

CLARIFYING EVIDENCE ON ALTERNATIVE STOCK STRUCTURE HYPOTHESES FOR SARDINE

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Ultimately the choice of the sardine component of the revised sardine-anchovy OMP, and particularly the details of the possible two-area aspect thereof, is going to depend on the relative plausibility assigned (whether explicitly or by implicit “human integration”) to alternative stock structure hypotheses for the regions east and west of Agulhas which are harvested by the current fishery.

This, no doubt, is a matter on which we would wish to seek the benefit of comments by the Panel at the regular International Review Workshop to be held this year commencing on November 28. That is turn will require a short summary document of current understanding and available analyses.

Towards that end, it is suggested that there would be benefit in the PWG discussing:

- a) On what aspects is or isn't there local consensus.
- b) Where further information can be brought to bear on the issue, what might be possible to prepare before the Workshop, and what are the pertinent relative priorities?

Document PEL/39 considered at the last meeting incidentally lists most such issues, and hence could provide a useful basis around which to structure such discussion. What seem to me to be the relevant extracts are duplicated below, with possible further action **highlighted in yellow**.

RELEVANT EXTRACTS FROM:

SUMMARY OF ISSUES PERTINENT TO A DECISION ON POSSIBLE ADJUSTMENT OF THE MAXIMUM DIRECTED SARDINE CATCH ALLOWANCE WEST OF AGULHAS FOR 2016

Coetzee, Butterworth, van der Lingen and de Moor

- 1) **Hydrodynamic model** – Rather work with proportion of biomass effectively contributing to recruitment in the west, than with the proportion of biomass west of Agulhas
- 2) **ER/M and F/M for the west coast sardine stock appears low compared to values evident for other sardine stocks when showing an increasing trend**
 - i) ER/M is 40% lower and F/M 38% lower than the median for such other stocks. ***(improve analyses previously presented?)***

A) Pertinent further information still to come

- i) Fits to stock recruit curves *(later this year)*
Do these indicate any preference between models which take account of spawners east of Agulhas making more or less contribution to recruitment in the west?
- ii) Update on hydrodynamics model *(next year)*
Will enable improved computations of effect 1) above

B) General/Longer Term

- There is clear evidence that there are at least two “biological” (“demographically distinct”) sardine stocks off South Africa. However the key point at issue here concerns recruitment from the westernmost of such stocks, for which the core question is to what extent spawners east of Agulhas contribute to recruitment on the west coast. *(what is the relative size of the two biological stocks on the south coast – next year?)*
- Views on this are inferentially based at this time, informed particularly by the hydrodynamics model.
- Reservations exist: evolutionary effects might see egg and larval behaviour more geared to achieve movement west than suggested by the inert particle assumption of the hydrodynamics model; the poor recruitment evident on the South Coast (including from westernmost stock animals on that coast) is unexpected, raising questions.
- Alternatively, the poor productivity of fish on the south coast (irrespective of their origin) might be expected because of the lower primary and secondary productivity in that area and potentially higher predation on early life stages by other small pelagic and demersal species. Additionally, extensive HAB outbreaks on the south coast in recent years and their apparent negative impact on sardine condition, and hence reproductive output, may also be a contributing factor.
- The only possibility for direct confirmation of current inferences would be via parent-offspring close-kin mark-recapture genetics, but costs would be in the tens of millions of Rands for genotyping the sample sizes required. *(medium term future?)*
- Is there movement across the Agulhas “boundary” during the year sufficient to invalidate decisions based on the distribution indicated by the November survey? An initial examination based on the distribution of 1+ sardine found during the recruitment survey did not support this contention. A full examination would however require extensive surveying. *(OLRAC analyses from catch patterns– later this year?)*