Output from the South African Hake OMP-2014 for the 2016 TAC recommendation

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Abstract

The TAC output from the South African hake OMP-2014 for 2016 is **147 500 t**, the same level as the 2015 TAC.

1. OMP-2014 formula

The formula for computing the TAC recommendation under OMP-2014 is as follows:

$$TAC_{y+1} = C_{y+1}^{para} + C_{y+1}^{cap} \tag{1}$$

with

$$C_{y+1}^{spp} = b^{spp}\left(J_y^{spp} - J_0^{spp}\right) \tag{2}$$

where

TAC_y is the total TAC recommended for year *y*,

C_y^{spp} is the intended species-disaggregated TAC for species *spp* year *y*,

J_0^{spp} and b^{spp} are tuning parameters (see Table 1), and

J_y^{spp} is a measure of the immediate past level in the abundance indices for species *spp* that is available to use for calculations for year *y.*

J_y^{spp} for the abundance indices is computed as follows:

$$J_y^{para} = \frac{1.0J_y^{WC\_CPUE,para} + 0.75J_y^{SC\_CPUE,para} + 0.5J_y^{WC\_surv,para} + 0.25J_y^{SC\_surv,para}}{2.5} \tag{3}$$

$$J_y^{cap} = \frac{1.0J_y^{WC\_CPUE,cap} + 0.75J_y^{SC\_CPUE,cap} + 0.5J_y^{WC\_surv,cap} + 1.0J_y^{SC\_surv,cap}}{3.25} \tag{4}$$

with

$$J_y^{WC/SC\_CPUE,spp} = \sum_{y'=y-3}^{y-1} I_y^{WC/SC\_CPUE,spp} \Bigg/ \sum_{y=2010}^{2012} I_y^{WC/SC\_CPUE,spp} \tag{5}$$

$$J_y^{WC/SC\_surv,spp} = \sum_{y'=y-2}^{y} I_y^{WC/SC\_surv,spp} \Bigg/ \sum_{y=2011}^{2013} I_y^{WC/SC\_surv,spp} \tag{6}$$

Thus the weighting of the different indices (denoted by *I*) is taken to be the same as for OMP-2010, and the normalization is such that a value of *J*=1 reflects resource abundance about the same as in 2011/2012.

Table 2 reports the GLM-standardised CPUE series (Glazer, 2015) and survey biomass abundance estimates (Fairweather, pers. commn), with the 2015 J_y^i values (equations 5 and 6). The 2013, 2014 and 2015 survey biomass estimates are from the industry vessel *Andromeda* and are taken to have the same *q* as the *Africana* New Gear.

The recent data are compared to the projections under OMP-2014 for the RS in Figure 1. The latest data point for the CPUE and survey indices for *M. paradoxus* are all well within the bounds. For *M. capensis*, the South Coast 2014 CPUE index is below the projected lower 5 percentile; this alone would not seem sufficient to declare Exceptional Circumstances, but indices for *M. capensis* should be kept under close review.

The J_{2015}^{spp} values are then computed as:

$$J_{2015}^{para} = \frac{1.0 \cdot 0.928 + 0.75 \cdot 0.951 + 0.5 \cdot 0.713 + 0.25 \cdot 3.322}{2.5} = 1.131$$

$$J_{2015}^{cap} = \frac{1.0 \cdot 0.855 + 0.75 \cdot 0.684 + 0.5 \cdot 1.550 + 1.0 \cdot 0.641}{3.25} = 0.856$$

and the catch by species is then:

$$C_{2015}^{para} = 83.83(1.131 - 0.132) = 83.761$$

$$C_{2015}^{cap} = 33.33(0.856 - 0.240) = 20.546$$

so that the TAC before applying the constraints on maximum allowable annual change, would be 104.307 thousand tons.

1.1 Maximum allowable annual change

The maximum allowable annual increase in TAC is 10%, and the maximum allowable annual decrease in TAC is 5% unless the *M. paradoxus* average biomass index falls too low, in which case the maximum allowable annual decrease becomes:

$$MaxDecr_y = \begin{cases} 5\% & \text{if } J_y \geq J^{thresh1} \\ \text{linear between x\% and 5\%} & \text{if } J^{thresh2} \leq J_y < J^{thresh1} \\ x\% & \text{if } J_y < J^{thresh2} \end{cases} \tag{7}$$

x, $J^{thresh1}$ and $J^{thresh1}$ are tuning parameters (see Table 1).

Here, the *M. paradoxus* average biomass index (1.131) is above $J^{thresh1}$ (0.75), so that the maximum allowable decrease of 5% would apply: the TAC after applying the constraint is 140 125t (reduced by 5% from a 2015 TAC of 147.500 thousand tons).

1.2 Upper cap and fixed TAC

Two further rules are included in OMP-2014:

    i.   An upper cap on the TAC is imposed, so that the TAC cannot exceed 150 000t.

    ii.   The TAC for 2015 and 2016 is fixed at 147 500t.

Hence the final TAC for 2015 is 147 500t.

REFERENCES

Fairweather T, Rademeyer RA and Butterworth DS. 2013. Abundance estimates for hake - *Nansen* vs. *Africana*. FISHERIES/2013/SEPT/SWG-DEM/54-corrected March 2014.

Glazer JP. 2015. Offshore hake species- and coast-specific standardized CPUE indices. Unpublished report: FISHERIES/2015/SEPT/SWG-DEM/50.
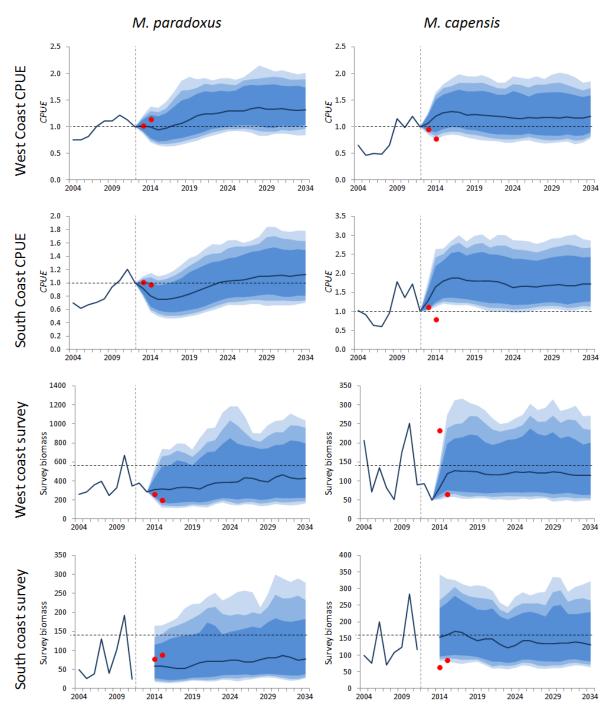
Table 1: Tuning parameter values for OMP-2014.

	M. paradoxus	M. capensis
J_0	0.132	0.240
b	83.83	33.33
$J^{thresh1}$	0.75	
$J^{thresh2}$	0.65	
x	25	

Table 2: GLM standardised CPUE series and West coast summer and south coast autumn survey abundance estimates. Note that the abundance estimates in bold incorporate the calibration factors agreed for OMP application as they are for surveys in which the old gear was used on the *Africana* (q^{old}/q^{new}=0.883 for *M. paradoxus* and 0.652 for *M. capensis*).

	M. paradoxus				M. capensis			
	WC CPUE	SC CPUE	WC summer survey	SC autumn survey	WC CPUE	SC CPUE	WC summer survey	SC autumn survey
2005	4.721	2.483	288.529	26.605	1.237	2.784	72.006	76.932
2006	5.112	2.699	**357.293**	**39.431**	1.335	1.939	**135.653**	**200.839**
2007	6.358	2.815	397.049	129.646	1.300	1.869	82.040	70.940
2008	6.970	3.021	246.542	39.505	1.725	2.937	50.877	108.195
2009	6.917	3.769	330.235	102.834	3.045	5.462	175.289	124.004
2010	7.613	4.141	**668.028**	**192.141**	2.590	4.184	**250.908**	**283.761**
2011	7.217	4.879	347.082	25.014	3.151	5.108	89.392	117.222
2012	6.168	4.198	377.515		2.595	2.818	92.588	
2013	6.271	4.264	210.175*		2.490	3.181	30.241*	
2014	7.041	4.106	260.245*	77.608*	2.040	2.281	232.823*	64.865*
2015			196.441*	88.563*			65.939*	85.354*
J^i_{2015}	0.928	0.951	0.713	3.322	0.855	0.684	1.550	0.641

* The 2013, 2014 and 2015 survey results are from the industry vessel *Andromeda* and are taken to have the same *q* as the *Africana* New Gear.

Figure 1: Projections (95%, 90% and 80% PI and medians) for the Reference Set under OMP-2014 compared with the most recent resource abundance index data. The red dots show the newest data points.