SARDI

ADVICE TO:	**PIRSA FISHERIES AND AQUACULTURE (PROF. GAVIN BEGG – EXECUTIVE DIRECTOR)**
FROM:	**SARDI AQUATIC AND LIVESTOCK SCIENCES (DR BEN STOBART AND ANDREAS REUTER)**
SUBJECT:	**2025 GIANT AUSTRALIAN CUTTLEFISH POPULATION ESTIMATE**
DATE:	**7 JULY 2025**

KEY ISSUES

- This Advice Note presents the Giant Australian Cuttlefish population estimate for the 2025 spawning season and provides temperature information and its relationship with the population estimates.
- Abundance decreased 23% between 2024 and 2025 to 63,734 cuttlefish, the fifth lowest value on record.
- While abundance has decreased over the last three consecutive years, it remains above low levels observed in 2013.

BACKGROUND

The Giant Australian 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. 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 spawning aggregation in 2025. As in previous years, the 2025 survey was done in June 2025 to coincide with the peak spawning period. The cuttlefish abundance estimates are a more robust population estimate than biomass. This is because biomass is dependent on size, and cuttlefish sizes are estimated *in-situ* by divers with varying levels of experience; estimates are no longer verified by capturing individual cuttlefish.

RESULTS/DISCUSSION

Giant Australian 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, cuttlefish abundance decreased below 100,000 to 81,420 which was the first time below this level in the past decade. Abundance decreased a further 23% in 2025 to 63,734 cuttlefish. This was the fifth lowest value on record. This lower value was driven by low counts in both deep (~5 m) and shallow (~2 m) transects surveyed in 2025 (Figure 1a). While the lower abundance observed in both the deep and shallow transects in 2025 likely reflects a decrease in the cuttlefish population, it could also reflect inter-annual variation in the timing of cuttlefish arrival relative to surveys in previous years. Overall, the estimates of cuttlefish abundance over the past twelve years indicate that the population increased substantially from the low levels observed in 2013 and has remained relatively high thereafter, albeit with a decreasing trend over the past three seasons.

Except for 2021 (63.1 t), the biomass of the spawning 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 has subsequently decreased consistently between 2022 and 2025 when it was the lowest since 2013, reflecting the lower abundance of cuttlefish in the deep and shallow transects (see above). The average size (mantle length) of female cuttlefish remained the same at 161 mm between 2024 and 2025, while there was a small decrease for males over the same period (181mm in 2024 and 179 mm in 2025), with both remaining below the long-term averages of 167 mm and 192 mm, respectively (Figures 2a-b). The sex ratio in 2025 (~17% females) remained male dominated and below the long-term average of 22% (Figure 2c).

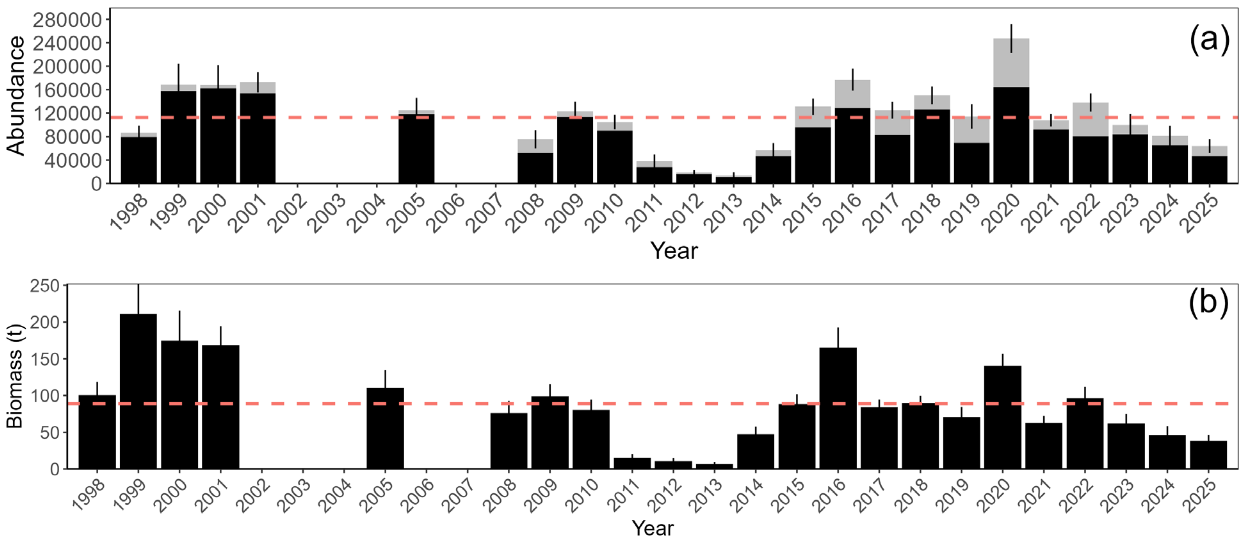

Figure 1. Annual peak estimates (June survey) of total (a) abundance and (b) biomass (± SD) of Giant Australian Cuttlefish aggregating around Point Lowly during peak spawning from 1998 to 2025. In (a) black abundance bars represent shallow transects, grey bars the four deep transects. *Population was heavily fished. Historic data obtained from Hall and Fowler (2003). The red dashed lines represent the overall average between 1998 and 2025.

Giant Australian Cuttlefish population strength is intrinsically linked to environmental processes that can be highly variable among years and impact both development and growth. This is reflected in the last eighteen consecutive survey years, 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 cuttlefish 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 3 a). 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; Figure 3 b, 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). Estimates in future years will help understand the consistency of this relationship.

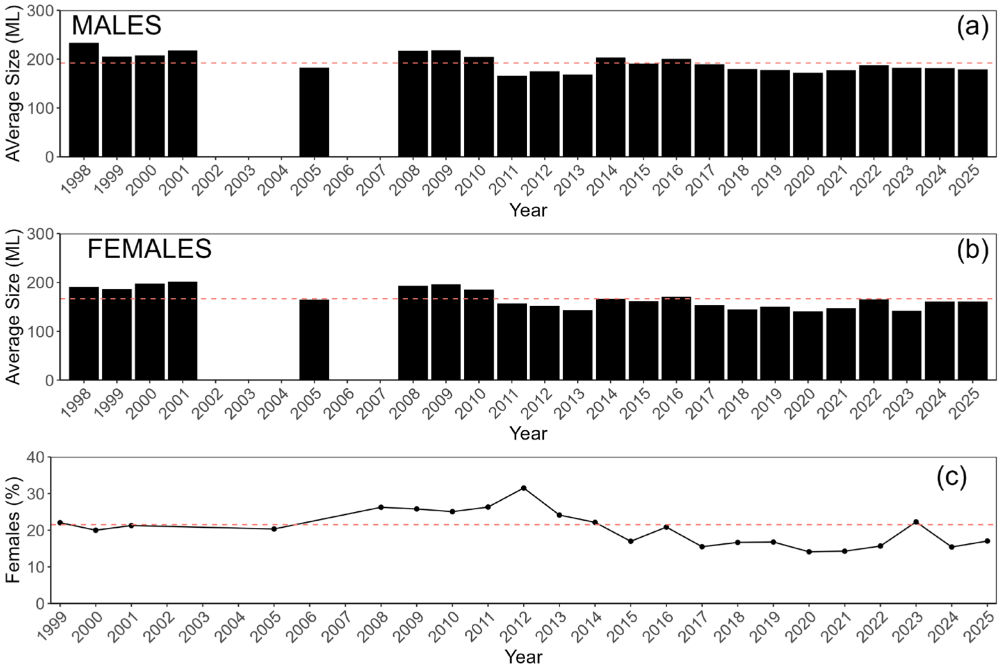

Figure 2. The average size of Giant Australian Cuttlefish (± SE) for males (a) and females (b) from 1998 to 2025. The population sex ratio presented as the percentage of females (c). The red dashed lines represent the overall average between 1998 and 2025.

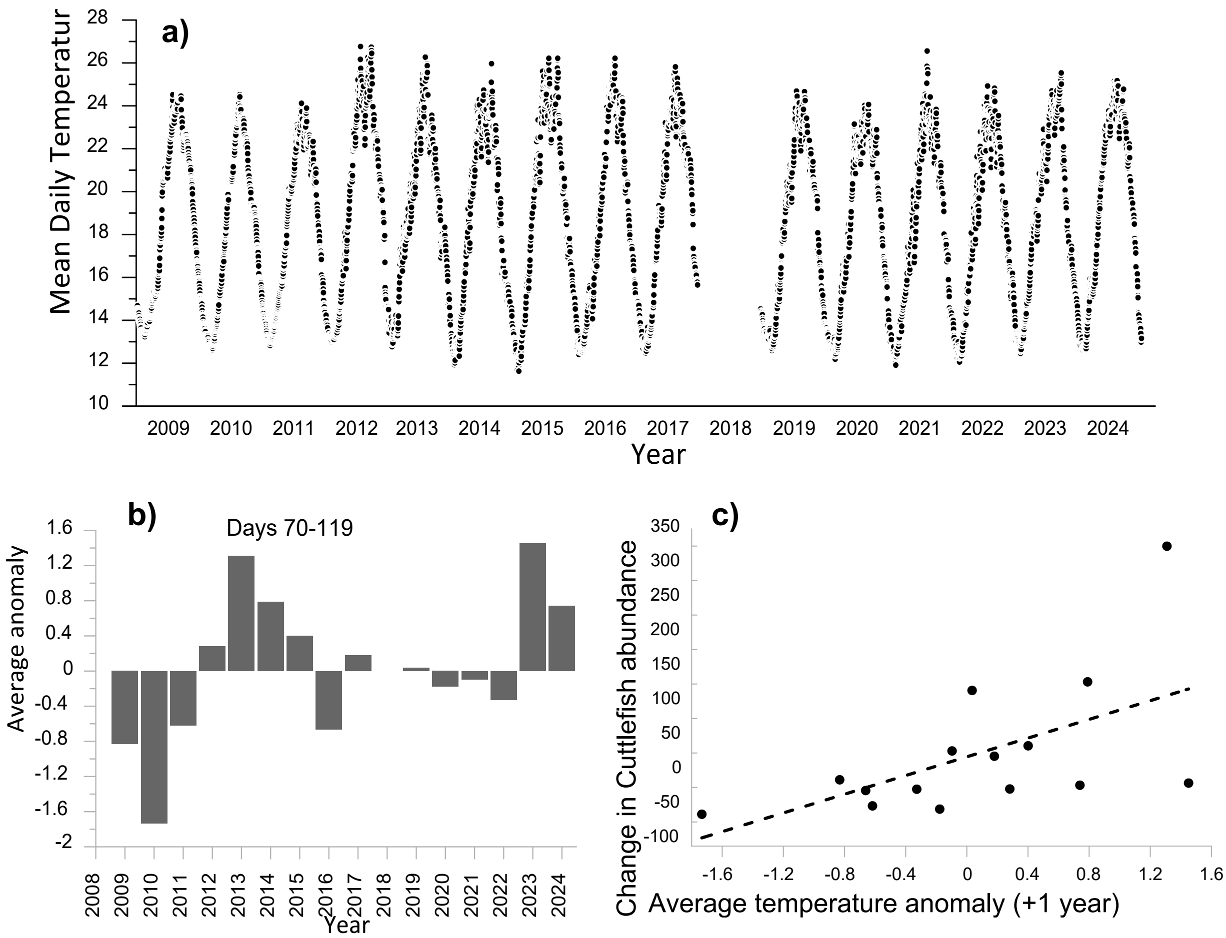

Figure 3. a) Mean daily temperature at Point Lowly (°C) from 2009 to 2025 (2018 temperature not available); b) Average annual temperature anomaly for days 70-119 after the end of the second week in June (i.e. after the peak of the aggregation period); and c) correlation between the average anomaly offset by one year and % change in cuttlefish abundance from the previous year.

A/Prof. Gretchen Grammar

A/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.

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.