South Coast Rock Lobster TAC for the 2015/16 season[1]

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Summary

Application of the OMP results in a TAC recommendation of 341 MT for the 2015/16 season (which reflects the maximum 5% decrease permitted under the OMP). Exceptional Circumstances are considered not to apply.

Introduction

OMP-2014 was developed in 2014 to be used to set the TAC for South Coast Rock Lobster for the 2014-2017 seasons. This OMP was a "target-based" OMP, and as with the previous OMP (OMP-2008) has a median target spawning biomass $B^{sp}_{2025}/B^{sp}_{2006}$ of 1.20 when simulation tested. i.e. a spawning biomass increase in median terms of 20% over the 2006-2025 period.

The operating model which was used to simulation test OMP-2014 is model RC1 reported in Johnston (2013). Johnston and Butterworth (2015) provide an update to the operating model, in order to check the assessment now is not considerably different from the operating model used to simulation test OMP-2014.

OMP-2014 as presented last year contains only the initial specifications of OMP-2014, and these have recently been extended (Johnston and Butterworth 2015), following further simulation testing, to allow for "Exceptional Circumstances", and in particular to provide a specific metarule governing the process under which the 5% maximum TAC inter-annual reduction constraint would be over-ruled if CPUE drops below a threshold level still to be determined.

OMP-2014 fixed the initial TAC for the first season (2014) at 359 MT.

OMP-2014

The TAC setting algorithm for OMP-2014

The algorithm used to recommend the TAC for the South Coast Rock Lobster fishery for season *y*+1 is:

$$TAC_{y+1} = TAC_y[1 + \alpha \frac{\overline{CPUE}_y - CPUE_{targ}}{CPUE_{targ}}] \quad (1)$$

where $\overline{CPUE}_y$ is a measure of recent CPUE and is calculated as follows:

$$\overline{CPUE}_y = \frac{1}{3}\sum_{y'=y-3}^{y-1}\sum_{A=1}^{3}\lambda_A CPUE^A_{y'} \quad (2)$$

where
$CPUE^A_{y'}$ is the GLM standardised CPUE for area *A* in year y' and

[1] Note that the split season 2015/16 (for example) is sometimes referenced as 2015 later in this document

the CPUE weighting factors, $\lambda_{A1E}, \lambda_{A1W}$ and λ_{A2+3} relate to the proportion of the overall biomass in each the three fishing areas, and were calculated using estimated values of q and B^{exp} for 2011 from the RC1 model to be:

$$\lambda_{A1E} = 0.003$$
$$\lambda_{A1W} = 0.128$$
$$\lambda_{A2+3} = 0.868.$$

$CPUE_{targ}$ = **1.22 –** this value results in the median *Bsp*(2025/2006)=1.30, the selected biomass target for OMP-2014 under the RC1 operating model.

Note that TAC_y is the TAC set (not the catch taken) in season *y*.

The tuning parameter α controls how responsive the OMP is to CPUE deviations from the CPUE target, and for OMP-2014 is set to be 1.0.

Note that the TAC for season *y*+1 is to be based upon the CPUE series that ends in season *y*-1, i.e. the TAC recommendation for the 2014/15 season would be based on a CPUE series that ended with the most recent CPUE value available at the time the TAC recommendation was required (August 2014) which would be here the 2012/13 season.

Inter-annual TAC constraint

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

$$\text{if } TAC_{y+1} > 1.05TAC_y \qquad TAC_{y+1} = 1.05TAC_y \tag{3}$$
$$\text{if } TAC_{y+1} < 0.95TAC_y \qquad TAC_{y+1} = 0.95TAC_y$$

TAC for first season (2014)

The TAC for the first season that OMP-2014 is implemented (2014) is set at a 5% increase over the TAC for the previous 2013 season. Thus TAC(2014) is fixed at 359 MT. The inter-annual rules described in the section above will come into play from the 2015 season onwards.

Maximum CAP on TAC

A maximum cap on TAC in any year in the future is set at 450 MT.

The TAC calculation for the 2015/16 season

Glazer (2015) provides the updated CPUE indices for the South Coast Rock lobster to include the 2013 season (see addendum of FISHERIES/2015/JUN/SWG_SCRL/03).

where $\overline{CPUE}_y$ is a measure of recent CPUE and is calculated as follows:

$$\overline{CPUE}_y = \frac{1}{3}\sum_{y'=y-3}^{y-1}\sum_{A=1}^{3}\lambda_A CPUE_{y'}^{A} \tag{4}$$

where
$CPUE_{y'}^{A}$ is the GLM standardised CPUE for area *A* in year y' and

the CPUE weighting factors, $\lambda_{A1E}, \lambda_{A1W}$ and λ_{A2+3} relate to the proportion of the overall biomass in each the three fishing areas, and were calculated using estimated values of q and B^{exp} for 2011 from the RC1 model to be:

$$\lambda_{A1E} = 0.003$$
$$\lambda_{A1W} = 0.128$$
$$\lambda_{A2+3} = 0.868.$$

Thus

$$\overline{CPUE}_{2014} = 1.084$$

And

$$TAC_{2015} = TAC_{2014}[1 + \alpha \frac{\overline{CPUE}_y - CPUE_{targ}}{CPUE_{targ}}]$$

$$TAC_{2015} = 359[1 + 1.0 \frac{1.084 - 1.22}{1.22}]$$

$$TAC_{2015} = 359[1 - 0.11148]$$

$$TAC_{2015} = 319\ MT$$

(This would be an 11.1% TAC reduction)

The rule to restrict the inter-annual TAC variation to no more than 5% up or down from season to season is applied as in previous OMPs, i.e.:

if $TAC_{y+1} > 1.05TAC_y$ $\quad TAC_{y+1} = 1.05TAC_y$ (5)

if $TAC_{y+1} < 0.95TAC_y$ $\quad TAC_{y+1} = 0.95TAC_y$

Thus TAC_{2015}= 0.95*359
= 341 MT.

Exceptional Circumstances

Exceptional Circumstances/Metarules provisions have yet to be finalized by the SCRL SWG. Nevertheless a standard consideration is whether values of monitoring data have fallen within the ranges predicted when the OMP was tested.

Figure 1 shows this comparison for CPUE data. For the last two year these do fall within the 90% probability envelopes for A1E and A2+3. For A1W however, they fall below this, failing to reflect the extent of increase predicted.

We consider that, particularly since the A1W CPUE nevertheless increased from 2012 to 2013, this result is NOT sufficient to warrant the declaration of Exceptional Circumstances and reconsideration of the TAC recommendation output by the OMP, but that this situation should be kept under careful review for the TAC recommendation to be made in 2016.

1. Methodology for calculating the TAE (total allowable effort)

A procedure for control of effort in the South Coast rock lobster fishery, was agreed by the Rock Lobster Working Group at its meeting on 31 July 2008. This method is reported in OLRAC(2008) and reproduced below.

4.1. Fishing day allocations

4.1.1 Effort will be controlled by the allocation to each company in the fishery of a number of ***fishing days*** for each season.

4.1.2 The number of fishing days used for any single ***trip*** is calculated as the number of ***seadays*** used less 1.5. This definition applies, both in administration of effort control for the current season and in calculation of performance in previous seasons (see section 4.2 below).

4.1.3. A day is included as a ***seaday*** for a trip if any part of that day is spent at sea. Thus the sailing day and landing day are both counted as seadays. However if a vessel spends a full day in port, e.g. for repairs, and does not spend any part of that day at sea, that day will not be counted as a seaday.

4.1.4 A ***trip*** is deemed to end when fish are offloaded and a landing report is completed.

4.1.5 The ***fishing day*** allocation $E_{c,y}$ for rights holder *r* in season *y* will be calculated as:

$$E_{r,y} = Q_{r,y} / BCR_y \qquad (5)$$

where

$Q_{r,y}$ is the quota in kilograms for rights holder *r* in season *y*, and

BCR_y is the ***base catch rate*** (in kg per fishing day) for season *y* (see section 4.2 below).

4.1.6 A fishing day ***pool*** will be available from which companies may draw if needed, at the discretion of South Coast Rock Lobster Industry Association. The number of fishing days allocated to the pool will be:

$$E_{pool,y} = 0.1\sum_{r} E_{r,y} \qquad (6)$$

i.e. the pool is 10% of the total effort allocation to all rights holders.

4.2. Calculation of base catch rate

The base catch rate, BCR_y, for season *y* is determined by:

$$BCR_y = \tfrac{1}{3}(CR_{y-4} + CR_{y-3} + CR_{y-2}) / D \qquad (7)$$

where

CR_{y-n} is the recorded catch in kg per fishing day in season *y-n*,

calculated as $CR_{y-n} = C_{y-n} / E_{y-n}$,

E_{y-n} is the total number of fishing days used by all participants in season *y-n*,

C_{y-n} is the total catch in kg by all participants in season *y-n*, and

D = 1.555369 is a constant (see section 4.3 below).

4.3. Calculation of the divisor D in equation (7)

$$D = e^{-2\sigma} \qquad (8)$$

where

σ^2 is the expected variance in: $[\ln(CR_y) - \ln(\tfrac{1}{3}(CR_{y-4} + CR_{y-3} + CR_{y-2}))]$ which is estimated as:

$$\sigma^2 = \tfrac{1}{17} \sum_{y'=1990}^{2006} [\ln(CPUE_{y'}) - \ln(\overline{CPUE_{y'}})]^2 \qquad (9)$$

where

$CPUE_{y'}$ is the GLM standardised catch per trap in season *y'*, and

$$\overline{CPUE_{y'}} = \tfrac{1}{3}(CPUE_{y'-4} + CPUE_{y'-3} + CPUE_{y'-2}). \qquad (10)$$

4.4. Base catch rate for the 2015 season (see FISHERIES/2015/JUL/SWG-SCRL/05 for details)

Using equation (7) the base catch rate for 2015 is

$$BCR_{2014} = \tfrac{1}{3}(CR_{2011} + CR_{2012} + CR_{2013}) / D$$
$$= \tfrac{1}{3}(170.923 + 187.70 + 253.7131) / 1.555369$$

= 131.231 kg per fishing day

References

Glazer, J.P. 2015. South Coast Rock Lobster standardized CPUE indices per Area. DAFF document, FISHERIES/2015/JUN/SWG_SCRL/03 + ADDENDUM.

Johnston, S.J. and D.S. Butterworth. 2008. OMP 2008 for the South Coast Rock Lobster Resource. MCM document, MCM/2008/AUG/SWG-SCRL/30. 8pp.

Johnston, S.J. 2013. Final 2013 updated South Coast rock lobster assessment results and description of OMP simulation framework. FISHERIES/2013/AUG/SWG-SCRL/06. 24pp.

OLRAC. 2008. A revised proposal for controlling effort in the South Coast rock lobster fishery. MCM document MCM/2008/JUL/SWG/SCRL/27.

Figure 1a: Plots of the CPUE (scaled to industry units) for each area as predicted by the current OMP (medians and 5th and 95th percentiles shown), together with the two most recently available CPUE values shown as red open circles. These recent data have become available subsequent to the development and acceptance of the current OMP.