

South coast rock lobster TAC for the 2021 season

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Summary

The application of OMP-2019 results in a TAC of 354 MT for the 2021¹ season (a 5% increase in the TAC from 2020).

The OMP-2019 TAC setting algorithm

Full details of the algorithm developed for setting the South Coast rock lobster TAC are available in Johnston and Butterworth (2019). In summary, the following equations apply:

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

where:

TAC_{y+1} is the TAC for the forthcoming season (2021 in this case),

TAC_y is the TAC from the previous season (i.e. $y=2020$),

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

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

where:

$CPUE_{y'}^A$ is the GLM standardized CPUE for area A in year y' (the values applicable to these calculations are as follows (Glazer, 2021)):

| Year | Area 1E | Area 1W | Area 2+3 |
|------|---------|---------|----------|
| 2017 | 1.63 | 1.40 | 1.44 |
| 2018 | 2.50 | 1.10 | 1.61 |
| 2019 | 2.52 | 1.71 | 1.89 |

λ_{1E} , λ_{A1W} and λ_{2+3} are CPUE weighting factors related to the proportion of the overall biomass in each of the three fishing areas (see Johnston and Butterworth (2019) for details), namely:

$$\lambda_{1E}=0.006$$

$$\lambda_{1W}=0.006$$

¹ The year 2020, for example, refers to the 2020/21 fishing season.

$$\lambda_{2+3}=0.988$$

$CPUE_{targ} = 1.22$ (the value for which the median $Bsp(2015/2006)=1.30$; the selected biomass recovery target for OMP-2019).

α is a tuning parameter that controls the responsiveness of the OMP to CPUE deviations from $CPUE_{targ}$ and for OMP-2019 is set at 1.0.

A rule is applied to limit inter-annual TAC variation to no more than 5% in either direction (i.e. the TAC is limited to fluctuating between $\pm 5\%$ of the previous season's TAC):

$$\text{if } TAC_{y+1} > 1.05TAC_y \quad \text{then} \quad TAC_{y+1} = 1.05TAC_y \quad (3)$$

$$\text{if } TAC_{y+1} < 0.95TAC_y \quad \text{then} \quad TAC_{y+1} = 0.95TAC_y \quad (4)$$

TAC for first two seasons (2019 and 2020)

The TAC for the first two seasons may not be less than the TAC set for 2018 (321 MT).

The 2021 TAC calculation

The application of the equations described above results in a TAC of 337 tons for the 2020 season:

$$\overline{CPUE}_{2020} = \frac{1}{3} (0.006(1.63) + 0.006(1.40) + 0.998(1.40) + 0.006(2.50) + 0.006(1.10) + 0.998(1.61) + 0.006(2.52) + 0.006(1.71) + 0.998(1.89)) = 1.649$$

$$TAC_{2020} = 337 \left[1 + 1.0 \left(\frac{1.649 - 1.22}{1.22} \right) \right]$$

$$= 455 \text{ MT}$$

This amounts to a 35% increase in TAC from that of 2020 (337 tons). Since this increase falls outside the upper 5% constraint related to TAC_{2020} the inter-annual TAC constraint applies, so that the TAC_{2021} value is:

$$TAC_{2021} = 1.05 TAC_{2020} = 1.05 * 337 = 354 \text{ MT}$$

References

Glazer, JP. 2021. South Coast Rock Lobster standardized CPUE indices per Area. Fisheries/2021/JUN/SWG-SCRL/02.

Johnston, S.J and Butterworth, D.S. 2019. South Coast Rock Lobster OMP 2019. Fisheries/2019/AUG/SWG-SCRL/10.