

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

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SUBJECT: SOUTH AUSTRALIAN GIANT CRAB FISHERY – POTENTIAL 2023/24 TACC REDUCTION BENEFITS

DATE: 28 JUNE 2023

KEY ISSUES

- The current harvest strategy for the South Australian Giant Crab Fishery (GCF) uses a five-year average commercial CPUE of legal-size crab as the key performance indicator (PI) to assess stock sustainability.
- In 2021/22, the South Australian GCF was classified as 'sustainable'. However, uncertainty exists in relation to future stock sustainability as the PI is now 2.1% above the trigger reference point (RP_{trig}).
- PIRSA Fisheries and Aquaculture have requested advice on an appropriate Total Allowable Commercial Catch (TACC) for the GCF in 2023/24 if the PI falls below the RP_{trig} in 2022/23.
- In 2022/23, the TACC allocated to South Australian GCF quota holders was 21 t (SZ: 8.3 t; NZ: 12.7 t). The total catch of quota holders reported in catch disposal records was 13.3 t, which is 63% of the allocated TACC.
- For the SZ, a substantial TACC reduction (>50%) is needed to limit catch to 2022/23 levels. For the NZ, this would be achieved by a TACC reduction of about 30%.
- Available scientific evidence indicates that these levels of TACC reduction are unlikely to reduce fishing mortality sufficiently to rebuild stock biomass (and increase CPUE) over a ten-year timeframe.
- Should the 2022/23 estimate of five-year average PI fall below the RP_{trig}, stock biomass recovery is likely to be promoted by initially reducing the TACC by 70% in the SZ and 50% in the NZ. Based on 2022/23 CDR catch records, this would reduce catch by 37.9% in the SZ and 31.5% in the NZ equating to TACCs of 2.5 t and 6.4 t, respectively. TACCs beyond 2023/24 can be informed by contemporary levels of CPUE and the upcoming review of the GCF management policy and its decision rules used to set TACC.

BACKGROUND

In 2021/22, the TACC in the GCF was 22.1 t. Of this, 95% (21 t) was allocated to GCF quota holders within the Southern Zone (8.3 t) and Northern Zone (12.7 t), and 5% (1.1 t) was allocated for Giant Crab by-product in the SARLF (PIRSA 2018). The TACC has been caught in three seasons since its inception in 1999 (1999, 2000 and 2012) but has not been caught for the last nine seasons. In 2021/22, the catch comprised 46.2% of the 22.1 t TACC (McLeay 2023).

Meetings between PIRSA Fisheries and Aquaculture, GCF licence holders, and SARDI research scientists on 8 September 2022 and 11 May 2023 discussed the current stock status, trends in

the fishery performance indicators, and the need for review of the harvest strategy within the management policy of the GCF.

Information presented in the meetings, previous Advice Notes (17/08/22; 21/09/22) and the 2021/22 stock assessment (McLeay 2023) indicated that although the GCF was classified as 'sustainable' in 2021/22, uncertainty exists in relation to future stock sustainability and performance of the GCF due to:

- 1) the biological susceptibility of Giant Crab populations to recruitment overfishing (long-lived and slow growth life history);
- 2) downward trends in relative biomass (catch per unit effort, CPUE) and catch despite the TACC not being caught in the last nine seasons;
- 3) industry reports of low Giant Crab catchability;
- 4) near record low estimates of pre-recruit abundance between 2019 and 2021; and
- 5) declining trends in catch reported across core areas of the species' distribution in Victoria and Tasmania.

The current harvest strategy for the GCF uses the five-year average commercial CPUE of legal-size Giant Crab as the key performance indicator (PI) to assess stock sustainability PIRSA (2018). In 2021/22, this indicator was 1.99 kg/potlift, which was the lowest estimate on record and 2.1 % above the Trigger Reference Point (RP_{trig}; 1.95 kg/potlift) (Appendix, Figure 1). Annual CPUE estimates of legal-size Giant Crab have declined in recent years. Under the decision rule within the harvest strategy, which categorises the status of the Giant Crab stock in South Australia (PIRSA 2018), the stock was classified as 'sustainable' in 2021/22. However, if the downward trend in annual CPUE continues, the PI would be expected to be below the RP_{trig} for 2022/23, and the fishery will then be classified as 'depleting'.

If the PI falls below RP_{trig}, a TACC is not prescribed but "*a review of the commercial fishing activity will be undertaken*" (PIRSA 2018). In response, PIRSA Fisheries and Aquaculture have requested advice on an appropriate TACC for the GCF below the RP_{trig} to meet the objective of moving the status of the stock from 'depleting' to 'sustainable' (above RP_{trig}).

The TACC for the GCF has not been caught for the last nine seasons. To assess the level at which a reduced TACC may become binding (i.e., constraining on catch), the benefit provided in reducing fishing mortality via sequential 10% reductions in TACC in each zone was assessed relative to zonal catch history measured from catch disposal records (CDRs) in 2022/23.

RESULTS/DISCUSSION

In 2022/23, the total catch of quota holders, reported on CDRs, was 13.3 t, which is 63% of the 21.0 t TACC allocated. Tables 1 and 2 show, for each management zone, the potential impact of different levels of TACC reduction on total catch (tonnes and percentage) relative to the 2022/23 catch history in each zone.

A reduction in TACC of more than 50% in the SZ would be required to reduce catches below the 2022/23 level (**bold**, Table 1). For TACC reductions of 60–80%, catch would be reduced by 17.2–58.6%, respectively.

Table 1. Potential percentage TACC reduction and resulting reductions in total and % catch relative to 2022/23 catch history in the Southern Zone (SZ catch in 2022/23 is confidential due to being recorded from <5 licences). Bold indicates the level at which a reduction in TACC becomes binding.

% TACC reduction	Potential TACC (t)	Potential reduction in total catch (%) (c.f. 2022/23)
0% (no change)	8.3	0
10%	7.5	0
20%	6.6	0
30%	5.8	0
40%	5.0	0
50%	4.2	0
60%	3.3	17.2
70%	2.5	37.9
80%	1.7	58.6

In the NZ, a reduction in TACC of about 30% would be required to reduce catches below the 2022/23 level. For TACC reductions of 30–80%, catch would be reduced by 4.1–72.6%, respectively (**bold**, Table 2).

Table 2. Potential percentage TACC reduction and resulting reductions in total and % catch relative to 2022/23 catch history in the Northern Zone. Bold indicates the level at which a reduction in TACC becomes binding.

% TACC reduction	Potential TACC (t)	Potential reduction in total catch (t) (c.f. 2022/23)	Potential reduction in total catch (%) (c.f. 2022/23)
0% (no change)	12.7	0	0
10%	11.5	0.0	0.0
20%	10.2	0.0	0.0
30%	8.9	0.4	4.1
40%	7.6	1.7	17.8
50%	6.4	2.9	31.5
60%	5.1	4.2	45.2
70%	3.8	5.5	58.9
80%	2.5	6.7	72.6

The scale and timeframe of response of the Giant Crab stock to different percentage reductions in TACC (and catch) is currently unknown, and a stock assessment model to enable harvest strategy evaluation has not been developed for the South Australian GCF. However, a length-based stock assessment model was developed for the GCF in Tasmania (Ziegler et al. 2009) and the most recent published outputs (Emery et al. 2015), within a similar context of catch and CPUE decline, provides some insight into the scale of management response required to reverse declines in Giant Crab population biomass.

In Tasmania, multiple TACC reductions have occurred in response to declining CPUE since a 103.5 t TACC was introduced in 1999. Model projections undertaken as part of the 2013/14 stock assessment predicted state-wide exploitable biomass to rebuild 56% between 2013 and 2023 under an 18% TACC reduction (with an additional 10% TACC under-catch) from 46.6 t to 38.3 t. However, recent information provided through the Status of Australian Fish Stocks reports for Giant Crab (Piddock et al. 2021) indicates that reductions in TACC (46.6 t–38.3 t in 2014, then

20.7 t in 2018) and catch (e.g., 16.8 t in 2018 and 19.9 t in 2019) halted a decline in biomass but were insufficient to result in any biomass increase. The Tasmanian stock was classified as 'depleted' in 2020. These trends highlight the slow recovery timeframe of Giant Crab populations and their susceptibility to recruitment overfishing.

With reference to the 2022/23 catch history in the GCF and TACC calculations provided in Tables 1 and 2, a substantial TACC reduction (>50%) is needed to limit catch to 2022/23 levels for the SZ. TACC first becomes binding in the NZ under about a 30% reduction in the current TACC. If TACC reductions of 60% and 30% were applied, these would decrease catch (fishing mortality) for the SZ and NZ by 17.2% and 4.1%, respectively. The available evidence from Tasmania indicates that these levels of TACC reduction are unlikely to reduce fishing mortality sufficiently to rebuild stock biomass (and increase CPUE) over a ten-year timeframe.

An Advice Note relating to the 2022/23 estimate of five-year average commercial CPUE PI is due to PIRSA on 15 August 2023. Should this PI fall below RP_{trig} of ≥ 1.95 kg/potlift, stock biomass recovery is likely to be promoted by initially reducing the TACC by 70% in the SZ and 50% in the NZ, to TACCs of 2.5 t and 6.4 t, respectively. Based on 2022/23 CDR catch records, this would reduce catch by 37.9% in the SZ and 31.5% in the NZ (Tables 1 and 2). TACCs beyond 2023/24 can be informed by contemporary levels of CPUE and the upcoming review of the GCF management policy and its decision rules used to set TACC.

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APPENDIX

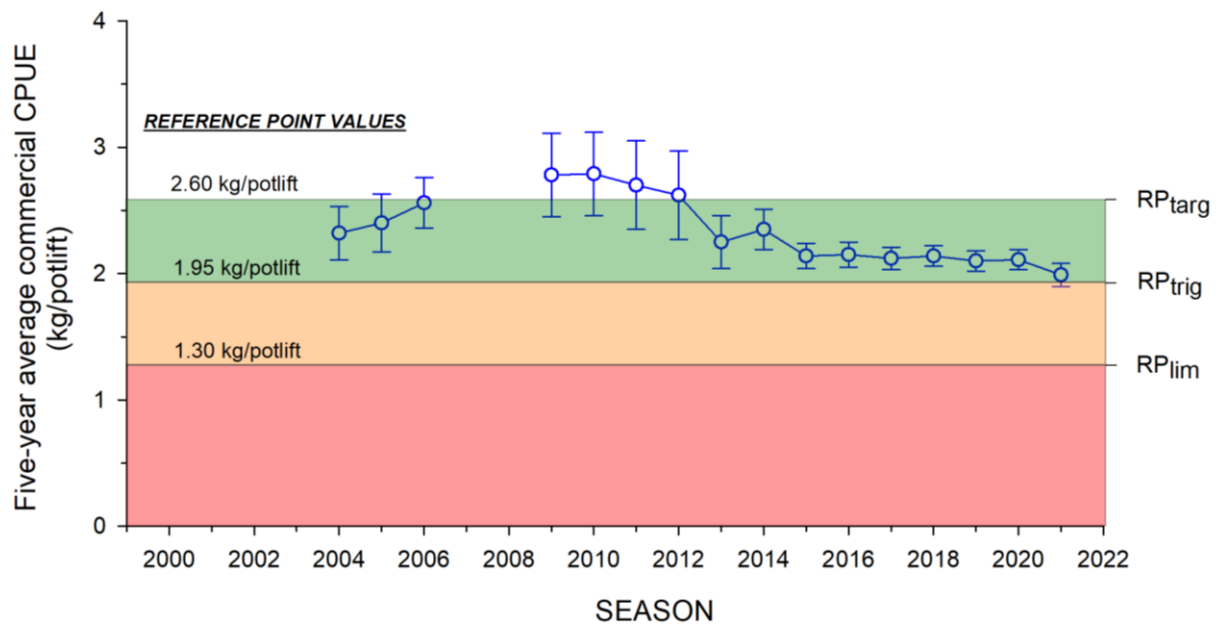


Figure 1. Five-year average commercial CPUE of legal-size Giant Crab caught in the GCF between 2000 and 2021. Values of five-year average commercial CPUE represent a 5-year moving average \pm SE. Target Reference Point = RP_{targ}; Trigger Reference Point = RP_{trig}; Limit Reference Point = RP_{lim}. Fishing season refers to the year the fishing season started e.g. 2021 = 2021/22 fishing season. Some data (2007/08 and 2008/09) not presented due to confidentiality (<5 fishers).