Recommendations on rock lobster TACs for Tristan and Nightingale islands for the 2021/22[1] season

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Executive Summary

OMPs are the agreed basis to recommend rock lobster TACs for all four islands of the Tristan da Cunha Group. The application of these OMPs using the most recent CPUE and survey data for input result in the following TAC recommendations for Tristan and Nightingale.

The OMP for Tristan recommends a TAC for 2021 at **120 MT** (2020 TAC 120 MT).
The OMP for Nightingale recommends a TAC for 2020 at **93 MT** (2019 TAC 89 MT).

If an overcatch of more than 0.5 MT is taken at an island in a given season, that amount is to be taken off the TAC allocated for the following season. Thus a 2.3 MT overcatch at Tristan for the 2020 season must be removed from the allocated TACs for the 2021 season.

Introduction

OMPs for Tristan and Nightingale were developed in 2020 (Johnston and Butterworth (2020a, b). OMPs have now been adopted for all four islands in the Tristan group for the purpose of scientific recommendations for TACs. All OMPs have the same form, as set out below:

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

where

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

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

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 max V% up and max V% down:

If $TAC_{y+1} < (1 - \max \text{V\% down}) TAC_y$ then $TAC_{y+1} = (1 - \max \text{V\% down})\, TAC_y$

If $TAC_{y+1} > (\max \text{V\% up})\, TAC_y$ then $TAC_{y+1} = (\max \text{V\% up})\, TAC_y$

Furthermore a maximum TAC (ceiling) or a minimum TAC (floor) may be imposed, where the latter is subject to Exceptional Circumstances (EC) rules where if I_y^{rec} drops below Ilim, the ECs apply and TAC decrease constrains are overridden.

Tristan

The final Tristan OMP accepted (CMP1 of Johnston and Butterworth 2020b) has:

J^{tar}	the CPUE target index of 1.0,
α	is 25,
max V%	5% up and 5% down,
Jlim	0.7 kg/trap,
TAC ceiling	NA, and
TAC Floor	120 MT.

Tristan TAC for 2021

The updated standardised CPUE are reported in Johnston and Butterworth (2021a). Each data series is renormalised so that the average over 2010-2012 is 1.0. Table 1a reports the input data from all three sources.

The calculation of the recommended 2021 TAC for Tristan is as follows:

The combined J_{2020}^{rec} value:

$$J_{2020}^{rec} = \frac{w_1 I_{2020}^{rec,comm} + w_2 I_{2020}^{rec,Edin} + w_3 I_{2020}^{rec,survey}}{w_1 + w_2 + w_3}$$ i.e. used all three indices

$$= \frac{0.569 * 0.972 + 0.046 * 1.065 + 0.384 * 0.885}{1}$$

= 0.942

Note: No Edinburgh vessel nor survey data are available for the 2020 season. As described in Johnston (2021), missing data values are handled as follows:

"Calculate the I_y^{rec} value for each series ($I_y^{rec,comm}$, $I_y^{rec,Edin}$ and $I_y^{rec,survey}$) as the average of the normalized values over the years within the last three years (*y*-2, *y*-1, *y*) for which data are available, if only one or two years' data are available".

$$TAC_{2021} = TAC_{2020} + \alpha(J_{2020}^{rec} - J^{tar})$$

$$= TAC_{2020} + 25(J_{2020}^{rec} - 1.0)$$

$$= 120 + 25(0.942 - 1.0)$$

$$= 119\ MT$$

This TAC value is lower than the "TAC floor" of 120, but the J_{2020}^{rec} value of 0.942 is above the threshold Ilim value of 0.70 (thus ECs are not invoked). Accordingly the final TAC recommended for Tristan for the 2021 season is **120 MT.**

Nightingale

The final Nightingale OMP accepted has:

I^{tar}	the CPUE target index of 5.0 kg/trap,
α	is 5,
max V%	5% up and 5% down,
Ilim	3.0 kg/trap,
TAC ceiling	95 MT and,
TAC floor	NA.

Nightingale TAC for 2021

The updated standardized CPUE for Nightingale is reported in Johnston and Butterworth (2021b). The calculation of the 2021 TAC for Nightingale is as follows:

$$TAC_{2021} = TAC_{2020} + \alpha(I^{rec}_{2020} - I^{tar})$$

$$= TAC_{2020} + 5(I^{rec}_{2020} - 5.0)$$

$$= 89 + 5(8.338 - 5.0)$$

$$= 106\ MT$$

This TAC value is greater than the maximum 5% increase from the previous TAC (89 MT); thus this TAC is adjusted to equal a 5% increase over the 89 MT, which is **93** MT.

The I^{rec}_{2020} value of 8.338 is not below the metarule threshold Ilim value of 3.0 kg/trap, so the metarule is not invoked.

Given that 93 MT is below the TAC ceiling value of 95 MT, the final TAC remains **93 MT.**

References

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Table 1a: The updated Tristan (2021) GLMM powerboat CPUE, Vessel and Biomass survey series for to be used for the I_{2021}^{rec} calculations (Johnston and Butterworth, 2021a).

	2021 GLMM powerboat CPUE		**Vessel GLM CPUE**		**Biomass series**	
	Pre-nomalisation	Re-normalised	Pre-nomalisation	Re-normalised	Pre-nomalisation	Re-normalised
2018	1.121	0.886	1.317	1.049	20.76	0.875
2019	1.117	0.883	1.340	1.080	21.26	0.896
2020	1.454	1.149	-	-	-	-
Average I_{2020}^{rec}	1.231	**0.972**	1.329	**1.065**	21.01	**0.885**