RECOMMENDATIONS ON ROCK LOBSTER TACs FOR TRISTAN AND NIGHTINGALE ISLANDS FOR THE 2018/19[1] SEASON

D S Butterworth and S J Johnston

Marine Resource Assessment and Management Group (MARAM)

Department of Mathematics and Applied Mathematics

University of Cape Town

Rondebosch 7701, South Africa

Executive Summary

OMPs have recently been accepted as the basis to recommend TACs for Tristan and Nightingale islands. The application of the OMPs together with the most recent standardized CPUE data result in the following TACs:

The OMP for Tristan sets the TAC for 2018 at **120 MT**. (No change from 2017.)

The OMP for Nightingale sets the TAC for 2018 at **83 MT.** (An increase of 4 MT from 2017.)

Tristan

Introduction

An updated OMP for the Tristan da Cunha island fishery was recently developed (see Johnston and Butterworth 2016d, Johnston and Glass 2017). This OMP continues to be a target-based OMP with the target (Itar) being the average of the 2010-2012 GLM standardized CPUE values (1.257 kg/trap/day). A new rule is that a TAC "floor" of 120 tons is set, BUT there is a lower limit (Ilim) in the observed recent standardized CPUE 3-yr average below which this 120t floor rule is over-ruled on the basis of Exceptional Circumstances (ECs) having occurred. This updated OMP is described in detail in Johnston and Butterworth 2016d. Essentially the EC rule comes into play once the recent 3-yr CPUE level drops below 0.9 kg/trap/day (see Johnston and Glass 2017).

[1] The convention used here is that the split season (eg 2016/17) is referred to as the "2016" season.

Tristan TAC for 2018

The updated standardised CPUE are reported in Johnston *et al.* (2017). The calculation of the 2018 TAC for Tristan is as follows:

$$TAC_{2018} = TAC_{2017} + \alpha(I^{rec}_{2018} - I^{tar})$$

$$TAC_{2018} = TAC_{2017} + 25(I^{rec}_{2018} - 1.257)$$

$$TAC_{2018} = 120 + 25(1.109 - 1.257)$$

$$TAC_{2018} = 116\ MT$$

This TAC value is lower than the "floor" of 120, and the I^{rec}_{2018} value is above the threshold Ilim value of 0.90 (thus ECs are not invoked). Accordingly the final TAC recommended for Tristan for the 2018 season is **120 MT.**

Nightingale

Introduction

An OMP for Nightingale was developed in 2017 (Johnston and Butterworth 2018). The OMP is based on the same structure as that for the current Tristan, Inaccessible and Gough OMPs (see Johnston and Butterworth 2013 and 2014). This is a target-based rule based on the recent commercial CPUE, *viz.*

$$TAC_{y+1} = TAC_y + \alpha(I^{rec}_y - I^{tar})$$

where

I^{rec}_y is the average of the GLM standardized CPUE over the last three years (*y*-2, *y*-1,*y*),

I^{tar} is the CPUE target index, and

α is a tuning parameter – the larger the α value, the more "responsive" the OMP is to changes in the catch rate in the future.

A rule to control the inter-annual TAC variation is also applied. The baseline % TAC change relative to the previous year ("max V%") is restricted to a maximum of either up 5% down 5%:

If $TAC_{y+1} < 0.95TAC_y$ then $TAC_{y+1} = 0.95TAC_y$

If $TAC_{y+1} > 1.05TAC_y$ then $TAC_{y+1} = 1.05TAC_y$

Furthermore a ceiling (upper bound) on the TAC is introduced:

If $TAC_{y+1} > TAC_{ceiling}$ then $TAC_{y+1} = TAC_{ceiling}$

As for the other OMPs that have been developed, the addition of a precautionary metarule rule is also incorporated into the OMP, where the 5% TAC decrease constraint is increased to up to 20% if the (catch rate) index drops below a threshold (Ilim) level. Here the baseline Ilim level is set at 3.0 kg/trap.

The final recommended TAC has:

I^{tar}	the CPUE target index of 5.0 kg/trap,
α	is 2.5,
max V%	5% up and 5% down,
Ilim	3.0 kg/trap and
$TAC_{ceiling}$	85 MT.

Nightingale TAC for 2018

The updated standardized CPUE for Nightingale is reported in Johnston and Butterworth (2017). The calculation of the 2018 TAC for Nightingale is as follows:

$$TAC_{2018} = TAC_{2017} + \alpha(I^{rec}_{2018} - I^{tar})$$

$$TAC_{2018} = TAC_{2017} + 2.5(I^{rec}_{2018} - 5.0)$$

$$TAC_{2018} = 79 + 2.5(10.977 - 5.0)$$

$$TAC_{2018} = 93.94\ MT$$

This TAC value is greater than the maximum 5% increase from the previous TAC (79 MT); thus this TAC is adjusted to equal a 5% increase over the 79 MT, which is **83** MT.

The I_{2018}^{rec} value of 10.977 is not below the metarule threshold Ilim value of 3.0 kg/trap, so the metarule is not invoked.

Given that the $TAC_{ceiling}$ value of 85 MT is not exceeded, the final TAC is 83 MT.

References

Johnston, S.J. and D.S. Butterworth. 2014. Initial OMP candidates for the Inaccessible and Gough rock lobster fisheries. MARAM document, MARAM/TRISTAN/2014/FEB/03.

Johnston, S.J. and Butterworth, D.S. 2016d. Initial results in the development of a new OMP 2016 for Tristan da Cunha island rock lobster. MARAM/TRISTAN/2016/MAY/07.

Johnston, S.J. and D.S. Butterworth. 2017. Updated (and rescaled) Tristan GLM-standardised lobster CPUE to take account of data for the 2016 season. MARAM document, MARAM/TRISTAN/2017/MAY/04.

Johnston, S.J., Brandao, A. and D.S. Butterworth. 2017. Updated 2017 GLMM-standardised lobster CPUE from the Tristan da Cunha outer group of islands. MARAM document, MARAM/TRISTAN/2017/MAY/06.

Johnston, S.J. and Glass, J.P. 2017. The amended Tristan OMP. MARAM/TRISTAN/2017/MAY/05.

Table 1: The updated (2018) GLMM CPUE (kg/trap) series for Nightingale and GLM CPUE for Tristan to be used for the I_{2018}^{rec} calculations.

Season	**Tristan**	**Nightingale**
2015	0.971	9.370
2016	1.173	13.100
2017	1.184	10.461
Average (I_{2018}^{rec})	**1.109**	**10.984**