

# West Coast Blue Swimmer Crabs RESOURCE STATUS REPORT 2016

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## Overview Description

### Fishery Description

Blue swimmer crabs (*Portunus armatus*) are found along the entire Western Australian coast (<50 m). The commercial crab fisheries within the West Coast Bioregion are the Cockburn Sound Crab Managed Fishery, the Warnbro Sound Crab Managed Fishery, Area 1 (Swan-Canning Estuary) and Area 2 (Peel-Harvey Estuary) of the West Coast Estuarine Managed Fishery and Area 1 (Comet Bay) and Area 2 (Mandurah to Bunbury) of the Mandurah to Bunbury Developing Crab Fishery. Commercial crab fishers currently use purpose-designed crab traps. For more detailed descriptions of the crab fisheries see Johnston et al., 2015a.

Blue swimmer crabs represent the most important recreationally fished inshore species in the southwest of WA in terms of participation rate centred largely on the estuaries and coastal embayments from Geographe Bay to the Swan River and Cockburn Sound using either drop nets, scoop nets or diving. Management arrangements for the commercial and recreational fisheries include minimum size, protection of breeding females, seasonal closures with effort controls for the commercial fishery.

Both the commercial and recreational Peel-Harvey crab fisheries attained MSC Certification in 2016 (see Johnston et al., 2015b for full details).

## SUMMARY FEATURES 2015

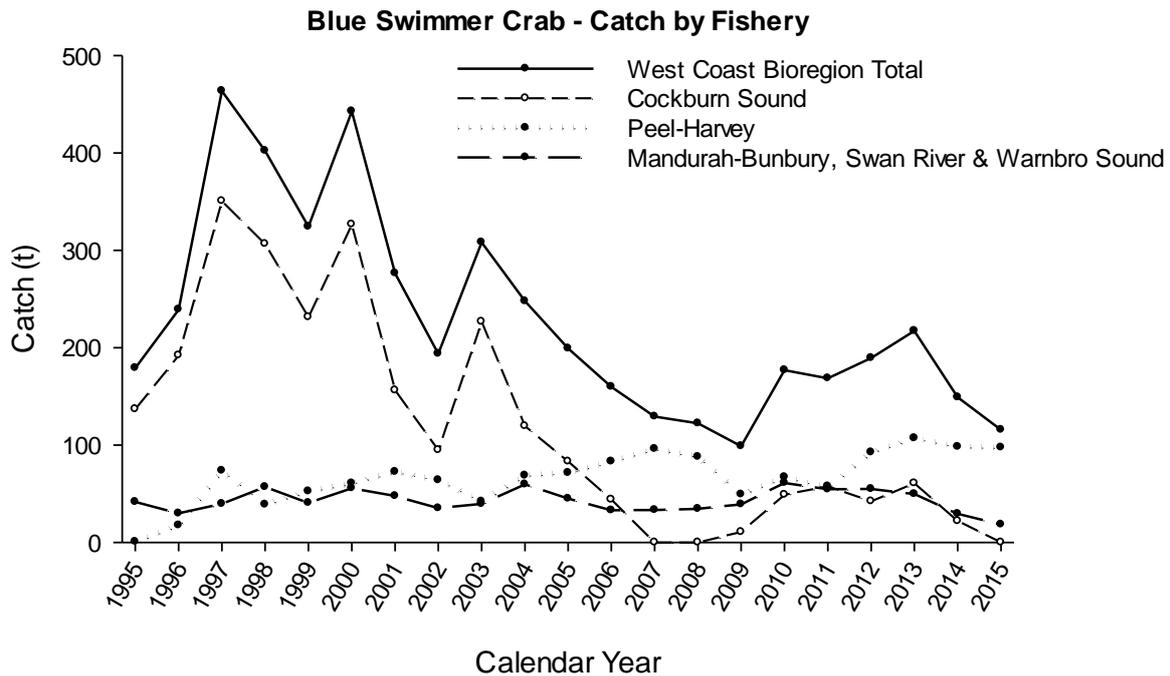
<b>Total Catch 2015</b>	<b>Commercial:</b> 116 t Cockburn Sound: 0 t Peel-Harvey: 97 t Other fisheries: 18 t	<b>Recreational:</b> 64 t (Boat survey May 13-Apr 14) Peel-Harvey: 107-194 t (Boat and Shore Nov 07-Oct 08)	
<b>Fishing Level 2015</b>	<b>Commercial</b> Cockburn Sound: closed Peel-Harvey: Acceptable Other fisheries: Acceptable	<b>Recreational</b> Cockburn Sound: closed Peel-Harvey: Acceptable Other fisheries: Acceptable	
<b>Stock Assessment:</b>	<b>Status</b>	<b>Assessment Methods</b>	
Cockburn Sound	Environmentally Limited	Level 4 Direct Survey	
Peel Harvey	Adequate	Level 2 Catch Rates	
Other SW	Adequate	Level 2 Catch Rates	
<b>Bycatch</b>	Negligible Risk	<b>Listed Species</b>	Negligible Risk
<b>Habitat</b>	Low Risk	<b>Ecosystem</b>	Low Risk
<b>Social</b>	Amenity Score: High Moderate – High Risk	<b>Economic</b>	GVP -< \$1 million Moderate-High Risk
<b>Governance 2015</b>	Management review underway	<b>External Drivers</b> (Environmental Effects)	C. Sound: High Risk P-H: Medium Risk Other: Medium Risk

## CATCH AND LANDINGS

### Commercial Sector

The total commercial catch from the West Coast Bioregion in 2015 was 116 t. This represents a 22% decrease on the 149 t taken in 2014 primarily due to the closures of Cockburn Sound and Warnbro Sound and cessation

of fishing in Area 2 of the Mandurah to Bunbury Developing Crab Fishery (West Coast Blue Swimmer Crab Figure 1).



**WEST COAST BLUE SWIMMER CRAB FIGURE 1**

West Coast bioregion commercial catch history for the blue swimmer crab in Western Australia since 2000.

**Recreational Sector**

Most (88%) of the recreational blue swimmer crab fishing in Western Australia occurs in the West Coast Bioregion (Ryan *et al.* 2015). The survey provided a statewide estimate of the boat-based recreational retained catch of 72 t (S.E.±4.8 t) with of which 64 t (S.E.±4.7 t) was from the West Coast bioregion.

A previous (2008), more comprehensive survey of recreational fishing in Peel-Harvey covering fishing from boats, shore, canals, and houseboats estimated the recreational catch to be between 107-193 t. This was lower compared to the recreational catch estimate of 251-377 t in 1998/99 (Johnston *et al.*, 2014). Additional recreational surveys have been conducted in Cockburn Sound, Warnbro Sound, Swan-Canning Estuary, Leschenault Inlet and Geographe Bay (see Johnston *et al.*, 2015a,b).

**INDICATOR SPECIES ASSESSMENTS AND STOCK STATUS**

Crab assemblages in the southwest are genetically separate to more northern stocks in Shark Bay and Exmouth Gulf, but there is genetic overlap between some stocks in the south-west that are spatially adjacent to each other. South-west stocks are however managed separately at the present time but with recognition that recruitment and breeding stock may be fluid between some areas.

Spawning in the south-west peaks between September and January. Juvenile growth is rapid with crabs maturing (at approx. 90mm carapace width) within 12 months and attaining commercial size (130 mm CW) within 15 months.

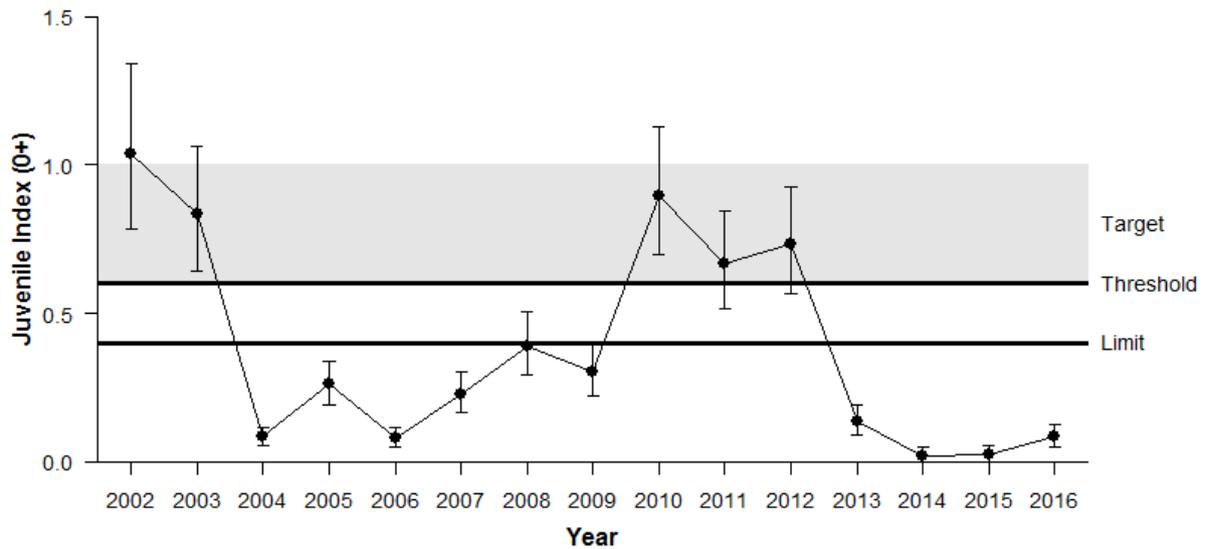
**Cockburn Sound**

Since the fishery was closed in 2014, a preliminary harvest strategy has been determined for the Cockburn Sound Crab Fishery where the primary performance indicators are the juvenile index and egg production index (Johnston *et al.*, 2015a,b). A weight of evidence approach is used for the stock assessment where the indices, in addition to commercial catch rates and the proportion of females in the commercial catch, are taken into account to assess stock status.

*Juvenile index:* The juvenile index for 2015 of 0.02 juveniles/100m<sup>2</sup> trawled was still below the limit. The juvenile index for 2016 was a slight improvement but continues to be below the limit at 0.08 juveniles/100m<sup>2</sup> trawled (West Coast Blue Swimmer Crab Figure 2).

*Egg Production index*: The revised egg production index in 2014 (4.0) and 2015 (2.8) remain well below the proposed threshold level of 12, based on the stock-recruitment relationship) outlined within the draft harvest strategy and the fishery remains closed.

Reasons for the stock decline being investigated include combined effects of reduced levels of primary productivity within Cockburn Sound, changes in water temperature, increased predation and the negative effects of density dependent growth which appears to have had an effect on the proportion of berried females. The declines in abundance are therefore substantially attributable to environmental changes, rather than fishing, consequently the stock is classified as **Environmentally Limited**.



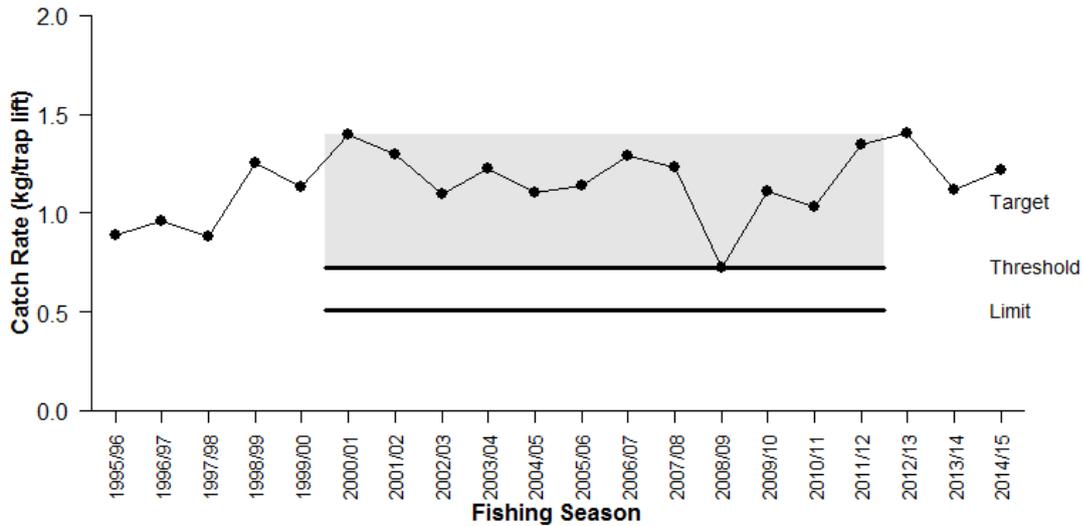
#### WEST COAST BLUE SWIMMER CRAB FIGURE 2

Annual standardised index of juvenile (0+) blue swimmer crabs in Cockburn Sound calculated using data from juvenile research trawl conducted in April, May and June of each year. The index units are numbers of juveniles/100m<sup>2</sup> trawled. The associated reference points (target, threshold and limit) for the preliminary harvest strategy and the 95% confidence intervals are shown.

#### Peel-Harvey Estuary

The commercial catch and effort from the Peel-Harvey Estuary for the 2014/15 fishing season was 97 t from 69,888 trap lifts which are both very similar to 2013/14 (West Coast Blue Swimmer Crab Figure 3).

Since the complete gear conversion from nets to traps in 2000/01, annual commercial catch rates have fluctuated between 0.8 and 1.7 kg/trap lift, but have generally remained above 1 kg/trap lift. The nominal annual catch rate for 2014/15 in the Peel-Harvey Estuary was 1.4 kg/trap lift (West Coast Blue Swimmer Crab Figure 3). The standardised catch rate of 1.3 kg/traplift for the 2014/15 fishing season was well above the harvest strategy threshold of 0.7 kg/traplift, indicating the stock is currently being fished at sustainable levels. On the basis of this evidence, the crab stock in the Peel Harvey is classified as **Sustainable**

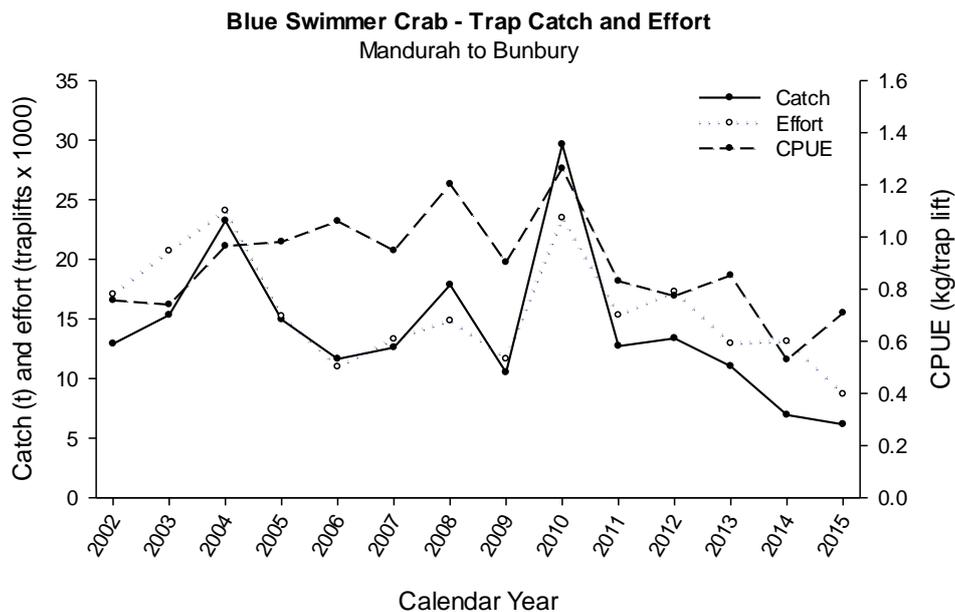


**WEST COAST BLUE SWIMMER CRAB FIGURE 6.**

Annual standardised commercial catch rate (kg/traplift) of blue swimmer crabs in the Peel-Harvey crab fishery relative to the associated reference points (target, threshold and limit) for the harvest strategy. The reference period is from 2000/01 to 2011/12; defined as the period where the fishery was operating with traps only and during which time the threshold (lowest historical catch rate), limit (20% below the lowest catch rate) and target (range between the threshold and highest historical catch rate) were set. Fishing season is defined as 1 November to 31 August.

**Mandurah to Bunbury Developing Crab Fishery**

The Mandurah to Bunbury Developing Crab Fishery (Area 1 and Area 2) reported a total annual catch and effort for 2015 of 6 t from 8,684 trap lifts, representing 11% and 34% decreases compared to 2014 (West Coast Blue Swimmer Crab Figure 4). The mean catch rate for 2015 of 0.7 kg/trap lift was a 34% increase on the 2014 catch rate of 0.5 kg/trap lift (West Coast Blue Swimmer Crab Figure 4). On the basis of this evidence, the crab stock in this region is classified as **Sustainable**.



**WEST COAST BLUE SWIMMER CRAB FIGURE 4**

Blue swimmer crab trap catch per unit effort (kg/traplift) in Area 1 and Area 2 of the Mandurah to Bunbury

Developing Crab Fishery since 2002.

## **BYCATCH and PROTECTED SPECIES INTERACTIONS**

Crab pots are purpose-designed to minimise the capture of non-target species and are therefore an inefficient way to capture fish. The low number of fish caught and returned poses a negligible risk to these stocks.

The crab trap longline system is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities.

## **HABITAT and ECOSYSTEM INTERACTIONS**

Retrieval of traps may result in minor dragging across the mostly sandy substrate. The small amount of living seagrass removed results in minimal habitat damage. The potential impacts of wading on near shore habitats by the recreational fishers who scoop net in the Peel-Harvey Estuary is currently being assessed.

As the commercial take of crabs represents a relatively small portion of the biomass, which is effectively renewed annually and subject to high levels of natural variation in abundance, secondary food chain effects are likely to be minimal in these fisheries.

## **SOCIAL AND ECONOMIC OUTCOMES**

### *Social*

During 2015, approximately 20 people were employed as skippers and crew on vessels targeting blue swimmer crabs in the West Coast Bioregion. Blue swimmer crabs also provide a highly popular recreational fishery, particularly in the Swan River, Cockburn Sound, Warnbro Sound, the Peel-Harvey Estuary and the Geographe Bay region, where they dominate the inshore recreational catch. This is the highest captured recreational species.

### *Economic*

The commercial blue swimmer crab catch in the West Coast Bioregion for 2015 was valued at approximately \$0.62 million, an increase on the \$0.78 million generated in 2014. Most of the catch from the West Coast Bioregion was sold through local markets. Price data was generated by collecting monthly returns recording prices paid to fishers by fish processors, a weighted average price is then calculated for the financial year from the monthly data collected and for 2015 were set at \$5.36 per kg.

## **GOVERNANCE SYSTEM**

### *Allowable Catch Tolerance Levels*

<b>Cockburn Sound:</b>	<b>Under review</b>
<b>Peel Harvey:</b>	<b>45 - 107 tonnes</b>
<b>Other West Coast fisheries:</b>	<b>Under review</b>

A catch range for Cockburn Sound crabs will need to be developed when the management arrangements and stock levels have stabilised. The acceptable catch range for Peel Harvey is now determined to be within the last 10 years of catch values. The other west coast crab fisheries are yet to develop a sufficiently stable catch history or set of management arrangements to develop a definitive catch range.

### *Harvest Strategy*

#### **Cockburn Sound: Closed**

A preliminary harvest strategy has been determined for the Cockburn Sound Crab Fishery where the primary performance indicators are the juvenile index and egg production index.

As these indicators are below the limit levels, the fishery will remain closed.

#### **Peel Harvey:**

A harvest strategy has been determined for the Peel-Harvey Crab Fishery (Johnston et al., 2015 b) where the primary performance indicator is standardised annual catch rate with the reference period between 2000/01 and 2011/12.

As the indicator was above the threshold, no changes to the management will occur for the 2017 season.

#### **Other West Coast fisheries:**

A preliminary harvest strategy has been determined for Area 1 and Area 2 of the Mandurah to Bunbury Developing Crab Fishery where the primary performance indicator is nominal annual catch rate using the reference period for Area 1 Comet Bay is between 2005/06 and 2011/12, and for Area 2 Mandurah-Bunbury between 2004/05 and 2011/12.

As the indicator was above the threshold, no changes to the management will occur for the 2017 season.

#### **Compliance**

Current risks to enforcement are low for West Coast crab fisheries. However, the Peel-Harvey Estuary has a high level of enforcement risk as it has the highest level of non-compliance in the State, particularly for undersize crabs being taken and during night-time periods.

#### **Consultation**

##### **Commercial**

The Department undertakes consultation directly with licensees on operational issues and processes and is responsible for the statutory management plan consultation. Industry Annual Management Meetings are convened by the Western Australian Fishing Industry Council (WAFIC), who are also responsible for statutory management plan consultation under a Service Level Agreement with the Department.

##### **Recreational**

Consultation processes are now facilitated by Recfishwest under a Service Level Agreement although the Department undertakes direct consultation with the community on specific issues.

#### **Management Initiatives/Outlook**

##### **New management initiatives (2014/15)**

A southwest crab fishery management review is being undertaken during 2016/17 with the aim of increasing protection to female breeding stock. Potential options include extending or introducing season closures and increasing minimum size to provide a greater buffer to female breeding stock.

#### **EXTERNAL DRIVERS**

Levels of recruitment to many of the crab fisheries fluctuate considerably mainly due to environmental influences (e.g. water temperature) both on spawning success and larval survival through to recruitment. The climate change implications associated with these environmental variables are also under consideration. The effect of the heat wave in the summer of 2010/11 and above average water temperatures on the following two summers on the spawning and juvenile phase of the crabs is being investigated for Cockburn Sound (and adjacent coastal areas), as well as the cause of the low proportion of berried females in the 2012/13. These temperature changes have also resulted in the increased abundance of crabs in the South Coast estuaries. Blue swimmer crabs were rated a high risk to climate change due to their sensitivity to water temperature changes.

#### **REFERENCES**

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