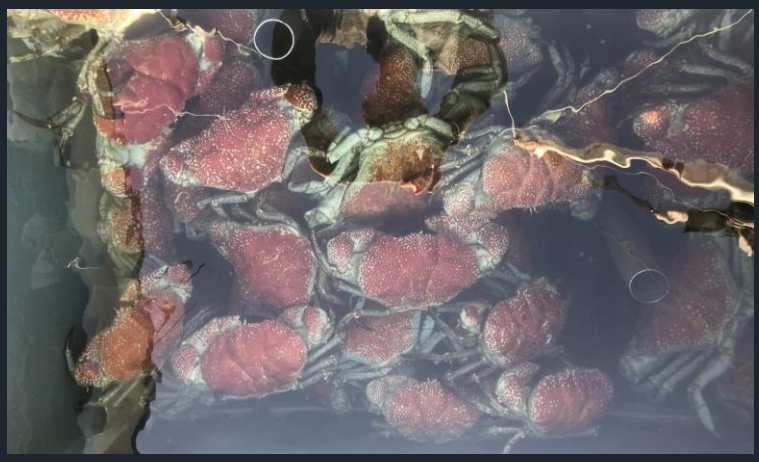
Victorian Fisheries AUTHORITY

Victorian Giant Crab Fishery

Stock Assessment Report

2024/2025 Season



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Giant Crab - Pseudocarcinus gigas

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Contact Details:
Victorian Fisheries Authority
1 Spring Street
Melbourne VIC 3001

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Victorian Giant Crab Fishery

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Executive Summary

In 2024/25, the total allowable commercial catch (TACC) for giant crab was 7.5 tonnes. The total landed catch during the TACC season (1 July 2023 to 30 June 2024) was 7.3 tonnes, which was almost entirely targeted. During the fishing year (16 November 2023 to 14 September 2024) the catch was also 7.3t.

A revised harvest strategy was adopted in 2025 and this is the first assessment in which this provides the primary guidance. This harvest strategy utilises a three-year rolling mean CPUE as the primary indicator. The three-year CPUE has been slowly and steadily increasing since 2020/21, reaching a fifteen year high in 2024/25. This value falls between the threshold and target reference points. Under the new harvest strategy this indicates that the TACC remains unchanged from the initial starting TACC of 8.5t.

The annual CPUE index is prone to a high level of inter-annual variability due to the small size of the fishery and significant recent changes in fishing operator. Consequently, the three-year rolling mean has been used as the primary indicator in the harvest strategy instead. The annual CPUE index saw a significant decrease in 2023/24 from 1.10 kg / adjusted potlift to 0.66. In 2024/25 this increased back to 1.16 kg / adjusted potlift.

Introduction

This document assesses the Victorian component of the giant crab (*Pseudocarcinus gigas*) stock. Giant crabs have been caught as by-product of rock lobster fishers operating in deeper waters from the early to mid-1900s. These early catches were sporadic, non-targeted and of limited value. In the early 1990s a substantial live market in Asia, Melbourne and Sydney was established. This significantly increased the value of giant crab and resulted in extensive targeting. The combined Victorian and Tasmanian catch peaked in the mid-1990s and likely exceeded 400t per annum. Due to the long life history of giant crabs, these high catches resulted in rapid depletion of the stock. There is insufficient data available to estimate the biomass of the Victorian component of the stock and how low this fell, but analyses indicate that the Tasmanian component of the stock likely dropped below 10% of the unfished biomass at the peak level of depletion during the last decade.

In both Tasmania and Victoria, the low CPUE arising from stock depletion resulted in a rapid reduction of fishing effort and catch, however, the remaining fishing activity was sufficient to continue decreasing the CPUE in Tasmania and retaining it at low levels in Victoria. Consequently, a TACC was introduced in 2000/01 in Victoria (see Table 1) and at a similar time in Tasmania. Since the introduction of the TACC, the Victorian CPUE (which is the primary biomass indicator) has remained above the limit reference point in the harvest strategy and has been above the threshold (but below the target) for the last four years. The Tasmanian component of the stock reached a record low CPUE in 2019/20 but has risen slightly in the subsequent years following from significant TACC reductions. As with the Victorian fishery the Tasmanian data is limited and CPUE data is challenging to interpret.

Due to the limited scale of the Victorian fishery, there is no routine fishery independent monitoring program and the data available to conduct the assessment is limited. The assessment is consequently focused on data collected from mandatory daily logbook returns. In 2018/19 an industry based voluntary length-frequency data collection commenced which provided promising initial data and was likely to become an important component of the stock assessment in future years. However, only limited length-frequency data has been collected since 2019/20 and hence it has not been possible to undertake new analyses of length-frequency data.

A FRDC project to address the lack of length frequency data across the giant crab fisheries was recently completed with the final report currently undergoing review. This project is titled "*Giant Crab Enhanced Data Collection - Innovative approaches to enhance data collection in the Victorian, South Australian and Tasmanian Giant crab fisheries*" (FRDC 2019-114). The project has developed an imaging system to facilitate onboard length-frequency data collection across fishing fleets in all three jurisdictions. Adoption of this system is one pathway to future TACC increases under the tiered system in the harvest strategy.

Catch data

The total landed catch of giant crab by all fishers in 2024/25 quota season (1 July to 30 June) was 7.3t which was almost entirely targeted (Figure 1). Reference points for this fishery are based on the fishing year (16 November-14 September) - during this period the catch was also 7.3t.

Table 1: Giant crab total allowable commercial catch by quota year since 2001–02.

Year	Quota Season	TACC Set (t)
2001-02	16 Nov – 31 Mar	25
2002-03	1 Apr – 31 Mar	25
2003-04	1 Apr – 31 Mar	25
2004-05	1 Apr – 31 Mar	25
2005-06	1 Apr – 31 Mar	25
2006-07	1 Apr – 31 Mar	25
2007-08	1 Apr – 31 Mar	25
2008-09	1 Apr – 31 Mar	25
2009-10	1 Apr – 31 Mar	25
2010-11	1 Apr – 30 Jun	31
2011-12	1 Jul – 30 Jun	18
2012-13	1 Jul – 30 Jun	12
2013-14	1 Jan 14 – 30 Jun	9
2014-15	1 Jul - 30 Jun	10.5
2015-16	1 Jul - 30 Jun	10.5
2016-17	1 Jul - 30 Jun	10.5
2017-18	1 Jul – 30 Jun	10.5
2018-19	1 Jul – 30 Jun	10.5
2019-20	1 Jul – 30 Jun	10.5
2020-21	1 Jul – 30 Jun	10.5
2021-22	1 Jul – 30 Jun	7.5
2022-23	1 Jul – 30 Jun	7.5
2023-24	1 Jul – 30 Jun	7.5
2024-25	1 Jul – 30 Jun	7.5
2025-26	1 Jul – 30 Jun	8.5

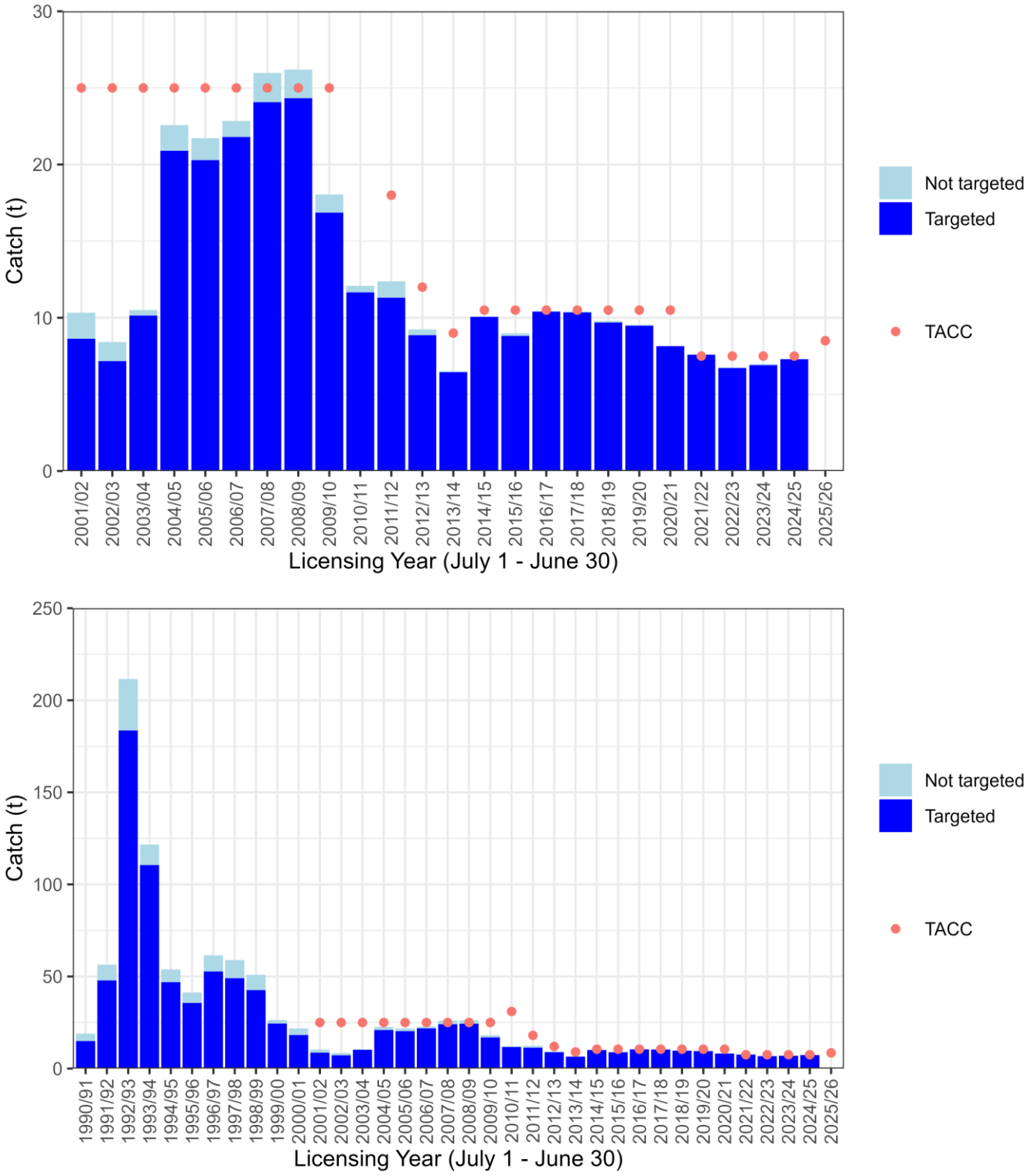

Figure 1: Total catch (t) and targeted catch history for the Victorian Giant Crab Fishery. Top: from 1990 onwards, bottom: detailed view of period since quota commencement. Red dots indicate the TACC which was first introduced for the 2001/02 season.

CPUE Analysis

Background

Giant crab CPUE is the primary biomass indicator used to assess the status of this fishery. A major difficulty in calculating historic CPUE arises from the catch being a mix of by-catch and targeted fishing. This is further complicated as, historically, targeting was poorly documented and the proportion of by-catch versus targeted catch has varied through time.

Separate giant crab and southern rock lobster fishing returns were mandated with the introduction of quota management in November 2001. For returns prior to April 1998, the target species was not specified and the effort targeted at giant crab was separated from effort targeted at southern rock lobster on the basis of two criteria. That is, where pots were set at depths greater than 140 metres or where more than 70% of the combined catch of these two species was giant crab, all of the effort was assumed to be targeted at giant crab.

Following the introduction of quota management, separate logbooks for the giant crab and southern rock lobster fisheries led to some inconsistencies in the reporting of the target species. This resulted in a reduced giant crab catch per unit effort (CPUE) overall, which was inconsistent with the observations of the most active fishers. A new measure of CPUE was therefore introduced involving the targeted catch and effort for only those fishers landing significant amounts of giant crab in a fishing year and with an extended record of crab fishing.

Data filtering

The Giant Crab Fishery requires careful data filtering, as a substantial portion of the catch through time has been taken in conjunction with rock lobster fishing and sporadically by fishers catching small quantities. To obtain data that is most representative of the underlying biomass, it is therefore important to filter the data. The following criteria have been used for over 6 years with some minor changes:

- A fisher must exceed 500kg of giant crab catch in a fishing year for their data from that year to be included
- A fisher must have >200 records in the database (giant crab or lobster) over all years
- A fisher must have recorded they are targeting giant crab or both
- Removal of identified erroneous records.

Prior to the 2020/21 assessment, the first two criteria were 1000kg and >300 records. The relaxation of the criteria was necessary as the old criteria would have excluded key data and prevented calculation of a meaningful CPUE index for this year. To provide a consistent index these criteria have been applied across all years. This has altered the exact values of historic CPUE but not the trends or overall impression of stock status.

Soak time correction

Giant crab targeted CPUE is expressed as kg per 24-hour period that a pot was set (soak days). Including a measure of soak time in the CPUE calculation is important because the pots are usually left to soak for several days and catch initially increases with soak time. Prior to 2001/02, soak days were estimated by counting days between entries in the daily logbook, with the maximum soak days in this calculation capped at seven days (after which time pots generally cease to attract additional crabs as the bait is depleted). Logbooks were modified during the 2001/02 fishing year to collect soak days directly.

A review undertaken by the Victorian Rock Lobster and Giant Crab Resource Assessment Group highlighted that a four-day soak-time cap was more appropriate and that this relationship was non-linear. It was found that the catch increases by 38% every additional day that a pot is left in the water up to a maximum of four days total soak time. Consequently, a relationship between catch and soak time was introduced in the CPUE calculation. This substantially altered the CPUE time series as typical soak times had changed in recent years. This relationship was re-analysed in 2017; whilst the current coefficient (38% increase in catch per day) gives the best fit between catch and soak-time, there is substantial uncertainty around this relationship and the CPUE time series is sensitive to

the relationship used. Coupled with the small number of operators in this fishery, this indicates that caution should be used when interpreting the CPUE time series.

Effort Correction

In early 2021, after the release of the 2019/20 assessment report, it became evident that a large correction to effort data for two fishers was required due to inconsistent effort reporting for both soak time and potlifts. This correction is applied from 2014/15 to April 2021. It is unclear how appropriate it is for earlier years in that period, but the corrected effort (and consequent CPUE value) from 2020/21 onwards is considered reliable, hence the decline from 2013/14 to 2020/21 is also considered reliable (as reliable as can be expected given the other aspects of the dataset).

CPUE trend

The targeted CPUE in 2024/25 was 1.16 kg / adjusted pot day (Figure 2, Figure 3 and Table 2). This is the highest level since 2008/09, however, due to the recent volatility in the industry and CPUE index some caution is required when interpreting this. The recent high level of variability in CPUE is unlikely to be representative of the stock as giant crabs are slow growing and such large changes in biomass over short periods (increases and decreases) are unlikely to be possible. One possible factor for these fluctuations are the significant changes in fishing operators that have occurred recently. Consequently, the change in CPUE may be driven largely by the change of fishing activities rather than a change in the stock. The changes in the fishing fleet cannot be corrected/adjusted for due to the small nature of the fishery and uncertainty in effort data from 2014-2020.

These fluctuations in annual CPUE were a key motivation for utilising a three-year running mean for CPUE in the new harvest strategy (Figure 3). This running mean has been slowly increasing since 2020/21 and reached a fifteen year high in 2024/25. Under the new harvest strategy the three-year running mean falls between the threshold and target indicating that the TACC should remain unchanged.

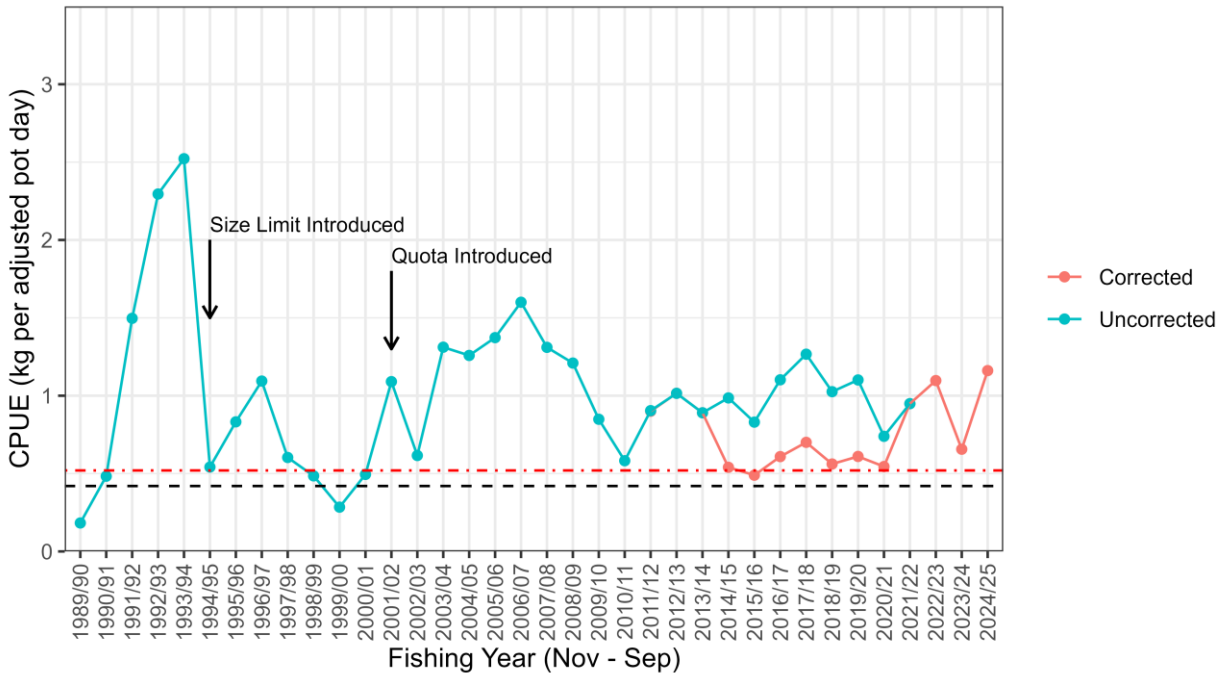

Figure 2: Targeted CPUE of giant crab (kg/adjusted pot day) corrected for a maximum of 4 days soak, with a slope of 0.38 for all fishers landing > 500kg of giant crab in a given year and with > 200 days of fishing overall. Dashed red line and solid black line represent indicate the limit and trigger reference points from the old harvest strategy. The blue line indicates data that has not been corrected for inconsistent effort reporting (from 2014/15 to April 2021) whilst the red line shows the corrected data which corresponds to the best estimate of CPUE during this period.

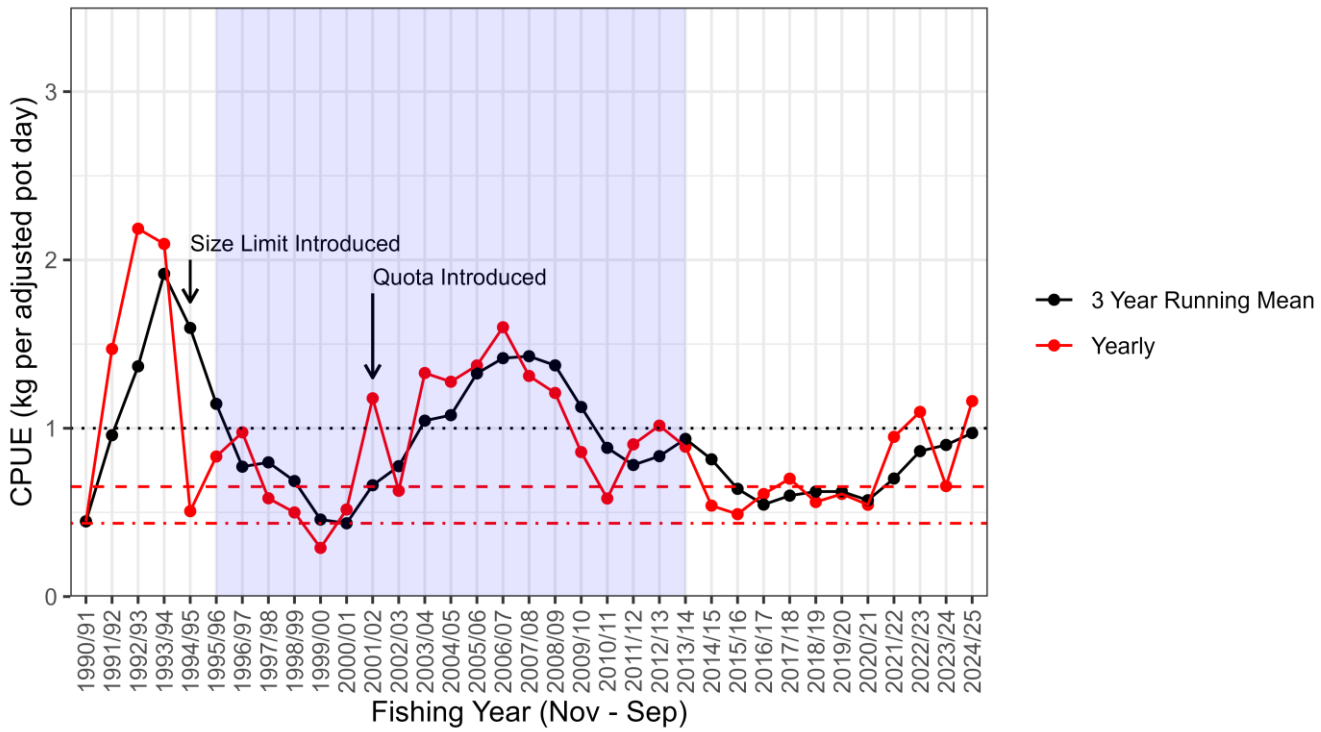

Figure 3: CPUE (kg per adjusted pot day). The current agreed time series is shown in red and the three-year running mean from the harvest strategy in black. The target, threshold and limit reference points are shown as horizontal lines from top to bottom. The shaded purple area is the reference period on which the reference points are based.

Table 2: Giant crab total catch and targeted CPUE (kg/adjusted pot day) during fishing years (16 November–14 September) from 1990/91.

Fishing Year	Total Catch (t)	CPUE	CPUE 3-Year Mean
1990/91	18.9	0.45	0.45
1991/92	56.7	1.47	0.96
1992/93	226.8	2.19	1.37
1993/94	122.3	2.10	1.92
1994/95	38.8	0.51	1.60
1995/96	44.4	0.83	1.14
1996/97	68.7	0.98	0.77
1997/98	51.0	0.58	0.80
1998/99	50.4	0.50	0.69
1999/00	25.3	0.29	0.46
2000/01	19.7	0.52	0.44
2001/02	9.5	1.18	0.66
2002/03	8.4	0.63	0.77
2003/04	10.5	1.33	1.04
2004/05	22.7	1.28	1.08
2005/06	21.7	1.37	1.33
2006/07	20.3	1.60	1.42
2007/08	27.6	1.31	1.43
2008/09	27.2	1.21	1.37
2009/10	16.4	0.86	1.13
2010/11	11.3	0.58	0.88
2011/12	12.6	0.90	0.78
2012/13	8.8	1.02	0.83
2013/14	6.5	0.89	0.94
2014/15	10.5	0.54	0.82
2015/16	10.0	0.49	0.64
2016/17	10.0	0.61	0.55
2017/18	10.0	0.70	0.60
2018/19	9.3	0.56	0.62
2019/20	11.7	0.61	0.62
2020/21	7.0	0.55	0.57
2021/22	7.4	0.95	0.70
2022/23	5.9	1.10	0.86
2023/24	6.6	0.66	0.90
2024/25	7.3	1.16	0.97

Size Structure

The average size of landed crabs is available through landings and daily catch reports. Consequently, a full time series of this data is available throughout the duration of the fishery. This data has remained relatively consistent since 2006/07. A decrease in mean weight in 2019/20 was influenced by the reduction in the male size limit in that year. An ongoing decline in mean weight was observed through to 2023/24 which reversed in 2024/25. These changes occurred around the same time as a major change in operators in the fishery and hence it is unclear whether this small change in mean weight is indicative of a change to the stock or change in fishing operation.

A new length-frequency data collection program commenced in 2018/19, which resulted in the measurement of 986 crabs. However, no new data has been collected in subsequent years. In 2022/23 collection of some length-frequency data resumed however at this point due to the small sample size this has limited utility and is not presented here.

When compared to previous measurements from the mid and late 2000s, there was a broader size range of crabs in 2018 and 2019, particularly males (Figure 5). In combination with similar CPUE levels, this suggests a lower exploitation rate is being applied to the population. However, the lower frequency of 160-169mm and 170-179mm animals is either inconsistent with this view or indicative of a period of comparatively low recruitment.

The interpretation must be treated with caution due to the small nature of the fishery. Furthermore, comparison with historical data can be misleading due to the substantial changes that have occurred between the two length-frequency measurement data sets. A consistent approach to the monitoring of length-frequency data would provide greater insight in future assessments.

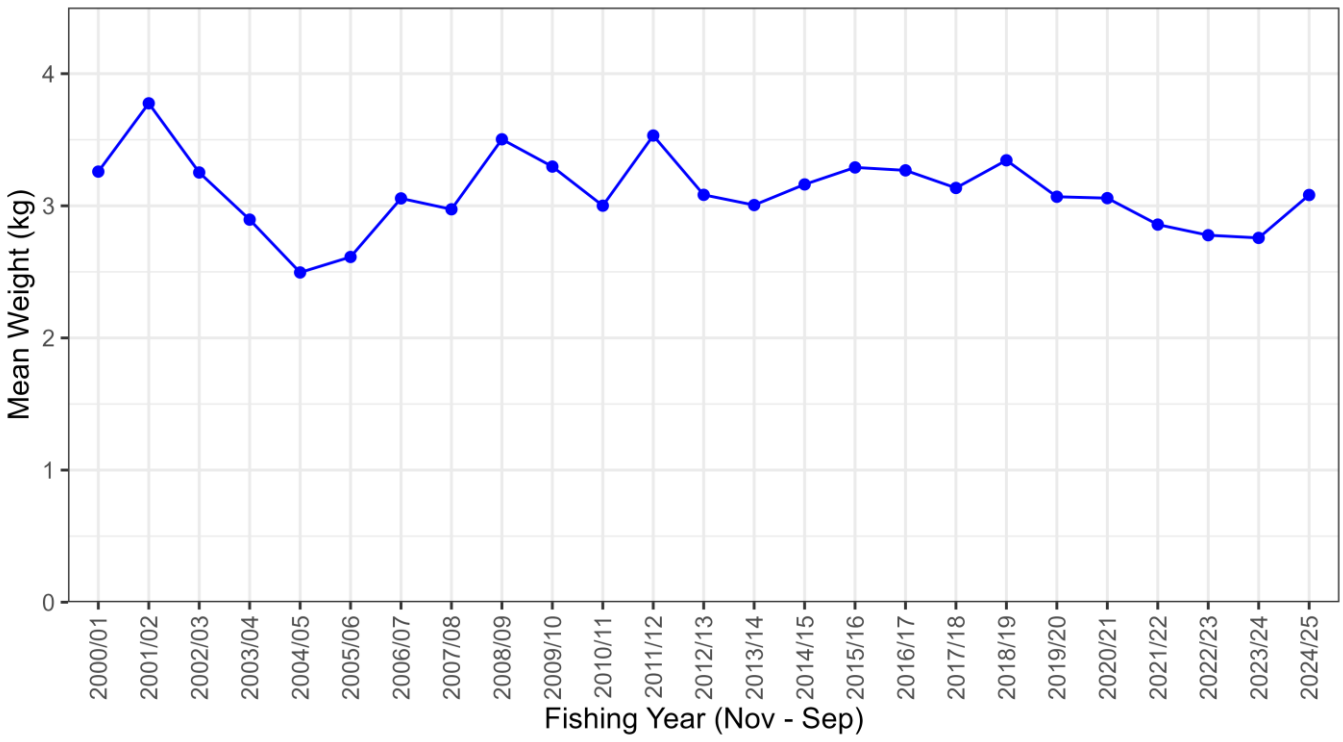

Figure 4: Mean weight (kg) per landed crab for all fishers from the 2000/01 fishing year onwards.

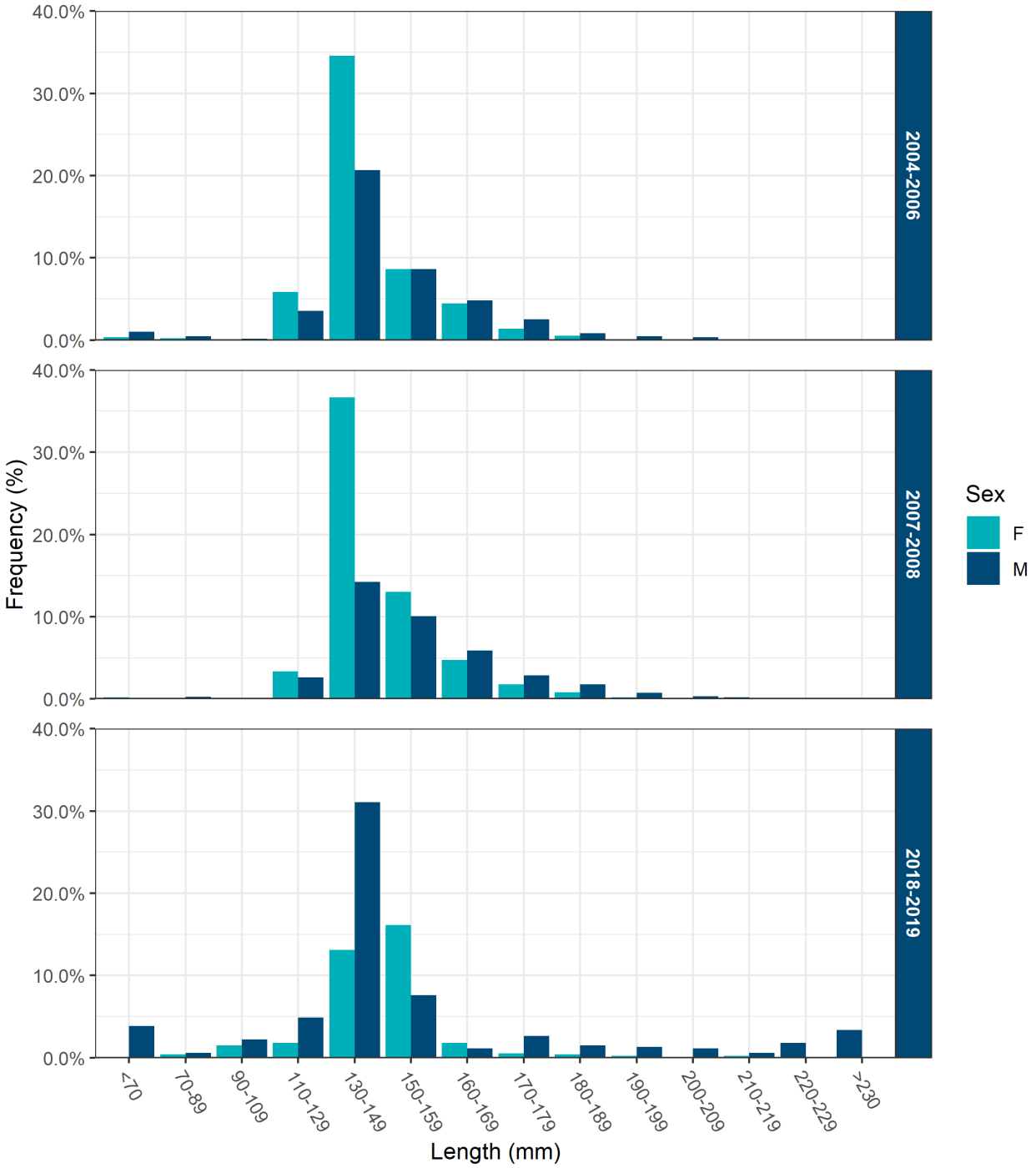

Figure 5: Length frequency measurements from the new industry-based data collection program (bottom) and data from previous data collection periods binned using the same size categories. Note that crabs measuring less than 150mm are categorised into 20mm bins and above 150mm into 10mm bins.

Evaluation

Application of the 2025 Giant Crab Harvest Strategy

This is the first year in which the 2025 Giant Crab Harvest Strategy is being formally applied. An excerpt from the harvest strategy is provided in Appendix 2.

The harvest strategy has three tiers depending on the level of available information. Due to the lack of length-frequency data and verification of Vic e-catch data, the fishery is presently at Level 1 of the harvest strategy.

In level 1 of the harvest strategy, TACC increases are not possible but TACC decreases are. The three-year running mean of targeted CPUE (Figure 3) is between the threshold and target reference points. Consequently, the TACC remains unchanged from the initial starting TACC of 8.5t under the harvest strategy.

Outlook

Recent increases in CPUE are positive with the three-year running mean falling just below the target, however, some caution is required when interpreting this as there have been significant changes in the operator and no additional data is available to inform stock status. This is reflected by the fishery being in the first tier of the harvest strategy which does not allow for any TACC increases (only decreases are possible). Length-frequency data would provide further insight into the stock which would permit the fishery to move to a Level 2 and provide the confidence needed for any potential future TACC increases.

An FRDC project to address the lack of length frequency data across the giant crab fisheries was recently completed with the final report currently undergoing review. This project is titled "*Giant Crab Enhanced Data Collection - Innovative approaches to enhance data collection in the Victorian, South Australian and Tasmanian Giant crab fisheries*" (FRDC 2019-114). The project has developed an imaging system to facilitate onboard length-frequency data collection across fishing fleets in all three jurisdictions. Adoption of this system is one possible pathway to Level 2 of the harvest strategy.

Appendix 1: Historical events in the Giant Crab fishery

Year	Licensing Season	Significant event
From Early-Mid 1900s		Giant crabs caught as by-catch of rock lobster fishers operating in deep waters. Catches sporadic, non-targeted and of limited value.
Early 1990s		Substantial live market for giant crabs develops leading to extensive targeting
1993	1992-93	Peak giant crab catch
1994	1994-95	Legal minimum length of giant crab (both sexes) introduced at 150mm
2001	2001-02	Introduction of quota management Giant Crab Western zone
2004	2004-05	Introduction of Marine Protected Areas (MPAs) Western Zone
2019	2019-20	Male minimum legal length reduced to 140mm in August 2019
2021	2021-22	It became clear that the effort data in recent year was significantly under-estimated and that this error may extend back to the 2014-15 season
2024	2022-23, 2023-24	Significant high-grading reported and contributing to low CPUE
2025	2026-27	New Harvest Strategy adopted

Appendix 2: Harvest Strategy

An excerpt of the 2025 Harvest Strategy is provided here, this consists of the characteristics of the harvest strategy tiers and the TACC setting rules. For full details refer to the harvest strategy document:

VFA (2025). Victorian Giant Crab Harvest Strategy 2025. Victorian Fisheries Authority Report No.01

Table 3: Key characteristics of the harvest strategy tiers.

	Level 1	Level 2	Level 3
Data Type	Vic-eCatch	Level 1 plus verified mandatory L-F sampling* and verification of Vic-eCatch data (observer or camera)	Level 2 data for 3+ years and a model-based assessment
Analysis and assessment	CPUE Trends	CPUE Trends	CPUE Trends, stock assessment model
Key Harvest Control Rule elements	**Cap:** 10.5t **Increase:** No available. **Decrease:** Up to 50% if the CPUE is below the threshold reference point 50-100% if the CPUE is below the limit reference point.	**Cap:** 10.5t when below the target reference point. No cap when above the target reference point. **Increase:** Up to 20% every 3 years if the CPUE is above the target reference point. **Decrease:** As per level 1	**Cap:** 10.5t when below the target reference point. No cap when above the target reference point. **Increase and decrease:** TACCs will be set according to the model to ensure the Fishery fluctuates around the target reference point; and remains above the limit reference point with a 90% probability.
Potential cost to licence holder/operator	Low	Low-Moderate	Moderate
Summary	A low level of data collection to inform the stock assessment; includes no scope to increase the TACC beyond 10.5; and results in a minimal cost to fishers.	The requirements include verified catch and length-frequency data which increases confidence in the assessment and permits the TACC to increase above 10.5t.	The assessment model provides an understanding of the stock status and dynamics. This allows input and output controls to be set flexibly to meet industry needs.

* Fishers catching >1t must measure a representative sample of their catch according to a protocol agreed with the VFA.

2. TACC Setting Rules

2.1 Determining the tier level

1. Level 1 is the baseline management arrangements for the Fishery and applies unless the requirements are met at another level.
2. Level 2 is applied if recent representative length frequency data is available in sufficient quantity, and can be verified, to provide insight into stock structure.
3. Level 3 can be applied if representative length-frequency data is available for three or more years, and a suitable model-based stock assessment has been conducted.

2.2 Level 1

Due to the small nature of this fishery and the stochasticity in the CPUE time series, it is inappropriate to have a strictly defined harvest control rule. The following harvest control rule provides a guide to TACC setting at Level 1, whilst providing sufficient flexibility to allow management to consider other information about the Fishery which may be available on a sporadic basis:

1. If CPUE exceeds the threshold reference point, the TACC remains unchanged.
2. If CPUE falls below the threshold reference point, the TACC is reduced by up to 50%.
3. If CPUE falls below the limit reference point, a stock rebuilding strategy is developed and the TACC is reduced by 50-100%.
4. If the Fishery returns to Level 1 from a higher level and has an existing TACC greater the Level 1 cap of 10.5t, the TACC is automatically reduced to 10.5t.

There is no firm rule for a fishery closure. If the CPUE falls significantly below the threshold reference point this will be investigated in detail. This includes consideration and appropriateness of retaining a sentinel fishery under a research permit to maintain data collection and monitoring (the only data source for the Fishery).

The starting TACC under this harvest strategy will commence at 8.5 tonnes within Level 1. This is below the Level 1 cap and no mechanisms exist to increase the TACC under this level. The cap remains relevant, however, as it will apply in the event that the fishery progresses to a higher level, experiences a TACC increase/s at that level and then returns to Level 1.

2.3 Level 2

Under Level 2, additional information about the length-frequency composition is available to assess stock abundance, including undersize stocks. Due to the low productivity attributes of giant crab and the limitations of the data, a precautionary approach is required that enables the impacts of TACC changes to be observed. This harvest control rule adds TACC increases to the Level 1 strategy:

1. If CPUE falls below the threshold reference point, the TACC is reduced by up to 50%.
2. If CPUE falls below the limit reference point, a stock rebuilding strategy is developed and the TACC is reduced by 50-100%.
3. If the CPUE is above the target reference point, the TACC can be increased by 20%. A maximum increase of a total of 20% can be applied in any three-year period.
4. Length-frequency data provides a secondary indicator. A TACC increase is conditional on satisfactory recruitment from this indicator.

2.4 Level 3

The nature of the harvest control rule under Level 3 will depend on the assessment model and the quality of the model-based stock assessment. However, the intent is to allow for more rapid TACC increases (e.g. 20% per year) whilst remaining confident that the Fishery will fluctuate around the target reference point and remain above the threshold reference point with a 90% probability.

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