Output from the South African Hake OMP-2014 for the 2015 TAC recommendation

R.A. Rademeyer

October 2014

Abstract

The TAC output from the South African hake OMP-2014 for 2015 is **147 500 t**, a 5.0% decrease on the 2014 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:

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

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

with

$$J_y^{WC/SC\_CPUE,spp} = \sum_{y'=y-4}^{y-2} I_y^{WC/SC\_CPUE,spp} \Big/ \sum_{y=2010}^{2012} I_y^{WC/SC\_CPUE,spp} \tag{5}$$

$$J_y^{WC/SC\_surv,spp} = \sum_{y'=y-3}^{y-1} I_y^{WC/SC\_surv,spp} \Big/ \sum_{y=2011}^{2013} I_y^{WC/SC\_surv,spp} \tag{6}$$

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, 2014) and survey biomass abundance estimates (Fairweather, pers. commn), with the 2014 J_y^i values (equations 5 and 6). The 2013 West Coast survey biomass estimates are abundance estimates from the *Nansen* calibrated to an *Africana* New Gear equivalent (see Fairweather *et al*., 2013). The 2014 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 J_{2014}^{spp} values are then computed as:

$$J_{2014}^{para} = \frac{1.0 \cdot 0.939 + 0.75 \cdot 1.007 + 0.5 \cdot 0.915 + 0.25 \cdot 2.927}{2.5} = 1.153$$

$$J_{2014}^{cap} = \frac{1.0 \cdot 0.987 + 0.75 \cdot 0.922 + 0.5 \cdot 1.592 + 1.0 \cdot 0.589}{3.25} = 0.942$$

and the catch by species is then:

$$C_{2015}^{para} = 83.83(1.153 - 0.132) = 85.600$$

$$C_{2015}^{cap} = 33.33(0.942 - 0.240) = 23.412$$

so that the TAC before applying the constraints on maximum allowable annual change, would be 109.012 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:

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

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

Here, the *M. paradoxus* average biomass index (1.153) is above $J^{thresh1}$ (0.75), so that the maximum allowable decrease of 5% applies: the TAC after applying the constraint is 147 500t (reduced by 5% from a 2014 TAC of 155.280 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

Glazer JP. 2014. Offshore hake species- and coast-specific standardized CPUE indices. Unpublished report: FISHERIES/2014/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
2004	2.197	1.511	259.53	48.9	0.811	1.661	205.94	99.9
2005	2.185	1.337	286.42	26.61	0.577	1.489	70.98	76.93
2006	2.368	1.453	**357.09**	**39.41**	0.621	1.035	**135.61**	**200.77**
2007	2.936	1.521	397.05	129.65	0.604	0.996	82.04	70.94
2008	3.227	1.633	246.54	39.51	0.806	1.566	50.88	108.20
2009	3.216	2.031	330.24	102.83	1.419	2.911	175.29	124.00
2010	3.534	2.243	**667.65**	**192.03**	1.212	2.234	**250.84**	**283.68**
2011	3.320	2.643	347.08	24.11	1.471	2.743	89.39	117.22
2012	2.854	2.249	377.52		1.212	1.529	92.59	
2013	2.937	2.291	287.74*		1.163	1.723	50.03*	
2014			261.21**	70.56**			226.65**	68.99**
J^i_{2014}	0.939	1.007	0.915	2.927	0.987	0.922	1.592	0.589

* The West coast 2013 survey results (*Africana* New Gear) are from application of a calibration factor to the *Nansen* results.

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

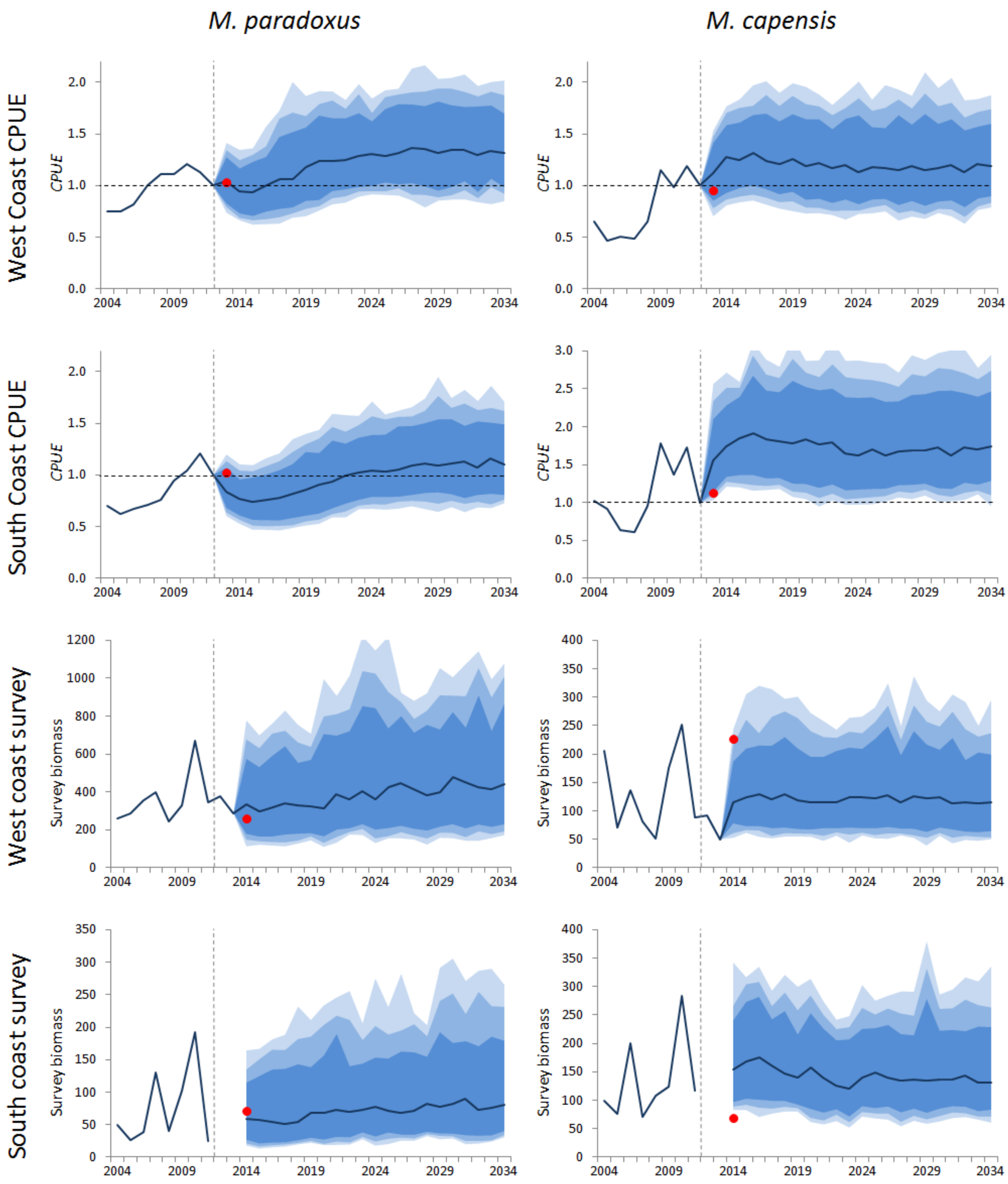

Figure 1: Projections (95%, 90% and 80% PI and medians) for the Reference Set under OMP-2014 compared with the most recent resource abundance index data. The red dots show the new data points.