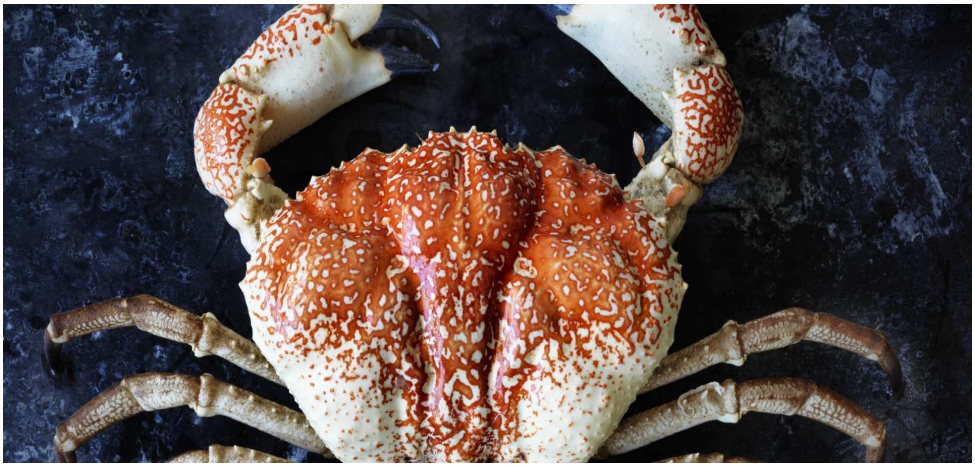
Giant Crab (2018)

Pseudocarcinus gigas



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Western Australia	Western Australia	SCCMF	Sustainable	CPUE, catch, effort, proportion of habitat unexploited
Victoria	Giant Crab Fishery (Victoria)	GCF	Sustainable	CPUE, catch, effort, proportion of spawning stock protected by minimum size limits
Tasmania	Giant Crab Fishery (Tasmania)	GCF	Depleted	Percentage of egg production relative to unfished level, CPUE
South Australia	South Australia	GCF	Sustainable	CPUE, catch, effort, mean weight, pre-recruit abundance, sex ratio, spawning female abundance

GCF Giant Crab Fishery (TAS), GCF Giant Crab Fishery (VIC), SCCMF South Coast Crustacean Managed Fishery (WA), GCF Giant Crab Fishery (SA)

STOCK STRUCTURE

Giant Crab is considered to be a single biological stock from Western Australia to Tasmania because the species occurs is continuously distributed across this range. Planktonic larval duration is around 50 days, with larval release occurring along the edge of the continental shelf. The shelf is a high current area, facilitating dispersal, and oceanographic modeling has indicated that Giant Crab dispersal occurs over large spatial scales [Gardner 1998, Gardner and Quintana 1998, Williams et. al. 2009].

Previous Status of Australian Fish Stocks reports on Giant Crab provided an overall assessment for this assumed biological stock. However, there have been significant changes in the relative performance of the various fisheries operating across this stock since 2014. New information indicates that Giant Crab are now considered to be depleted in Tasmania but sustainable in Western Australia. It is difficult to reconcile these differences in regional depletion levels under an assumption of a single stock. But management arrangements also vary across jurisdictions and the fishing fleets in each jurisdiction consist of vessels with different

characteristics, resulting in different patterns of exploitation.

Assessment of stock status is presented here at the jurisdictional level—Western Australia and South Australia; and the management unit level—Giant Crab Fishery (Victoria) and Giant Crab Fishery (Tasmania).

STOCK STATUS

Giant Crab Fishery (Tasmania)

A length-based model has been developed to estimate annual levels of Giant Crab biomass and egg production. The model includes catch and effort data from commercial fisheries [Gardner et. al. 2007]. This model was used to develop the current sex-specific size limits (carapace length of 140 mm for males and 150 mm for females to afford protection to mature female crabs, which are also protected whilst berried and through female spawning closures. Despite these measures, egg production has decreased to an estimated 14 per cent of unfished levels in 2013–14 [Emery et. al. 2018]. This level of egg production is considered to be inadequate relative to benchmarks in most crustacean fisheries [Fogarty and Gendron 2004]. Since the 2013–14 assessment the model has not been updated due to a lack of data, and analyses have focused instead on CPUE trends. CPUE has decreased almost continually since the inception of the Tasmanian fishery. Due to its slow growth and longevity, Giant Crab is particularly susceptible to becoming recruitment overfished. The above evidence indicates that the stock is likely to be depleted.

Giant Crab Fishery (Victoria)

Management of Giant Crab fishing mortality in Victoria is achieved through a TACC and legal minimum length (LML, 150 mm carapace length) to protect mature undersized crabs. The LML aims to ensure that egg production remains at no less than 40 per cent of unfished levels [McGarvey et al. 1999]. However, there is considerable uncertainty around the growth rates and sizes at maturity of larger females and hence in the degree of protection provided by these limits. Setting of an annual TACC occurs according to the performance measures and strategies specified in the Victorian Giant Crab Fishery Management Plan [Fisheries Victoria 2010]. Catch per unit effort (CPUE) is the primary indicator of Giant Crab biomass and is expressed as the catch taken per 24-hour pot-lift, by fishers landing more than 1 t in a fishing year. The TACC was set at 25 t from 2002–11 but was decreased over several years in response to declining catch rates, to 10.5 t in 2014–15, and has since been maintained at this level. A review of standardisation methods to account for soak time was implemented in 2015 and has estimated that CPUE has been stable at an average of 0.96 kg/24-hour pot-lift for the five years since 2010–11. This is above the limit reference point of 0.52 kg/24-hour pot-lift for the fishery [VFA 2016]. The CPUE estimate for 2016–17 increased to 1.26 kg/24-hour pot-lift. Assessments of the status of the Victorian component of the Giant Crab stock are uncertain due to the lack of fishery independent data, the reduction to a single operator for all targeted effort in the fishery, recent changes to fishing practices, a decrease in the spatial distribution of effort and a decline in non-targeted Giant Crab catch. Nonetheless, the above evidence indicates that the biomass of this stock is unlikely to be depleted, that recruitment is unlikely to be impaired, and that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence presented above, the Giant Crab Fishery (Victoria) management unit is classified as a **sustainable stock**.

South Australia

The South Australian Giant Crab Fishery (GCF) comprises three commercial fishing sectors: (1) the Miscellaneous Fishery sector; (2) the South Australian Rock Lobster Fishery (SARLF) quota sector (RL-quota); and (3) the SARLF byproduct sector (RL by-product). Fishing mortality in South Australia is managed through TACCs and a minimum legal size (MLS) (150 mm carapace

length) to protect females up to spawning size. A recently adopted management policy for the fishery guides the classification of stock status relative to limit, trigger and target reference points defined for a CPUE-based performance indicator relating to relative stock biomass measured from 2000/01 to 2009/10 - a relatively stable period of data collection from Giant Crab catch logbooks. The five year average commercial catch rate (CPUE) of legal-size Giant Crab calculated from data collected from targeted Giant Crab fishing in the Miscellaneous Fishery and RL-quota sectors [PIRSA 2018] is the primary indicator for biomass and fishing mortality.

The most recent assessment was based on data to the end of the 2016–17 season (1 October 2016–31 May 2017) [McLeay 2018]. In 2016–17, 7 157 potlifts were used to catch a total of 16.3 t of Giant Crab, comprising 76.0 per cent of the 22.1 t TACC in that season.

Commercial CPUE increased from 2.42 kg/potlift at the start of the series in 2004–05 to reach a peak of 3.05 kg/potlift in 2008–09. CPUE then decreased to 2.62 kg/potlift in 2012–13, before decreasing further to 2.25 kg/potlift in 2013–14. Average CPUE over the period 2004–12 was 2.68 kg/potlift, above the target of 2.60 kg/potlift. Since then, commercial CPUE has been relatively stable above the trigger level, at approximately 83 per cent of the 2004–12 average and 85 per cent of the target [McLeay 2018]. Although these recent CPUE levels are lower than historical values, CPUE increased slightly between 2015–16 and 2016–17. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. Furthermore, the evidence indicates that the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence presented above, Giant Crab in South Australia is classified as a **sustainable stock**.

Western Australia

Limited data are available for Giant Crab targeted fishing in Western Australia, with catches being generally either a byproduct of Southern Rock Lobster fishing, or as part of a combined catch of other deep sea crabs. Recently, logbook data have become available to provide limited data on targeted Giant Crab catches. Catches of Giant Crabs in Western Australia increased from 2009–10 to 2012–13 and then declined slightly to 2015–16 with an increase again in the 2016–17 season to 11.7 tonnes (t). Catch rates have remained relatively stable with the current landings coming from across a wide geographic range, compared to the situation in other jurisdictions. There are large portions of the stock in Western Australia (particularly east of longitude 125°E) that are not being exploited. The above evidence indicates that the biomass of this stock is unlikely to be depleted, that recruitment is unlikely to be impaired, and that the current level of fishing pressure is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence presented above, Giant Crab in Western Australia is classified as a **sustainable stock**.

BIOLOGY

Giant Crab biology [Gardner 1998, McGarvey et. al. 1999, Williams et. al. 2009,]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Giant Crab	≥ 30 years, > 200 mm CL , ~10 kg	125–140 mm CL, depending on region

DISTRIBUTION

Distribution of reported commercial catch of Giant Crab

TABLES

Commercial Catch Methods	South Australia	Tasmania	Victoria	Western Australia
Crab Trap				✓
Giant Crab Trap	✓			
Traps and Pots		✓	✓	✓
Unspecified		✓	✓	✓

Fishing methods				
	South Australia	Tasmania	Victoria	Western Australia
Commercial				
Giant Crab Trap	✓			
Traps and Pots		✓		✓
Unspecified		✓	✓	
Indigenous				
Giant Crab Trap	✓	✓		
Traps and Pots				✓
Recreational				
Giant Crab Trap	✓	✓		
Traps and Pots				✓

Management Methods				
	South Australia	Tasmania	Victoria	Western Australia
Commercial				
Limited entry	✓	✓	✓	✓

Quota	✓	✓	✓	✓
Size limit	✓	✓	✓	✓
Spatial closures	✓	✓	✓	✓
Temporal closures	✓	✓	✓	✓
Indigenous				
Customary fishing permits			✓	
Possession limit		✓		
Size limit	✓	✓		✓
Temporal closures	✓	✓		✓
Recreational				
Possession limit		✓		
Size limit	✓	✓		✓
Temporal closures	✓	✓		✓

Active Vessels			
	South Australia	**Victoria**	**Western Australia**
	16 Licences in GCF,	4 Licence Holders in GCF,	5 in SCCMF,

GCF Giant Crab Fishery(VIC)

SCCMF South Coast Crustacean Managed Fishery (WA)

GCF Giant Crab Fishery(SA)

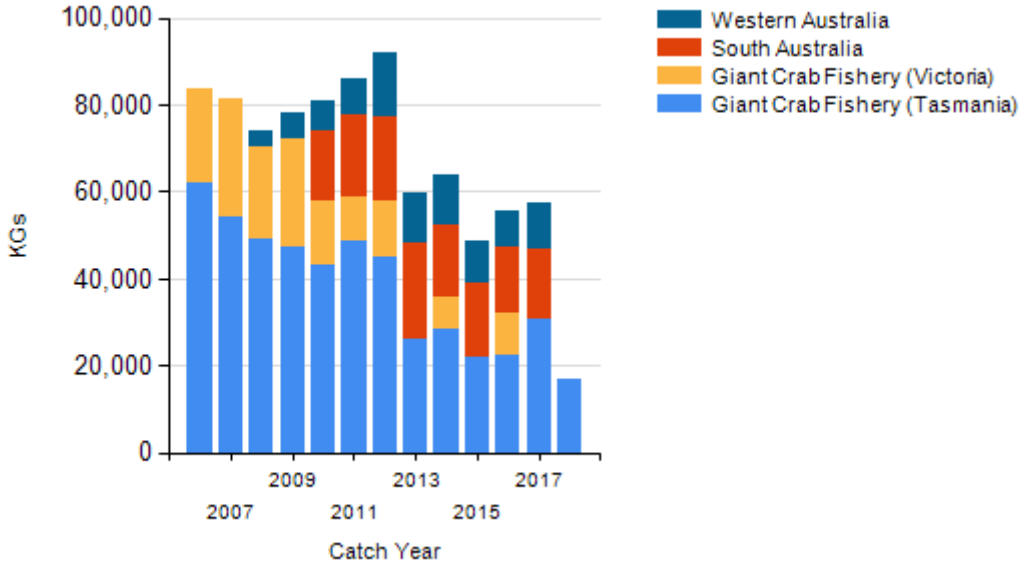
Catch				
	South Australia	**Tasmania**	**Victoria**	**Western Australia**
Commercial	16.3383t in GCF,	30.607t in GCF,		10.698t in SCCMF,
Indigenous	Negligible	Negligible	Unknown (No catch under permit)	Zero
Recreational	Negligible	Negligible	Unknown	Negligible

GCF Giant Crab Fishery (TAS), GCF Giant Crab Fishery (VIC), SCCMF South Coast Crustacean Managed Fishery (WA), GCF Giant Crab Fishery (SA),

South Australian data are from quota holders in the 2016–17 fishing season (October 2016–May 2017), Victorian data are for the 2016–17 fishing season (November 2016–September 2017), Tasmanian data are for the 2017-18 fishing season (March 2017 – February 2018) and South Coast Deep Sea Crustacean Fishery (Western Australia) data are for the 2016–17 financial year. **Victoria – Indigenous (management methods)** In Victoria, regulations for managing recreational fishing may not apply to fishing activities by Indigenous people. Victorian traditional owners may have rights under the Commonwealth's *Native Title Act 1993* to hunt, fish, gather and conduct other cultural activities for their personal, domestic or non-commercial communal needs without the need to obtain a licence. Traditional Owners that have

agreements under the *Traditional Owner Settlement Act 2010* (Vic) may also be authorised to fish without the requirement to hold a recreational fishing licence. Outside of these arrangements, Indigenous Victorians can apply for permits under the *Fisheries Act 1995* (Vic) that authorise fishing for specific Indigenous cultural ceremonies or events (for example, different catch and size limits or equipment). There were no Indigenous permits granted in 2017 and hence no Indigenous catch recorded.

CATCH CHART



Commercial catch of Giant Crab - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on Giant Crab

References

1641	Emery, T, Hartmann K and Gardner C, 2015, Giant Crab stock assessment report 2013/14, IMAS, Hobart.
1642	Fogarty, MJ and Gendron, L 2004, Biological reference points for American lobster (Homarus americanus) populations: limits to exploitation and the precautionary approach, Canadian Journal of Fisheries and Aquatic Sciences, 61(8): 1392–1403.
1640	Gardner, C, Haddon, M, Hobday,D and McGarvey R 2007, Development of the tools for long term management of the Giant Crab resource: data collection methodology, stock assessment and harvest strategy evaluation, final report to the Fisheries Research and Development Corporation, Canberra.
1634	Gardner, C 1998, First record of larvae of the Giant Crab Pseudocarcinus gigas in the plankton, Papers and Proceedings of the Royal Society of Tasmania, 132: 47–48.
1635	Gardner, C and Quintana R 1998, Larval development of the Australian Giant Crab Pseudocarcinus gigas (Lamarck, 1818) (Decapoda: Oziidae) reared in the laboratory, Journal of Plankton Research, 20(6): 1169–1188.
1636	Williams, A, Gardner, C, Althaus, F, Barker, B and Mills D 2009, Understanding shelf-break habitat for sustainable management of fisheries with spatial overlap, final report to the Fisheries Research and Development Corporation, project 2004/066, CSIRO Marine and Atmospheric Research, Hobart.
1637	McGarvey, R, Matthews, JM and Levings, AH 1999, Yield-, value-, and egg-per-recruit of Giant Crab, Pseudocarcinus gigas, South Australian Research and Development Institute, Adelaide.
1638	Fisheries Victoria 2010, Giant Crab Management Plan, Second Edition, ISBN 978-1-74264-478-3.
1639	Victorian Giant Crab Fishery Stock Assessment Report: 2015/16 Fishing Season.
1643	McLeay, L 2018, Stock status report for the South Australian South Australian Giant Crab

	(Pseudocarcinus gigas) Fishery 2016/17. Fishery Status Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2011/000332-7. SARDI Research Report Series No. 976.
1644	PIRSA 2018, Management Policy for Commercial Fishing of Giant Crabs in South Australia. Primary Industries and Regions South Australia. Adelaide, Australia.