Further work on a risk analysis of the impact of harvesting sardine on the west coast of South Africa

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Background

de Moor and Butterworth (2016a) undertook an initial risk analysis to consider the risk to the sardine resource for the 2016 season, in terms of the west coast harvest proportion. This analysis was to assist in discussions regarding the implementation of the "Gentleman's agreement" that the South African pelagic industry self-regulate fishing pressure west of Cape Agulhas to ensure the spread of fishing west compared to east of Cape Agulhas is similar to that observed during recent November surveys (further details provided in de Moor and Butterworth (2016a)).

Revised Decision Table

The risk analysis undertaken by Moor and Butterworth (2016a) was based on a decision table of west coast harvest proportions calculated from the directed sardine catch west of Cape Agulhas in 2016 as a proportion of the "effective" west coast biomass estimated by the hydroacoustic survey in November 2015. Given the recent availability of an updated assessment of the sardine resource (de Moor and Butterworth 2016b), Table 1 now gives an update of the decision table provided by de Moor and Butterworth (2016a) with an improved west coast harvest proportion using the "true" effective west coast biomass at the time of the November 2015 survey as estimated by the model (de Moor and Butterworth 2016b). The maximum catch in Table 1 is also constrained to the final directed sardine TAC for 2016 which is also now available (de Moor 2016). The six hypothesis for the proportion of south coast biomass that contributes to the effective west coast biomass remain the same as in de Moor and Butterworth (2016a).

The risk analysis in Table 1 shows that should the presently agreed maximum of 33 500t be caught west of Cape Agulhas during 2016, the harvest proportion on the effective west coast biomass would range from 5% to 24%. When the alternative hypotheses of the proportion of south coast biomass contributing to effective west coast biomass are plausibility weighted using the same weighting as de Moor and Butterworth (2016a), this expected harvest proportion is 0.15.

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In Summary

As before, the ultimate purpose of Table 1 is to inform decision makers of the likely consequences of alternative decisions regarding the directed catch of sardine to be allowed to be taken west of Agulhas this year. This should be accompanied by statements about the "safety" associated with expected harvest proportions shown in the final column of the Table. In summary, the higher the catch allowed on the west coast, the higher the harvest proportion in 2016, and hence the worse the abundance of this population at the end of the year. Noting again that one purpose of the catch-split agreement facilitating the adoption of OMP-14 was that the harvest proportions on the west coast should be reduced compared to the recent past (see Figure 1), Table 1 indicates that increasing the catch on the west coast above 33 500t would increase the harvest proportion above the average of the most recent five years, and above that reported by Butterworth and Coetzee (2016) to correspond with previous increases in biomass for the South African sardine west stock.

References

Butterworth, D.S. and Coetzee J.C. 2016. Comparative harvest rates for sardine and anchovy stocks elsewhere. DAFF: Branch Fisheries Document FISHERIES/2016/AUG/SWG-PEL/35.

de Moor, C.L.. 2016. Final Anchovy and Sardine TACs and TABs for 2016, Using OMP-14. DAFF: Branch Fisheries Document FISHERIES/2016/JUL/SWG-PEL/26.

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Table 1. A decision table showing the west coast harvest proportion (west coast catch divided by "effective" west coast biomass). For each alternative possible west coast catch, the expected value for the harvest proportion is the sum of the probability of each effective biomass hypothesis multiplied by the associated harvest proportion.

Catch west of Cape Agulhas during 2016	Alternative hypotheses of the proportion of biomass surveyed east of Cape Agulhas in November 2015 that forms part of the "effective" west coast biomass for 2016						Expected harvest proportion
	0.0	0.2	0.4	0.6	0.8	1.0	
	Probability						
	0.1	**0.9**	**0.0**	**0.0**	**0.0**	**0.0**	
29074	0.21	0.12	0.09	0.07	0.05	0.05	**0.13**
30000	0.21	0.12	0.09	0.07	0.06	0.05	**0.13**
32500	0.23	0.13	0.10	0.07	0.06	0.05	**0.14**
33500	0.24	0.14	0.10	0.08	0.06	0.05	**0.15**
35000	0.25	0.15	0.10	0.08	0.06	0.05	**0.16**
36000	0.26	0.15	0.11	0.08	0.07	0.06	**0.16**
37500	0.27	0.16	0.11	0.08	0.07	0.06	**0.17**
40000	0.29	0.17	0.12	0.09	0.07	0.06	**0.18**
50000	0.36	0.21	0.15	0.11	0.09	0.08	**0.22**
60000	0.43	0.25	0.18	0.14	0.11	0.09	**0.27**
64928	0.46	0.27	0.19	0.15	0.12	0.10	**0.29**

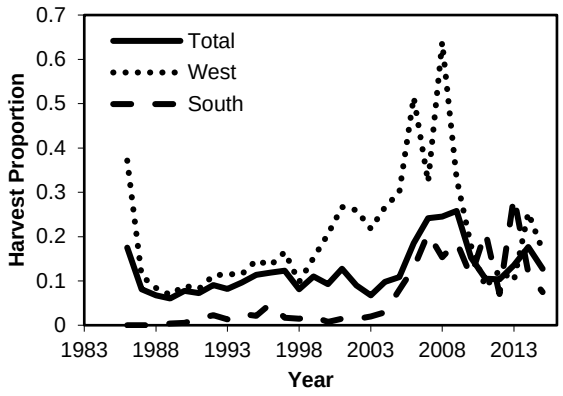

Figure 1. The historical harvest proportions of South African sardine (de Moor and Butterworth 2016b). Over the last six years the average on the west coast has been 0.15.