ADVICE TO:	**PIRSA FISHERIES AND AQUACULTURE (PROF. GAVIN BEGG – EXECUTIVE DIRECTOR)**
FROM:	**SARDI AQUATIC AND LIVESTOCK SCIENCES (DR BEN STOBART AND EMMA-LOUISE DALY)**
SUBJECT:	**2026 GIANT AUSTRALIAN CUTTLEFISH POPULATION ESTIMATE**
DATE:	**7TH AUGUST 2026**

KEY ISSUES

- This Advice Note presents the Giant Australian Cuttlefish (hereafter termed cuttlefish) population estimate for the 2026 breeding season and provides temperature information and its relationship with the population estimates.
- No cuttlefish were observed on the standard SARDI surveys conducted in June and July 2026. The population estimate using these counts was zero cuttlefish. While abundance decreased over the previous three consecutive years, the 100% decrease between 2025 and 2026 is unprecedented. Four cuttlefish were sighted outside the survey area at Backy Point (3 cuttlefish) and at the Santos wall near Whyalla (1 cuttlefish).
- Surveys conducted by the Department for Environment and Water (DEW) in June, July and August 2026, using the same locations and similar methodology as SARDI, recorded a low number of cuttlefish. The population estimate using these counts was 113 cuttlefish. DEW also modified the survey to include counts of cryptic cuttlefish by searching under rocks with torches. The population estimate using these counts was 1,811 cuttlefish.
- While temperature is known to affect cuttlefish development and therefore survival, there is no evidence from the temperature records for 2025 and 2026 that they were anomalous and likely to have affected the cuttlefish numbers at Point Lowly in 2026.
- In mid-March 2025, a harmful algal bloom (HAB), dominated by *Karenia spp*., was identified in the waters around the Fleurieu Peninsula in South Australia. The bloom subsequently spread, primarily into Gulf St Vincent, but also into the Spencer Gulf, southern Yorke Peninsula, Kangaroo Island and the Coorong.
- Given the large impact the HAB is known to have had on other mollusc species (e.g. Calamari, Abalone), and its recent incursion into the Spencer Gulf, it is likely that the HAB is a significant contributing factor in the large, observed decline in the cuttlefish population between 2025 and 2026.

BACKGROUND

The Giant Australian Cuttlefish (hereafter termed cuttlefish) is an iconic species of South Australia, that aggregates annually off Point Lowly. It is important to have a robust assessment of its status on an annual basis to inform the management of this species. This Advice Note provides estimates of abundance and biomass that are provided to PIRSA Fisheries and Aquaculture annually. The cuttlefish abundance estimates are a more robust population estimate than biomass because biomass is dependent on size and cuttlefish sizes are estimated in-situ by divers with varying levels of experience, and estimates are no longer verified by capturing individual cuttlefish. In addition, temperature information and its relationship with the population estimates since 2009 are also provided based on the mean values from two data loggers (one located just East of the Santos Jetty and one at Black Point).

Standard survey methodology (Steer et al. 2013) was used to determine annual estimates of cuttlefish abundance and biomass of the Point Lowly breeding aggregation in 2026. As in previous years, the 2026 SARDI survey was conducted in June (25 and 26th June; see Table 1 for historic survey dates in June) to coincide with the most likely peak breeding period. However, given a nil count by SARDI in June 2026, and the very low numbers observed in 2026 (reported by the Department for Environment and Water (DEW)) a second survey was conducted by SARDI on 21 and 22 July 2026. Surveys were also undertaken by DEW across the breeding season (5-6 May, 10-11 June, 7-8 July and 4-5 August 2026), to ensure the peak of the breeding season was not missed (i.e. to confirm that the timing of the 2026 breeding season was not anomalous). The DEW survey was conducted across the same sites as SARDI and using similar methodology. There were two key differences: DEW data excluded estimates of cuttlefish size and sex and DEW modified the survey to include counts of cryptic cuttlefish by searching under rocks with torches. DEW also provided an estimate of counts without the searching under rocks and use of torches that aligns with the SARDI method.

In mid-March 2025, a harmful algal bloom (HAB), dominated by *Karenia* spp., was identified in the waters around the Fleurieu Peninsula in South Australia (SA). The HAB subsequently spread, primarily into Gulf St Vincent, but also into the Spencer Gulf, southern Yorke Peninsula, Kangaroo Island and the Coorong. It is estimated the HAB has affected over 500 species of fish, invertebrates and associated marine and coastal diversity (source: iNaturalist). This has included mortality of commercial species such as Pipi, Abalone, Calamari, and Snapper, iconic species such as Leafy Seadragons, and larger marine life, including many species of sharks and rays.

Table 1. Days in June on which cuttlefish surveys have been conducted (X) from 1998 to 2026. Note ✶ is date of the 2026 June DEW survey.

Year	Day in June																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	21	22	25	26	27	28	29	30
1998	X	X	X	X	X																			X	X	X
1999																									X	X
2000	X	X											X	X	X							X	X	X		
2001					X	X	X	X	X		X			X												
2005	X	X																								
2008		X	X	X	X																					
2009	X	X																								
2010	X	X	X	X																						
2011						X	X	X	X																	
2012									X	X	X	X														
2013											X	X					X									
2014																X	X	X								
2015										X	X															
2016														X	X	X										
2017																X	X									
2018					X																					
2019						X	X																			
2020															X	X										
2021																			X	X						
2022									X	X							X									
2023					X	X																				
2024			X	X																						
2025																						X	X			
2026										✶	✶										X	X				

RESULTS/DISCUSSION

Cuttlefish abundance was relatively high, but variable, from 2015-2023 with annual estimates consistently exceeding 100,000 cuttlefish (Figure 1a). Within this period, the 2020 estimate of 247,146 was the highest on record. In 2024, abundance decreased below 100,000 to 81,420 which was the first record below this level in the past decade. Abundance then decreased a further 23% in 2025 to 63,734 cuttlefish, the fifth lowest value on record (Figure 1a). No cuttlefish were observed on either the June or July 2026 surveys conducted by SARDI. The population estimate using these counts was zero cuttlefish. In addition to the nil count on transects, no cuttlefish were observed in the vicinity of the transects in the survey area or on an additional dive at Black Point during the June survey. Three cuttlefish (1 in June and 2 in July) were observed during dives at the nearby Backy Point and one cuttlefish was observed in June at the BHP wall near Whyalla (no dives were conducted at the BHP wall in July). A low cuttlefish count was expected for 2026 given a low count by DEW early in June. However, the nil count from the SARDI survey is unprecedented.

During the 2026 DEW cuttlefish surveys at the SARDI survey locations, no cuttlefish were observed in the May survey, and low numbers were recorded in June, July and August (0, 16, 20 and 2 cuttlefish, respectively for the counts, not scaled to total area). Note that the June and August surveys conducted by DEW were incomplete surveys (missing Fitzgerald Bay and the three Point Lowly sites and Point Lowly West and Point Lowly Lighthouse, respectively), while the July survey was a complete survey. The population estimate using the July 2026 DEW data and SARDI methodology (i.e. no searching for cryptic cuttlefish and scaled to the total area) was 113

cuttlefish. The population estimate using the July 2026 DEW data and the DEW modified method (i.e. searching for cryptic cuttlefish and scaling to the total area) was 1,811 cuttlefish.

Except for 2021 (63.1 t), the biomass of the breeding aggregation remained above 70 t from 2015 to 2022, with peaks of 165.2 t in 2016 and 140.5 t in 2020 (Figure 1b). Biomass subsequently decreased consistently between 2022 and 2025, when it was the lowest since 2013. The SARDI surveys for 2026 recorded nil cuttlefish and, thus, zero biomass. The DEW surveys did not include the estimates of cuttlefish size required to estimate biomass. There is also no estimate of mantle size or sex ratio for 2026. Historic estimates of mantle size and sex ratio are provided for reference (Figure 2).

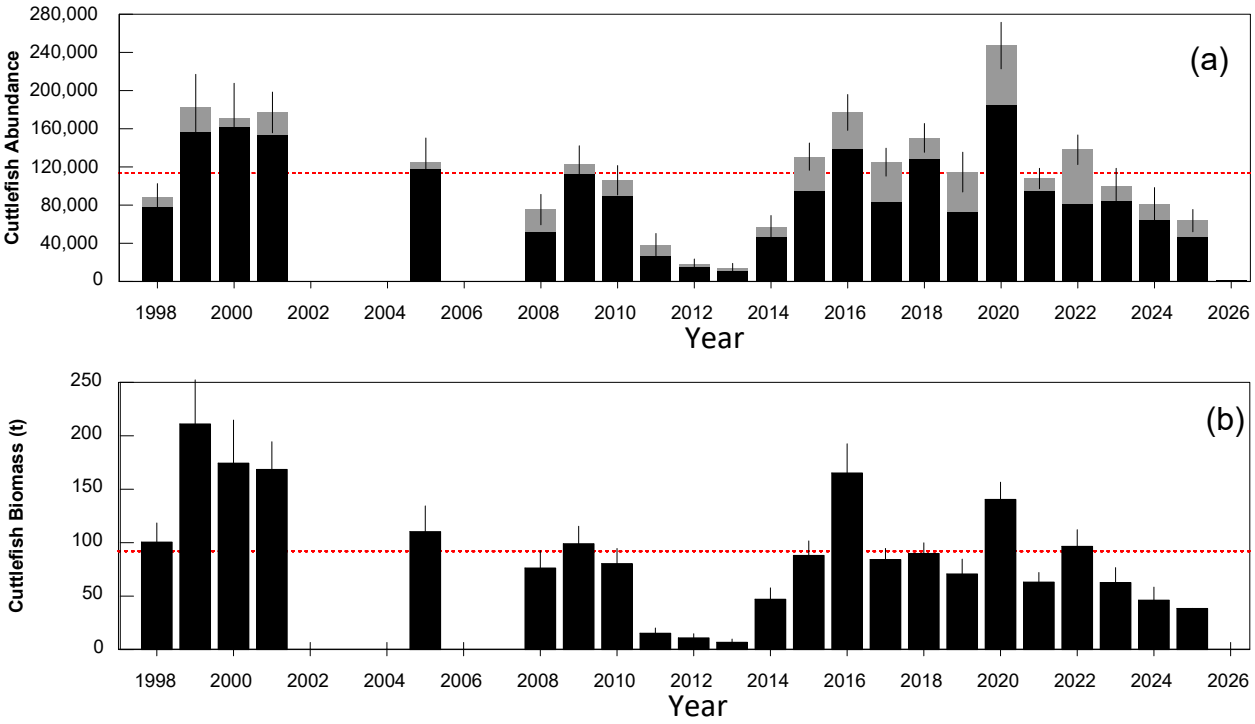

Figure 1. Annual peak estimates (June survey) of total (a) abundance and (b) biomass (± SD) of Giant Australian Cuttlefish aggregating around Point Lowly during peak breeding from 1998 to 2026. In (a) black abundance bars represent shallow transects, grey bars the four deep transects. The grey bar in 2026 may not be discernible, indicating 1,811 cuttlefish from the DEW survey. Historic data obtained from Hall and Fowler (2003). The red dashed lines represent the overall average between 1998 and 2025. Note population was heavily fished in 1998.

Cuttlefish population strength is intrinsically linked to environmental processes that can be highly variable among years and impact both development and growth. This has been reflected in the nineteen consecutive survey years prior to 2026, where both abundance and biomass have fluctuated considerably over short time scales. The temperature pattern in the months when embryos are developing following the laying of eggs is hypothesised to be an important factor in influencing cuttlefish abundance the following year (Steer et al. 2013). This is because temperature is known to affect cephalopod development and, at Point Lowly, it is increasingly being demonstrated to correlate with cuttlefish abundance. The annual temperature cycle at Point Lowly ranges from high summer temperature that peaks in February (Max recorded = 27.8 °C) with lowest water temperatures in August (Min recorded = 11.3 °C; Figure 3a). Years in which

temperature increases faster after winter can be identified by their difference to the average temperatures for that period (i.e. by a temperature anomaly). When all available years are considered, there is a weak relationship between the temperature anomaly and cuttlefish abundance the following year (R^2 = 0.32 not including 2026 information; Figure 3b, c). The relatively low R^2 value reflects variability in abundance between years that, amongst others, may also have been influenced by cuttlefish arrival times, weather and sea conditions at the time of survey (e.g. abundance may have been underestimated in 2024 as visibility was poor), and overestimates when cuttlefish numbers are very high (e.g. the high abundance estimate in 2020).

It is unlikely that an anomalous temperature cycle has led to the unprecedented decrease in cuttlefish abundance between 2025 and 2026. The temperature anomaly was similar to previous years (Figure 3b) and the weekly water temperatures in 2025 and 2026 were within historic ranges (Figure 4). Given the known impact the recent HAB has had on cephalopods, the most likely explanation for the decrease in cuttlefish abundance in 2026 is that they have also been impacted by this event over the past year.

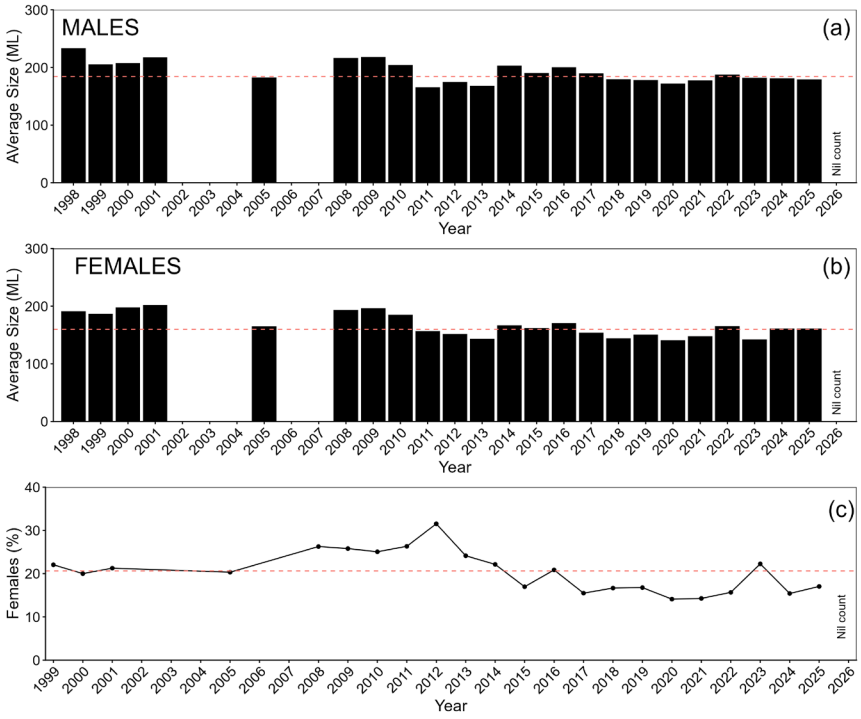

Figure 2. The average size of Giant Australian Cuttlefish (± SE) for males (a) and females (b) from 1998 to 2026. The population sex ratio presented as the percentage of females (c). The red dashed lines represent the overall average between 1998 and 2025. Note the count for 2026 was nil.

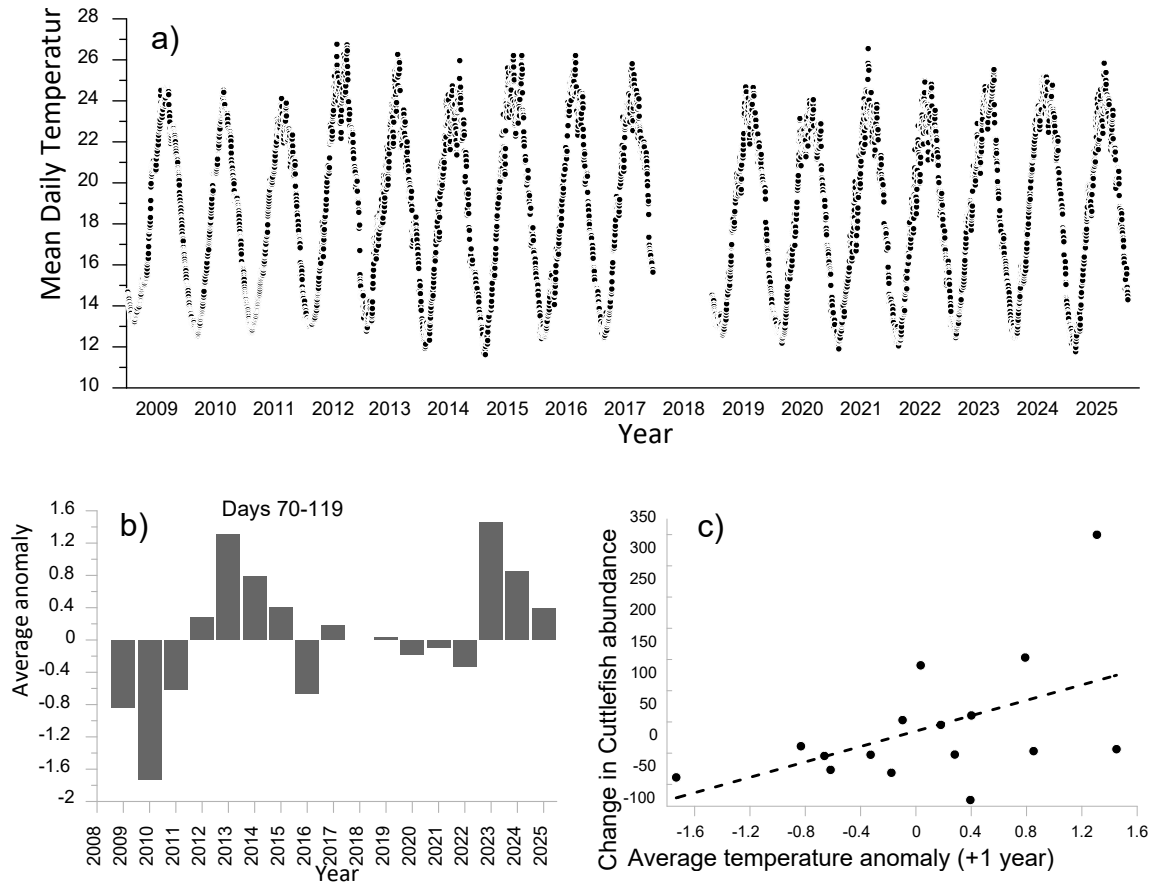

Figure 4. (a) Mean daily temperature at Point Lowly (ºC) from 2009 to 2026 (2018 temperature not available); (b) Average annual temperature anomaly for days 70-119 after the end of the second week in June (i.e. after the peak of the aggregation period); and (c) Correlation between the average anomaly offset by one year and % change in cuttlefish abundance from the previous year.

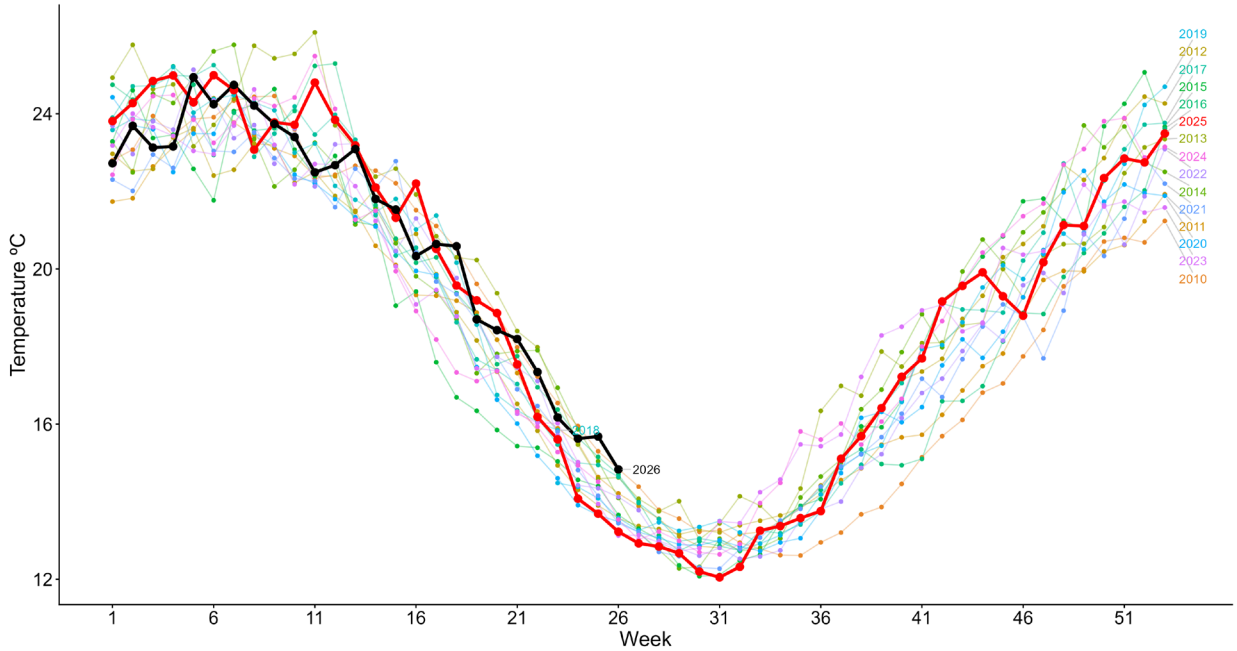

Figure 3. Mean weekly temperature at Point Lowly by year (see labels on plot) with 2025 highlighted in red and 2026 in black.

References

Hall, K.C and Fowler, A.J. (2003). The fisheries biology of the cuttlefish *Sepia apama* Gray, in South Australian waters. Final Report to FRDC (Project No. 98/151). SARDI Aquatic Sciences, Adelaide. 289 pp.

Steer, M. A., Gaylard, S. and Loo, M. (2013). Monitoring the relative abundance and biomass of South Australia's Giant Cuttlefish breeding population. Final Report for the Fisheries Research and Development Corporation. South Australian Research and Development Institute (Aquatic Sciences). Adelaide. SARDI Publication No. F2013/000074-1. SARDI Research Report No. 684. 103pp.

Dr. Qifeng Ye

A/Research Director, SARDI Aquatic and Livestock Sciences