The agreed sardine 'top-up' harvest control rule for OMP-14

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The Small Pelagics Scientific Working Group (SPSWG) agreed to use the "Alt 1" Harvest Control Rule (HCR) (de Moor 2014) to calculate the initial directed sardine TAC when the November survey estimate of 1+ biomass is between 300 and 600 000t. In this range of survey biomass, the "buffer rule", which allocates only a portion of the directed sardine TAC at the start of the year, applies:

$$\text{If } B_{ec}^{S} = 300 \leq B_{y-1,N}^{S} < 600, \qquad TAC_{y,init}^{S} = \frac{TAC_{y}^{S}}{2} + \frac{TAC_{y}^{S}}{2} \times \left(\frac{B_{y-1,N}^{obs,S} - B_{ec}^{S}}{B_{ec}^{S}} \right)^{p} \tag{1}$$

with $p = 1$ for the old Candidate Management Procedure ("CMP") and $p = 0.535$ for Alt 1 and OMP-14.

The SPSWG, however, requested that the mid-season increase of directed sardine TAC after the May recruit survey rather be more conservative than that used for "Alt 1" in de Moor (2014). The HCR is thus generalised to

$$TAC_{final,y}^{S} = TAC_{y,init}^{S} + \left(\frac{N_{y,r}^{obs,S}}{Avg_{rec}} \right)^{w} \times \left(TAC_{y}^{S} - TAC_{y,init}^{S} \right) \tag{2}$$

with $w = 1.5$ for OMP-14, while $w = 1$ for the old CMP and for Alt 1. As the maximum final TAC is governed by the shape of the initial TAC, it was agreed that the final HCR for OMP-14 should have the same maximum as Alt 1 in this range of 300 to 600 000t. Thus equation (2) is subject to

$$TAC_{final,y}^{S} \leq \left(1.1 + \frac{0.1}{1 - 2^{q}} \left\{ \left(\frac{B_{y-1,N}^{obs,S}}{B_{ec}^{S}} \right)^{q} - 1 \right\} \right) \times TAC_{y}^{S} \tag{3}$$

with $q = 1$ for CMP and $q = -1.66099$ for Alt 1 and OMP-14.

Figure 1 shows the initial HCR and maximum possible directed sardine TAC for the OMP-14 while Figure 2 shows the final HCR for OMP-14 for selected November survey estimates of 1+ biomass. Table 1 shows the initial and final directed sardine TAC under the OMP-14 HCR compared to the old CMP and Alt 1. For comparative purposes, all results shown in this document assume $\beta = 0.09$. Note, however, that the final control parameters for OMP-14 will be different due to the need to still re-tune this revised HCR to the agreed risk-levels.

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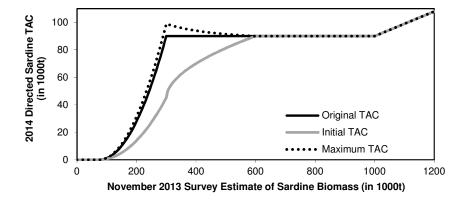
References

de Moor, C.L. 2014. OMP-14: Alternative initial directed sardine TAC rules. Report No. FISHERIES/2014/OCT/SWG-PEL/53. Cape Town: Department of Agriculture, Forestry and Fisheries. 24pp.
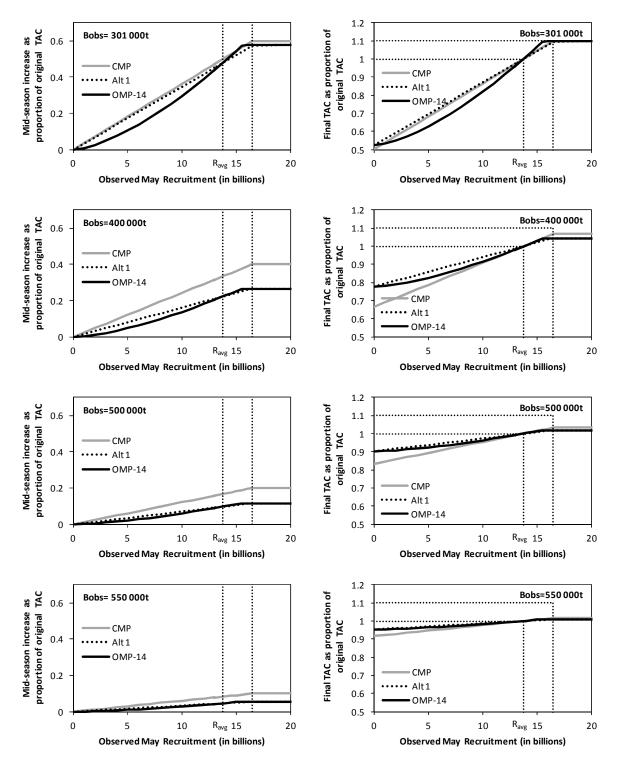
Table 1. The initial and final directed sardine TAC (rounded to the nearest thousands of tons) under OMP-14, the old CMP and Alt 1 for selected November survey estimates of 1+ biomass (in thousands of tons) and selected May recruit survey estimates of recruitment (in billions).

Survey estimate of 1+ biomass	Survey estimate of recruitment	Initial TAC			Final TAC		
		CMP	OMP-14	Alt 1	CMP	OMP-14	Alt 1
301	3	45	47	47	55	52	56
	6				65	60	66
	9				75	70	75
	12				84	82	85
	15				94	96	94
400	3	60	70	70	67	72	74
	6				73	76	79
	9				80	81	83
	12				86	86	87
	15				93	93	92
500	3	75	81	81	78	82	83
	6				82	84	85
	9				85	86	87
	12				88	88	89
	15				91	91	91
550	3	83	86	86	84	86	87
	6				86	87	88
	9				87	88	89
	12				89	89	89
	15				91	90	90

Figure 1. The "original" Harvest Control Rule for directed ≥14cm sardine TAC, TAC#, the initial and maximum final directed ≥14cm sardine TAC for OMP-14. The figure is plotted applying constraints assuming the preceding year is 2013.

Figure 2. The mid-season increase (left panels) and final (right panels) directed ≥14cm sardine TAC as a proportion of the original Harvest Control Rule calculated direct ≥14cm sardine TAC for selected November survey estimates of 1+ biomass between 300 and 600 000t. The original TAC is obtained when the May survey estimate of recruitment equals $R_{avg} = 13.74$ billion recruits for all alternatives.