ADVICE TO:	**PIRSA FISHERIES AND AQUACULTURE (PROF. GAVIN BEGG – EXECUTIVE DIRECTOR)**
FROM:	**DR BEN STOBART (SARDI AQUATIC AND LIVESTOCK SCIENCES)**
SUBJECT:	**2023 GIANT AUSTRALIAN CUTTLEFISH POPULATION ESTIMATE**
DATE:	**14 JUNE 2023**

KEY ISSUES

- This Advice Note presents the Giant Australian Cuttlefish population estimate for the 2023 spawning season.

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 fishery management. This advice note provides estimates of abundance and biomass that are provided to PIRSA Fisheries and Aquaculture annually.

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 2023. As in previous years, the 2023 survey was done in June to coincide with the peak spawning period. 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.

RESULTS/DISCUSSION

Giant Australian Cuttlefish abundance was relatively high, but variable, from 2015-2023 with annual estimates consistently exceeding 100,000 cuttlefish and the 2020 estimate of 247,146 Cuttlefish being the highest on record (Figure 1a). Between 2020 and 2021, abundance decreased 56% to 107,847, then increased to 137,999 in 2022, and has subsequently decreased to 100,042 in 2023. While the abundance estimate for 2023 is the lowest value since 2014, and below the average over the 26 years of surveys, the value is largely driven by very low counts in all four deeper transects surveyed (~5m; Figure 1a grey bars). In contrast, the shallower counts suggest cuttlefish abundance in 2023 is higher than that observed in 2017, 2019 and 2022 (Figure 1a black bars). The lower abundance observed in deep transects in 2023 may reflect variation in the timing of cuttlefish arrival relative to surveys in previous years. Overall, the estimates of cuttlefish abundance over the past nine years indicate that the population increased substantially from the historic low observed in 2013 and has remained relatively high thereafter.

Except for 2021 (63.1 t) and 2023 (62.7 t), the biomass of the spawning aggregation remained above 70 t from 2015 to 2023, with peaks of 165.2 t in 2016 and 140.5 t in 2020 (Figure 1b). The biomass in 2023 was the lowest since 2014, reflecting the lower abundance of cuttlefish in the deep transects (see above). The average size (mantle length) of female (143 mm) and male (182 mm) cuttlefish decreased between 2022 and 2023, with both remaining below the long-term averages of 167 mm and 193 mm, respectively (Figures 2a-b). The sex ratio in 2023 (~22% females) remained male dominated and was similar to the long-term average of 21% (Figure 2c).

Giant Australian Cuttlefish population strength is intrinsically linked to environmental processes that are highly variable and impact both development and growth. This is reflected in the last sixteen consecutive survey years, where both abundance and biomass have fluctuated considerably over short time scales.

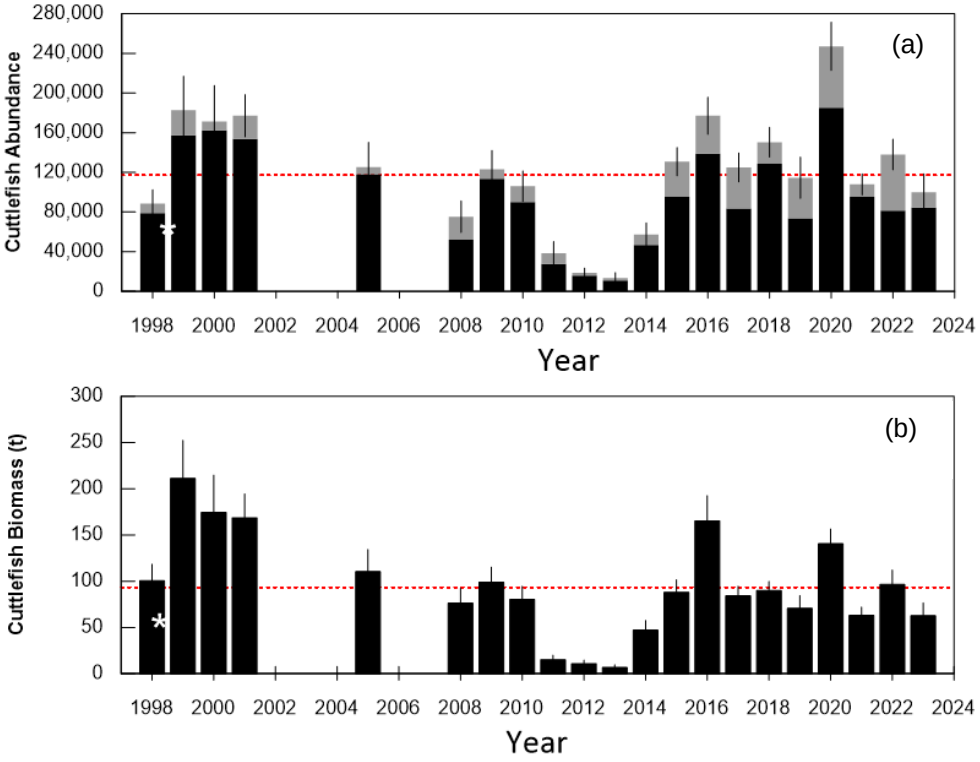

Figure 1. Annual peak estimates (June survey) of total (a) abundance and (b) biomass (± SD) of Giant Australian Cuttlefish aggregating around Point Lowly during peak spawning from 1998 to 2023. In (a) black abundance bars represent shallow transects, grey bars the four deep transects. *Population was heavily fished. Historic data obtained from Hall and Fowler (2003). The red dashed lines represent the overall average between 1998 and 2023.

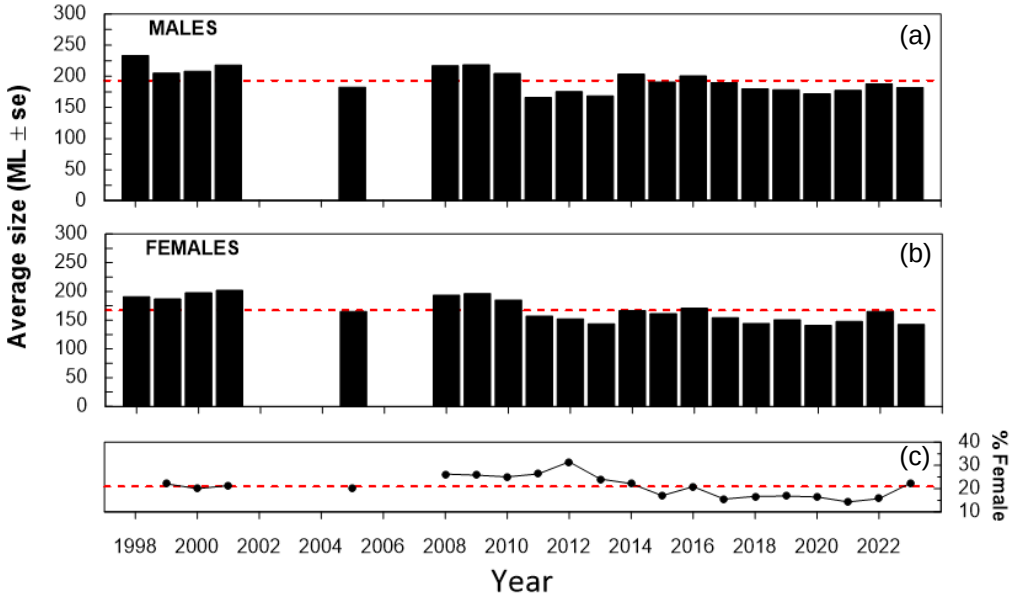

Figure 2. The average size of Giant Australian Cuttlefish (± SE) for males (a) and females (b) from 1998 to 2023. The population sex ratio presented as the percentage of females (c). The red dashed lines represent the overall average between 1998 and 2023.

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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.