Re-opening a closed abalone fishery: East Coast case study

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# Background

The following re-opening criteria have been extracted from various documents pertaining to the closure of the Tasmanian East coast commercial Abalone Fishery: From: IMAS East coast blacklip abalone recovery plan 2020 Version 1.docx

**Density**

* Abalone populations match or exceed the baseline abalone/10 minutes levels observed in the early 2000s baseline.

**Size Structure**

* The population is represented by substantial numbers in at least four age classes above the legal minimum length.
* The mean size exceeds the median of the mean size/site observed in the early 2000s baseline.

**Distribution**

* and patchiness Abalone populations meet density and size structure criteria in a high proportion (>75%) of survey sites.

# Re-opening after closure: DRAFT Tasmanian Abalone Fishery Sustainable Harvest Strategy 2024

If a fishery closure occurs, the closure will be for a minimum of eight years in the absence of fisheries independent data, or for a period less than eight years, if fisheries independent data and associated scientific advice supports re-opening. Criteria considered in re-opening a closed fishery includes:

Population density

* Evidence of abundance densities above a minimum threshold.

Size structure

* Evidence of multiple age classes above the LML and the median of the mean size per site above that observed in the baseline.

Distribution and patchiness

* Evidence of SAU-wide recovery. Abalone populations meet density and size structure criteria in a high proportion of survey sites (i.e. not driven by a small number of sites showing high abundance).

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| Table 1: Site Percenatge Change: Summary table of sites surveyed in sample year and percentage change in abundance of legal and sub-legal abalone between sample year (2024) and previous year (2023).   | BlockNo | Sites | <140 mm | >140 mm | | --- | --- | --- | --- | | 16 | 41 | -3.0 | 15.0 | | 22 | 58 | -48.1 | -26.2 | | 23 | 34 | 15.8 | -8.6 | | 24 | 58 | -4.2 | -29.7 | |

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| Table 2: Reference Site Percenatge Change: Summary table of sites surveyed in sample year and percentage change in abundance of legal and sub-legal abalone between sample year (2024) and previous year (2023).   | BlockNo | Sites | <140 mm | >140 mm | | --- | --- | --- | --- | | 16 | 7 | 32.6 | 46.4 | | 22 | 14 | -7.8 | -32.8 | | 23 | 8 | 26.9 | 6.8 | | 24 | 13 | 13.4 | -24.5 | |

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| Table 3: Site abundance: Summary of sites surveyed and average count by Block. Sites = number of sites surveyed; Average count = average number of abalone <140 mm or >140 mm sounted within 10 minutes between paired divers at each site within a block.   | Blockno | Sites | Average count <140mm | Average count >140mm | | --- | --- | --- | --- | | 16 | 41 | 23.9 | 28.9 | | 22 | 58 | 21.6 | 31.6 | | 23 | 34 | 29.5 | 24.8 | | 24 | 58 | 34.2 | 29.8 | |

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| Table 4: Summary of sites surveyed by Block in 2024. Sites = number of sites surveyed; Days = number of sampling days; Sites\_Day = average number of sites surveyed for each sampling day.   | Blockno | Sites | Days | Sites\_Day | | --- | --- | --- | --- | | 16 | 41 | 3 | 13.7 | | 22 | 58 | 5 | 11.6 | | 23 | 34 | 5 | 6.8 | | 24 | 58 | 5 | 11.6 | | Total | 191 | 18 |  | |

Need to explain what average count measn .. is it the average acount between divers??

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| Figure 1: Boxplot comparing the of the number of sub-legal (<140 mm) and legal (>140 mm) abalone counted within 10 minutes between paired divers at each site within a block between years. Red circle indicates the overall average between paired divers for the corresponding size class within the block. Number of sites sampled given above each boxplot. |

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| Figure 2: Average count of all legal (>140 mm) and sub-legal (<140 mm) abalone within 10 minutes between paired divers at each site within each block by year. |

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| Figure 3: Asolute change in average abundance of all legal (>140 mm) and sub-legal (<140 mm) abalone counted within 10 minutes between paired divers at each site within each block and year to 2020 baselines and the hypothetical percentage changes. |

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| Figure 4: Asolute change in average abundance of all legal (>140 mm) and sub-legal (<140 mm) abalone counted within 10 minutes between paired divers at each reference site within each block and year to 2020 baselines and the hypothetical percentage changes. |

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| Figure 5: Relative change in average abundance of all legal (>140 mm) and sub-legal (<140 mm) abalone counted within 10 minutes between paired divers at each site within each block and year to 2020 baselines and the hypothetical percentage changes. |

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| Figure 6: Relative change in average abundance of all legal (>140 mm) and sub-legal (<140 mm) abalone counted within 10 minutes between paired divers at each reference site within each block and year to 2020 baselines and the hypothetical percentage changes. |

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| Figure 7: Relative change in average abundance of all sub-legal (<140 mm) abalone counted within 10 minutes between paired divers at each reference site during 2024 within each block to 2020 baselines. Green = two years of consecutive increases above 2020 baseline (current and previous year); Red = two consecutive years of decline (current and previous year) or current year decline but previous year increase or no change; Amber = current year increase or no change but previous year decline. |

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| Figure 8: Percent frequency plot of size classes by year and block. |

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| Figure 9: Absolute frequency plot of size classes by year and block. |

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| Figure 10: Smoothed absolute frequency plot of size classes by year and block. |

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| Figure 11: Absolute frequency plot of size classes by year and block. |

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| Figure 12: The median of the mean size per site above that observed in the baseline. |

## Notes:

Notes: will attempt to code a colour and/or symbol to represent the overall trend for the block in meeting the criteria for consideration of re-opening (i.e. >75% of reference sites showing increasing abundance – green dot or facet stripe colour with word ‘OPEN’; orange = ?, red = ‘CLOSED’). Based on the criteria of majority of sites showing increasing sub-legal abundance (i.e. >75% sites), no blocks would have met the criteria to re-open in 2023. All but Block 27 and 28 met the criteria for legal abundance in 2023.

Threshold for what classifies as an increase or recovery?

* A significant change in mean abundance between years?
* Reaching an acceptable or globally recognised percentage threshold (fisheries reference limit)?

**Mean absolute deviation (MAD) – reference sites**

1. Determine abalone count for each site for each year.
2. Determine mean site abundance for each year.
3. Extract mean site abundance for 2020 (baseline).
4. Subtract 2020 mean site abundance (baseline) from each site count (deviation).
5. Determine mean deviation for each block or site.

Larger deviation = larger variation in abundance from mean baseline in 2020. Doesn’t reveal increasing or decreasing trend but when used in combination with absolute abundance reveals the magnitude of that real trend from the baseline?