The projected range of total sardine biomass

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Figure 1 shows the histogram of the projected range of future hydroacoustic survey estimates of sardine 1+ biomass that were simulated during the testing of OMP-08 (de Moor and Butterworth 2008) and Interim OMP-13 v2 (de Moor and Butterworth 2013). Assuming a single sardine stock hypothesis, the cumulative simulated probability of obtaining a survey estimate of sardine 1+ biomass of less than 750 thousand tons was simulated to be 21% under OMP-08 and 29% under Interim OMP-13 v2. Assuming a two sardine stock hypothesis, the cumulative probability of obtaining a survey estimate of sardine 1+ biomass of less than 750 thousand tons was simulated to be 86-87% under “MoveE1” and “MoveB2” and 24% under “NoMove3”.

Historically (1984-2012) 62% of survey estimates of sardine 1+ biomass have been below 750 thousand tons (Figure 1), with 6 out of the past 7 years being under this threshold.

There exists a general protocol for OMPs for South African fisheries which cater for unanticipated events and can lead to the initiation of a review of an OMP ahead of schedule (see Appendix 2 of Rademeyer et al. 2008). An “Exceptional Circumstance” in this light would be if realised survey estimates of abundance are appreciably outside the bounds predicted during the OMP testing, where the norm would typically be 90% to 95% PI.

The lower 5%ile of the distribution is 311 thousand tons under OMP-08, 275 thousand tons under Interim OMP-13 v2 assuming a single stock hypothesis, 323 thousand tons under Interim OMP-13 v2 assuming a two stock hypothesis and NoMove, and 22-23 thousand tons under Interim OMP-13 v2 assuming a two stock hypothesis and MoveB or MoveE. The lower 10%ile of these distributions increase to 472, 404, 450 and 32-33 thousand tons, respectively.

The November 2012 survey estimate of 345 thousand tons was thus in the lower 6%ile of OMP-08 projections, lower 7.5%ile of Interim OMP-13 v2 projections assuming a single stock hypothesis and

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† Future movement of “west” stock recruits to the “south” stock switches between increasing or decreasing towards an equilibrium proportion based on whether a favourable or unfavourable environment exists on the south coast.
‡ Future movement of “west” stock recruits to the “south” stock is based on a relationship with the ratio of “south” to “west” stock 1+ biomass.
§ No future movement of “west” stock recruits to the “south” stock.
lower 6%ile of Interim OMP-13 v2 projections assuming a two stock hypothesis with no future movement.

Figure 2 shows the distributions of survey estimates of sardine 1+ biomass that were simulated for Novembers 2012\textsuperscript{4}, 2013 and 2014 and show the beginning of the divergence in projections for the difference hypotheses.

References


\textsuperscript{4} Projections start in November 2011.
**Figure 1.** The histogram of simulated future survey estimates of 1+ biomass under OMP-08 (assuming a single sardine stock) and Interim OMP-13 v2, assuming either a single sardine stock or a two stock operating model with different movement hypotheses. The bar graph shows the histogram of historic (1984-2012) hydroacoustic survey estimates.
Figure 2. The histogram of simulated future survey estimates of 1+ biomass in a) November 2012, b) November 2013 and c) November 2014 under Interim OMP-13 v2, assuming either a single sardine stock or a two stock operating model with different movement hypotheses. The observed survey 1+ biomass in November 2012 was 345 000t.