

# Blue Swimmer Crab (2018)

*Portunus armatus*



**Danielle Johnston** : Department of Primary Industries and Regional Development, Western Australia, **Arani Chandrapavan** : Department of Primary Industries and Regional Development, Western Australia, **Anna Garland**: Department of Agriculture and Fisheries, Queensland, **Crystal Beckmann**: South Australian Research and Development Institute, **Daniel Johnson**: Department of Primary Industries, New South Wales

## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Fisheries	Stock status	Indicators
Western Australia	Cockburn Sound	CSCMF	Recovering	Catch, CPUE, fishery-independent recruitment index, egg production index
Western Australia	Peel-Harvey Estuary	WCEMF	Sustainable	Catch, CPUE
Western Australia	Shark Bay	SBCMF	Recovering	Catch, fishery-independent recruitment and breeding stock abundance
Western Australia	Western Australia North Coast	EGPMF, EGPMF    NBPMF    PDCF, NBPMF, PDCF	Sustainable	Catch, CPUE
Western Australia	Western Australia South-West Coast	MBDCF, MBDCF    SCEMF    WCEMF    WSCMF, SCEMF, WCEMF, WSCMF	Sustainable	Catch, CPUE
Queensland	North-Eastern Australia	BSCF, BSCF    ECTOF, ECOTF	Sustainable	Estimated biomass, standardised catch rates, fishery- independent recruitment abundance
New South Wales	South Eastern Australia	EGF, EPTF, N/A, OTF	Sustainable	Catch, effort, CPUE, size composition
South Australia	Gulf St. Vincent	BCF, MSF	Sustainable	Fishery-independent legal-sized relative catch rate

South Australia	Spencer Gulf	BCF, MSF	Sustainable	Fishery-independent legal-sized relative catch rate
South Australia	West Coast	MSF	Sustainable	Catch, CPUE

EGF Estuary General Fishery (NSW), EPTF Estuary Prawn Trawl Fishery (NSW), N/A Not Applicable (NSW), OTF Ocean Trawl Fishery (NSW), BSCF Blue Swimmer Crab Fishery (QLD), ECOTF East Coast Otter Trawl Fishery (QLD), BCF Blue Crab Fishery (SA), MSF Marine Scaefish Fishery (SA), CSCMF Cockburn Sound Crab Managed Fishery (WA), EGPMF Exmouth Gulf Prawn Managed Fishery (WA), MBDCF Mandurah to Bunbury Developing Crab Fishery (WA), NBPMF Nickol Bay Prawn Managed Fishery (WA), PDCF Pilbara Developmental Crab Fishery (WA), SBCMF Shark Bay Crab Managed Fishery (WA), SCEMF South Coast Estuarine Managed Fishery (WA), WCEMF West Coast Estuarine Managed Fishery (WA), WSCMF Warnbro Sound Crab Fishery (WA), EGPMF || NBPMF || PDCF Various Fisheries combined due to 3 boat rule (WA), MBDCF || SCEMF || WCEMF || WSCMF Various Fisheries combined due to 3 boat rule (WA), BSCF || ECTOF Blue Swimmer Crab Fishery || East Coast Otter Trawl Fishery (QLD)

## STOCK STRUCTURE

Blue Swimmer Crab is distributed in Australia from the south coast of Western Australia, north to the Northern Territory, across Queensland, down the east coast and to the New South Wales–Victoria border. They are also found in the warmer waters of the South Australian gulfs [Kailola et al. 1983].

In Western Australia, Blue Swimmer Crab is fished in numerous fisheries across five regions. The stock delineation between these regions is unknown [Chaplin et al. 2001; Chaplin et al. 2008]. Stock structure on the east coast of Australia is uncertain, involving overlapping stocks or a semi-continuous stock [Chaplin et al. 2001]. Due to the geographic separation between the major fishing grounds for Blue Swimmer Crab in New South Wales and Queensland, they are managed as two separate biological stocks. In South Australia, research has identified three separate biological stocks of Blue Swimmer Crab—in Spencer Gulf, Gulf St Vincent and on the coastline west of the Eyre Peninsula [Bryars and Adams 1999, Dixon and Hooper 2011].

Here, assessment of stock status is presented at the biological stock level—North-Eastern Australia (Queensland), South-Eastern Australia (New South Wales), Spencer Gulf, Gulf St Vincent and West coast (South Australia), and at the management unit level—Shark Bay, Cockburn Sound, Peel-Harvey Estuary, Western Australian North Coast and Western Australian South-West Coast (Western Australia).

## STOCK STATUS

### Cockburn Sound

Historically, variations in recruitment of Blue Swimmer Crabs in the Cockburn Sound (Crab) Managed Fishery have been driven by environmental conditions, which have caused large fluctuations in stock abundance and annual commercial catch [de Lestang et al. 2010]. A shift by commercial fishers from using set nets to traps in the mid-1990s resulted in a marked increase in mean annual crab landings. Following a series of high catches (250–350 t) in the late-1990s, the catch declined significantly [Johnston et al. 2011a,b]. Fishery-independent surveys indicated that low recruitment was a result of high fishing pressure combined with poor environmental conditions, which reduced the spawning stock to low levels and required the closure of the fishery in December 2006 [de Lestang et al. 2010; Johnston et al. 2011a,b]. Fishery-independent trawl surveys indicated that the strength of recruitment and the spawning stock biomass did not improve sufficiently to reopen the fishery until December 2009. The commercial fishing season for 2010 was restricted to 3.5 months and minimum size limits were increased from 130 mm carapace width to 140 mm carapace width to ensure that the catch level would enable continued recovery of the spawning stock biomass. At that time, the fishery was assessed to be recovering.

Based on improving abundances of juveniles (aged 0+ years) and increased egg production levels in 2010, 2011 and 2012, management restrictions were eased. This included lengthening the fishing season to six months (December–June) and decreasing the minimum size to the pre-closure size limit of 130 mm carapace width (CW), while retaining a 20 per cent reduction in trap numbers. However, catches remained low at around 50 t, with catch rates declining from

1.1 kg per trap-lift in 2010 to 0.5 kg per trap-lift in 2012. In 2013, despite a slight increase in catch to 62 t, fishery-independent trawl surveys indicated low recruitment, similar to the low levels preceding the closure in 2006. Although egg production (based on mature female abundance) in 2012 was within the historical range, a low proportion of berried females was observed during commercial monitoring and fishery-independent trawl surveys between September 2012 and January 2013, potentially explaining the low recruitment observed in 2013. The role of the 2010–11 marine heatwave in the recruitment decline is not clear; some evidence suggests that crabs in Cockburn Sound were in poor nutritional condition during this period, possibly due to a lack of prey. The fishery was closed early in the 2013–14 season as a result of very low stock biomass and low egg production.

A preliminary harvest strategy has been developed for the Cockburn Sound Crab Fishery using juvenile and egg production indices as performance indicators, with associated limit reference levels [Johnston et al. 2018].

The juvenile index for 2017 of 0.097 juveniles/100 m<sup>2</sup> trawled improved slightly over the past four years but was still below the limit reference level of 0.4 juveniles/100 m<sup>2</sup> trawled. The egg production index of 12.0 for 2016 was a significant increase from 2014 (4.0) and 2015 (2.8) and was at the harvest strategy threshold level of 12. Despite this increase in egg production, the proportion of berried females was lower than historic levels which may have contributed to the 2017 juvenile recruitment index remaining low. The egg production index declined to 10.3 in 2017 and the effect of this on recruitment in 2018 is as yet unknown.

As commercial catch rates also improved during 2016 and 2017, indicating increasing available biomass, the status of the stock was changed from environmentally limited to recovering for the 2017/18 season [Johnston et al. 2018].

The recent declines in abundance are believed to be substantially attributable to reduced productivity driven by environmental changes, indicated by continued low juvenile abundance in 2017 despite the improvement in egg production [Johnston et al. 2018].

The above evidence indicates that spawning stock biomass is likely to have been reduced to the point where average recruitment levels are significantly reduced. Fisheries management has responded appropriately to indications of reduced abundance and environmental changes, and increases in commercial catch rates indicate that current fishing mortality is below the level that would prevent the stock from recovering.

On the basis of the evidence provided above, the Cockburn Sound (Crab) Managed Fishery (Western Australia) management unit is classified as a **recovering stock**.

### **Gulf St. Vincent**

The process for determining the status of the Gulf St. Vincent biological stock is the same as for the Spencer Gulf stock, using a similar fishery-independent pot survey design, and the same definition and usage of limit reference points based on survey catch rate, as an index of relative biomass and fishing mortality [PIRSA, 2018]. The most recent stock assessment by Beckmann and Hooper (2018) reported that, during the 2016–17 season (1 July 2016–30 June 2017), the TACC was fully harvested (245 t) for the third consecutive year.

Catch rates of legal-sized crabs in 2017 (2.8 kg crabs per pot-lift) were above the target reference point (1.2 kg crabs per pot-lift) and the second highest on record [Beckmann and Hooper 2018]. The catch rate of legal-sized crabs has been above the target reference point during each of the last three surveys. 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 provided above, the Gulf St. Vincent (South Australia) biological stock is classified as a **sustainable stock**.

**North-  
Eastern  
Australia**

The Queensland Blue Swimmer Crab fishery primarily operates in southern Queensland. Prior to 1998, the majority of fishing was conducted inshore, in and around Moreton Bay. In 1998 commercial pot fishers began exploiting Blue Swimmer Crab populations further offshore, in areas that were previously lightly fished. Fishing in offshore waters peaked in 2003, when the offshore harvest contributed approximately 70 per cent to total harvest. By 2015, the offshore harvest had decreased and returned to levels slightly higher than those pre-expansion. This rise and subsequent fall of harvest in the offshore area is of concern, and may indicate a decline in fishable biomass for the offshore area and the biological stock as a whole [QDAF 2018].

Queensland assessed the north-eastern Australian Blue Swimmer Crab stock in 2015 (including data up until 2014) using an integrated stock assessment. Representative outputs for Moreton Bay and Sunshine Coast were used to determine status for the entire biological stock [Sumpton et al. 2015]. The model estimated spawning biomass between 38 and 58 per cent of assumed equilibrium [Sumpton et al. 2015]. At the current minimum legal size (MLS), median maximum sustainable yield (MSY) estimates range from 375 to 750 t [Sumpton et al. 2015]. Current combined commercial and recreational harvest from the representative area of approximately 368 t (336 and 32 t respectively) is below this range [QDAF 2018].

Standardised catch rates in Moreton Bay and Sunshine Coast have been relatively stable in recent years although at lower levels than historically (76 and 71 per cent of the 1989 to 2016 average respectively), this may indicate a reduction in the level of biomass in these areas. Catch rates in Hervey Bay have declined significantly in recent years but are still above half of the historical average (62 per cent of the 1989 to 2016 average) [QDAF 2018]. Fishery independent recruitment surveys show a relative increase in recruitment in the inshore area since 2009 (QDAF 2018), although recruitment target reference points are yet to be established by Fisheries Queensland. The most recent assessment [Sumpton et al. 2015] estimates that spawning biomass in 2014 was between 38 and 58 per cent of 1989 levels. This stock is not considered to be recruitment impaired.

The recent stock assessment also estimated fishing pressure on the exploitable component of the stock. Analyses indicated male legal Blue Swimmer Crab abundance to be between 22 and 42 per cent of assumed equilibrium [Sumpton et al. 2015]. Active commercial pot fishing licences and fishing effort (in days fished) decreased between 2003 and 2017 by approximately 50 per cent [QDAF 2018]. Long term trends in total catch and effort are directly proportional to the expansion and subsequent contraction of fishing in offshore areas [Sumpton et al. 2015], with overall fishing pressure on the Blue Swimmer Crab stock showing a decline.

Spatial closures within the Moreton Bay, Great Sandy Strait and Great Barrier Reef Marine Parks provide some protection of the Blue Swimmer Crab biomass from fishing mortality [QDAF 2018]. Management arrangements in Queensland prohibit the take of female crabs, and a minimum legal size ensures that a high proportion of male Blue Swimmer Crabs have an opportunity to mate before recruitment into the fishery [QDAF 2018]. This level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the North-Eastern Australia (Queensland) biological stock is classified as a **sustainable stock**.

**Peel-Harvey Estuary** The gradual conversion from targeting Blue Swimmer Crabs using gillnets to using hourglass traps in the Peel-Harvey Estuary Crab Fishery (Area 2 of West Coast Estuarine Managed Fishery) between the mid-1990s and early-2000s resulted in an increase in annual crab catches. Commercial catch levels have generally ranged between 50 and 100 t annually. A recreational boat-based survey conducted in Western Australia in 2015/16 estimated the total state-wide recreational catch of Blue Swimmer Crabs to be approximately 47 t, of which 82 per cent (by number) were caught in waters within the Metro Zone (which includes the Swan and Canning Rivers and Peel-Harvey Estuary crab fisheries) (Ryan et al. 2017).

The Peel-Harvey Estuary Crab Fishery (PHECF) is managed under a formal harvest strategy, using annual standardised catch rates (catch per unit effort, ) and total catch for each fishing season (November-August) [Johnston et al. 2014; Johnston et al. 2015]. Since conversion from nets to traps in 2000/01, annual standardised commercial catch rates have fluctuated between 0.8 and 1.4 kg per trap-lift, but have generally remained above 1 kg per trap-lift. In 2012/13, a catch of 107 t and a standardised CPUE of 1.4 kg per trap-lift were the highest on record. Annual catch and standardised commercial catch rates declined to 97 t and 1.1 kg/traplift in 2014/15 and to 55t and 0.9 kg/traplift in 2016/17, but remained above the threshold reference level of 0.7 kg/traplift [Johnston et al. 2018]. This decline was attributed to cooler than average water temperatures negatively impacting growth, and rainfall events flushing crabs out of the estuary. The above evidence indicates that this stock is not depleted. As a result, the PHECF gained Marine Stewardship Council certification in 2016, being the first fishery to have attained such certification for both commercial and recreational sectors [Johnston et al. 2015].

The breeding stock in this region has additional protection because the size at maturity (86–98 mm CW) is well below the legal minimum size (LMS; 127–130 mm CW). Spawning occurs near the mouth and outside the estuary following flushing of crabs from the estuary during winter, providing the spawning stock with further spatial protection from fishing. The above evidence indicates that current fishing pressure is unlikely to cause the stock to become depleted.

On the basis of the evidence provided above, the Peel-Harvey Estuary Crab Fishery (Area 2 of West Coast Estuarine Managed Fishery) (Western Australia) management unit is classified as a **sustainable stock**.

**Shark Bay** The Shark Bay Crab Managed Fishery for Blue Swimmer Crab expanded rapidly between 2000 and 2010. In 2010, it was Australia’s highest producing Blue Swimmer Crab fishery, with landings of 828 tonnes (t), collectively caught by the dedicated crab trap sector and as by-product by the trawl sector. This stock also supports a small (around 2.2 t) but important recreational fishery. In late 2011, the crab stock in Shark Bay was found to be at historically low levels (commercial and survey catch rates below limit reference level) as a combined result of fishing, recruitment failure and increased natural mortality of adult stock. This was attributed to the combination of the effects of an extreme marine heat wave event during the summer of 2010–11, two significant flooding events and high fishing pressure in the years prior. Commercial fishing for Blue Swimmer Crabs in Shark Bay ceased in April 2012 on a voluntary industry-agreed basis to facilitate stock rebuilding, at which point it was classified as being environmentally limited. During the closure, intensive monitoring of the resource began, using a combination of trawl and trap-based fishery-independent surveys. The surveys provide indices of spawning stock and recruitment levels which are assessed periodically. During 2013, indices of spawning stock increased from 200 (below limit reference of 300) to 1 789 (kg per square nautical mile) and recruitment levels improved from 991 (limit reference level of 700) to 2197 (kg per square nautical mile). These improved indices indicated a recovering stock and provided some confidence for the

resumption of limited commercial fishing for Blue Swimmer Crabs in Shark Bay.

In 2015, the fishery transitioned to a fully managed status under a new management plan, which includes a system of individual transferable quotas that applies across all three commercial sectors in Shark Bay. A formal harvest strategy is being developed for the fishery, where quota setting is now based on three primary performance indicators of peak spawning (during June), peak recruitment (during February) and residual legal biomass levels (during November), while secondary indicators include quota achievement and commercial trap catch rates.

Since 2013, annual stock assessments have indicated a steady stock recovery under catch levels of up to 372 t. In 2017, the highest landing since the reopening of the fishery was achieved at 443 t while maintaining spawning and recruitment levels above the limit, and legal biomass and commercial catch rates above the target reference levels which are back with in the historical range.

On the basis of the evidence provided above, the Shark Bay Crab Managed Fishery (Western Australia) management unit is classified as a **recovering stock**.

**South  
Eastern  
Australia**

Blue Swimmer Crabs occur in coastal and estuarine waters along the length of the New South Wales coastline. New South Wales Blue Swimmer Crab populations are at the southern end of the species distribution along the east coast and have a limited spawning period (November–February), rather than the year-round spawning that occurs in more northern latitudes [Johnson et al. 2010]. A legal minimum size (LMS) of 60 and 65 mm carapace length is enforced for recreational and commercial fishers, respectively. Female crabs close to the LMS are sexually mature, and are capable of producing one–three batches of eggs within a season [Johnson et al. 2010].

The most recent estimate of the recreational harvest of Blue Swimmer Crabs in New South Wales was approximately 51 000 crabs (27 t) during 2013–14 [West et al. 2016]. The annual recreational harvest of Blue Swimmer Crabs in New South Wales was previously estimated to lie between 150 and 310 t based on the results of the National Recreational and Indigenous Fishing Survey [Henry and Lyle 2003] and surveys undertaken by New South Wales Department of Primary Industries. Commercial catches of this species have tended to fluctuate around a long-term average of about 144 t over the period 2000/01–2016/17. Nominal catch rates of Blue Swimmer Crabs by the main fishing methods in the Estuary General Fishery (EGF) have remained relatively steady and have been above long-term averages for the past five years. Four estuaries account for 85 per cent of commercial Blue Swimmer Crab landings in New South Wales (121 t in 2016/17), the most important being Wallis Lake (99 t in 2016/17). Catch rates in Wallis Lake appear stable and within historic levels indicating a stable level of biomass in this area. Since the transition to daily reporting in 2009/10, annual commercial catch rates (kg.day<sup>-1</sup>) for fish trapping, the method that accounts for around 95 per cent of commercial landings (95 t in 2016/17) have fluctuated between 14.1 and 35.3 kg.day<sup>-1</sup>, but have generally remained above the eight year mean catch rate of 25 kg.day<sup>-1</sup>. In 2016/17, total landings from Wallis Lake (99 t) and CPUE(30.1 kg.day<sup>-1</sup>) were six and 24 per cent higher than eight year averages, respectively. The length compositions of the commercial landings for this species have been stable since monitoring commenced in 2009 [Stewart et al. 2015]. Nominal effort levels (in the number of fisher days) over the past eight years have remained steady (~2900 per year), and are well below historical levels (> 8 000 per year).

Fishing mortality in the EGF is now controlled through an interim Total Commercial Access Level (ITCAL) of 223 t, with catch allocations based on current shareholdings, effective from 1 December 2017. The increased minimum legal length for the commercial sector and, the implementation of daily possession limit for all ocean fisheries (25 kg) has reduced fishing pressure on

the spawning stock. This reduction in fishing effort in combination with stable size compositions in landings indicates that fishing mortality is constrained in New South Wales waters to sustainable levels.

The above evidence indicates that the biomass of this stock is unlikely to be depleted and the current level of fishing mortality in New South Wales is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the South-Eastern Australia (New South Wales) biological stock is classified as a **sustainable stock**.

## **Spencer Gulf**

In the South Australian gulfs, access to take Blue Swimmer Crabs is provided via a Blue Crab Fishery (BCF) or a Marine Scalefish Fishery (MSF) licence endorsed with quota entitlements. MSF licence holders predominantly use hoop and drop nets while, the pot fishing sector of the BCF uses specifically designed crab pots. TACC levels have been set since 1996 to limit Blue Swimmer Crab catches within ecologically sustainable limits. Since 1999–2000, exploitation rates have been limited by setting the TACC at a level below the maximum historical catch for the fishery. The TACC during the 2016/17 season (1 July 2016–30 June 2017) was 382 t and was fully harvested. Throughout South Australia, a LMS of 110 mm CW is enforced, at which size crabs are approximately 14–18 months old and sexually mature. Females produce at least two batches of eggs each season [Kumar et al. 2003].

The most recent stock assessment report [Beckmann and Hooper 2018] used data up to 30 June 2017. The primary measures of biomass and fishing mortality for the Spencer Gulf biological stock are the relative abundance of legal-sized crabs, obtained from catch rates in fishery-independent pot surveys. The catch rates of legal-sized crabs from fishery-independent surveys are considered to be a more reliable index for biomass and fishing mortality than fishery-dependent data because the fishery-independent sampling design has remained relatively consistent since 2002. Survey catch rates are compared with limit reference points defined in the South Australian Blue Crab Fishery Management Plan [PIRSA 2018]. These reference points were set at the lower end of the observed range of relative catch rates in the reference period 2002–10, to ensure that relative abundance remains within the range of historical values during a period when the TACC was constant and considered to be harvested sustainably.

Catch rates of legal-sized crabs in 2017 (3.1 kg crabs per pot-lift) were above the target reference point (2.7 kg crabs per pot-lift) and the highest on record [Beckmann and Hooper 2018]. The catch rate of legal-sized crabs has been above the target reference point during five of the last seven surveys. 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 provided above, the Spencer Gulf (South Australia) biological stock is classified as a **sustainable stock**.

## **West Coast**

On the West Coast of South Australia, access to take Blue Swimmer Crabs is provided via a MSF licence. MSF licence holders predominantly use hoop and drop nets. Fishers in this fishery target a range of species, and effort patterns generally reflect changes in relative seasonal abundance of the various species and their market prices. The West Coast zone is not subject to the quota management system and is managed separately to the BCF. This zone of the fishery operates under the Management Plan for the MSF [PIRSA 2018] that specifies general performance indicators.

The most recent stock assessment by Beckmann and Hooper (2018) reported a total harvest of 47 t during the 2016–17 season (1 July 2016–30 June 2017) and

this was above the long-term average (1893/84–2015/16;  $27 \pm 4$  t). The primary indices of biomass and fishing mortality for the West Coast Gulf biological stock are the commercial CPUE and catch trends. Comparison of recent CPUE and catch trends to values in the past decade is considered to provide a reliable proxy for relative biomass and fishing mortality. These historical values have been stable at relatively high levels, indicating that the biomass of this stock was unlikely to be depleted or that recruitment was unlikely to be impaired in the past decade.

The total harvest in 2016–17 was above the long-term average (1983/84–2015/16;  $27 \pm 4$  t). The 2016–17 targeted crab net catch rate was 65 kg per boat day and the catch rate has remained around this level since 2007–08 (range: 62–79 kg per boat day). 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 provided above, the West Coast (South Australia) biological stock is classified as a **sustainable** stock.

**Western  
Australia  
North Coast**

The Western Australia North Coast management unit is made up of two dedicated developing crab trap fisheries—the Pilbara Developmental Crab Fishery (PDCF), and the Exmouth Gulf Developing Crab Fishery (EGDCF)—and crab taken as by-product in certain prawn trawl fisheries—the Exmouth Gulf Prawn Managed Fishery, Onslow Prawn Managed Fishery (OPMF) and Nickol Bay Prawn Managed Fishery (NBPMF). Total catch for all these fisheries in 2017 was 55.5 t, a slight decrease from the catch of 56.5 t reported in 2015. No Blue Swimmer Crabs were reported to have been landed in the 2017 calendar year in either the EGDCF or OPMF.

In 2017, the catch rate of 1.1 kg per traplift for the PDCF was well above threshold levels of the draft harvest strategy (0.6 kg/traplift), indicating that the stock is currently being fished at a sustainable level. The above evidence indicates that the biomass in this management unit is unlikely to be depleted and that current levels of fishing mortality are unlikely to cause the management unit to become recruitment impaired.

On the basis of the evidence provided above, the Western Australia North Coast management unit is classified as a **sustainable** stock.

**Western  
Australia  
South-West  
Coast**

The Western Australia South-West coast management unit is made up of a number of dedicated minor crab trap and gillnet fisheries: the Warnbro Sound Crab Managed Fishery (WSCMF), the Swan and Canning Rivers Crab Fishery (SCRCF), the Mandurah to Bunbury Developing Crab Fishery (MBDCF), the South Coast Estuarine Managed Fishery (SCEMF), Open Access Fisheries in the West Coast (WL(SC)) and the Joint Authority Southern Demersal Gillnet and Demersal Longline Managed Fishery (JASDGDMF); as well as crab taken as by-product in other net and trawl fisheries. Total catch for these fisheries in 2017 was 21.3 t, which is a significant decline from 71.8 t reported in 2015. This decline was primarily a result of declines in catch for the SCEMF (53.5 t in 2015 to 10.5 t in 2017) and the SCRCF (10 t in 2015 to 1 t in 2017).

Following some of the highest Blue Swimmer Crab catches on record for the SCEMF between 2013 and 2016, possibly resulting from above average water temperatures in 2011/12 and 2012/13 having a positive impact on recruitment of these southern stocks, the catch decreased during 2017 to previous levels. This decrease is thought to be related to cooler water temperatures associated with a weaker Leeuwin Current reducing the productivity of crab populations in this region. Commercial catches at the beginning of 2017 were within historical levels in the SCRCF (annual catch around 6–10 t), but declined due to unseasonably high rainfall flushing crabs from the system. Consequently,

commercial operations in this fishery ceased for the remainder of 2017. Despite the decline in catch, standardised catch rates for the SCRCF remained well above the threshold and within the target range for this fishery. Although catch declined slightly in 2017 for the MBDCF, standardised catch rates for Area 1 of this fishery (Comet Bay) were just above the threshold and within the target range, with Area 2 (Mandurah-Bunbury) not fished. Following a voluntary closure in 2014/15, catches increased for the WSCMF in 2016/17, however, standardised catch rates declined to below the threshold level of 0.8kg/traplift. Despite the decline in catch rates for this fishery, standardised catch rates for all other crab fisheries on the South-West Coast remain above threshold levels, indicating that stocks are currently fished at sustainable levels. The above evidence indicates that the biomass in this management unit is unlikely to be depleted and that current levels of fishing mortality are unlikely to cause the management unit to become recruitment impaired.

On the basis of the evidence provided above, the Western Australia south-West Coast management unit is classified as a **sustainable** stock.

## BIOLOGY

**Blue Swimmer Crab Biology** [de Lestang et al. 2003a,b, Sumpton et al. 2003]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Blue Swimmer Crab	3–4 years, ~ 200 mm CW	Varies among locations, 6–14 months, 86–110 mm CW

## DISTRIBUTION



Blue Swimmer Crab Spatial Distribution

## TABLES

Commercial Catch Methods	New South Wales	Queensland	South Australia	Western Australia
Beach Seine				✓

<b>Blue Swimmer Crab Trap</b>			✓	
<b>Crab Trap</b>	✓			✓
<b>Fish Trap</b>	✓			✓
<b>Gillnet</b>				✓
<b>Haul Seine</b>				✓
<b>Haul Seine/Beach Seine</b>	✓			
<b>Lift nets</b>			✓	
<b>Mesh Net</b>	✓			
<b>N/A</b>		✓		
<b>Net</b>				✓
<b>Octopus Traps And Pots</b>				✓
<b>Otter Trawl</b>	✓	✓		✓
<b>Traps and Pots</b>		✓		✓
<b>Unspecified</b>	✓			✓

<b>Fishing methods</b>				
	<b>New South Wales</b>	<b>Queensland</b>	<b>South Australia</b>	<b>Western Australia</b>
<b>Commercial</b>				
Blue Swimmer Crab Trap			✓	
Crab Trap	✓			✓
Fish Trap	✓			
Gillnet				✓
Haul Seine				✓
Lift nets			✓	
Mesh Net	✓			
Otter Trawl	✓	✓		✓
Traps and Pots		✓		✓
Unspecified	✓			✓
<b>Indigenous</b>				
Traditional apparatus		✓		
<b>Recreational</b>				
Blue Swimmer Crab Trap	✓			✓
Coastal, Estuary and River Set Nets			✓	✓
Dip Net	✓			
Diving			✓	✓
Traps and Pots		✓		

Management Methods				
	New South Wales	Queensland	South Australia	Western Australia
<b>Charter</b>				
Gear restrictions		✓		
Protection of female crabs		✓		
Size limit		✓		
Spatial closures		✓		
<b>Commercial</b>				
Catch limits		✓		
Effort limits				✓
Gear restrictions	✓	✓	✓	✓
Limited entry	✓	✓	✓	✓
Protection of egg-bearing females	✓		✓	✓
Protection of female crabs		✓		
Size limit	✓	✓	✓	✓
Spatial closures	✓	✓	✓	✓
Spatial zoning	✓		✓	✓
Temporal closures			✓	✓
Total allowable catch	✓		✓	✓
Vessel restrictions	✓	✓		✓
<b>Indigenous</b>				
Native Title	✓			
Section 37 (1d)(3)(9), Aboriginal cultural fishing authority	✓			
<b>Recreational</b>				
Bag limits			✓	✓
Boat limits			✓	✓
Gear restrictions	✓	✓	✓	✓
General	✓			✓

<b>recreational licence or fishing boat licence (not species specific)</b>				
<b>Limited entry (licensing)</b>				✓
<b>Passenger restrictions</b>				✓
<b>Protection of egg-bearing females</b>	✓		✓	✓
<b>Protection of female crabs</b>		✓		
<b>Size limit</b>	✓	✓	✓	✓
<b>Spatial closures</b>	✓	✓	✓	✓
<b>Spatial zoning</b>				✓
<b>Temporal closures</b>				✓

<b>Active Vessels</b>	<b>New South Wales</b>	<b>Queensland</b>	<b>South Australia</b>	<b>Western Australia</b>
	169 Fishing Business in EGF, 18 Fishing Business in EPTF, 56 Fishing Business in OTF,	104 in BSCF, 212 in ECOTF,	3 Licences in BCF, 4 Licences in BCF, 1 Licences in MSF, 30 Licences in MSF,	6 in EGPMF, &lt;3 in MBDCF, 3 in NBPMF, &lt;3 in PDCF, 22 in SBCMF, 22 in SCEMF, 11 in WCEMF, &lt;3 in WSCMF, &lt;3 in Charter,

**EGF** Estuary General Fishery(NSW)

**EPTF** Estuary Prawn Trawl Fishery(NSW)

**OTF** Ocean Trawl Fishery(NSW)

**BSCF** Blue Swimmer Crab Fishery(QLD)

**ECOTF** East Coast Otter Trawl Fishery(QLD)

**BCF** Blue Crab Fishery(SA)

**MSF** Marine Scalefish Fishery(SA)

**EGPMF** Exmouth Gulf Prawn Managed Fishery(WA)

**MBDCF** Mandurah to Bunbury Developing Crab Fishery(WA)

**NBPMF** Nickol Bay Prawn Managed Fishery(WA)

**PDCF** Pilbara Developmental Crab Fishery(WA)

**SBCMF** Shark Bay Crab Managed Fishery(WA)

**SCEMF** South Coast Estuarine Managed Fishery(WA)

**WCEMF** West Coast Estuarine Managed Fishery(WA)

**WSCMF** Wambro Sound Crab Fishery(WA)

**Charter** Tour Operator(WA)

Catch	New South Wales	Queensland	South Australia	Western Australia
<b>Charter</b>				Negligible
<b>Commercial</b>	131.195t in EGF, 1.54t in EPTF, 5.651t in N/A, 3.001t in OTF,	0.322t in BSCF, 473.412t in BSCF    ECTOF,	630.879t in BCF, 46.953t in MSF,	0t in CSCMF, 55.486t in EGPMF    NBPMF    PDCF, 21.22t in MBDCF    SCEMF    WCEMF    WSCMF, 466.28t in SBCMF, 64.449t in WCEMF,
<b>Indigenous</b>	Unknown	Unknown	Unknown	Unknown
<b>Recreational</b>	27 t (2013–14)	36 t (2013–14)	376 t (Dec 2013–Nov 2014)	47 t (2015/16)

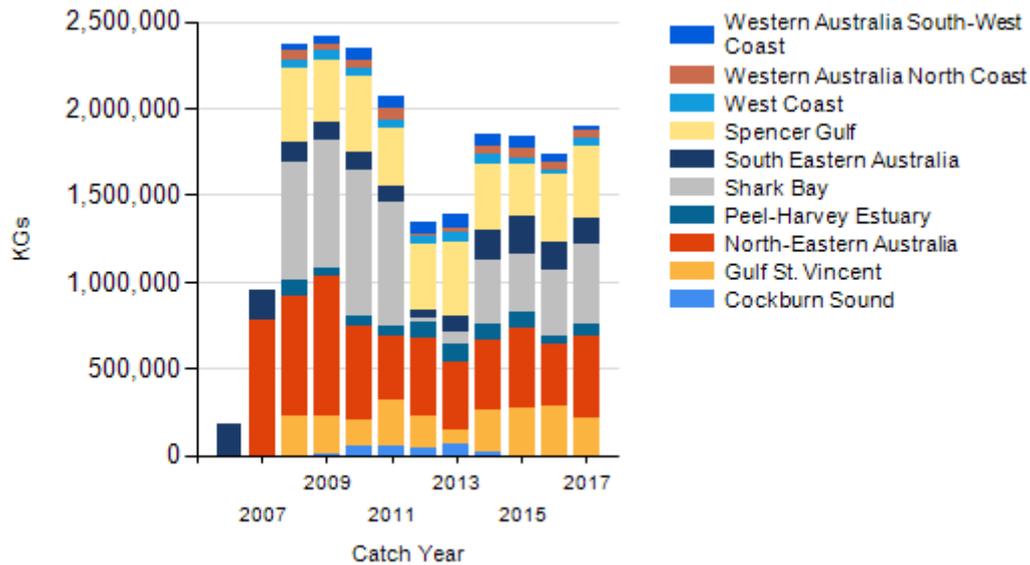
EGF Estuary General Fishery (NSW), EPTF Estuary Prawn Trawl Fishery (NSW), N/A Not Applicable (NSW), OTF Ocean Trawl Fishery (NSW), BSCF Blue Swimmer Crab Fishery (QLD), ECOTF East Coast Otter Trawl Fishery (QLD), BCF Blue Crab Fishery (SA), MSF Marine Scalefish Fishery (SA), CSCMF Cockburn Sound Crab Managed Fishery (WA), EGPMF Exmouth Gulf Prawn Managed Fishery (WA), MBDCF Mandurah to Bunbury Developing Crab Fishery (WA), NBPMF Nickol Bay Prawn Managed Fishery (WA), PDCF Pilbara Developmental Crab Fishery (WA), SBCMF Shark Bay Crab Managed Fishery (WA), SCEMF South Coast Estuarine Managed Fishery (WA), WCEMF West Coast Estuarine Managed Fishery (WA), WSCMF Wambro Sound Crab Fishery (WA), EGPMF || NBPMF || PDCF Various Fisheries combined due to 3 boat rule (WA), MBDCF || SCEMF || WCEMF || WSCMF Various Fisheries combined due to 3 boat rule (WA), BSCF || ECTOF Blue Swimmer Crab Fishery || East Coast Otter Trawl Fishery (QLD),

**Western Australia – Recreational (catch)** Boat-based recreational catch from 1 May 2013–30 April 2014 [Ryan et al. 2018].

**Queensland – Indigenous (Management Methods)** Under the *Fisheries Act 1994* (Qld), Indigenous fishers in Queensland are entitled to use prescribed traditional and non-commercial fishing apparatus in waters open to fishing. Size and possession limits, and seasonal closures do not apply to Indigenous fishers. Further exemptions to fishery regulations may be applied for through permits.

**New South Wales – Indigenous (Management Methods)** (a) Aboriginal Cultural Fishing Interim Access Arrangement—allows an Indigenous fisher in New South Wales to take in excess of a recreational bag limit in certain circumstances; for example, if they are doing so to provide fish to other community members who cannot harvest for themselves; (b) The Aboriginal cultural fishing authority is the authority that Indigenous persons can apply to take catches outside the recreational limits under the *Fisheries Management Act 1994* (NSW), Section 37d) (3)(9), Aboriginal cultural fishing authority; and (c) In cases where the *Native Title Act 1993* (Cth) applies, fishing activity can be undertaken by the person holding native title in line with S.211 of that Act, which provides for fishing activities for the purpose of satisfying their personal, domestic or non-commercial communal needs. In managing the resource where native title has been formally recognised, the native title holders are engaged with to ensure their native title rights are respected and inform management of the State's fisheries resources.

## CATCH CHART



Commercial catch of Blue Swimmer Crab - note confidential catch not shown.

## EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

### ENVIRONMENTAL EFFECTS on Blue Swimmer Crab

References	
332	Beckmann, CL and Hooper, GE 2018, Blue Crab ( <i>Portunus armatus</i> ) Fishery 2016/17. Fishery Assessment Report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2007/000729-14. SARDI Research Report Series No. 980. 59pp.
333	Bryars, S and Adams, M 1999, An allozyme study of the blue swimmer crab, <i>Portunus pelagicus</i> (Crustacea: Portunidae), in Australia: stock delineation in southern Australia and evidence for a cryptic species in northern waters, <i>Marine and Freshwater Research</i> , 50: 15–26.
334	Chaplin, J, Yap, ES, Sezmis, E and Potter, IC 2001, Genetic (microsatellite) determination of the stock structure of the blue swimmer crab in Australia, Fisheries Research and Development report, FRDC project 98/118, Murdoch University, Western Australia.
335	Chaplin, JA and Sezmis, E 2008, A genetic assessment of the relationships among the assemblages of the blue swimmer crab, <i>Portunus pelagicus</i> , in Cockburn Sound, the Swan River Estuary and Warnbro Sound, Final report to the Department of Fisheries, Western Australia, Centre for Fish and Fisheries Research, Murdoch University.
336	de Lestang, S, Hall, NG and Potter, IC 2003a, Reproductive biology of the Blue Swimmer Crab, <i>Portunus pelagicus</i> (Decapoda: Portunidae) in five water bodies on the west coast of Australia, <i>Fishery Bulletin</i> , 101: 745–757.
337	de Lestang, S, Hall, NG and Potter, IC 2003b, Do the age compositions and growth of the crab <i>Portunus pelagicus</i> in marine embayments and estuaries differ?, <i>Journal of the Marine Biological Association of the United Kingdom</i> , 83: 1– 8.
338	de Lestang, S, Bellchambers, LM, Caputi, N, Thomson, AW, Pember, MB, Johnston, DJ and Harris, DC 2010, Stock– recruitment–environment relationship in a <i>Portunus pelagicus</i> fishery in Western Australia, in GH Kruse, GL Eckert, RJ Foy, RN Lipcius, B Sainte-Marie, DL Stram and D Woodby (eds), <i>Biology and management of exploited crab populations under climate change</i> , Alaska Sea Grant, University of Alaska, Fairbanks, doi: 10.4027/bmecpcc.2010.06.
339	Dixon, CD and Hooper, GE 2011, Blue Crab ( <i>Portunus pelagicus</i> ) Fishery 2009/10, Stock assessment report to Primary Industries and Resources South Australia (Fisheries and Aquaculture), South Australian Research and Development Institute publication F2007/000729-7, SARDI research report series 531, SARDI, Adelaide.
340	Henry GW, Lyle JM 2003, The national recreational and Indigenous fishing survey. Fisheries Research and Development Corporation, Canberra.
341	Johnson, DD, Gray, CA and Macbeth, WG 2010, Reproductive biology of <i>Portunus pelagicus</i> in a south-east Australian estuary, <i>Journal of Crustacean Biology</i> , 30: 200–205.

STATUS OF AUSTRALIAN FISH STOCKS REPORT  
Blue Swimmer Crab (2018)

342	Johnston, DJ, Harris, D, Caputi, N and Thomson, P 2011a, Decline of a blue swimmer crab ( <i>Portunus pelagicus</i> ) fishery in Western Australia—history, contributing factors and future management strategy, Fisheries Research, 109(1): 119– 130.
343	Johnston, D, Harris, D, Caputi, N, de Lestang, S and Thomson, A 2011b, Status of the Cockburn Sound Crab Fishery, Fisheries research report 219, Western Australian Department of Fisheries, Perth.
344	Johnston, D, Chandrapavan, A, Wise, B and Caputi, N 2014, Assessment of blue swimmer crab recruitment and breeding stock levels in the Peel–Harvey Estuary and status of the Mandurah to Bunbury Developing Crab Fishery, Fisheries research report 258, Western Australian Department of Fisheries, Perth.
345	Johnston, DJ, Smith, KA, Brown, JI, Travaille, KL, Crowe, F, Oliver, RK and Fisher, EA 2015, Western Australian Marine Stewardship Council Report Series No 3: West Coast Estuarine Managed Fishery (Area 2: Peel-Harvey) and Peel-Harvey Estuary Blue Swimmer Crab Recreational Fishery. Department of Fisheries, Western Australia. 284 pp.
346	Johnston, D., Marks, R. and O'Malley, J. (2018). West Coast Blue Swimmer Crab Fishery Status Report 2017, in Gaughan, D.J. and Santoro, K. (eds), Status reports of the fisheries and aquatic resources of Western Australia 2015/16: the state of the fisheries. Report prepared by the Western Australian Department of Fisheries.
347	Kailola, PJ, Williams, MJ, Stewart, PC, Reichelt, RE, McNee, A and Grieve, C 1993, Australian fisheries resources, Bureau of Resources and Fisheries Research and Development Corporation, Canberra.
348	Queensland Department of Agriculture and Fisheries 2018, Queensland Stock Status Assessment Workshop Proceedings 2018. Species Summaries. 19–20 June 2018, Brisbane.
349	Kumar, MS, Xiao, Y, Venema, S and Hooper, G 2003, Reproductive cycle of the blue swimmer crab, <i>Portunus pelagicus</i> , off southern Australia, Journal of the Marine Biological Association of the United Kingdom, 83: 983–994.
350	PIRSA 2018, Management Plan for the South Australian Commercial BCF. South Australian Fisheries Management Series Paper No. 75. Adelaide, Australia: Primary Industries and Regions South Australia (Fisheries and Aquaculture).
351	Ryan, KL, Hall, NG, Lai, EK, Smallwood, CB, Taylor, SM, and Wise, BS 2017, State-wide survey of boat based recreational fishing in Western Australia 2015/16. , Fisheries research report 287, Department of Primary Industries and Regional Development, western Australia, 205pp.
352	Stewart, J, Hegarty, A, Young, C, Fowler, AM and Craig, J 2015, Status of Fisheries Resources in NSW 2013-14, NSW Department of Primary Industries, Mosman: 391pp.
353	Sumpton, W, Gaddes, S, McLennan, M, Campbell, M, Tonks, M, Good, N and Hagedoorn, W 2003, Fisheries biology and assessment of the blue swimmer crab ( <i>Portunus pelagicus</i> ) in Queensland, Queensland Department of Primary Industries and Fisheries Research and Development Corporation project 98/117.
354	Sumpton, W, Campbell, M, O'Neill, M, McLennan, M, Campbell A and Leigh, G 2015, Assessment of the blue swimmer crab ( <i>Portunus armatus</i> ) fishery in Queensland. Department of Agriculture and Fisheries, Brisbane.
355	West, LD, Stark, KE, Murphy, JJ, Lyle, JM and Ochwada-Doyle, FA 2016, Survey of Recreational Fishing in New South Wales and the ACT, 2013/14, NSW Fisheries Final Report Series 149.