

**ADVICE TO:** PIRSA FISHERIES AND AQUACULTURE (PROF. GAVIN BEGG – EXECUTIVE DIRECTOR)

**FROM:** DRS GREG FERGUSON AND BEN STOBART (SARDI AQUATIC AND LIVESTOCK SCIENCES)

**SUBJECT:** COFFIN BAY VONGOLE FISHERY – 2023 HARVESTABLE BIOMASS ESTIMATE

**DATE:** 10 MAY 2024

### KEY ISSUES:

- This Advice Note reports on the 2023 estimates of harvestable biomass for Coffin Bay. Vongole length-frequency, legal density and stock status are also provided.
- The estimate of legal-sized harvestable biomass at the 80% confidence interval for Coffin Bay in 2023 was 991 t.
- Across the survey area, mean total density of *Katelysia rhytiphora* (yellows) was higher than for *K. scalarina* (greys) reflecting higher legal-sized and sublegal-sized densities of yellows.
- Mean densities of sublegal-sized yellows and greys show recent recruitment.
- Under the National Fishery Status Reporting Framework (NFSRF; Pidcocke et al. 2021), the Coffin Bay Fishing Zone Vongole stock is classified as ‘sustainable’ in 2023. This is the same classification as in 2021 (Ferguson et al. 2022).

### BACKGROUND:

The Vongole fishery in Coffin Bay (*Katelysia* spp., also known as mud cockles) primarily targets two species – *Katelysia scalarina*, known as “greys”, and *K. rhytiphora*, known as “yellows”. A third species, *K. peronii*, known as “whites”, is rarely present. Harvestable biomass of Vongole determined from fishery independent surveys informs setting of annual total allowable commercial catches (TACCs) under the harvest strategy in the Management Plan (PIRSA 2013). The maximum exploitation rate (Harvest Fraction, HF) in the Management Plan is defined as 7.5% of the legal-sized biomass estimate at the 80% quantile confidence interval (CI).

A review of the Vongole research program by Foster (2022; Recommendation 1), highlighted the importance of consistently sampling the same strata and transect locations across years. Consequently, strata and transect locations were extensively reviewed in 2023. A set of agreed strata (Figure A1) and transect locations for Coffin Bay was finalised and adopted for

the harvestable biomass estimate from 2023. This set of strata and transects will provide robust baseline estimates of biomass, legal and sublegal density, and size structures from 2023, overcoming historical difficulties of comparing among years.

This Advice Note reports on the 2023 estimates of harvestable biomass and stock status for Vongole in the Coffin Bay Fishing Zone. Biomass estimates are presented at the 80% CI unless otherwise indicated.

## RESULTS/DISCUSSION:

### *Harvestable biomass estimates*

The median estimate of harvestable biomass for Coffin Bay in 2023 was 1,265 t, and, at the 80% CI was 991 t (Table 1). Yellows contributed 63% to the total harvestable biomass.

In 2023, low intensity sampling of two small strata in Kellidie Bay was undertaken and the biomass from these areas not included because there is a high level of uncertainty associated with the additional estimated biomass from Kellidie Bay, due to non-representative sampling. The uncertainty could be reduced by more intensive sampling of these strata if they are retained, but this will increase the costs of undertaking the survey.

During the current analysis it was established that the estimate of harvestable biomass in 2021 (1,095 t, 80% CI) was upwardly biased as changes to strata during that year were incorrectly accounted for in the biomass estimate. The corrected estimate of harvestable biomass in Coffin Bay for 2021 was 643 t. Using the transects from the 2023 survey design (excluding Kellidie Bay), the estimate for 2021 was 673 t. Thus, the estimated harvestable biomass has increased by ~47% between the 2021 and 2023 surveys.

**Table 1.** Estimated total harvestable biomass (t) for Coffin Bay Fishing Zone in 2023 at 10–90% quantiles for greys; yellows and whites (n=284 transects). Bold text on bottom row indicates total harvestable biomass at the 80% CI.

Species	Probability (%) of legal biomass estimate (t)								
	90%	80%	70%	60%	50%	40%	30%	20%	10%
Greys ( <i>K. scalarina</i> )	260	<b>369</b>	406	489	521	552	645	680	787
Yellows ( <i>K. rhytiphora</i> )	566	<b>621</b>	666	704	744	783	827	881	957
Whites ( <i>K. peronii</i> )	0	<b>0</b>	0	1	1	1	1	1	1
<b>Total</b>	827	<b>991</b>	1,072	1,194	1,265	1,336	1,473	1,562	1,745

### *Densities and length frequency*

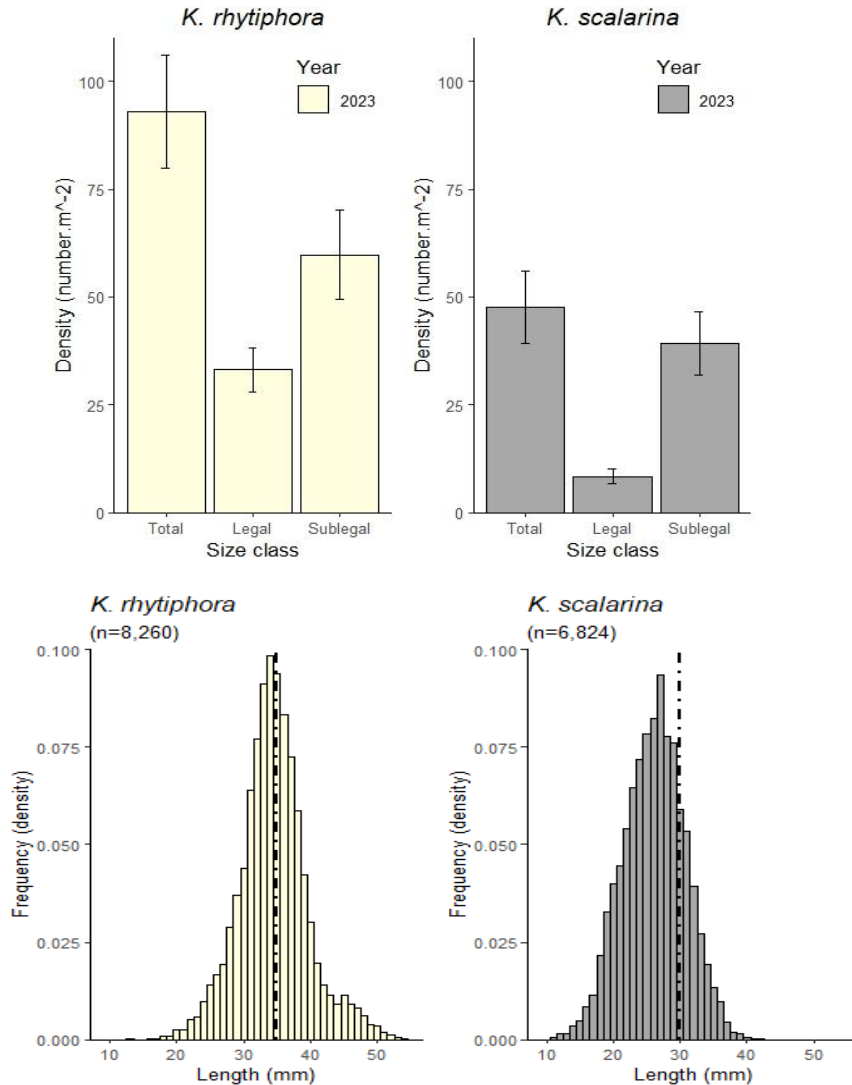
Mean total density of yellows was 48% higher than that of greys (Figure 1).

The modal size of yellows in 2023 was 35 mm and the modal size for greys was 28 mm (Figure 2). The strong representation of sub-legal sized individuals in the length-frequency distributions, and high density of sub-legal individuals for both species, demonstrates recent recruitment. Recruitment is known to be episodic for Vongole species (Dent et al. 2016, Heldt and Mayfield 2020), with its strength likely reflecting a combination of environmental conditions and the spawning biomass. A stock-recruit relationship has not been established for Vongole and environmental conditions required for recruitment success are unknown.

Growth rates of Vongole differ among species and locations and are poorly understood. Consequently, the time required for sublegal-size Vongole to recruit into the fishery is not well known. However, based on estimates of growth rate for yellows in Streaky Bay (Dent et al. 2016), and Ansons Bay and Little Musselroe Bay in Tasmania (Riley et al. 2005), the recent

recruits may continue to enter the fishery for several years. Data on the growth rates of greys are more limited, but the recruits would also be expected to be available to the fishery within the next few years.

**Figure 1.** Mean, total, legal, and sublegal densities (Vongole.m<sup>-2</sup>) for *K. rhythiphora* (yellows) and *K. scalarina* (greys) in Coffin Bay during 2023.



**Figure 2.** Size frequency distributions (mm) for *K. rhythiphora* (yellows) and *K. scalarina* (greys) in Coffin Bay during 2023. On each panel, the vertical dashed line indicates current minimum legal size (MLS, *K. scalarina* = 30 mm SL and *K. rhythiphora* = 35 mm SL).

### Stock status

The estimate of harvestable biomass for Coffin Bay in 2023 at the 80% CI was 991 t, 47% above the last estimate in 2021, and there is evidence of recent recruitment. Consequently, based on a weight of evidence approach, under the National Fishery Status Reporting Framework (NFSRF; Piddocke et al. 2021) the Coffin Bay Fishing Zone Vongole stock in 2023/24 remains classified as ‘sustainable’.

**Dr Mike Steer**  
**Research Director, SARDI Aquatic and Livestock Sciences**

**Disclaimer**

PIRSA and its employees do not warrant or make any representation regarding the use, or results of the use, of the information contained herein as regards to its correctness, accuracy, reliability and currency or otherwise. PIRSA and its employees expressly disclaim all liability or responsibility to any person using the information or advice. Use of the information and data contained in this Advice Note is at the user's sole risk. If users rely on the information they are responsible for ensuring by independent verification its accuracy, currency or completeness.

## APPENDIX



**Figure A1.** Sampling areas (strata) for Coffin Bay Fishing Zone in 2023 (n=284 transects). Locations are Longnose Point (top left), Oyster Farms (second from top left), Little Douglas (top centre) and Long Beach (bottom right). Inset shows two additional strata in Kellidie Bay containing four transects (Total number Including Kellidie Bay = 288 transects)

## REFERENCES

- Dent, J., Mayfield, S., Carrol, J. (2016). Harvestable biomass of *Katylisia* spp. in the South Australian commercial Mud Cockle Fishery. Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2014/000191-1. SARDI Research Report Series No. 766. 22 pp.
- Ferguson, G., K. Heldt, B. Stobart and M. S. (2022) Harvestable biomass in the South Australian Vongole Fishery (*Katylisia* spp.). Report to PIRSA Fisheries and Aquaculture, SARDI Publication No. F2014/000191-3. SARDI Research Report Series No. 1127 South Australian Research and Development Institute (Aquatic Sciences), Adelaide, 37 pp.
- Foster, S. (2022) Review of fishery independent survey for Vongole. Prepared for Primary Industries and Regions, South Australia. CSIRO, Hobart, Tasmania, 10 pp.
- Heldt, K., Mayfield, S. (2020). Harvestable biomass of *Katylisia* spp. in the South Australian Vongole Fishery. Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2014/000191-2. SARDI Research Report Series No. 1060. 40 pp.
- Piddocke, T., Crispian, A., Hartmann, K., Hesp, A., Hone, P., Klemke, J., Mayfield, S., Roelofs, A., Saunders, T., Stewart, J., Wise, B. and J. Woodhams (eds) 2021, Status of Australian fish stocks reports 2020, Fisheries Research and Development Corporation, Canberra.