Directed Sardine and Initial Anchovy TACs and TABs for 2013, Using Interim OMP-13

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Following the recent 2012 spawner biomass survey, the initial 2013 TACs and TABs for South African sardine and anchovy are to be recommended. The following data have been used:

1) November 2012 survey sardine 1+ biomass: 345 054 tonnes.

2) November 2012 survey anchovy spawner biomass: 3 187 964 tonnes.

3) Directed sardine TAC for 2012: 100 595 tonnes.

4) Directed anchovy normal season TAC for 2012: 352 718 tonnes[1].

Using the above data, the initial 2013 TAC and TAB recommendations are calculated by Interim OMP-13 to be:

Directed >14cm sardine TAC:	90 000 tonnes
≤14cm sardine TAB with directed >14cm sardine fishing:	6 300 tonnes
Initial normal season anchovy TAC:	247 500 tonnes
Initial normal season ≤14cm sardine TAB with directed anchovy fishing:	25 139 tonnes
>14cm sardine TAB with directed round herring and anchovy fishing:	7 000 tonnes
≤14cm sardine TAB with directed round herring fishing:	1 000 tonnes
Anchovy TAB for sardine only rights holders:	500 tonnes

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

Comments on the TACs

The directed >14cm sardine TAC was constrained at the minimum TAC in the absence of Exceptional Circumstances, with this minimum being about three times that which would have arisen without this constraint. Note that because Exceptional Circumstances do not apply, the directed >14cm sardine TAC and associated ≤14cm TAB recommendation is final and for the whole season, rather than an initial figure to be revised in mid-year.

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[1] The total anchovy TAC for 2012 was 472 718t, comprising of 352 718t for the normal season and 120 000t for the additional season.

The anchovy initial normal season TAC is constrained by the maximum decrease (of 25%) from the two-tier threshold, given the 2012 normal season TAC was above this threshold. Exceptional Circumstances do not apply.

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References

de Moor, C.L. and D.S. Butterworth. 2012. Interim OMP-13. Unpublished report, Department of Agriculture Forestry and Fisheries, South Africa. Report No. FISHERIES/2012/DEC/SWG-PEL/64. 17pp.

Appendix: Summary of Initial TAC and TAB Equations of Interim OMP-13 (from de Moor and Butterworth 2012).

The directed >14cm sardine TAC is initially calculated in proportion to the 2012 November 1+ biomass estimate:

$$TAC_{2013}^{S} = \beta \, B_{2012,Nov}^{obs,S} \tag{A.1}$$

This results in $TAC_{2013}^{S} = 31\ 055\,\text{t}$. As the biomass estimate is above 800 000t, and because the TAC in 2012 is below the 2-tier threshold, the following constraint applies:

$$\max\left\{\left(1 - c_{mxdn}^{S}\right)TAC_{2012}^{S} \; ; c_{mntac}^{S}\right\} \leq TAC_{2013}^{S} \leq c_{mxtac}^{S} \tag{A.2}$$

The above constraints result in $TAC_{2013}^{S} = 90\ 000\,\text{t}$. In the above equations we have:

$\beta = 0.090$ - 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.

$B_{y,Nov}^{obs,S}$ - 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 sardine 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 ≤14cm sardine bycatch with directed sardine fishing is calculated as follows:

$$TAB_{2013,small}^{S} = \omega TAC_{2013}^{S} \tag{A.3}$$

where

$\varpi = 0.07$ - an estimate of the maximum percentage of ≤14cm sardine bycatch in the >14cm sardine catch

The directed anchovy initial TAC is based on how the 2012 November spawner biomass survey estimate of abundance relates to the historic (pre-2000) average.

$$TAC_{2013}^{1,A} = \alpha_{ns} \ \delta \ q \left(p + (1-p)\frac{B_{2012,Nov}^{A}}{\overline{B}_{Nov}^{A}} \right) \tag{A.4}$$

This results in $TAC_{2012}^{1,A} = 114\,015\,\text{t}$. The anchovy TAC is subject to similar constraints as apply for sardine. As the normal season TAC in 2012 was above the 2-tier threshold, the following constraint applies:

$$\max\left\{ \left(1 - c_{mxdn}^{A}\right) c_{tier}^{A} ; c_{mntac}^{A} \right\} \leq TAC_{2012}^{1,A} \leq c_{mxtac}^{A} \tag{A.5}$$

This results in $TAC_{2012}^{1,A} = 247\,500\,\text{t}$. 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 .

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

$\alpha_{ns} = 0.321$ - 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).

$c_{mxtac}^{A} = 450$ - 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 ≤14cm sardine TAB with anchovy directed fishing is calculated using:

$$TAB_{2012,anch}^{1,S} = \gamma_{2012} \ TAC_{2012}^{1,A} \tag{A.3}$$

where: $\gamma_{2012} = 0.1 + \dfrac{0.1}{1 + \exp\left(-\ln(19)\dfrac{\left(B_{2011,Nov}^{S} - B_{50}\right)}{\left(B_{95} - B_{50}\right)} \right)} = 0.102$

In the above equations we have:

γ_y - a conservative allowance for the ratio of juvenile sardine to juvenile anchovy in subsequent catches in year y.

$B_{50} = 2000$ - biomass where the logistic curve for γ_y reaches 50%.

$B_{95} = 3177.8$ - biomass where the logistic curve for γ_y reaches 95%.