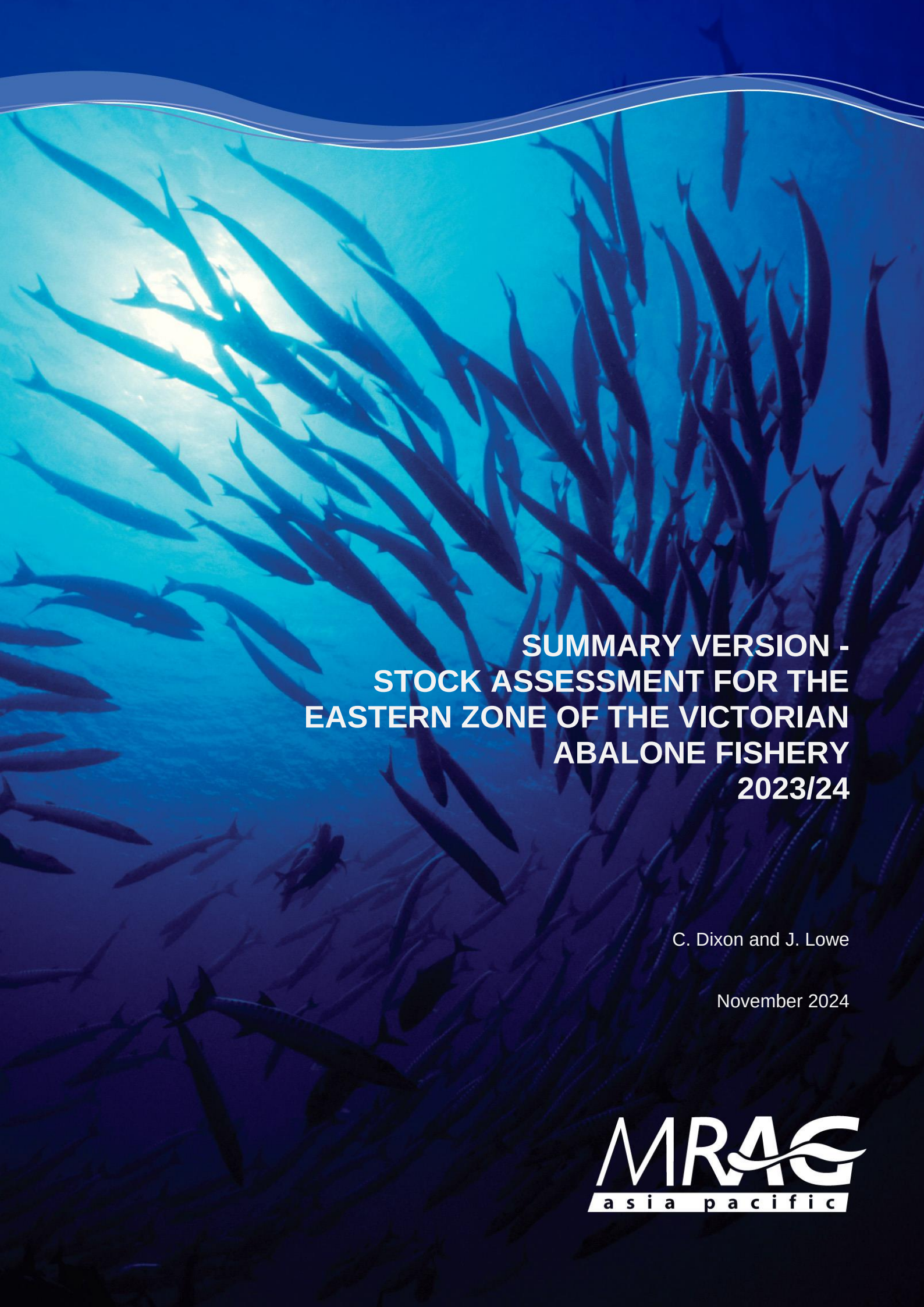

SUMMARY VERSION - STOCK ASSESSMENT FOR THE EASTERN ZONE OF THE VICTORIAN ABALONE FISHERY 2023/24

C. Dixon and J. Lowe

November 2024

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About MRAG Asia Pacific

MRAG Asia Pacific is an independent fisheries and aquatic resource consulting company dedicated to the sustainable use of natural resources through sound, integrated management practices and policies. We are part of the global MRAG group with sister companies in Europe, North America and the Asia Pacific.

2/29 Woodstock Rd	PO Box 732	P: +61 7 3371 1500
Toowong Qld 4066	Toowong Qld 4066	F: +61 7 3100 8035
Australia	Australia	E: info@mragasiapacific.com.au

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1. Executive Summary

This report summarises the 2024 stock assessment for the Victorian Eastern Zone Abalone Fishery. The information that underpins this Executive Summary can be read in detail in the full Eastern Zone Stock Assessment Report 2024. Three primary analytical frameworks are used in this assessment of stock status to inform TACC decision making; (i) a weight of evidence assessment, (ii) analysis of trends against Performance Indicators set out in the in the Victorian Wild Harvest Abalone Fishery Management Plan and (iii) performance of the fishery against the Draft Harvest Strategy. Divers' observations and select data from the current season are presented at the Total Allowable Commercial Catch (TACC) setting meeting and approaches to incorporating these data into the formal stock assessment should be considered for future reports.

As discussed in recent Stock Assessment Reports and review documents, there are substantial limitations associated with the two primary sources of data. Catch per unit effort (CPUE) is positively biased due to hyperstability, while Fishery Independent Survey (FIS) data are negatively biased because FIS site locations are not representative of the entire stock, and in particular the current fished stock. As a result, the research and management framework for the fishery is currently undergoing review and further refinement.

In this context, last year's report stated, "*industry's role as stewards of the resource and VFA's obligation to act precautionarily in the face of uncertainty is particularly important until a more robust assessment framework is in place*". Importantly, during the December 2023 TACC setting process, industry voluntarily reduced the TACC from 284.5 t to 208.6 t, which was supported by the Victorian Fisheries Authority (VFA). While it is too soon to determine whether these reductions have been sufficient to slow the decline in biomass, the Eastern Zone Abalone Industry Association (EZAIA) and VFA should be commended for this decision.

In February 2024, an Abalone Scientific Working Group (ASWG) was formed to utilise the experience and expertise of independent scientific personnel, fishery managers and abalone industry members to provide recommendations on how best to assess and monitor the Victorian Abalone Fishery across all three zones. The short-term priorities included changes to the stock assessment reporting framework, and these changes have been included in this report.

The FIS review provided evidence that the decline in abundance at FIS sites from 2003 to around 2010 represents serial depletion of the stocks in the offshore and mid depth reefs. Currently, the fishery is reliant primarily on shallow water reefs that are not surveyed, and accordingly there are no data to assess total or relative biomass for the entire stock. Work has commenced to establish new FIS sites in shallow grounds representative of the fishery, and surveys will begin in 2025.

The available data for the weight of evidence assessment continues to be pessimistic. The total catch of 284.5 t in 2023/24 was close to 100% of the TACC (284.6 t), however it is currently around 60% of the peak historic catch following the introduction of quota in 1988. Standardised CPUE has declined by around 20% since 2019. Mean daily catches are at low levels from an historic perspective, however this appears to have been affected by individual daily catch limits applied by the processor.

In summary, recent trends in available data clearly indicate that the stock has been in decline in recent years and the status of the Eastern Zone stock remains 'declining'. It is not possible to determine how close the stock is to a point where future recruitment may be impaired, however the risk is not negligible. Importantly, industry recommended large reductions in the TACC for the 2024/25 season, which were implemented by VFA. It is too early for any response to be observed in the available data. On this basis, it is recommended that the current TACC and Optimal Targets (OTs) remain stable in the short-term, unless individual diver observations suggest that further reductions in OT are required at some Spatial Management Units (SMUs). Increases in TACC should not be considered until clear evidence of stock recovery over several years is apparent.

2. Summary of key outcomes

This Summary Version of the Draft Stock Assessment Report for the Eastern Zone Abalone Fishery aims to document the key results for the Zone and SMU scales, and the key conclusions from the assessment. Catch, effort and fishery independent survey (FIS) abundance data are presented. Additional data and analyses are provided in the full stock assessment report, along with rationales for key conclusions.

Performance Indicators are presented in Appendix 1. Draft Harvest Strategy results are presented in Appendix 2. A summary of LML changes in presented in Appendix 3.

Analytical approaches to stock assessment

As reported in previous Stock Assessment Reports and associated review documents, there are substantial uncertainties associated with the two primary sources of data for assessment. CPUE data are positively biased due to hyperstability, and therefore present an overly optimistic assessment of stock status. FIS data are negatively biased because historic FIS site locations are not representative of the entire stock, and thus they represent an overly pessimistic assessment of stock status. As a result, in recent years VFA have requested reviews of the current CPUE standardisation approach (Dichmont et al 2022) and the FIS approach (Dixon 2023).

This report is the first to use a revised CPUE standardisation model that has been developed through the ASWG. In 2024, new fixed transects were established at some of the “Top 15” historic sites to test the establishment of the new fixed transect approach, and to provide comparison data between FIS methods. Establishment of new fixed transect sites in shallow water reefs representative of the current fishing grounds is planned to commence in 2025.

In December 2024, industry voluntarily proposed large cuts to the TACC to reduce fishing mortality rates in the hope of halting declines in biomass. These reductions were well beyond those suggested through the Draft Harvest Strategy. Large reductions in OTs were implemented at five of the seven SMUs: Mallacoota Central, Marlo, Mallacoota East, Mallacoota West and Mallacoota Small. This report is based on information for the 2023/24 season, which ended on 30 March 2024. The large reductions in TACC implemented last year are for the current 2024/25 season. Analyses of up-to-date data from the 2024/25 season will be provided at the TACC setting meeting in December but are not included in this report.

As expected, this year’s report identifies concerning trends in the primary data source of commercial CPUE, which result in suggested reductions in TACC through the Draft Harvest Strategy. However, the proactive reduction in TACC proposed by industry at last year’s TACC setting meeting has effectively “gotten ahead” of the need for TACC reductions based on 2023/24 data. As a result, the advice provided in this report at the SMU scale is effectively a “wait and see” approach regarding the need for further reductions in OTs, particularly at SMUs that have already been substantially reduced. On this basis, the observations of divers at these SMUs will be critical in determining whether further reductions in OT are required.

CPUE standardisation

The revised CPUE standardisation, agreed through the ASWG, has removed some of the previous interaction terms that were considered to cause unnecessary complication. The “month” term has been replaced with a “quarter” term which is considered to better reflect the patterns of fishing across a year. In addition, a revised set of filters on the input dataset has been applied to remove many of the influential outliers.

Importantly, it must be acknowledged that the key issues with hyperstability of CPUE remain. However, the revised model does show some departure from the nominal mean over time at the Zone level and at most SMUs. While this does not mean it is representative of trends in biomass, a departure away from the nominal mean in the negative direction would be expected under the

scenario of reduced biomass over time which has occurred for the Eastern Zone. This provides some indication that the current model is a better representation of changes in biomass than the previous model. Further improvements to the CPUE standardisation are expected to continue, developed through the ASWG.

Performance Indicators

Previous reports have identified that the current Performance Indicators require review. The Performance Indicators are assessed for the long-term from 2003 to current and for the short-term from 2009 to current. In this report, we include an additional analysis of the Performance Indicators over the last four years, which aligns with the timelines of the Draft Harvest Strategy. We also included a performance measure of mean daily catch which could be considered in a future review however we note that this measure has been substantially affected by market forces in recent years.

While CPUE will likely remain a key performance measure in the future, the issues associated with hyperstability need to be better accounted for. That said, the revised CPUE standardisation model does demonstrate some departure from the nominal in a manner expected for a stock in decline. The current FIS program is being restructured with new sites likely being implemented in current fishing grounds in 2025. However, it will be several years before meaningful data are available that can inform performance measures. Finally, the review of Performance Indicators must include potential measures that can be derived from commercial effort logger data that have been gathered for the last two years.

Weight of evidence assessment

The weight of evidence assessment is impeded by the same data uncertainties as the Harvest Strategy and Performance Indicators, particularly regarding the importance of CPUE as the primary data source. The FIS review identified that historic FIS site locations are no longer representative of the current fishing grounds. The Top 15 sites provide some data for sites adjacent to the current fishing grounds, however these data need to be augmented with data from shallower sites to provide a reliable index of abundance at the Zone scale, across current fishing grounds. This year's report includes analysis of mean catch per day, however changes in marketing/processing forces arrangements have influenced the interpretation of mean catch per day data in recent years. An improved understanding of daily catch limits per individual diver may help to improve this measure.

Length frequency data from the commercial catch were only collected up to 2018/19 and length frequency data gathered during FIS include two sources of bias that mean they should be given little weight in the assessment of stock status.

TACC setting and Optimal Target catches

The TACC setting process occurs in December of each year for the Eastern Zone, around two thirds of the way through a current quota year. TACC setting is complicated by the lag in time between the assessment of stock status based on data from the previous quota year and the need to establish a TACC for the following quota year (i.e. a full year lag). In the last three years, informal assessments of up-to-date summaries of catch (SMU and reefcode) and CPUE (SMU only) have been provided at the TACC setting meeting, and this will occur again in December 2024. However, future assessment processes should aim to incorporate all available data into the assessment and TACC setting process in a formal manner. It is expected that progress of this will occur through the ASWG in the next few months.

The importance of timely data has never been more apparent than for this year's assessment process. This report identifies concerning trends in the primary data source of commercial CPUE, which results in suggested reductions in TACC through the Draft Harvest Strategy. However, last year's TACC was reduced substantially from 284 t to 208 t following a recommendation by industry. In the last two years, substantial reductions in OT have been made for five of the seven EZ SMUs. On

this basis, the recommended reductions in OT through the Draft Harvest Strategy are not necessarily required because the industry has predetermined "gotten ahead" of these outcomes and made the cuts voluntarily before the Harvest Strategy can take effect. The two SMUs where the OT has been largely maintained are the Airport SMU and the Mallacoota Large SMU. It is noted that the Draft Harvest Strategy outcomes for both these SMUs is Stable.

The large reduction in TACC that was implemented voluntarily by industry for the 2024/25 season was a responsible decision that reflects concerns over declining biomass across most of the fishery. Any response in stock status will not be observed in available data immediately. On this basis, it is recommended that the current OTs remain stable in the short-term, unless individual diver observations suggest that further reductions in OT are required at some SMUs. Increases in TACC should not be considered until clear evidence of stock recovery over several years is apparent.

Assessment of stock status

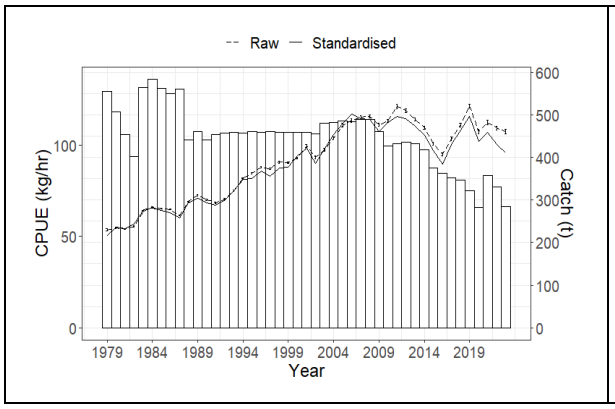
The latest Status of Australian Fish Stocks (SAFS) assessment of the Victorian Eastern Zone Abalone Fishery is based on data up to and including 2021/22 and the fishery was classified as a depleting stock. Since then, further reductions in TACC have been implemented, particularly for the current 2024/25 season where the TACC was reduced from 284 t to 208 t. This report identifies further declines in CPUE for the 2022/23 season, however the industry/VFA have already acted upon these trends by taking the large reductions in TACC for 2024/25.

The factors affecting the Eastern Zone stock over the last two decades appear to have affected most, if not all, Australian abalone stocks, primarily through reduced recruitment over a prolonged period (at least two decades). In addition, sea urchins have increased in abundance and have reduced the available habitat for abalone in the Eastern Zone. The EZAIA is also investigating potential impacts from higher recent water flows from the Snowy Rover that may have impacted abalone stocks in the Marlo SMU.

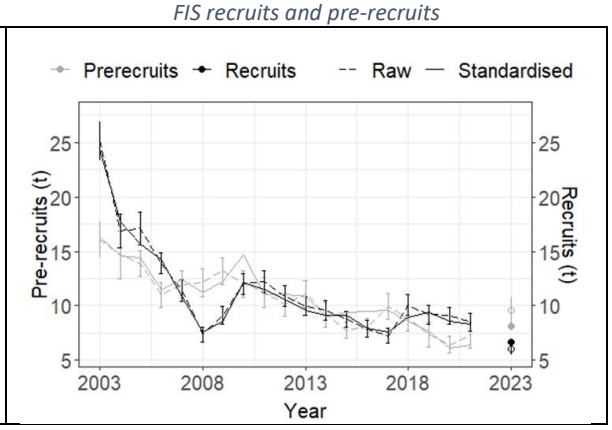
While the causes for decline in biomass are important to understand, the primary tool available to the fishery to manage these impacts is through appropriate management of fishing mortality (i.e. the TACC). It was encouraging to see that proactive decisions were made on a voluntary basis by industry, supported by VFA, through large reductions in TACC for the 2024/25 season. It is too soon to determine whether these reductions have been sufficient to halt the biomass decline. On this basis, the status of the stocks remains as "declining".

3. Eastern Zone

Catch and CPUE



FIS recruits and pre-recruits



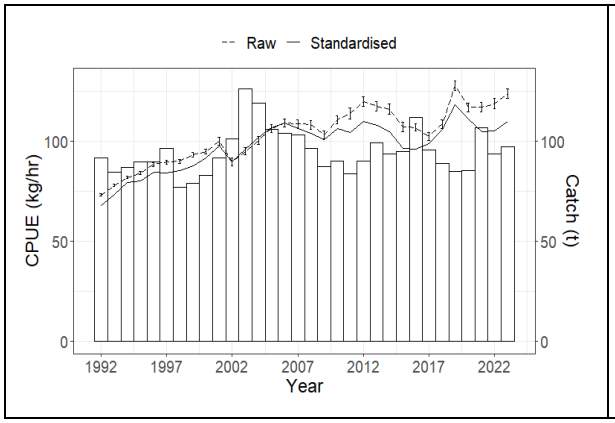
- The commercial catch for 2023/24 was 284.5 t, which was almost 100% of the TACC (284.6 t).
- Standardised CPUE increased consistently and significantly from 1992 to 2012. Catches had already been reduced by around 50 t prior to the first signs of decline in CPUE trends. Standardised CPUE declined substantially from 2012 to 2016 and during this period catches were reduced from 436 to 363 t. Catches continued to be reduced from 2016 and CPUE increased substantially and significantly until it reached a historic peak in 2019, then CPUE has declined thereafter.
- FIS data presented above are for the Top 15 sites only (see Dixon 2023). No data were collected in 2022 and only 10 of the 15 sites were done in 2024. Both recruit and pre-recruit data are presented, with little difference between standardised and nominal trends for either measure.
- Trends in recruit abundance declined rapidly between 2003 and 2008 and then ranged from around 7.5 to 12.5 abalone per transect from 2008 to 2021, before declining to their lowest levels in 2023.
- Pre-recruit abundance declined slowly and consistently from 2003 to 2021 before increasing in 2023 to 2017 levels.

4. Airport SMU

Table 3: Summary of Catch, Optimum Targets and Performance Indicators for the Airport SMU.

Catch					Long-term indicators CPUE 2003/04 – 2023/24 Abundance 2003-2023			Short-term indicators CPUE 2009/10 – 2023/24 Abundance 2009-2023		
2023/24		OT (t)			CPUE	Pre-recruits	Recruits	CPUE	Pre-recruits	Recruits
(t)	(%)	22/23	23/24	24/25						
97.3	34.2	85.0	85.0	80.0	15	NA	NA	9	NA	NA
LML = 110/120 mm		Mean daily catch=406 kg								

Catch and CPUE



FIS recruits and pre-recruits

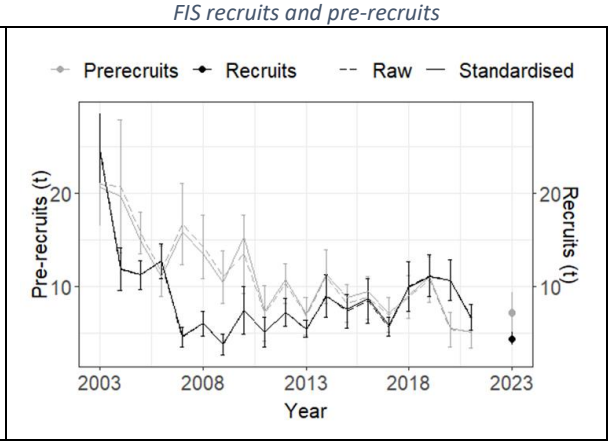


Table 4: Catches (kg) by reefcode for the Airport SMU from 2018/19 to 2022/23, the five-year average catch from 2018/19 to 2022/23, and the OT + carryover for 2023/24.

Reefcode	2018/19	2019/20	2020/21	2021/22	2022/23	5-yr average	2023/24	OT	Difference (kg)
24.21 Quarry Beach / Betka	40319	38550	24373	40805	43676	37545	48186	37000	11186
24.10 Little Rame Lee	21643	25434	19142	22988	18483	21538	29639	23000	6639
24.16 Gabo Harbour	11087	9343	18415	17235	13629	13942	7761	13000	-5239
24.15 Tullaberga	9173	4274	11457	13037	11956	9979	6108	6000	108
24.11 Shipwreck	6557	7184	11797	12540	5809	8777	5556	6000	-444

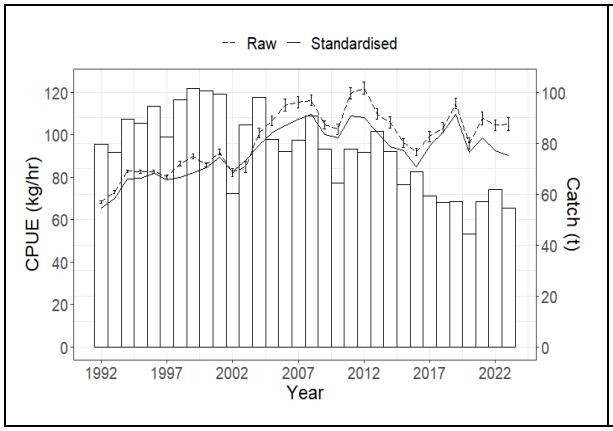
- The 2023/24 catch was 97.3 t was around the long-term historical average. Catches have dramatically exceeded the OT in the last three years. CPUE has increased in the last three years.
- The OT was substantially exceeded at Quarry Beach/Betka River and Little Rame Lee, while the OT was under-caught at Gabo Harbour.
- FIS recruit abundance at the Top 15 sites declined between 2021 and 2023. Pre-recruit abundance increased in 2023 but remains low in an historic context.
- The OT was reduced from 85 to 80 t for 2024/25 and the Draft Harvest Strategy resulted in a Stable Final Category for 2025/26.
- **Catches in recent years remain high in an historic context, which differs to all other parts of the fishery that have shown declines in biomass and catch. Despite these relatively high catches, CPUE has increased in recent years. Notably, the OT was reduced from 85 to 80 t for the 2023/24 season. While there is no direct evidence from the data that further reductions are required, diver observations will be critical in determining the OT for the Airport SMU.**

5. Mallacoota Central

Table 7: Summary of Catch, Optimum Targets and Performance Indicators for the Mallacoota Central SMU.

Catch					Long-term indicators CPUE 2003/04 – 2023/24 Abundance 2003-2023			Short-term indicators CPUE 2009/10 – 2023/24 Abundance 2009-2023		
2023/24		OT (t)			CPUE	Pre-recruits	Recruits	CPUE	Pre-recruits	Recruits
(t)	(%)	22/23	23/24	24/25						
54.3	19.1	57.0	46.4	34.8	3	NA	NA	-10	NA	NA
LML = 125 mm		Mean daily catch=351 kg								

Catch and CPUE



FIS recruits and pre-recruits

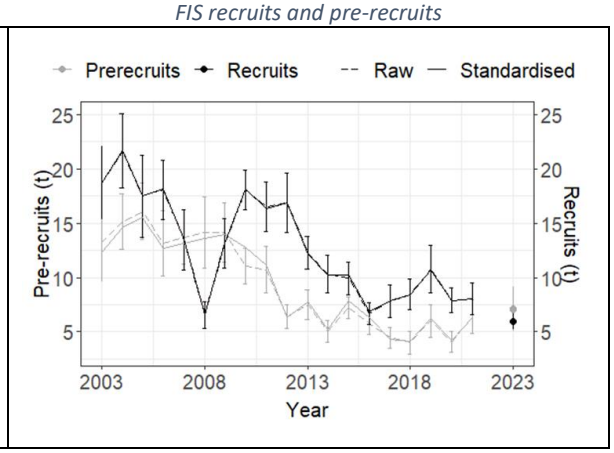


Table 8: Catches by reefcode for the Mallacoota Central SMU from 2018/19 to 2023/24, the five-year average catch from 2018/19 to 2022/23, and the OT + carryover for 2023/24.

Reefcode	2018/19	2019/20	2020/21	2021/22	2022/23	5-yr average	2023/24	OT	Difference (kg)
24.07 Sandpatch Lee	32420	31395	25025	25403	28375	28524	29259	24000	5259
24.06 Sandpatch Point	16809	15844	10524	20367	22806	17270	16253	14400	1853
24.08 Benedore	6508	8453	8283	10327	9486	8611	8204	7000	1204
24.04 Red River	837	1325	616	912	1074	953	598	1000	-402
24.05 Secret Reef	0	0	0	0	0	0	0	0	0

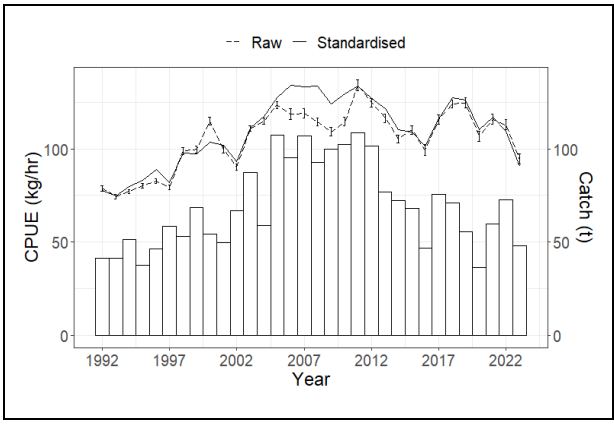
- The Mallacoota Central SMU catch was 54.3 t in 2023/24 which was 7.9 t above the OT.
- CPUE has declined since 2019.
- The catch at Sandpatch Lee was 5.2 t higher than the OT with catches at Sandpatch Point and Benedore just above the OT.
- Both recruit and pre-recruit abundances have declined since 2003. Recruit abundance was at its lowest point in 2023 while pre-recruit abundance was the highest since 2015.
- The Draft Harvest Strategy resulted in a Decreasing Final Category, however substantial reductions in OT from 46.4 to 34.8 t were already made for 2024/25.
- **While the OT was reduced by around 10 t for 2023/24, catches were 8 t (17%) over the OT. The OT was further reduced by around 11 t for 2024/25. While there is no clear evidence to suggest that the OT needs further reductions, diver observations will be critical in determining the status of the Mallacoota Central SMU.**

6. Marlo

Table 5: Summary of Catch, Optimum Targets and Performance Indicators for the Marlo SMU.

Catch					Long-term indicators CPUE 2003/04 – 2023/24 Abundance 2003-2023			Short-term indicators CPUE 2009/10 – 2023/24 Abundance 2009-2023		
2023/24		OT + carryover* (t)			CPUE	Pre-recruits	Recruits	CPUE	Pre-recruits	Recruits
(t)	(%)	22/23	23/24	24/25						
48.0	16.9	91.0*	71.5	35.8	-18	NA	NA	-27	NA	NA
LML = 125 mm		Mean daily catch=370 kg								

Catch and CPUE



FIS recruits and pre-recruits

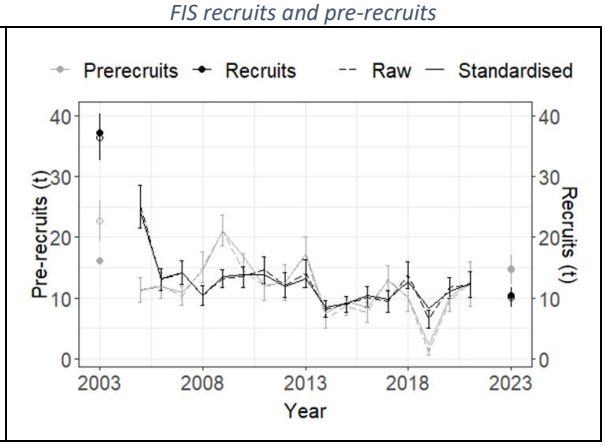


Table 6: Catches by reefcode for the Mallacoota Central SMU from 2018/19 to 2023/24, the five-year average catch from 2018/19 to 2022/23, and the OT + carryover for 2023/24.

Reefcode	2018/19	2019/20	2020/21	2021/22	2022/23	5-yr average	2023/24	OT	Difference (kg)
22.08 Pearl Point	15580	13072	8453	21288	16607	15000	15449	20000	-4551
22.04 Cape Conran	20501	14859	9312	15116	14906	14939	13385	15000	-1615
22.05 East Cape	13794	11033	11845	13877	23516	13052	8459	17000	-8541
22.03 Point Ricardo	5700	5889	1877	3402	6836	4741	6528	5000	1528
22.06 Yeerung Reef	8032	7475	3578	4129	5351	5713	3011	8000	-4989
22.02 Frenches	7285	3329	1316	1687	4761	3676	946	6500	-5554
22.10 Clinton Rocks	0	0	0	0	352	70	191	0	191
22.09 Tamboon	0	0	0	0	113	23	0	0	0
23.01 Point Hicks	0	0	49	0	110	32	0	0	0
22.01 Marlo	0	0	0	0	0	0	0	0	0

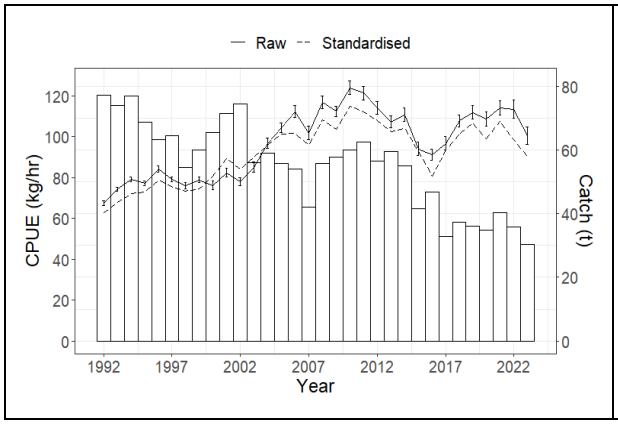
- Catch from the Marlo SMU was again well below the OT in 2023/24. Catches have been poor in recent years, with industry suggesting that fresh water outflow has impacted productivity.
- CPUE has declined since 2019.
- Recruit and pre-recruit abundance has been relatively stable at Top 15 sites since 2006.
- The Draft Harvest Strategy resulted in a Decreasing Final Category, however the OT was halved from 71.5 to 31.8 t for 2024/25.
- **In response to poor stock status, the OT was halved for 2024/25. More time is required to determine whether these cuts were sufficient to improve stock status. Diver observations will be critical in determining whether the reductions were sufficient in the short-term.**

7. Mallacoota East

Table 9: Summary of Catch, Optimum Targets and Performance Indicators for the Mallacoota East SMU.

Catch					Long-term indicators CPUE 2003/04 – 2023/24 Abundance 2003-2023			Short-term indicators CPUE 2009/10 – 2023/24 Abundance 2009-2023		
2023/24		OT (t)			CPUE	Pre-recruits	Recruits	CPUE	Pre-recruits	Recruits
(t)	(%)	22/23	23/24	24/25						
30.5	10.7	32.5	26.2	19.7	1	NA	NA	-13	NA	NA
LML = 120 mm		Mean daily catch=358 kg								

Catch and CPUE



FIS recruits and pre-recruits

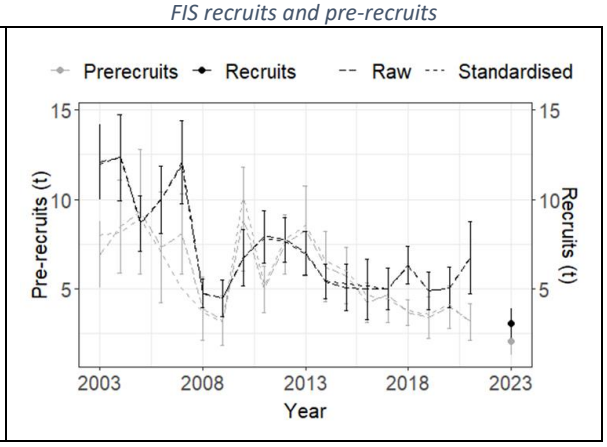


Table 10: Catches by reefcode for the Mallacoota East SMU from 2018/19 to 2023/24, the five-year average catch from 2018/19 to 2022/23, and the OT + carryover for 2023/24.

Reefcode	2018/19	2019/20	2020/21	2021/22	2022/23	5-yr average	2023/24	OT	Difference (kg)
24.17 Gabo Island	23236	25897	26047	25613	24891	25137	20195	15200	4995
24.19 Iron Prince	11460	8312	6477	11877	8154	9256	7875	9000	-1125
24.18 Gunshot	2591	2004	2438	2810	2781	2525	2395	2000	395

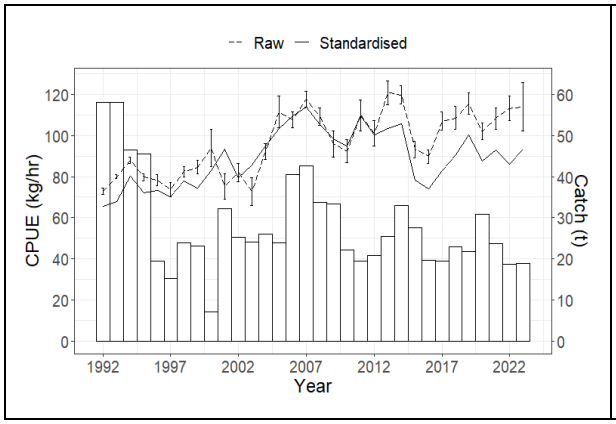
- The Mallacoota East SMU catch of 30.5 t in 2023/24 was 4.3 t above the OT. Catches and CPUE have been relatively stable since around 2017.
- Catches at Gabo Island continue to be harvested at levels well above the OT (5 t in 2023/24).
- Recruit and pre-recruit abundance have declined since 2003. Both recruit and pre-recruit abundance were at their lowest levels observed in 2023.
- The Draft Harvest Strategy resulted in a Decreasing Final Category for the SMU, however the OT was reduced from 26.2 t to 19.7 t for the 2024/25 season.
- **While cuts to the OT were made for 2023/24, most of that was caught as the OT was again exceeded. Further substantial cuts have been made for the 2024/25 season, so it is too early to determine whether these reductions have improved stock performance. Again, diver observations will be critical in determining the OT for 2025/26.**

8. Mallacoota Large

Table 13: Summary of Catch, Optimum Targets and Performance Indicators for the Mallacoota Large SMU.

Catch					Long-term indicators CPUE 2003/04 – 2023/24 Abundance 2003-2023			Short-term indicators CPUE 2009/10 – 2023/24 Abundance 2009-2023		
2023/24		OT + carryover* (t)			CPUE	Pre-recruits	Recruits	CPUE	Pre-recruits	Recruits
(t)	(%)	22/23	23/24	24/25						
18.8	6.6	20.0	18.5	18.5	9	NA	NA	-5	NA	NA
LML = 135 mm		Mean daily catch=335 kg								

Catch and CPUE



FIS recruits and pre-recruits

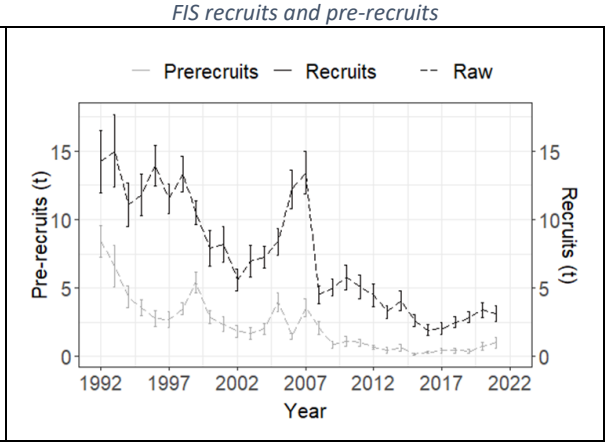


Table 14: Catches by reefcode for the Mallacoota Large SMU from 2018/19 to 2023/24, the five-year average catch from 2018/19 to 2022/23, and the OT + carryover for 2023/24.

Reefcode	2018/19	2019/20	2020/21	2021/22	2022/23	5-yr average	2023/24	OT	Difference (kg)
23.06 Big Rame	15589	15057	22246	14558	12960	16082	12094	12000	94
24.0 The Skerries	5212	5472	6645	7197	4353	5776	5345	5000	345
24.03 Easby Creek	2198	1323	1902	1887	1317	1726	1323	1500	-177

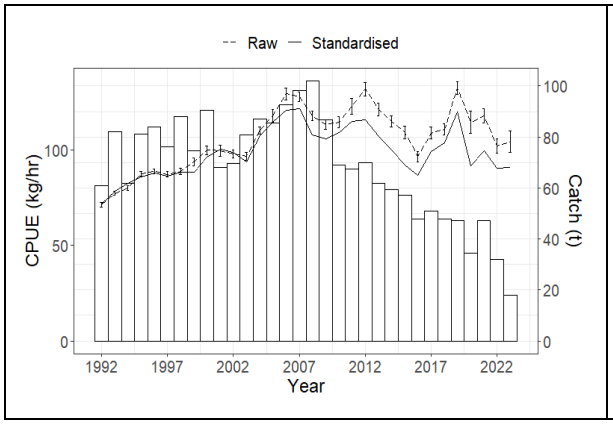
- The catch of 18.8 t in 2023/24 was just above the OT of 18.5 t. Catches were close to the OT at all three reefcodes.
- Standardised CPUE has shown no real trends over the last two decades.
- Recruit and pre-recruit FIS abundances declined substantially from 2003 to 2021. There were no Top 15 sites surveyed at the Mallacoota Large SMU.
- The Draft Harvest Strategy resulted in a Stable Final Category for the SMU.
- **Mallacoota Large was the only SMU not to have a reduction in OT during 2024/25. In recent years, this SMU has been managed by a cap that has prevented catches exceeding the OT due to a higher demand for larger abalone. Given the reductions in stock status and subsequently catch at most other SMUs, it is plausible the hard cap has helped to maintain stock status in this region. There is no evidence to suggest that changes are required to the OT.**

9. Mallacoota West

Table 11: Summary of Catch, Optimum Targets and Performance Indicators for the Mallacoota West SMU.

Catch					Long-term indicators CPUE 2003/04 – 2023/24 Abundance 2003-2023			Short-term indicators CPUE 2009/10 – 2023/24 Abundance 2009-2023		
2023/24		OT (t)			CPUE	Pre-recruits	Recruits	CPUE	Pre-recruits	Recruits
(t)	(%)	22/23	23/24	24/25						
18.1	6.4%	44.0	21.5	12.0	-3	NA	NA	-14	NA	NA
LML = 125 mm		Mean daily catch=353 kg								

Catch and CPUE



FIS recruits and pre-recruits

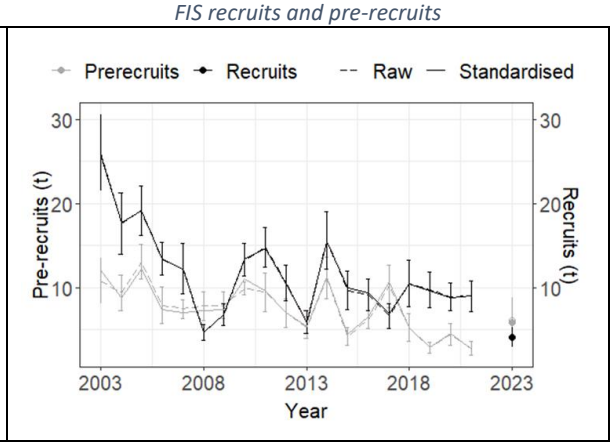


Table 12: Catches by reefcode for the Mallacoota West SMU from 2018/19 to 2023/24, the five-year average catch from 2018/19 to 2022/23, and the OT + carryover for 2023/24.

Reefcode	2018/19	2019/20	2020/21	2021/22	2022/23	5-yr average	2023/24	OT	Difference (kg)
23.02 Whaleback	8343	5853	5708	5519	5580	6200	7732	6500	1232
23.04 Petrel Point	19015	20634	13239	20964	13708	17512	6359	9000	-2641
23.05 Island Point	15312	15108	13103	15685	8283	13498	2019	0	2019
23.03 Meuller	5075	5729	2334	5058	4282	4496	1945	6000	-4055

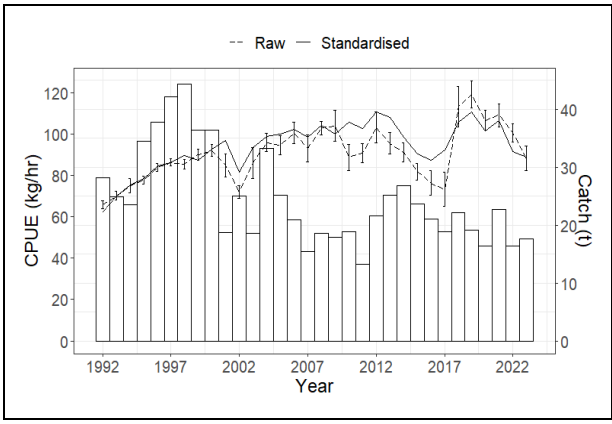
- The catch in 2023/24 was 18.1 t, which was below the OT of 21.5 t. The OT has been reduced from 44 t in 2022/23 to 12.0 t in 2024/25.
- The catch at Meuller was only one third of the OT. The catch at Petrel Point was also below the OT. Island Point had a zero OT but some catches were allowed to evaluate the stock.
- CPUE has declined over the last 4 years.
- Recruit abundance has declined substantially since 2003 and was at its lowest level in 2023. Pre-recruit abundance in 2023 and was at similar levels to those observed in 2018.
- The Draft Harvest Strategy resulted in a Decreasing Final Category for the SMU, however OTs have already been dramatically reduced.
- **The OT for the Mallacoota West SMU has been reduced from 44 t in 2022/23 to 12 t in 2024/25. Given the severity of the reductions in OT for 2023/24 and lack of information to determine how the stock may have responded in this time, it is unclear whether further cuts are required. Diver observations will be critical in determining the OT for 2024/25.**

10. Mallacoota Small

Table 15: Summary of Catch, Optimum Targets and Performance Indicators for the Mallacoota Small SMU.

Catch					Long-term indicators CPUE 2003/04 – 2023/24 Abundance 2003-2023			Short-term indicators CPUE 2009/10 – 2023/24 Abundance 2009-2023		
2023/24		OT (t)			CPUE	Pre-recruits	Recruits	CPUE	Pre-recruits	Recruits
(t)	(%)	22/23	23/24	24/25						
17.7	6.2	21.0	15.5	7.8	-5	NA	NA	-11	NA	NA
LML = 115 mm		Mean daily catch=304 kg								

Catch and CPUE



FIS recruits and pre-recruits

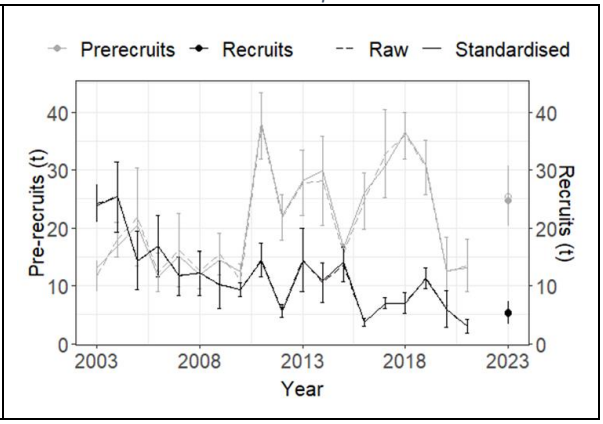


Table 16: Catches by reefcode for the Mallacoota Small SMU from 2018/19 to 2023/24, the five-year average catch from 2018/19 to 2022/23, and the OT + carryover for 2023/24.

Reefcode	2018/19	2019/20	2020/21	2021/22	2022/23	5-yr average	2023/24	OT	Difference (kg)
24.09 Little Rame	16115	12515	11270	14776	10342	13004	13990	10500	3490
24.14 Bastion Point	6093	6581	5063	7949	6025	6342	3691	5000	-1309

- The 2023/24 catch o 17.7 t was 2.1 t above the OT. The catch from Little Rame was around 3.5 t above the OT while the catch from Bastion Point was below the OT.
- Current CPUE has declined over the last four years.
- The abundance of recruits has declined since 2003 with 2023 levels similar to 2018. The abundance of pre-recruits has been highly variable over time, with 2023 levels just above the long-term average.
- The Draft Harvest Strategy resulted in a Decreasing Final Category for the SMU, however the OT was halved from 15.5 to 7.8 t for 2024/25.
- **CPUE has declined since 2019, though remains within historic levels. The OT has been reduced substantially in the last two years from 21 t to 7.8 t. It is too soon to determine whether the stock has responded to these large reductions in OT. While the Draft Harvest Strategy suggests reductions are required for 2025/26, diver observations will be important in determining whether this is required.**

Appendix 1: Performance Indicators

Tables 1 and 2 summarise performance measures for the Eastern Zone overall and for SMUs. Long-term and short-term measures for CPUE follow the formal Performance Indicators for the fishery. Measures for the last four years is also provided. Recruit and pre-recruit abundance are for the Top 15 sites in 2023 only (see Dixon 2023) as insufficient sites were done in 2024 for valid comparison. Mean daily catch and total catches are also provided as additional performance measures.

*Table 1: Performance Indicators and performance measures for assessment of the Eastern Zone abalone fishery. * 2022/23*

Measure	2023/24	Long term (since 2003/04)	Short term (since 2009/10)	Last 4 years (since 2020/21)
Nominal CPUE (kg/hr)	107.5	97.7 (↑10%)	111.4 (↓4%)	107.6 (0%)
Standardised CPUE (kg/h)	95.8	98.6 (↓3%)	107.7 (↓11%)	102.2 (↓6%)
Recruit abundance (Top 15 n/transect)	6.7*	17.7 (↓62%)	12.2 (↓45%)	8.6 (↓23%)
Mean daily catch (kg/day)	367.8	426.5 (↓14%)	433.3 (↓15%)	277.5 (↑33%)
Pre-recruit abundance (Top 15 n/transect)	8.1*	14.6 (↓44%)	14.7 (↓45%)	6.1 (↑34%)
Catch (t)	284.5	480.7 (↓41%)	460.4 (↓38%)	282.5 (↑1%)
2023/24 TACC t, (% TACC)	284.6 t, (100%)			

Table 2: Total catch, optimum targets, categorisation, and CPUE performance indicators for each Spatial Management Unit (SMU) and the Eastern Zone overall.

Spatial Management Unit (SMU)	Catch				Standardised CPUE		
	Total Catch 2023/24		OT (t)	SMU Category	Long-term (2003/04)	Short-term (2009/10)	4 years (2019/20)
	(t)	(%) TACC					
Airport	97.3	34.2	85	Large	15	9	-1
Mallacoota Central	54.3	19.1	46.4	Large	3	-10	-2
Marlo	48.0	16.9	71.5	Large	-18	-27	-18
Mallacoota East	30.5	10.7	26.2	Medium	1	-13	-9
Mallacoota Large	18.8	6.6	18.5	Small	9	-5	7
Mallacoota West	18.1	6.4	21.5	Small	-3	-14	-1
Mallacoota Small	17.7	6.2	15.5	Small	-5	-11	-13
Eastern Zone	284.5	100.0	284.6		-3	-11	-6

Notes: Coloured shading indicates whether catch has been caught within the OT, Threshold or exceeded the Limit. Green (within OT range) indicates catch was <±15% of the OT, Yellow (within threshold range) indicates catch was ±15-30% OT, Red (exceeding limit range) indicates catch was >±30% of the OT for the 2018/19 quota year. SMU catch categories (% of zone catch): Large ≥ 15%, Medium 10-15%, Small < 10%.

Appendix 2: Summary of Draft Harvest Strategy results

Table 3: Reference points for Eastern Zone SMUs, mean annual CPUE from 2018 - 2023 and applicable catch control rules (CCR).

SMU	Limit RP	Threshold RP	Target RP	2018	2019	2020	2021	2022	2023	Current Status	Years above Threshold	CCR
Airport	50	70	100	105.8	118.2	110.9	104.8	105.0	109.9	Above Target	31	1
Mallacoota Central	50	70	100	101.1	109.5	91.8	98.6	92.5	90.1	Above Threshold	31	1
Mallacoota East	40	60	110	101.2	106.7	98.9	107.4	98.7	90.4	Above Threshold	35	1
Mallacoota Large	40	60	100	90.8	100.3	87.5	93.0	86.1	93.2	Above Threshold	36	1
Mallacoota Small	50	70	100	105.7	110.7	101.6	106.5	91.6	88.9	Above Threshold	31	1
Mallacoota West	50	70	110	103.8	119.8	91.6	99.5	90.3	90.7	Above Threshold	32	1
Marlo	50	70	130	127.5	126.4	110.4	117.2	109.3	90.8	Above Threshold	33	1

Table 4: Harvest Strategy results for Eastern Zone SMUs, with suggested target catch ranges

SMU	4yr gradient	Primary Indicator	2yr ratio (% change)	Secondary Indicator	Primary Category	Tertiary Indicator	Final Category	2024/25 Target Catch (OT, t)	Total catch, Lower (t)	Total catch, Upper (t)
Airport	-0.27	Stable	4.6	Stable	Stable	NA	Stable	80.0	76.0	84.0
Mallacoota Central	-1.21	Stable	-2.6	Stable	Stable	NA	Stable	34.8	33.1	36.5
Mallacoota East	-3.31	Stable	-8.4	Decreasing	Decreasing	NA	Decreasing	19.7	16.7	18.7
Mallacoota Large	1.18	Stable	8.3	Increasing	Stable	NA	Stable	18.5	17.6	19.4
Mallacoota Small	-5.06	Decreasing	-3.0	Stable	Decreasing	NA	Decreasing	7.8	6.6	7.4
Mallacoota West	-1.26	Stable	0.4	Stable	Stable	NA	Stable	12.0	11.4	12.6
Marlo	-5.72	Decreasing	-17.0	Decreasing	Decreasing	NA	Decreasing	35.8	30.4	34.0
Total								208.6	191.8	212.6

Appendix 3: Summary of LML changes

Table 19: Summary of changes in LML (mm) for the Eastern Zone. Multiple LMLs indicate different LMLs for reefcodes within an SMU.

Date from	Marlo	Mallacoota West	Mallacoota Large	Mallacoota Central	Mallacoota Small	Airport Undersize	Airport	Mallacoota East
1 Apr 1998	120	120	120	120	110 & 120	110	120	110 & 120
2 Mar 2009	120	120	120	120	110 & 120	110	120	120
1 Apr 2009	120	120	120	120	110 & 120	110 & 112	120	120
1 Apr 2010	120 & 127	127	127	127	110 & 120	110 & 112	120	120
1 Apr 2011	120 & 125	125 & 127	138	127	110 & 120	110	120	120
1 Apr 2012	120 & 125	125 & 127	138	127	110 & 115	110 & 115	120	120
1 Apr 2013	120 & 125	125 & 127	138	127	110 & 115	110	120	120
1 Apr 2015	120 & 125	120 & 127	138	123 & 127	115	110	120	120
1 Apr 2017	120	125	138	125	115	110	120	120
1 Apr 2019	120	125	135	125	115	110	120	120