

Directed Sardine and Initial Anchovy TACs and Sardine TAB for 2011, Using OMP-08

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Following the recent 2010 spawner biomass survey, the initial 2011 TACs for South African sardine and anchovy and initial sardine TAB are to be recommended. The following data have been used:

- 1) November 2010 survey sardine 1+ biomass: 508 392 tonnes.
- 2) November 2010 survey anchovy spawner biomass: 2 077 414 tonnes.
- 3) Directed sardine TAC for 2010: 90 000 tonnes.
- 4) Directed anchovy normal season TAC for 2010: 453 183 tonnes¹.

Using the above data, the initial 2011 TACs and TAB recommendations are calculated by OMP-08 to be:

Directed sardine TAC: 90 000 tonnes

Initial normal season anchovy TAC: 247 500 tonnes

Initial normal season sardine TAB: 28 830.5 tonnes

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

Comments on the TACs

The directed sardine TAC is constrained by the minimum in the absence of Exceptional Circumstances. Note that given that Exceptional Circumstances do not apply, the directed sardine TAC recommendation is final and for the whole season, rather than an initial figure to be revised in mid-year.

As the anchovy normal season TAC was above the two-tier threshold of 330 000t in 2010, the anchovy initial normal season TAC is constrained by the maximum decrease (of 25%) from the two-tier threshold. Exceptional Circumstances do not apply.

Acknowledgements

Janet Coetzee and Dagmar Merkle are thanked for providing the input data from the 2010 spawner biomass survey for these computations.

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¹ The total anchovy TAC for 2010 was 573 183t, comprising of 453 183t for the normal season and 120 000t for the additional season.

References

de Moor, C.L. and D.S. Butterworth. 2008. OMP-08. MCM document, MCM/2008/SWG-PEL/23. 15pp.

Appendix: Summary of Initial TAC and TAB Equations of OMP-08 (from de Moor and Butterworth 2008).

The directed sardine TAC is initially calculated in proportion to the 2010 November 1+ biomass estimate:

$$TAC_y^S = \beta B_{y-1,Nov}^S \quad (A.1)$$

This results in $TAC_y^S = 49\,314$ t. As the biomass estimate is above the exceptional circumstances threshold of 300 000t, but below 800 000t, and because the TAC in 2010 is below the 2-tier threshold, the following constraint applies: Letting $TAC_y^{S*} = \max\{49\,314t; c_{mntac}^S\}$, the constraints are given as follows:

$$\max\left\{\left(1 - c_{mxdn}^S\right)TAC_{y-1}^S \times \frac{B_{y-1,Nov}^S - B_{ec}^S}{B^* - B_{ec}^S} + TAC_y^{S*} \frac{B_{smooth}^S - B_{y-1,Nov}^S}{B_{smooth}^S - B_{ec}^S}; c_{mntac}^S\right\} \leq TAC_y^S \leq c_{mxtac}^S \quad (A.2)$$

The above constraints result in $TAC_y^S = 90\,000$ t. In the above equations we have:

$\beta = 0.097$ - a control parameter reflecting the proportion of the previous year's November 1+ biomass index of abundance that is used to set the directed sardine TAC.

$B_{y,Nov}^S$ - the estimate of sardine 1+ abundance (in thousands of tonnes) from the hydroacoustic survey in November of year y .

$c_{mxdn}^S = 0.20$ - the maximum proportional amount by which the directed sardine TAC can be reduced from one year to the next.

$c_{mntac}^S = 90$ - the minimum directed TAC (in thousands of tonnes) that may be set for sardine.

$c_{mxtac}^S = 500$ - the maximum directed TAC (in thousands of tonnes) that may be set for sardine.

$c_{tier}^S = 255$ - 2-tier threshold for directed anchovy TAC

$B_{ec}^S = 300$ - the biomass threshold (in thousands of tonnes) below which Exceptional Circumstances apply for sardine.

$B_{smooth}^S = 800$ - the threshold (in thousands of tonnes) below which the directed sardine TAC may be reduced by more than c_{mxdn}^S from one year to the next.

The directed anchovy initial TAC is based on how the 2010 November spawner biomass survey estimate of abundance relates to the historic (pre-2000) average.

$$TAC_y^{1,A} = \alpha_{ns} \delta q \left(p + (1-p) \frac{B_{y-1,Nov}^A}{B_{Nov}^A} \right) \quad (A.3)$$

This results in $TAC_y^{1,A} = 229\,037$ t. The anchovy TAC is subject to similar constraints as apply for sardine. As the normal season TAC in 2010 was above the 2-tier threshold, the following constraint applies:

$$\left(1 - c_{mxdn}^A\right) c_{tier}^A \leq TAC_y^{1,A} \leq c_{mxtac}^A \quad (A.4)$$

This results in $TAC_y^{1,A} = 247\,500$ t. The anchovy biomass estimated by the November survey is above the Exceptional Circumstances threshold and thus no Exceptional Circumstances provisions were invoked. In the above equations we have:

- $B_{y,Nov}^A$ - the estimate of anchovy abundance (in thousands of tonnes) from the hydroacoustic spawner biomass survey in November of year y .
- \bar{B}_{Nov}^A - the historic average index of anchovy abundance from the spawner biomass surveys from November 1984 to November 1999, of 1 380.28 thousand tonnes.
- $\alpha_{ns} = 0.78$ - 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 spawner biomass survey component in setting the anchovy TAC.
- $q = 300$ - reflects the average annual TAC expected under OMP99 under average conditions if $\alpha_{ns} = 1$.
- $c_{mxdn}^A = 0.25$ - the maximum proportional amount by which the normal season directed anchovy TAC can be reduced from one year to the next (note that the additional season anchovy TAC is not taken into consideration in this constraint).
- $c_{mxtac}^A = 600$ - 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 sardine TAB is calculated using:

$$TAB_y^{1,S} = \gamma_y TAC_y^{1,A} + TAB_{rh}^S \quad (A.5)$$

where:
$$\gamma_y = 0.1 + \frac{0.1}{1 + \exp\left(-\frac{1}{0.1} 0.00025 (B_{y-1,Nov}^S - 2000)\right)} = 0.102$$

In the above equations we have:

- $TAB_{rh}^S = 3500$ t- the fixed tonnage of adult sardine bycatch set aside for the round herring fishery each year.
- γ_y - a conservative allowance for the ratio of juvenile sardine to juvenile anchovy in subsequent catches.