Initial Sardine and Anchovy TACs and Sardine TAB for 2008, Using OMP-08

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Following the recent 2007 spawner biomass survey, the initial 2008 TACs for South African sardine and anchovy and initial sardine TAB are to be recommended. The following data have been used:

1) November 2007 survey sardine 1+ biomass: 260 685 tonnes.
2) November 2007 survey anchovy spawner biomass: 2 507 501 tonnes.
3) Directed sardine TAC for 2006: 162 436 tonnes.
4) Directed anchovy normal season TAC for 2006: 386 942 tonnes[1].

Using the above data, the initial 2008 TACs and TAB recommendations are calculated by OMP-08 to be:

Directed sardine TAC: 90 776 tonnes

Initial normal season anchovy TAC: 247 500 tonnes

Initial normal season sardine TAB: 28 565.9 tonnes

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

Comments on the TACs

As the observed sardine biomass only 10 thousand tonnes above the Exceptional Circumstances threshold, the OMP rule resulted in a TAC near the sardine minimum TAC (in the absence of Exceptional Circumstances) of 90 000t. As the anchovy normal season TAC in 2006 was above the 2-tier threshold, the constraints applied resulted in a maximum drop to 75% of the anchovy 2-tier threshold.

Comments on OMP-08

The OMP applied is very similar to "Straw3" OMP-08 from Cunningham and Butterworth (2007). There has been a small change to the control parameters given an incorrect value in the input files used for the testing of "Straw3" OMP-08. This correction effectively moves about 3 000t of directed adult sardine catch to adult sardine bycatch, resulting in a smaller average directed sardine catch projected over the next 20 years (from 214 to 207 thousand tonnes) and a lower β (from 0.11767 to 0.1112572). Using the

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[1] The total anchovy TAC for 2007 was 536 942t, comprising of 386 942t for the normal season and 150 000t for the additional season.

trade-off point from "Straw3" OMP-08 (resulting from Re-revised OMP-04) results in a change in α_{ns} from 0.1375 to 0.12.

In addition, initial further checking of the risk criteria for anchovy reflect that an increase in the risk threshold for anchovy above 0.25 may be appropriate. However, further testing of this is still required and will be reported at the first Pelagic Working Group meeting of 2008.

Note that the directed sardine TAC and the initial anchovy TAC and sardine TAB for 2008 are the same for "Straw3" OMP-08 and the version of OMP-08 implemented given the above correction.

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References

Cunningham, C.L. and D.S. Butterworth. 2007. Development and Testing of OMP-08. MCM document, MCM/2007/26NOV/SWG-PEL/01. 40pp.

Appendix: Summary of Initial TAC and TAB Equations of OMP-08 (from Cunningham and Butterworth 2007).

The directed sardine TAC was initially calculated in proportion to the 2007 November 1+ biomass index of abundance:

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

This results in $TAC_y^S = 29.003$ thousand tonnes. As the observed biomass was above the exceptional circumstances threshold of 250 000t, but below 800 000t, and because the TAC in 2006 was below the 2-tier threshold, the TAC decreases linearly from the constraint of a maximum 20% decrease from the 2006 directed sardine TAC down to a minimum (being the maximum of either $c_{mntac}^S = 90\,000\,t$ or the result of equation (A.1)). Letting $TAC_y^{S*} = \max\{29\,003t; c_{mntac}^S\}$, the constraints are given as follows:

$$\max\left\{\left(1 - c_{mxdn}^S\right)TAC_{y-1}^S \times \frac{B_{y-1,Nov}^S - 250}{B* - 250} + TAC_y^{S*}\frac{B* - B_{y-1,Nov}^S}{B* - 250}; c_{mntac}^S\right\} \leq TAC_y^S \leq c_{mxtac}^S \tag{A.2}$$

The above constraints result in $TAC_y^S = 90\,776$ tonnes. In the above equations we have:

$\beta = 0.111257$ - 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 observed 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.

$c_{mntac}^S = 90\,000\,t$ - the minimum directed TAC that may be set for sardine.

$c_{mxtac}^S = 500\,000\,t$ - the maximum directed TAC that may be set for sardine.

$B* = 800$ - 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 was based on how the 2007 November spawner biomass survey estimate of abundance related to the historic (pre-2000) average.

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

This results in $TAC_y^{1,A} = 38\,097$ tonnes. The anchovy TAC is subject to similar constraints as apply for sardine. As the normal season TAC in 2006 was above the 2-tier threshold, the following constraint applies:

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

This results in $TAC_y^{1,A} = 247\,500$ tonnes. The observed anchovy biomass was above the Exceptional Circumstances threshold and thus no Exceptional Circumstances provisions were invoked. In the above equations we have:

$B_{y,Nov}^A$ — the observed estimate of anchovy abundance (in thousands of tons) 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.

$\alpha_{ns} = 0.12$ — 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).

$c_{mxtac}^A = 600\,000t$ — the maximum directed TAC that may be set for anchovy.

The initial sardine TAB was calculated using:

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

where: $\gamma_y = 0.1 + \dfrac{0.1}{1 + \exp\!\left(-\dfrac{1}{0.1}0.00025\big(B_{y-1,Nov}^S - 2000\big)\right)} = 0.101$

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.

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