Comments on the Penguin Pressure Model

Collated comments from some members of the SWG-PEL in response to FISHERIES/2011/SWG-PEL/30 (Comments received from Doug Butterworth, Carryn de Moor and Janet Coetzee)
This document has previously been tabled as FISHERIES/2011/SWG-PEL/36.

Background

In January 2010 a joint meeting of the small pelagic and ecosystems approach to fisheries scientific working groups recommended the formation of a 2 task teams. The first task team, comprised of members of the pelagic SWG, industry and invited experts was to investigate further island closures or modifications to the island closure programme so that a considered recommendation could be included in advice to the Minister for the 2011 season. The second Task Team, comprised of members of the EAF SWG and invited experts, was to investigate measures relating to penguin conservation that are not related to forage fish abundance, such as seal predation, heat stress, new colony creation and a penguin recovery plan.

Progress of this task team and in particular, development and preliminary results of their "Penguin Pressure Model" were presented to the pelagic SWG on the 17th May 2011. This model is currently being developed for Robben Island as an MSc project, but expansion to other Islands is planned for the future. As time for discussion during the meeting was limited, the chair was requested to collate comments for circulation to the student and her supervisors.

General observations:

i. Members agreed that the population model component of the approach was good, but noted that whereas it is necessary to evaluate alternative approaches in order to offer sound scientific advice, all approaches should be subjected to similar levels of scientific scrutiny – particularly if they are to be used to provide recommendations for management.

ii. Models used must also be reasonably consistent with existing data. Certainly a model that is not consistent with existing data cannot be used to provide reliable inferences. Stating "expert opinion" alone as the basis to select relationships and values for their parameters, when results could obviously vary enormously on the basis of such selections, is not sufficient to meet the standard required under i). Although ideally every value selected should be based on a fit to data for the population concerned, clearly this will not always be possible; but then VERY strong arguments need to be advanced to justify the choice made.

iii. Members further requested that in order to provide informed feedback to the model developers they require much more detail of the model, including documentation of all assumptions and equations used, than was provided in the tabled document (FISHERIES/2011/SWG-PEL/30). Understandably this document was offered by way of an overview presentation, but without such information provided in its full mathematical detail, as is customary for WG documents, it is impossible to properly evaluate what is being proposed. Further feedback will depend on such a detailed document being made available to the SWG-PEL.

iv. The pelagic SWG, as the principle body advising on the management of pelagic fish resources, requests to be kept informed on progress in this project.

Specific comments:

1) Pg 2: The model is said to be in a different paradigm from traditional stock assessment models, yet seems identical in structure – merely not taken as far (as yet?) in terms of fitting to data.
2) Pg 6: If the model does not ignore the impact of relationships for which there are no quantitative data, what basis is used to limit the range of the parameter values for those relationships – without such limits, the range of projections becomes effectively unlimited, so that the model would have no predictive ability?
3) Pg 8 and following: This basic dynamics presented only schematically here suggest that this model, once further developed, could provide a welcome alternative to existing approaches. A priority is to provide the mathematical specifications.
4) Pg 12: The equation for Logit(survival) is fundamental to the exercise, but no specification is provided for how the effect of pressure or the value of pressure is defined, or the values of the associated parameters determined.
5) Note that on pg 1 the statement is made that the scenarios investigated elucidate "known relationships between food availability and specific population parameters" – The PWG is not aware that reliable relationships of this nature exist (they have not been advised to the PWG) – if there are such, they should be fully documented as part of the priority task under ii above. Important to note in this regard that a group of penguin specialists met in December to formulate specific hypotheses linking food availability to population parameters (FISHERIES/2011/SWG-PEL/03. These hypotheses are still to be tested using available data.
6) The statement that a flood kills about 40% of chicks seemingly implies data available from which to draw this conclusion, but no such data have been provided to the PWG in response to its request for all data of this nature to support penguin modeling exercises. Is this indeed a data-based inference, or rather simply a "guess"?
7) Pgs 17-18: Standard requirements for such analyses are to fully document how the model has been "fitted" to data (here the penguin count trend) in full, so that this is clear and the acceptability of the fit can be evaluated in terms of standard diagnostics. It is not clear what has been done here. The comment about a relationship to predators runs counter to available tag-recapture data, which show appreciably lower survival rates after the turn of the century, rather than the opposite as indicated here.
8) Pg 22: The relationships shown are potentially useful, but since their individual magnitudes will depend on the parameterization of the associated relationships with the "pressure" concerned, the reliability of the results cannot be assessed in the absence of a full explanation of the basis used to determine and quantify these. On pg 25 there is reference to the use of expert inputs towards this end. The basis for formulation of those inputs must be documented to allow their review and evaluation – entirely *ex cathedra* statements are unacceptable as they do not admit a basis to potentially falsify, which is a necessary and fundamental component of any scientific exercise.