

## Initial Directed Anchovy TAC and Sardine and Anchovy TABs for 2019, Using OMP-18

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Following the recent 2018 November biomass survey, the initial 2018 TACs and TABs for South African sardine and anchovy are to be recommended. This document presents the OMP-18 recommended initial TAC for anchovy only, together with the associated small sardine TAB and other fixed TABs. The following data have been used:

- 1) November 2018 survey anchovy biomass: 1 559 546 tonnes.
- 2) November 2018 survey sardine total biomass: 90 768 tonnes.
- 3) Directed anchovy TAC for 2017: 315 242 tonnes.

Using the above data, the initial 2019 TAC and TAB recommendations are calculated by OMP-18 to be:

Initial anchovy TAC:	347 860 tonnes
Initial $\leq 14$ cm sardine TAB with directed anchovy fishing:	35 078 tonnes
$> 14$ cm sardine TAB with directed round herring and anchovy fishing:	7 000 tonnes
$\leq 14$ cm sardine TAB with directed round herring fishing:	1 000 tonnes
Anchovy TAB for sardine only right holders:	500 tonnes

The equations used to calculate these TAC/Bs are given in the Appendix.

No directed sardine TAC or associated small sardine TAB are given here as Exceptional Circumstances have been proposed for the sardine resource (Coetzee 2018). The above sardine TABs may also be reduced from these OMP-18 calculated values due to Exceptional Circumstances.

### Comments on the OMP-18 recommended TACs and TABs

The anchovy initial TAC was not subject to any constraint. The associated  $\leq 14$ cm sardine TAB with directed anchovy fishing is, as always, deliberately set high and not expected to be fully taken. The  $> 14$ cm sardine TAB with directed round herring and anchovy fishing, the  $\leq 14$ cm sardine TAB with directed round herring fishing and the anchovy TAB for sardine only right holders are final for the year.

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### **Acknowledgements**

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### **References**

- Coetzee JC. 2018. Do we have reason to declare exceptional circumstances for sardine? DAFF: Branch Fisheries Document FISHERIES/2018/DEC/SWG-PEL/43.
- de Moor CL. 2018. The 2018 Operational Management Procedure for the South African sardine and anchovy resources. DAFF Branch Fisheries Document FISHERIES/2018/DEC/SWG-PEL/37.

**Appendix: Summary of Initial anchovy TAC and associated sardine TAB Equations of OMP-18 (from de Moor 2018).**

The directed anchovy initial TAC is based on how the 2018 November biomass survey estimate of abundance relates to the historical (pre-2000) average.

$$TAC_{2019,init}^A = \alpha \delta q \left( p + (1 - p) \frac{B_{2018}^{obs,A}}{\bar{B}_{Nov}^A} \right) \quad (A.1)$$

This results in  $TAC_{2019,init}^{1,A} = 347\,860t$ . As the TAC in 2018 was below the 2-tier threshold, the following constraint applies:

$$\max\{(1 - c_{mxdn}^A)TAC_{2018}^A; c_{mntac}^A\} \leq TAC_{2019,init}^A \leq c_{mxtac}^A \quad (A.2)$$

This results in  $TAC_{2019,init}^A = 347\,860t$ . The anchovy biomass estimated by the November survey is above the Critical Biomass threshold and thus the Metarule was not used. In the above equations we have:

$B_y^{obs,A}$  - the estimate of anchovy abundance (in thousands of tonnes) from the hydroacoustic biomass survey in November of year  $y$ .

$\bar{B}_{Nov}^A$  - the historical average index of anchovy abundance from the biomass surveys from November 1984 to November 1999, of 1 380.28 thousand tonnes.

$\alpha_{ns} = 1.313$  - a control parameter which scales the anchovy TAC to meet target risk levels for sardine and anchovy.

$\delta = 0.85$  - a 'scale-down' factor used to lower the initial anchovy TAC to provide a buffer against possible poor recruitment.

$p = 0.7$  - the weight given to the recruit survey component compared to the biomass survey component in setting the anchovy TAC.

$q = 300$  - reflects the average annual TAC expected under OMP99 under average conditions if  $\alpha = 1$ .

$c_{mxdn}^A = 0.25$  - the maximum proportional amount by which the directed anchovy TAC can be reduced from one year to the next.

$c_{mntac}^A = 120$  - the stable directed TAC (in thousands of tonnes) that may be set for anchovy.

$c_{mxtac}^A = 450$  - the maximum directed TAC (in thousands of tonnes) that may be set for anchovy.

$c_{tier}^A = 330$  - 2-tier threshold for directed anchovy TAC

The initial  $\leq 14cm$  sardine TAB with anchovy directed fishing is calculated using:

$$TAB_{2019,anch}^{1,S} = \gamma_{2019} TAC_{2019,init}^A \quad (A.3)$$

where:  $\gamma_{2019} = 0.1 + \frac{0.1}{1 = \exp\left(-\ln(19) \frac{(B_{2018}^{obs,S} - B_{50})}{(B_{ec} - B_{50})}\right)}$  = 0.100

In the above equations we have:

- $\gamma_y$  - a conservative allowance for the ratio of juvenile sardine to juvenile anchovy in subsequent catches in year  $y$ .
- $B_y^{obs,S}$  - the estimate of sardine abundance (in thousands of tonnes) from the hydroacoustic biomass survey in November of year  $y$ .
- $B_{50} = 2000$  - biomass where the logistic curve for  $\gamma_y$  reaches 50%.
- $B_{95} = 3177.8$  - biomass where the logistic curve for  $\gamma_y$  reaches 95%.