

## **Recommended TAC 2012 for the South Coast Rock Lobster Resource using re-tuned OMP 2010**

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### **Introduction**

Re-tuned OMP 2010 (Johnston and Butterworth 2010) is used here to calculate the TAC for the South Coast Rock Lobster resource for the 2012 season. (Note the convention that 2010 is used to refer to the 2010/2011 season.)

Note that re-tuned OMP-2010:

1. has a 5% maximum TAC change constraint, and
2. has a median anticipated recovery expressed in terms of  $B^p$  (2025/2006) of 1.20 under operating Model 3 (MARAM Time Varying Selectivity).

### **TAC 2012 recommendation from re-tuned OMP 2010**

Table 1 and Figure 1 report the recently updated CPUE series for the South Coast rock lobster (Glazer 2012). These input CPUE values are used in conjunction with re-tuned OMP 2010 (Johnston and Butterworth 2010) to produce a TAC recommendation for the 2012 season of **326 MT**. Appendix 1 provides the detailed calculation of TAC 2012.

The recommended TAC is 1% more than the current TAC of 323.

### **References**

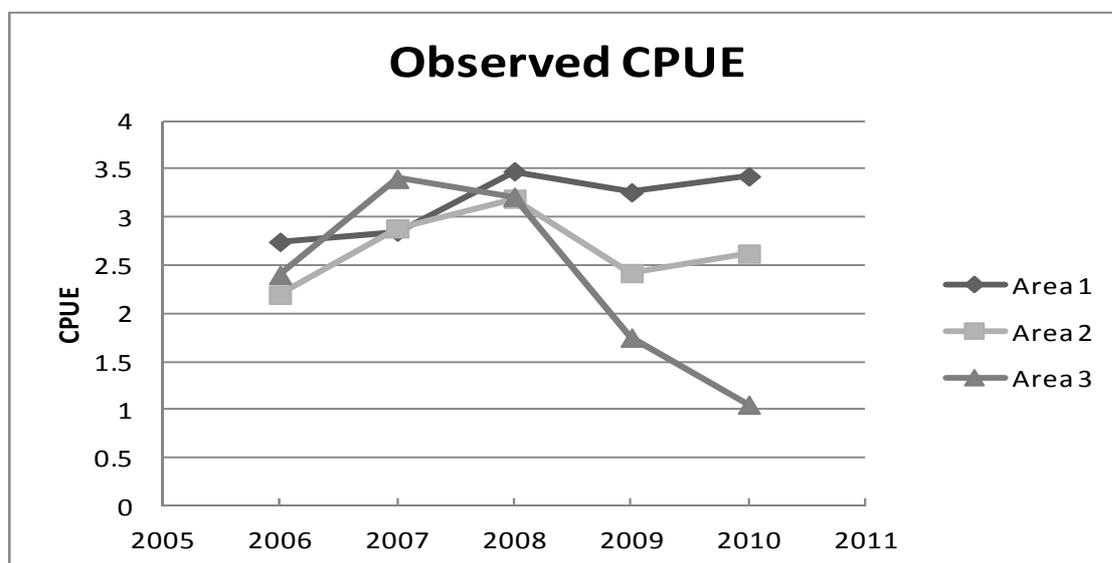
Glazer, J.P. 2012. Standardized CPUE for the South Coast rock lobster for various area combination scenarios. FISHERIES/2012/MAR/SWG-SCRL/09.

Johnston, S.J., and Butterworth, D.S. 2010. Re-tuning of OMP-2008 using updated 2010 Operating Models for the South Coast Rock Lobster Resource to provide OMP-2010. Fisheries/2010/AUG/SWG-SCRL/12.

Table 1: CPUE input data into OMP-2012- (Glazer 2012), and the slope  $s_{2012}^A$  of the associated log-linear regressions.

Season	Area 1	Area 2	Area 3
2006	2.746	2.198	2.403
2007	2.853	2.886	3.401
2008	3.478	3.195	3.214
2009	3.260	2.424	1.753
2010	3.427	2.624	1.056
slope	0.0576	0.0179	-0.2307

Figure 1: CPUE input data into OMP-2012 (Glazer 2012).



## Appendix 1: Detailed calculation of the re-tuned TAC for 2012 using OMP-2010

Johnston and Butterworth (2010) provides the details of OMP-2010. The key OMP equations are reproduced below, and show how the TAC recommendation for 2012 is calculated.

### TAC setting algorithm

The algorithm used to set the total TAC for the South Coast Rock Lobster fishery is:

$$TAC_{y+1} = TAC_y [1 + \alpha(s_y - \delta)]h(r_y) \quad (A1)$$

where

the value of  $\alpha$  is set at 3.0;

$s_y^A$  is the slope parameter from a regression of  $\ln CPUE_y^A$  against year  $y$  over the last five years of available data (2006-2010) for each area  $A$ , and

$$s_y = \sum_{A=1}^3 w^A s_y^A \quad (A2)$$

where  $w^A = \frac{1}{\sigma_s^{A^2}} \frac{1}{\sum_{A=1}^3 \left(\frac{1}{\sigma_s^{A^2}}\right)}$  (A3)

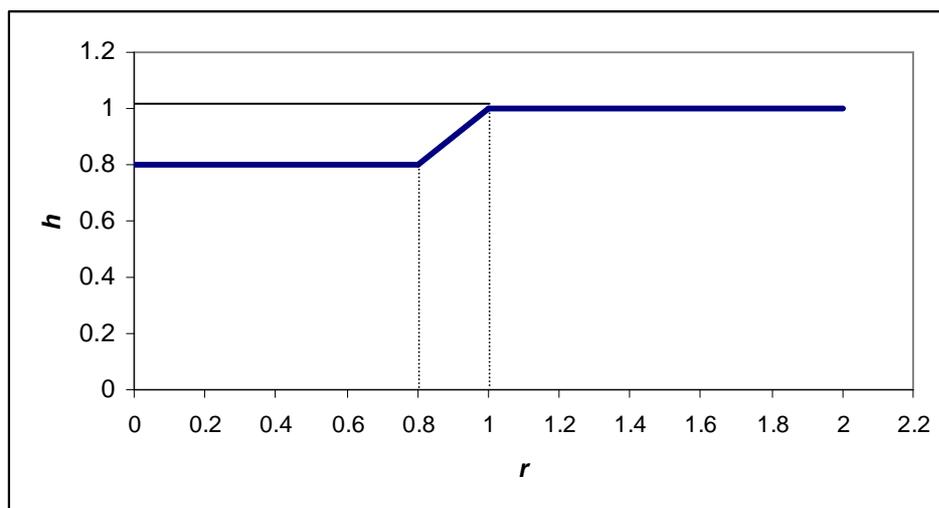
and  $\sigma_s^A$  is the standard error of the regression estimate of  $s_y^A$  which is bounded below at 0.15.

$\delta$  is a control parameter value and is tuned to be equal to -0.029 for re-tuned OMP-2010.

Also:

$$\begin{aligned} h(r) &= 0.8 && \text{for } r \leq 0.8 \\ &= r && \text{for } 0.8 \leq r \leq 1.0 \\ &= 1.0 && \text{for } r \geq 1.0 \end{aligned} \quad (A4)$$

i.e.:



where  $r$  is the ratio of recent CPUE to that at the time the OMP commences:

$$\overline{CPUE}_{init} = \frac{1}{3} \sum_{y'=2003}^{2005} \sum_{A=1}^3 \lambda_A CPUE_{y'}^A \quad (A5)$$

$$\overline{CPUE}_y = \frac{1}{3} \sum_{y'=y-3}^{y-1} \sum_{A=1}^3 \lambda_A CPUE_{y'}^A \quad (A6)$$

$$r_y = \frac{\overline{CPUE}_y}{\overline{CPUE}_{init}} \quad (A7)$$

where

$$\lambda_1 = 0.08$$

$$\lambda_2 = 0.87$$

$$\lambda_3 = 0.05$$

### Implementation

From regressions applied to the data in Tables 1, the  $\sigma$  values of Eqn (A3) which are bounded below by 0.15 are:

$$\sigma_s^1 = 0.150$$

$$\sigma_s^2 = 0.165$$

$$\sigma_s^3 = 0.364$$

The average slope is then:

$$s_{2011} = \sum_{A=1}^3 w^A s_y^A = 0.5019 * (0.0576) + 0.4131 * (0.0179) + 0.0850 * (-0.2307) = 0.0167$$

Further:

$$r_{2011} = \frac{\overline{CPUE}_{2011}}{\overline{CPUE}_{init}} = \frac{2.762}{3.109} = 0.888 \quad \dots\dots\dots \text{using Eqn (A7)}$$

and hence  $h(r) = 0.888 \quad \dots\dots\dots \text{using Eqn (A4)}$

Thus before any inter-annual constraints:

$$\begin{aligned} TAC_{2012} &= TAC_{2011} [1 + 3(0.0167 - (-0.029))](0.888) \\ &= 323[1 + 3(0.0167 - (-0.029))](0.888) \quad \text{using Eqn (A1)} \\ &= 326.35 \text{ MT} \end{aligned}$$

*Inter-annual TAC constraint*

A rule to restrict the inter-annual TAC variation to no more than 5% up or down from year to year is applied, i.e.:

$$\begin{aligned} \text{if } TAC_{y+1} > 1.05TAC_y & \quad TAC_{y+1} = 1.05TAC_y \\ \text{if } TAC_{y+1} < 0.95TAC_y & \quad TAC_{y+1} = 0.95TAC_y \end{aligned} \quad (A8)$$

Thus as  $TAC_{2012} / TAC_{2011} = 326.35 / 323 = 1.010$  , this is BELOW the upper 5% bound, so that this does not call for the inter-annual TAC variation constraint to be implemented.

The final  $TAC_{2012}$  thus = 326 MT