

Victorian Giant Crab Fishery

Stock Assessment Report 2018/2019 Season





Giant Crab - Pseudocarcinus gigas

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Victorian Giant Crab Fishery

Stock Assessment Report for the 2018/19 Season

Executive Summary

In 2018/19, the total allowable commercial catch (TACC) for giant crab was 10.5 tonnes. The total landed catch was 9.8 tonnes, which was almost entirely targeted. The targeted catch rate in 2018/19 was 1.04 kg/24 hour pot-lift. This is a substantial reduction from the 2017/18 value of 1.27kg/24 hour pot-lift but remains well above the limit reference point of 0.52 kg/24 hour pot-lift for the fishery.

The minimum legal size for male giant crabs was reduced from 150mm to 140mm on August 1 2019. This brings the size limit in line with Tasmania and was based on an analysis that indicated both economic benefits and improvement in egg production. In line with this change, the length-frequency data collection program has been expanded, with 986 giant crabs measured since commencement in May 2018.

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. Insufficient data is available to assess the Victorian stock, but analyses indicate that the Tasmanian component of the stock dropped below 10% of the unfished biomass.

The low CPUE arising from the 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). Since the introduction of the TACC, CPUE which is the primary biomass indicator has remained above the present trigger and limit reference points.

Due to the limited scale of this fishery there is no routine industry independent monitoring program and the data available to conduct the assessment is limited. The assessment is consequently focussed on data collected from mandatory daily logbook returns. In 2018/19 an industry based voluntary length-frequency data collection commenced which has provided promising initial data and is likely to become an important component of the stock assessment in future years.

Catch data

The total landed catch of giant crab by all fishers in 2018/19 quota season (July 1 to June 30) was 9.8t which was almost entirely targeted (Figure 1). Reference points for this fishery are based on the fishing year (November-September), during this period the catch was 9.2t.

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

Table 1: Giant crab total allowable commercial catch by quota year between 2001–02 and 2018–19.



Figure 1: Total catch (t) and targeted catch history for the Victorian Giant Crab Fishery. Red dots indicate the TACC which was first introduced for the 2001/02 season.

CPUE Analysis

Giant crab CPUE is the primary biomass indicator used to assess the status of this fishery. A major difficulty in calculating CPUE arises from the catch being a mix of by-catch and targeted fishing. This is further complicated as historically this has been 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. 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 second measure of CPUE was therefore introduced involving the targeted catch and effort for only those fishers landing more than one tonne of giant crab in a fishing year.

Giant crab targeted CPUE is expressed as kg per 24 hour pot-lift because the pots are usually left to soak for several days. 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. 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. Consequently a relationship between catch and soak time was introduced. 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 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.

The size limit for male crabs was reduced to 140mm in August 2019. No crabs were landed in the 2018/19 assessment period after this date, consequently the change did not impact the calculated CPUE. However in future years this will need to be addressed to ensure that CPUE remains a consistent biomass index.

The targeted catch rate in 2018/19 was 1.04 kg/24 hour pot-lift (Figure 2, Table 2) – a substantial reduction from the 1.27kg/24 hour pot-lift in 2017/18 but within the range observed in the last decade where CPUE has typically fluctuated between 0.8 and 1.1 kg / 24 hour pot-lift (Table 2).



Figure 2: Catch rate of giant crab (kg/24 hour pot lift) corrected for a maximum of 4 days soak, with a slope of 0.38 for all fishers landing > 1000kg of giant crab in a given year and with > 300 days of fishing overall. Dashed red line and solid black line represent limit and trigger reference points, respectively.

Fishing Year	Total Catch (t)	Catch Rate (fishers > 1t)
1990/91	18.9	0.63
1991/92	56.7	1.58
1992/93	226.8	2.32
1993/94	122.3	2.85
1994/95	38.8	0.57
1995/96	44.4	1.02
1996/97	68.7	1.09
1997/98	51.0	0.60
1998/99	50.4	0.46
1999/00	25.3	0.41
2000/01	19.7	0.66
2001/02	9.5	1.26
2002/03	8.4	0.69
2003/04	10.5	1.43
2004/05	22.7	1.28
2005/06	21.7	1.37
2006/07	20.3	1.54
2007/08	27.6	1.31
2008/09	27.2	1.25
2009/10	16.4	0.85
2010/11	11.3	0.65
2011/12	12.6	0.90
2012/13	8.8	1.09
2013/14	6.5	0.89
2014/15	10.5	0.99
2015/16	10.0	0.91
2016/17	10.0	1.23
2017/18	10.0	1.27
2018/19	9.2	1.04

Table 2: Giant crab total catch and catch rate during fishing years (16 November–14 September) from 1990/91 to 2018/19.

Size Structure

A new length-frequency data collection program commenced in 2018. This has resulted in the measurement of 986 crabs. 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 4). 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. Ongoing monitoring of the length-frequency data collected in a consistent manner by the new program will provide greater insight in future assessments.

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.



Figure 3: Mean weight (kg) per crab for all fishers from the 2000/01 fishing year onwards.



Figure 4: 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

The fishery was evaluated by comparing the biological stock performance indicator of targeted CPUE against the giant crab biological reference points (Figure 2). The reference points prescribed in the Management Plan are based on 'fishing year' (November–September) and include a limit reference point (mean for the 3-fishing-year period from 1998/99 to 2000/01) of 0.52 kg/24 hour pot-lift and a trigger reference point (80% of limit reference point) of 0.42 kg/24 hour pot-lift.

Based on the estimate of 1.04 kg/24 hour pot-lift, the targeted CPUE in 2018/19 was above the limit reference point (0.52 kg/24 hour pot-lift) and hence the trigger reference point.

There are no formal reference points associated with the additional size-frequency data collected in 2018/19. Development of an associated reference point may be desirable in the future, however several years of data are required to be able to obtain a consistently recorded time-series and determine an appropriate reference point.



