

## List of Key Questions for the Panel Regarding Small Pelagics

**C.L. de Moor\* and D.S. Butterworth\***

Correspondence email: [carryn.demoor@uct.ac.za](mailto:carryn.demoor@uct.ac.za)

- 1) Have we an adequate reference set of operating models for sardine? How do we best report performance statistics for this set?
- 2) How do we best choose risk thresholds in terms of biomass levels for sardine and anchovy?
- 3) How do we best select the acceptable probability of dropping below a risk threshold?
- 4) Can one dispense with risk and simply consider catch over the medium-to-long term as sufficient to incorporate any negative consequences of undue depletion of the population? (This because future catches should be reduced if the stock is depleted such that future recruitment drops.)
- 5) What would be the best way to simulation test the impact of a single area directed sardine TAC in a situation of two spatially distinct sardine population components?
- 6) The 2016 panel recommended OMP variants that include spatial management be considered (recommendation B.1.3). Is spatial management of the sardine TAC necessary? If we consider explicit spatial management to be necessary during “concerning periods” only, how do we best determine the “flags” for switching such spatial management on and off?
- 7) How might one best specify the November survey estimate of abundance below which the directed sardine fishery should be closed?

---

\* MARAM (Marine Resource Assessment and Management Group), Department of Mathematics and Applied Mathematics, University of Cape Town, Rondebosch, 7701, South Africa.

A short overview of the sardine documents follows, with links to the above questions.

### Background documents

**MARAM/IWS/2017/Sardine/BG1:** Coetzee JC, de Moor CL and Butterworth DS. 2017. A summary of the sardine (and anchovy) fishery.

- A summary document providing an overview of the sardine resource and fishery, and a brief description of the data available, assessments and management of the fishery.

**MARAM/IWS/2017/Sardine/BG2:** de Moor CL, Butterworth DS and van der Lingen CD. 2017. Progress on recommendations from the 2016 review panel report.

**MARAM/IWS/2017/Sardine/BG3a:** de Moor CL, Butterworth DS and van der Lingen CD. 2017. The Quantitative Use of Parasite Data in Multi-Stock Modelling of South African Sardine (*Sardinops sagax*).

**MARAM/IWS/2017/Sardine/BG3b:** Supplementary material to BG3a.

- Sardine two stock OM, showing that including parasite prevalence-by-length in the likelihood improves the precision with which movement can be estimated.
- Section B of the supplementary material provides detailed equations for the sardine assessment

**MARAM/IWS/2017/Sardine/BG4:** Butterworth, DS, van der Lingen CD, Coetzee J and de Moor CL. 2016. The present agreed hypothesis for South African sardine stock structure.

- The current stock structure hypothesis for sardine.

**MARAM/IWS/2017/Sardine/BG5:** Coetzee JC. 2016. Estimation of the effective proportion of sardine biomass contributing to putative western stock recruitment by including the proportion of eggs transported to the West Coast nursery area from South Coast spawning areas.

- Biomass-weighted average proportion of south coast eggs and larvae that are successfully transported to the west coast nursery area.
- To inform the proportion “p” of south coast spawning contributing to west coast recruitment.

**MARAM/IWS/2017/Sardine/BG6:** van der Lingen CD and McGrath A. 2017. Incorporating seasonality in sardine spawning into estimations of the transport success of eggs spawned on the South Coast to the West Coast nursery area.

- In response to 2016 recommendation B.1.1

**MARAM/IWS/2017/Sardine/BG7:** de Moor CL. 2017. Updated simulation testing framework to be used during the development of OMP-18.

- Details the framework used to simulation test alternative candidate Management Procedures given alternative Operating Models for both sardine and anchovy.
- May be useful for reference when considering key questions #1, #5 and #6.

### Primary papers

**MARAM/IWS/2017/Sardine/P1:** List of key questions for the panel regarding small pelagics.

**MARAM/IWS/2017/Sardine/P2:** de Moor CL. 2017. Alternative risk thresholds for South African sardine and anchovy resources.

- Details alternative risk thresholds considered thus far for the sardine west component (with some similarities for sardine single stock hypothesis) and for anchovy.
- Relates primarily to key question #2.

**MARAM/IWS/2017/Sardine/P3:** de Moor CL and Butterworth DS. 2017. Selection of acceptable levels of risk for South African small pelagics: the probability of dropping below pre-defined risk thresholds.

- Details some methods used to determine an acceptable probability of dropping below a pre-defined risk threshold.
- Relates primarily to key question #3.

**MARAM/IWS/2017/Sardine/P4:** de Moor CL and Coetzee J. 2017. Simulating single area management on two sardine components.

- Considers alternative methods to simulate the implementation of a single area directed sardine TAC on an operating model which assumes two sardine components.
- Relates primarily to key question #5.

**MARAM/IWS/2017/Sardine/P5:** Butterworth DS, de Moor CL and Coetzee JC. 2017. At what biomass threshold should the directed sardine fishery be closed?

- Considers alternative survey biomass thresholds below which closure might be recommended for the directed sardine fishery.
- Relates primarily to key question #7.

**MARAM/IWS/2017/Sardine/P6:** de Moor CL. 2017. A summary of the operating models being used to simulation test OMP-18 for South African sardine and anchovy.

- Summarises the operating models being used to simulation test OMP-18, and, in particular, some of the key uncertainties
- Relates to key question #1.

**MARAM/IWS/2017/Sardine/P7:** de Moor CL. 2017. Results for sardine projections under alternative future management scenarios.

- Provides some comparative results under alternative single-area and two-area management scenarios for future directed sardine TACs.
- Relates to key questions #1 and #6

**MARAM/IWS/2017/Sardine/P8:** Bergh M. 2017. Sardine assessment results compared to a run which excludes the directed sardine catch, 1984-2015.

- By contrasting these two sets of biomass trajectories to indicate the impact of past catches on the resource, a perspective is provided that relates to the acceptable probability of dropping below a risk threshold.
- Relates to key question #3

**MARAM/IWS/2017/Sardine/P9:** Bergh M. 2017. Use of the relationship between long term catch and biomass to establish a management target.

- Relates to key question #4

