Interim OMP-13 v3

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Introduction

The management procedure used to recommend total allowable catches (TACs) and bycatches (TABs) for sardine and anchovy in South African waters is currently being revised. Given the extensive testing desired for this new management procedure, which among other factors includes taking account of the possibility of multiple sardine stocks and of the impact of the recommended catches on penguins, a final version of OMP-13 is not yet available. However, the Small Pelagic Scientific Working Group has agreed a revised version of "Interim OMP-13v2" (de Moor and Butterworth 2013), called "Interim OMP-13v3" for use in December 2013 for calculating recommended initial TAC/Bs for 2014. The revised management procedure is expected to be finalised and agreed during 2014. This document provides details of "Interim OMP-13v3" only in respect of differences from "Interim OMP-13v2".

Important Changes from Interim OMP-13 v2

The single difference between Interim OMP-13 v2 and the new Interim OMP-13 v3 is the provision for a conservative lower initial directed >14cm sardine TAC for the range of November hydroacoustic survey estimates of sardine biomass from 300 000t (below which Exceptional Circumstances would be declared) and 600 000t.

If Exceptional Circumstances are declared, the Harvest Control Rule is such that given the calculated directed >14cm sardine TAC ($TAC^{\#}$), only half of this is recommended as an initial TAC ($TAC_{init} = 0.5TAC^{\#}$). The increase in TAC_{init} recommended after the recruit survey can range from 0-120% of TAC_{init}, dependent on the survey estimate of sardine recruitment, so that the final TAC can range from 50-110% of the $TAC^{\#}$ value calculated originally.

The new provision in Interim OMP-13 v3 moves linearly from this recommendation of 50% of the $TAC^{\#}$ as an initial TAC (TAC_{init}) at a survey estimate of 300 000t (with a potential increase during the year), to the recommendation of 100% $TAC^{\#}$ as an initial TAC (TAC_{init}) at a survey estimate of 600 000t (Figure 1). Thus for a November survey biomass estimate of 600 000t and above, $TAC^{\#}$ as recommended by Interim OMP-13 v3 at the start of the year is final and for the full calendar year, with no mid-season increase.

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The Small Pelagic Scientific Working Group has not yet agreed a rule upon which to base the potential increase in the directed >14cm sardine TAC in 2014, under the circumstances that the survey estimate of biomass is within the range of 300 – 600 000t. It is hoped that a final OMP will be agreed prior to such a rule being necessary.

The remainder of the OMP is unchanged from Interim OMP-13 v2 (see Tables 1 and 2), which is fully described in de Moor and Butterworth (2013). Interim OMP-13v3 cannot be simulation tested without the definition of the "top-up" rule; however, it is currently more conservative than Interim OMP-13 v2 (Figure 2). Key summary statistics for the less conservative Interim OMP-13 v2 and simulated distributions of sardine and anchovy at the end of the projection period are given in de Moor and Butterworth (2013), where they are also compared to a no-catch scenario.

References

de Moor, C.L., and Butterworth, D.S. 2013. Interim OMP-13 v2. DAFF Branch Fisheries document: FISHERIES/2013/JUL/SWG-PEL/15. 18pp.

de Moor, C.L., Coetzee, J., Durholtz, D., Merkle, D., van der Westhuizen, J.J. and Butterworth, D.S. 2012. A record of the generation of data used in the 2012 sardine and anchovy assessments. DAFF Branch Fisheries document: FISHERIES/2012/AUG/SWG-PEL/41. 29pp.

Table 1. Definitions of control parameters and constraints used in OMP-02, OMP-04, OMP-08, Interim OMP-13 and Interim OMP-13v2 together with their values. **The control parameters and constraints for Interim OMP-13v3 are unchanged from those of Interim OMP-13 v2.** All mass-related quantities are given in thousands of tons. Values for Interim OMP-13v2 which differ from OMP-08 are given in bold face.

Key Control Parameters		OMP-02	OMP-04	OMP-08	Interim OMP-13	Interim OMP13v2
β	Directed sardine catch control parameter	0.1865	0.14657	0.097	**0.090**	**0.090**
α_{ns}	Directed anchovy catch control parameter for normal season	0.16655	0.73752	0.78	**0.321**	**0.871**
α_{ads}	Directed anchovy catch control parameter for additional season	0.99956	1.47504	1.17	**0.4815**	**N/A**
Fixed TABs		**OMP-02**	**OMP-04**	**OMP-08**	**Interim OMP-13**	**Interim OMP13v2**
TAB_{big}^{S}	Fixed >14cm sardine bycatch	10^1	10^1	3.5^1	**7**	**7**
TAB^{A}	Fixed anchovy bycatch for sardine only right holders	N/A	N/A	N/A	**0.5**	**0.5**
$TAB_{y,small,rh}^{S}$	Fixed ≤14cm sardine bycatch with round herring	N/A	N/A	N/A	**1.0**	**1.0**
Fixed Control Parameters		**OMP-02**	**OMP-04**	**OMP-08**	**Interim OMP-13**	**Interim OMP13v2**
δ	Scale-down factor applied to initial anchovy TAC	0.85^2	0.85	0.85	0.85	0.85
p	Weighting given to recruitment survey in anchovy TAC	0.7^3	0.7	0.7	0.7	0.7
q	Relates to average TAC under OMP-99 if $\alpha_{ns}=1$	300^4	300	300	300	300
$\overline{B}_{Nov}^{A}$	Historic average 1984 to 1999 index of anchovy abundance from the November spawner biomass surveys		2 149	1 380	1 380	1380
$\overline{N}_{rec0}^{A}$	Average 1985 to 1999 observed anchovy recruitment in May, back-calculated to November of the previous year	N/A	N/A	198 billion	**180 billion**	**217 billion**
ϖ	Estimate of the percentage of ≤14cm sardine bycatch in the >14cm sardine catch	N/A	N/A	N/A	**0.07**	**0.07**
γ_y	Range within which initial estimate of juvenile sardine : anchovy ratio is set, dependent upon observed sardine biomass	0.1	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2
γ_{max}	Maximum of the logistic curve for γ_y	N/A	0.1	0.1	0.1	0.1
B_{50}	Biomass of sardine where the logistic curve for γ_y reaches 50%	N/A	2 000	2 000	2 000	2000

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[1] TAB (assumed adult) with round herring only, initially set at 10 000t calculated as 12.5% of the predicted average round herring catch of 80 000t; subsequently decreased to 3 500t when considering historic bycatch had not been greater than 3 500t.

[2] A value of $\delta = 0.85$, used since OMP-02, reflects the industry's desire for greater 'up-front' TAC allocation for planning purposes, even if this means some sacrifice in expected average TAC to meet the same risk criterion.

[3] A value of $p = 0.7$ reflects the greater importance of the incoming recruits in the year's catch relative to the previous year's biomass survey.

[4] Leaving $q = 300$ unchanged facilitated easy comparison between the outputs from OMP-02 and subsequent revised OMP candidates

Table 1 (continued)**.**

	Constraints	OMP-02	OMP-04	OMP-08	Interim OMP-13	Interim OMP13v2
B_{95}	Biomass of sardine where the logistic curve for γ_y reaches 95%	N/A	3 178	3 178	3 178	3178
c_{mntac}^{S}	Minimum directed sardine TAC	90	90	90	90	90
c_{mntac}^{A}	Minimum normal season anchovy TAC	150	150	120	120	120
c_{mxtac}^{S}	Maximum directed sardine TAC	250	500	500	500	500
c_{mxtac}^{A}	Maximum total anchovy TAC	600	600	600	**450**	**450**
c_{tier}^{S}	Two-tier threshold for directed sardine TAC	N/A	240	255	255	255
c_{tier}^{A}	Two-tier threshold for normal season anchovy TAC	N/A	330	330	330	330
c_{mxdn}^{S}	Maximum proportion by which directed sardine TAC can be reduced annually	0.20	0.15	0.20	0.20	0.20
c_{mxdn}^{A}	Maximum proportion by which normal season anchovy TAC can be reduced annually	0.30	0.25	0.25	0.25	0.25
$c_{mxinc}^{ns,A}$	Maximum increase in normal season anchovy TAC	150	200	150	150	**N/A**
$c_{mxinc}^{ads,A}$	Maximum additional season anchovy TAC	100	150	120	120	**N/A**
TAB_{ads}^{S}	Maximum sardine bycatch during the additional season	2	2	2	**1.5[5]**	**N/A**
B_{ec}^{S}	Threshold at which Exceptional Circumstances are invoked for sardine	150	250	300	300	300
B_{ec}^{A}	Threshold at which Exceptional Circumstances are invoked for anchovy	400	400	400	400	**600**
Δ^{S}	threshold above B_{ec}^{S} at which linear smoothing is introduced before sardine exceptional circumstances are declared (to ensure continuity)	N/A	500	500	**400**	**400**
Δ^{A}	threshold above B_{ec}^{A} at which linear smoothing is introduced before anchovy exceptional circumstances are declared (to ensure continuity)	N/A	N/A	100	100	100
B_{1}	threshold above which the anchovy additional sub-season TAC can increase more rapidly	N/A	N/A	1 000	1 000	**N/A**
B_{2}	threshold above which the anchovy additional sub-season TAC reaches a maximum	N/A	N/A	1 500	1 500	**N/A**
x^{S}	the proportion of B_{ec}^{S} below which sardine TAC is zero.	0	0	0.25	0.25	0.25
x^{A}	the proportion of B_{ec}^{A} below which anchovy TAC is zero.	0	0.25	0.25	0.25	0.25
R_{crit}	sardine recruitment threshold above which the maximum possible mid-year increase in sardine TAC under exceptional circumstances is achieved	N/A	N/A	17.38	**16.48**	**16.48**

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[5] Interim OMP-13 assumed the additional season runs from October to December, rather than September to December as assumed for earlier OMPs.

Table 2. The data required as input to the Interim OMP-13v3 formulae to provide the directed sardine TAC and initial anchovy TAC and sardine TAB recommendations for year y in December of year $y-1$, and to set the revised and final anchovy TAC and sardine TAB recommendations in June of year y.

	Input	Definition
December y-1	$B_{y-1,N}^{S}$	November survey estimate of sardine 1+ biomass in year $y-1$ (in thousands of tons)
	$B_{y-1,N}^{A}$	November survey estimate of anchovy 1+ biomass in year $y-1$ (in thousands of tons)
June y	$N_{y,r}^{A}$	May survey estimate of anchovy recruitment in year y (in billions)
	$N_{y,r}^{S}$ [6]	May survey estimate of sardine recruitment in year y (in billions)
	t_{y}^{A}	Day of commencement of recruitment survey (time in months after 1 May)
	$C_{y,1}^{A}$	Anchovy catch at age 1[7] from 1 November of year $y-1$ to the day before the commencement of the recruitment survey (in billions)
	$C_{y,0bs}^{A}$	Anchovy catch at age 0[9] from 1 November of year $y-1$ to the day before the commencement of the recruitment survey (in billions)
	$r_{y,sur}$	Ratio of juvenile sardine to anchovy (by mass) indicated by the recruitment survey
	$r_{y,com}$	Ratio of juvenile sardine to anchovy (by mass) in the commercial catches during May, using only the commercial catches comprising at least 50% anchovy
	$\overline{w}_{1}^{A}=10.689$	Average historic anchovy weight-at-age 1 in November
	$\overline{w}_{2}^{A}=13.671$	Average historic anchovy weight-at-age 2 in November
	$\overline{w}_{0c}^{A}=4.847$	Average historic catch weight-at-age 0
	$\overline{w}_{1c}^{A}=10.983$	Average historic catch weight-at-age 1

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[6] Only needed if sardine Exceptional Circumstances are declared in December $y-1$.

[7] Monthly cut-off lengths are used to split the anchovy catch into juveniles and adults. The monthly cut-off lengths for November to March are given in de Moor *et al.* (2012), while the monthly cut-off lengths for April, May and June (if necessary) are dependent on the recruit cut-off length used for the recruit survey in year y.
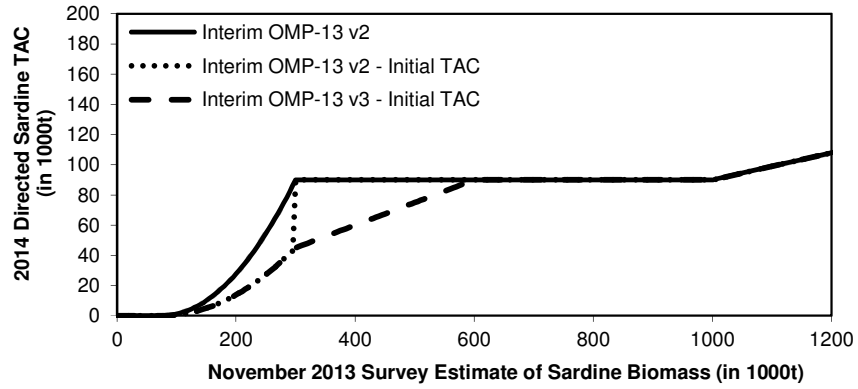
Figure 1. The Harvest Control Rule for directed ≥14cm sardine TAC in 2014 under Interim OMP-13 v2 and Interim OMP-13 v3. The initial sardine TAC awarded at the beginning of the year under Interim OMP-13 v2 and Interim OMP-13 v3 are also plotted.
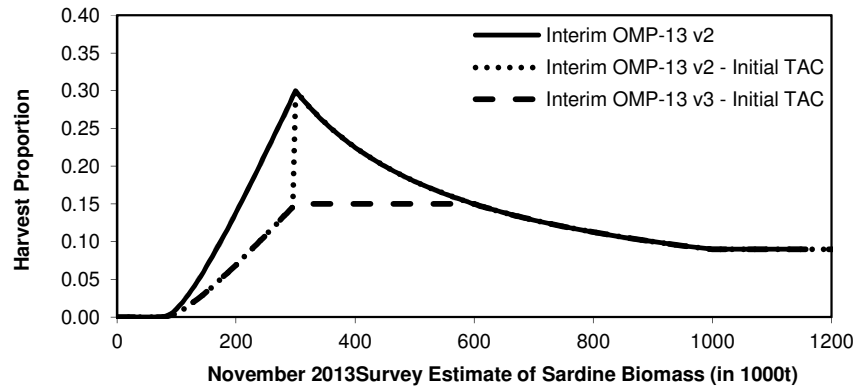

Figure 2. The harvest rate (TAC/survey estimate of sardine 1+ biomass) for the alternative Harvest Control Rules shown in Figure 1.