable, and since better fits to them may lead to fit problems for other data types, should we simply have to be satisfied with a range of possible models corresponding to different weighting given to “conflicting” data sources?
 - d. Are there diagnostic output and plots apart from those already provided that should be looked at that might illuminate potential problem areas?
- 2) Is it reasonable to assume the same basal mortality for fish of all ages, given that smaller hake will have more “other predators” that are not included in the model?
- 3) The model frequently struggles to estimate the predation parameters if the starting position is not reasonable. One approach to deal with this is to scale the predation upwards slowly, but another would be to reduce the number of estimable parameters. Are there suggestions for areas where parameters could (at least initially) be fixed at biologically feasible values (e.g. the preference function)?
- 4) The predation and cannibalism model suggests a very different status (relative to, say Bmsy) than does the conventional assessment, with probably quite different management implications. How should these two alternative descriptions of the resource be given relative weightings to aid in the process of developing management advice?
- 5) Priorities for further work:
 - a. Priorities have been preliminarily allocated by ourselves to the past Panel recommendations in Table 1 of MARAM/IWS/DEC15/Hake/BG3. Are these allocations appropriate?
 - b. Are there suggestions for other considerations not included in that Table 1?

Hake – SCAA spatial box modelling

The Panel is requested to comment on the status of the ECOFISH program hake work on SCAA spatial box modelling

Sardine – two stock assessment model

- 1) Comment on the ongoing development of the two mixing-stock hypothesis of South African sardine and, in particular, on the use of parasite data as a ‘biological tag’. Comments will be welcomed on (but not restricted to):
 - a) The revised model structure (note changes from when the Panel last reviewed this work, which are listed in MARAM IWS/DEC15/Sardine/P3).
 - b) At present only parasite prevalence is planned to be used when fitting population models; is there any potential use for parasite intensity information?
 - c) Clearly both parasite infection and age-specific movement rates differ from year to year, but there are insufficient data to estimate all these parameters freely. What might be the best way to move towards improved estimation (perhaps use of a random effects approach for some of these parameters?).
- 2) Comment on other planned model approaches, such as including an additional mid-year cohort of south stock recruitment and the estimation of a stock-recruitment relationship, particularly in response to previous recommendations (see MARAM IWS/DEC15/Sardine/BG2).

Penguins – Impact of closure on industry

- 1) Is the Opportunity Based Model (OBM), developed to quantify alternative fishing opportunities, an appropriate basis for estimating lost fishing opportunity?
- 2) Have the sensitivities of the model's outputs to assumptions been sufficiently tested?
- 3) What further analyses of available information could assist in resolving uncertainties about lost fishing opportunities or addressing shortcomings in the approach to date?

Note: In the context of the investigation to which this is contributing, answers are not required with high precision. Typically the key question re opportunities is whether existing estimation processes could result in lost opportunity estimates that are more than one fifth or one tenth less than at present. Please provide answers with this aspect in mind.

Penguins – Detection of closure effects on birds

Document MARAM/IWS/DEC2015/PengD/P4 lists a large number of issues which need to be finalised for the analyses (particularly of bias) penguin response data related to island closures for Robben and Dassen islands. The Panel is requested to advise on how best to achieve this finalisation for as many of these issues (and related ones they themselves may raise) in the time available. This advice should be given in the context of the need for a conclusion to be reachable on this issue no later than the end of 2016.