OMP-13: Application of the Maximum Anchovy TAC Constraint

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Interim OMP-13 was developed with a request for a decreased maximum total anchovy TAC, c^{A}_{mxtac}, from 600 000t in OMP-08 to 450 000t. The rules used in Interim OMP-13 (de Moor and Butterworth 2012) and subsequent calculations for alternative Candidate OMP-13s (de Moor and Butterworth 2013a,b) have only applied the maximum anchovy constraint to the normal season anchovy TAC (e.g. see Figure 1 of de Moor and Butterworth 2013b). The appendix details the equations used to calculate the additional season anchovy TAC.

Some input is sought on exactly how the anchovy maximum constraint be applied:

1) If the constraint remains unchanged then the maximum normal season anchovy TAC will be 450 000t, with a maximum additional season anchovy TAC of 120 000t, implying the total possible anchovy TAC in years of good anchovy abundance and recruitment is 570 000t.
2) If the constraint is applied to the total annual anchovy TAC, then in years of good anchovy abundance and recruitment, it is possible that the full 450 000t be awarded during the normal season and thus an additional season anchovy TAC of 0 will result.
3) An alternative would be to constrain the normal season anchovy TAC to a maximum below 450 000t, while maintaining a maximum total annual anchovy TAC of 450 000t, thus ensuring that in good abundance and recruitment years, some TAC will be awarded during the additional season.

Although the choice between the above options will impact results, particularly for average anchovy catches, in absolute terms (Table 1), it is unlikely to have much effect on relative differences between the performance statistics for alternative Candidate OMP-13s.

References

de Moor, C.L. and Butterworth, D.S. 2012. Interim OMP-13. Department of Agriculture, Forestry and Fisheries Document FISHERIES/2012/DEC/SWG-PEL/64. 17pp.

de Moor, C.L. and Butterworth, D.S. 2013a. Re-considering the appropriate risk level for anchovy in OMP-13 development. Department of Agriculture, Forestry and Fisheries Document FISHERIES/2013/APR/SWG-PEL/04. 18pp.

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de Moor, C.L. and Butterworth, D.S. 2013b. OMP-13: Further Investigation of the Anchovy Control Rule. Department of Agriculture, Forestry and Fisheries Document FISHERIES/2013/APR/SWG-PEL/06. 8pp.

Table 1. The risk to the resources, the ratio of lower percentiles of the predicted distribution of anchovy 1+ biomass in the final projection year under the MP to that under a no catch scenario, and average projected annual directed catch (with average anchovy assumed caught during the additional season in parentheses), a Candidate OMP-13 (with $c^{A}_{mxtac} = 450$ and $B^{A}_{ec} = 400$ or $B^{A}_{ec} = 600$). All results are given assuming a Beverton Holt stock recruitment relationship and $\overline{M}^{A}_{j} = \overline{M}^{A}_{ad} = 1.2\,\text{year}^{-1}$ in the underlying operating model. Results are given assuming the maximum anchovy TAC constraint applies 1) to the normal season anchovy TAC only and 2) to the total annual anchovy TAC. All biomasses are given in thousands of tons.

	1)	2)	1)	2)
B^{A}_{ec}	400	400	600	600
β	0.082	0.082	0.082	0.082
α	0.636	0.636	0.636	0.636
$risk^{A}$	0.347	0.343	0.186	0.180
$risk^{S}$	0.207	0.206	0.201	0.199
10%ile	0.11	0.11	0.19	0.20
20%ile	0.14	0.14	0.22	0.22
30%ile	0.17	0.17	0.24	0.24
40%ile	0.20	0.21	0.26	0.27
50%ile	0.24	0.25	0.29	0.31
$\overline{C}^{A}$	281 (69)	260 (44)	287 (71)	265 (44)
$\overline{C}^{S}$	145	145	146	146
$TAC^{S}_{y} < c^{S}_{mntac}$	0.05	0.05	0.05	0.05
$TAC^{A}_{y} < c^{A}_{mntac}$	0.26	0.28	0.31	0.30
$EC^{S}_{con\,\text{sec}}$	1.4yrs	1.3yrs	1.3yrs	1.3yrs
$EC^{A}_{con\,\text{sec}}$	3.3yrs	3.3yrs	3.1yrs	3.1yrs

Appendix: Relevant equations extracted from de Moor and Butterworth (2012)

Final anchovy TAC: $$TAC_y^{3,A} = \alpha_{ads}\ q\left(p\frac{N^A_{y-1,rec0}}{\overline{N}^A_{rec0}} + (1-p)\frac{B^{obs,A}_{y-1,N}}{\overline{B}^A_{Nov}} \right) \quad \text{(OMP.15)}$$

Subject to: $$TAC_y^{2,A} \le TAC_y^{3,A} \le \min\left\{ c^A_{mxtac}; TAC_y^{2,A} + c^{ads,A}_{mxinc} \right\} \quad \text{(OMP.16)}$$

In addition:

$$TAC_y^{3,A} = \begin{cases} TAC_y^{3,A*} & \text{if } B^A_{y,proj} < B_1 \\ TAC_y^{3,A*} + \dfrac{c^{ads,A}_{mxinc} - \left(TAC_y^{3,A*} - TAC_y^{2,A}\right)}{B_2 - B_1}\left(B^A_{y,proj} - B_1\right) & \text{if } B_1 \le B^A_{y,proj} < B_2 \\ TAC_y^{2,A} + c^{ads,A}_{mxinc} & \text{if } B^A_{y,proj} \ge B_2 \end{cases} \quad \text{(OMP.17)}$$

where $TAC_y^{3,A*}$ is the value output from equations (OMP.15) and (OMP.16) and $B^A_{y,proj}$ is calculated using the equivalent of equation (OMP.24) for the final TAC.