West Coast Blue Swimmer Crab Fishery Status Report

D. Johnston, D. Harris and J. Fissioli

Main Features

Status		Current Landings	
Stock level		Total Commercial catch (2011/12)	186 t
Cockburn Sound	Acceptable	Cockburn Sound	46 t
Peel-Harvey Estuary	Acceptable	Peel-Harvey Estuary	81 t
		Catch by other commercial fisheries	59 t
Fishing Level			
Cockburn Sound	Acceptable	Total Recreational catch	
Peel-Harvey	Acceptable	West Coast Bioregion (Boat-based) (Feb 11- Mar 12)	87 t
		Peel-Harvey Estuary (boat and shore) (Nov 07 - Oct 08)	107-193 t

Fishery Description

The blue swimmer crab (*Portunus armatus*) is found along the entire Western Australian coast, in a wide range of inshore and continental shelf areas, from the intertidal zone to at least 50 metres in depth. However, the majority of the commercially and recreationally fished stock is concentrated in the coastal embayments between Geographe Bay (in the south) and Port Hedland (in the north).

The commercial blue swimmer crab fisheries within the West Coast Bioregion are the Cockburn Sound Crab Managed Fishery, the Warnbro Sound Crab Managed Fishery, Area I (the Swan and Canning Rivers) and Area II (the Peel-Harvey Estuary) of the West Coast Estuarine Managed Fishery and Area I (Comet Bay) and Area II (Mandurah to Bunbury) of the Mandurah to Bunbury Developing Crab Fishery. Originally, commercial crab fishers in WA used set (gill) nets or drop nets, but most have now converted to purpose-designed crab traps. Blue swimmer crabs are also retained as byproduct by trawlers operating in Comet Bay (Area D of the South West Trawl Managed Fishery), and occasionally by trawlers operating in the waters from Fremantle to Cape Naturaliste (Area B of the South West Trawl Managed Fishery).

Recreational crabbing in the West Coast Bioregion is centred largely on the estuaries and coastal embayments from Geographe Bay north to the Swan River and Cockburn Sound. Blue swimmer crabs represent the most important recreationally fished inshore species in the southwest of WA in terms of participation rate. While the majority of recreational fishers use either drop nets or scoop nets, diving for crabs is becoming increasingly popular.

There are separate reports for crab fisheries in the Gascoyne and North Coast Bioregions.

Governing legislation/fishing authority

West Coast Estuarine Fishery (Interim) Management Plan 2003

Cockburn Sound (Crab) Management Plan 1995

Warnbro Sound (Crab) Management Plan 1995

South West Trawl Management Plan 1989

Exceptions to the Fish Traps Prohibition Notice 1990 and Fish Traps Restrictions Notice 1994

Exemptions under Section 7 of the *Fish Resources Management Act 1994*

Consultation process

Meetings between the Department of Fisheries and the commercial fishing sector including WAFIC

Meetings between the Department of Fisheries and Recfishwest

Boundaries

The Cockburn Sound (Crab) Managed Fishery encompasses the inner waters of Cockburn Sound, from South Mole at Fremantle to Stragglers Rocks, through Mewstone to Carnac Island and Garden Island, along the eastern shore of Garden Island, and back to John Point on the mainland.

The Warnbro Sound (Crab) Managed Fishery includes Warnbro Sound itself and adjacent waters, extending from Becher Point to John Point.

The West Coast Estuarine Fishery encompasses the waters of the Swan and Canning Rivers and the waters of the Peel Inlet and Harvey Estuary, together with the Murray, Serpentine, Harvey and Dandalup Rivers.

The Mandurah to Bunbury Developing Crab Fishery covers the waters south of the Shoalwater Islands Marine Park (32°22′40″ S) to Point McKenna near Bunbury (33°18′ S), and offshore to 115°30′ E. The fishery is further divided into two zones. A single northern zone (Area 1) 80-pot exemption authorises crab fishing in a specified area of Comet Bay between 32°22′40″ S and 32°30' S. A single southern zone (Area 2) 120-pot exemption authorises crab fishing in the waters between Cape Bouvard and the southern

boundary of the fishery. The area separating the 2 zones (waters between 32°30' S and Cape Bouvard) is closed to commercial crab fishing.

The Geographe Bay fishery was officially closed on 21 January 2005 to reduce conflict between the recreational and commercial fishing sectors and commercial fishing in the Leschenault Estuary at Australind ceased in 2000.

Management arrangements

Commercial access to blue swimmer crab stocks in WA is governed by a series of separate management arrangements provided for under the legislative framework of the Fish Resources Management Act 1994. Individual fisheries are managed under an input control system, primarily through the regulation of vessel and trap numbers. Supplementary controls cover retainable species and associated minimum size limits, gear specifications and seasonal and daily time restrictions.

The principal management tool employed to ensure adequate breeding stock in the commercial crab fisheries involves maintaining minimum size limits well above the size at sexual maturity. Blue swimmer crabs become sexually mature below 100 mm carapace width. The legal minimum size range varies between 127 – 135 mm carapace width in the fisheries of the West Coast Bioregion – well above the size at sexual maturity (86-97 mm carapace width depending on the fishery).

Recreational fishing for blue swimmer crabs in Western Australia is managed through a series of input and output controls. As with commercial fishing, the principal management tool employed to sustain an adequate breeding stock involves maintaining minimum size limits well above the size at sexual maturity. A minimum legal size limit of 127 mm carapace width applies in State waters, along with a bag limit of 10 crabs per person or 20 crabs per boat. A Recreational Fishing from Boat Licence was introduced in March 2010 that restricts catch to 20 crabs per powered boat when there are two or more people on-board holding Recreational Fishing from Boat Licences and 10 crabs if there is only one person on-board holding a Recreational Fishing from Boat Licence regardless of the number of fishers aboard.

Restrictions also govern gear types that can be used to take blue swimmer crabs, along with localised spatial and temporal closures. Management measures were introduced in August 2007 to include a seasonal closure to both commercial and recreational fishers in the Peel-Harvey Estuary for the months of September and October to protect pre-spawning female crabs.

In 2006, the Cockburn Sound crab fishery was closed to protect crab stocks that were significantly depleted due to fishing pressures and environmental conditions that resulted in poor recruitment. Commercial fishers were prohibited from taking crabs in all waters of the Cockburn Sound Managed Crab Fishery, while recreational fishers were prohibited from taking crabs south of a line from Woodman Point across to Garden Island. The closure remained in place for the 2006/07, 2007/08 and 2008/09 season.

Following a rebuilding of the Cockburn Sound crab stock, the fishery was re-opened on 15 December 2009. A precautionary management approach has been adopted since re-opening the fishery with several changes being made over the past few years (see Johnston *et al.,* State of Fisheries Reports, 2010, 2011, 2012)[1].

There was further easing of fishing arrangements for the 2011/12 season, with a decrease in minimum size of males and a season extension for the commercial and recreational sectors. The following management controls were implemented:

- a 20% reduction in commercial pot numbers;
- a commercial size limit of 130 mm for male crabs and 135 mm for female crabs;
- a recreational size limit of 127 mm;
- a limited commercial season from 15 December 2011 to 15 June 2012; and
- a limited recreational season from 15 December 2011 to 31 July 2012.

There was slight easing of fishing arrangements for the 2012/13 season, with a decrease in minimum size of females to 130 mm CW (all other season arrangements remained the same).

A voluntary Fisheries Adjustment Scheme resulted in the number of licenses in the Swan/Canning River (Area 1 of the West Coast Estuarine Fishery) being reduced from 4 to 2 in July 2005. A further licence was removed from the fishery in early 2008.

Research summary

Data for the assessment of blue swimmer crab stocks in the West Coast Bioregion are obtained from a variety of sources. Commercial catch and effort is assessed using fishers' compulsory monthly catch and effort returns, voluntary daily log books from fishers in the Mandurah to Bunbury Developing Crab Fishery, and data from on-board catch monitoring conducted by the Department of Fisheries' research staff in each of the West Coast Bioregion's commercial crab fisheries.

In addition, direct surveys generating recruit, residual and breeding stock indices, along with data on the general crab population, have been conducted in Cockburn Sound for about 10 years and in the Peel-Harvey for five years.

A stock-recruitment-environment model has been developed for Cockburn Sound, which correlates water temperature in

1 Johnston, D. and Harris, D. (2010). West Coast Blue Swimmer Crab Fishery Status Report. In: State of the Fisheries and Aquatic Resources Report 2009/10 eds. W.J. Fletcher and K. Santoro, Department of Fisheries, Western Australia, pp. 54-61.

Johnston, D., Harris, D., Warmbrunn, A. and Coloper, M. (2011). West Coast Blue Swimmer Crab Fishery Status Report. In: State of the Fisheries and Aquatic Resources Report 2010/11 eds. W.J. Fletcher and K. Santoro, Department of Fisheries, Western Australia, pp. 68-75.

Johnston, D., Harris, D., Fissioli, J. and Walshe, K. (2012). West Coast Blue Swimmer Crab Fishery Status Report. In: Status Reports of the Fisheries and Aquatic Resources of Western Australia 2011/12: The State of the Fisheries eds. W.J. Fletcher and K. Santoro, Department of Fisheries, Western Australia, pp. 68-75.

the pre-spawning months of August and September, and the size of the breeding stock, with the following season's commercial catch.

Following the closure of the Cockburn Sound crab fishery in December 2006, research funding (from the Development and Better Interest Fund) was granted to assess the reasons for the stock collapse and monitor the recovery of the fishery. The causes of the collapse and description of the recovery have been described in the scientific paper (Johnston *et al*., 2011)[1]. The stock status of the Cockburn Sound crab fishery, a description of the stock-recruitment-environment relationship for the Cockburn Sound crab stock, and a summary of the crab fisheries in Warnbro Sound and the Swan River have been presented (Johnston *et al*., 2011)[2]. Reports on the population status of the Peel-Harvey Estuary crab stock, and the 2007/08 recreational crabbing survey in the Peel-Harvey Estuary, are being finalised. A new 3 year project funded through the Recreational Fishing Initiatives Fund will commence in July 2013 to obtain data on recreational catch and effort and crab stocks in the important recreational fisheries of Swan-Canning River, Geographe Bay and Leschenault Estuary.

Retained Species

Commercial landings (season 2011/12):

Total 186 tonnes

Cockburn Sound	**46 tonnes**
Peel-Harvey Estuary	**81 tonnes**
Other west coast commercial fisheries	**59 tonnes**

The total commercial catch from the West Coast Bioregion in 2010/11 was 186 t, a 16% increase on the 161 t taken in 2010/11. This increase was primarily due to significant increases in crab catch from Warnbro Sound and the Peel-Harvey Estuary, and slight increases in catch from the Mandurah to Bunbury trap fishery. This catch accounted for 53% of the state commercial blue swimmer crab catch of 352 t for 2011/12 (West Coast Blue Swimmer Crab Figure 1).

The commercial catch from the Cockburn Sound Crab Managed Fishery for 2011/12 was 46 t, a 13% decrease from the 53 t caught during the 2010/11 season (West Coast Blue Swimmer Crab Figure 2).

The commercial catch from the Peel-Harvey Estuary (Area II of the West Coast Estuarine Managed Fishery) for 2011/12 was 81 t. This represents a 31% increase on the 62 t in 2010/11 (West Coast Blue Swimmer Crab Figure 4).

The Mandurah to Bunbury Developing Crab Fishery reported an annual catch for 2011/12 of 15 t, representing a 36% increase on the 11 t reported for the 2010/11 financial year (West Coast Blue Swimmer Crab Figure 5).

Recreational boat-based catch estimate:

West Coast Bioregion (boat-based)

(Feb 11-Mar 12) 87 tonnes

Recreational catch estimate:

Peel-Harvey Estuary (boat and shore)

(Nov 07 - Oct 08) 107-193 tonnes

An integrated survey of boat-based recreational fishing in WA was conducted between 1 March 2011 and 29 February 2012. Most of the recreational blue swimmer crab fishing in Western Australia occurs in the West Coast Bioregion, with 92% of the recreational crab catch reported in a state-wide survey of boat-based recreational fishing in 2011/12 coming from this area (Ryan *et al*., 2013)[3]. Catch data were recorded in numbers of animals, and have been converted to weight for this report using a mean state-wide estimate of 229 g/animal (based on 382 crabs weighed during boat ramp surveys). The survey provided a boat-based recreational estimate of retained blue swimmer crabs for the 12-month period for the West Coast Bioregion of 87 t.

This compares with total commercial landings for this bioregion of 174 t over the same period.

The total recreational catch and effort in the Peel-Harvey Estuary which covered fishing from boats, shore, canals, and houseboats was estimated from November 2007 to October 2008 as to be between 107-193 t. This was lower than a similar recreational catch estimate of 251-377 t for this region undertaken in 1998/99.

Within Cockburn Sound, recreational crabbing surveys in 1996/97 and 2001/02, and in the 2002, 2003 and 2004 calendar years, produced relatively consistent recreational catch estimates of 24 t, 25 t, 18 t, 23 t and 18 t respectively for catches made in daylight. The estimated recreational catch for the 2005/06 financial year of only 4 t reflects this was just before the closure for this area was introduced The portion of Cockburn Sound south of a line drawn between Woodman Point and the northern end of Garden Island was closed to recreational crabbing in 2006 to protect crab stocks that were significantly depleted due to fishing pressures and environmental conditions that resulted in poor recruitment. The whole of Cockburn Sound was re-opened to recreational crabbing for the 2009/10 season from December 15th 2009 to March 31st 2010. A survey quantifying recreational catch and effort in the West Coast Bioregion was conducted over a two-year period between July 2008 and June 2010. The survey provided a recreational catch estimate for the 3½ months of the 2009/10 season of 15.4 t (S.E.±3.3 t) of blue swimmer crabs, for an area covering Cockburn Sound (south of latitude 32°05'S), Shoalwater Bay and the northern half of Warnbro Sound (north of latitude 32°20'S). However, the survey covered only the period during the day between 9am and

1 Johnston, D., Harris, D., Caputi, N. and Thomson, A. (2011). Decline of a blue swimmer crab (*Portunus pelagicus*) fishery in Western Australia—History, contributing factors and future management strategy. Fish. Res. 109(1), 119-130 doi:10.1016/j.fishres.2011.01.027

2 Johnston, D., Harris, D., Caputi, N., de Lestang, S. and Thomson, A. (2011). Status of the Cockburn Sound Crab Fishery. Fisheries Research Report No. 219. Department of Fisheries, Western Australia. 104 pp.

3 Ryan, K.L., Wise, B.S., Hall, N.G., Pollock, K.H., Sulin, E.H. and Gaughan, D.J. (2013). An integrated system to survey boat-based recreational fishing in Western Australia 2011/12. Fisheries Research Report No. 249, Department of Fisheries, Western Australia. 162 pp.

5pm. As there is a significant level of early morning recreational crabbing in Cockburn and Warnbro Sounds, an additional survey was conducted between 5.30 am and 9am during the 2009/10 crabbing season. This survey provided an additional recreational catch estimate for this area of 18.8 t (S.E.±5.5 t) of blue swimmer crabs for the 3½ months of the 2009/10 season.

All of Cockburn Sound was again re-opened to recreational crabbing for the 2010/11 season from December 15th 2010 to April 30th 2011.

A 12-month survey of recreational fishing in the Swan/Canning Estuary Basin between August 1998 and July 1999 estimated the total recreational blue swimmer crab catch to be 7.3 t. This compares with a commercial catch during the 1998/99 financial year of 24 t. In subsequent years, commercial catches have ranged between 10 t and 20 t, but no further recreational surveys have been undertaken specifically in the Swan-Canning Estuary.

Both the Leschenault Inlet and Geographe Bay are now exclusively for recreational use. Previous surveys have found the annual recreational blue swimmer crab catch from Geographe Bay to be between 7 – 11 t per year.

Fishing effort/access level

After three years of closure due to declining crab stocks, the Cockburn Sound (Crab) Managed Fishery partially re-opened for the 2009/10, 2010/11 and 2011/12 fishing seasons. Commercial fishers in Cockburn Sound reported a total of 76,190 trap lifts for the 2011/12 season, a 38% increase on the 55,294 trap lifts reported during the 2010/11 season (West Coast Blue Swimmer Crab Figure 2) as a result of extending the season by 2.5 months.

Commercial fishers in the Peel-Harvey Estuary reported 48,263 trap lifts during the 2011/12 season – a 17% decrease on the 58,119 trap lifts reported the previous year (West Coast Blue Swimmer Crab Figure 3).

Commercial effort in the Mandurah to Bunbury Developing Crab Fishery increased 61% in 2011/12, with a total of 21,172 trap lifts reported compared to 13,186 trap lifts the previous year (West Coast Blue Swimmer Crab Figure 4), primarily because the Mandurah to Bunbury fisher resumed operations.

Stock Assessment

Assessment complete:	**Yes**
Assessment method and level:	
Cockburn Sound	**Level 4 - Direct survey**
Peel-Harvey	**Level 2 - Catch rate**
Other West Coast fisheries	**Level 2 - Catch rate**
Breeding stock levels:	
Cockburn Sound	**Adequate**
Peel-Harvey	**Adequate**
Other West Coast fisheries	**Adequate**

Catch rates from crab fisheries within the West Coast Bioregion generally provide an index of abundance that can be used to assess individual fishery performance from year-to-year. In addition, direct surveys generating recruit, residual and breeding stock indices, along with data on the general crab population, have been conducted in Cockburn Sound for about10 years and in the Peel-Harvey for five years.

Cockburn Sound: Historically, natural variations in stock abundance resulted in large fluctuations in the annual commercial blue swimmer crab catch from Cockburn Sound. This fluctuation related largely to variable recruitment dependent on environmental conditions, although the shift by commercial fishers from set nets to crab traps in the mid-1990s initiated a marked increase in effective effort and mean annual crab landings. Following the second highest annual catch on record in 2000 (340 t) the catch began to decline over the next few years to the point where low stock abundance required closure of the fishery in December 2006 for two seasons.

Adequate protection of the breeding stock of blue swimmer crabs in Cockburn Sound had been assumed to occur if the minimum legal size was set well above the size at sexual maturity, which would allow female crabs to spawn at least once before entering the fishery. While this is a common strategy for this species, a combination of biological, environmental and fishery-dependent factors contributed to the collapse and include: 1) vulnerability to environmental fluctuations as this species is at the southern extreme of its temperature tolerance, 2) a life cycle contained within an embayment and is self-recruiting, 3) a change in fishing method from gill nets to traps which increased fishing pressure on pre-spawning females in winter and reduced egg production to one age class, 4) four consecutive years of cooler water temperatures resulting in poor recruitment and 5) continued high fishing pressure during years of low recruitment resulting in low breeding stock.

Fishery-independent trawl and commercial monitoring surveys conducted during 2009 suggested the strength of both recruitment and breeding stock in Cockburn Sound had improved sufficiently to re-open the crab fishery for the 2009/10 fishing season.

The catch in 2011/12 of 46 t was lower than the previous year's catch of 53 t, despite an increase in effort (~80,000 pot lifts in 2011/12 compared to 55,000 potlifts in 2010/11) due to the 2½ month extension of the commercial fishing season to June 15th and a lowering of the minimum size for male crabs from 135 to 130 mm. This relatively low catch was generated by the very high proportion of undersize crabs present in Cockburn Sound resulting in a low proportion of legal sized crabs being present through the season. It appears that the majority of crabs did not moult during the December – January period, with the majority of the cohort remaining at sub-legal sizes for the remainder of the season. Historically, the majority of crabs moult to legal size between December and January, with a high proportion of crabs remaining legal size through the season. This lack of moulting during the 2011/12 season was only observed in Cockburn Sound; the proportion of legal sized crabs in Swan River, Warnbro Sound and Peel Harvey were all at normal or higher levels.

Recruitment index: Based on the juvenile (0+) catches sampled in the research trawls the recruitment of juvenile crabs within Cockburn Sound remained at acceptable levels in 2012. The index has now remained above 1.0 since 2010; substantially above the 0.15 value observed in 2006 (West

Coast Blue Swimmer Crab Figure 5).

Residual index: The abundance of residual crabs (1+) was again strong in 2012 with the index having now been above 10 for the past three seasons (West Coast Blue Swimmer Crab Figure 5) as a result of the closure and conservative management approach since the resumption of fishing.

Breeding Stock index: The breeding stock (egg production) levels during 2011/12 remains above the proposed threshold breeding stock index of 1.5 (West Coast Blue Swimmer Crab Figure 6) which is based the level of egg production that produced adequate recruitment level during the productive years for the fishery (1989-2003) as determined from the relationship between egg production and recruitment. The levels of juvenile and residual abundance observed in 2012 suggest that the breeding stock in 2012/13 should be maintained at an acceptable level.

Peel Harvey: The mean annual catch rate for 2011/12 in the Peel-Harvey Estuary was 1.68 kg/trap lift, substantially higher than the 2010/11 catch rate of 1.07 kg/trap lift (West Coast Blue Swimmer Crab Figure 3), and representing the highest catch rate since the fishery converted from nets to crab traps in 1996/97.

A recreational survey conducted in the Peel-Harvey Estuary during 2007/08 estimated that the recreational take accounted for approximately 60 % of the total catch therefore the trends in the recreational fishery can affect the stock status. This highlights the importance of having established fishery-independent surveys that will soon be able to complement the commercial logbook and monitoring data.

Mandurah to Bunbury: Mean annual trap catch rates in the Mandurah to Bunbury Developing Crab Fishery have increased steadily since the commencement of exploratory fishing along the coast south of Mandurah to Bunbury in 2002. This increase reflects more efficient fishing of the region as the commercial operators' knowledge of the spatial and temporal distribution of resident stocks and localized environmental influences increased over time. The mean catch rate for 2011/12 in the Mandurah to Bunbury fishery was 0.71 kg/trap lift – a 12% decrease on the 2010/11 catch rate of 0.81 kg/trap lift (West Coast Blue Swimmer Crab Figure 4).

Monthly monitoring surveys conducted aboard commercial vessels in the Mandurah to Bunbury fishery have indicated a high percentage of female crabs in the catch from this fishery, especially during the peak period of commercial fishing from April to August, and this will need to be closely monitored to avoid overfishing the breeding stock.

Non-Retained Species

Bycatch species impact: Negligible

The shift from using set nets to traps in most blue swimmer crab fisheries has resulted in a substantial reduction in bycatch from dedicated crab fishing. Pots are purpose-designed to minimise the capture of non-target species and are therefore an inefficient way to capture fish, the majority of which are able to escape through the entrance gaps when the pot is soaking or being hauled.

Small numbers of fish are infrequently captured in crab pots, but the fishers are not permitted to retain them. The low number of fish caught and returned by crab fishers is considered to pose a negligible risk to these stocks.

Discarded bycatch from trawl fisheries taking crabs as a byproduct is dealt with in the status reports that are specific to each trawl fishery.

Protected species interaction: Negligible

The crab trap longline system used in the targeted crab fisheries has little possibility of interacting with protected species. The fishery 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.

Ecosystem Effects

Food chain effects: Low

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.

Habitat effects: Negligible

Fishing with crab traps results in limited habitat disturbance, with only minor dragging of traps on the bottom occurring during trap retrieval. Sand and associated biota do not get brought to the surface in commercial blue swimmer crab traps, as the mesh used on traps is sufficiently large to allow the escape of any sand-dwelling macro-benthos.

Although seagrasses are occasionally brought to the surface with the trap, the infrequent nature of this occurrence, and the small amount of living seagrass removed, results in minimal habitat damage.

Social Effects

During 2011/12, approximately 31 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.

Economic Effects

Estimated annual value (to fishers) for year 2010/11: Level 2 - $1-5 million ($1.65 million)

The commercial blue swimmer crab catch in the West Coast Bioregion for 2011/12 was valued at around $1.65 million, a 43% increase on the $1.15 million generated in 2010/11. Most of the catch from the West Coast Bioregion was sold through local markets.

The economic value of the total commercial blue swimmer crab catch for the State of Western Australia for the 2011/12

financial year was estimated to be $2.53 million – a 58% decrease on the estimated $6.35 million generated in 2010/11.

Fishery Governance

Current fishing level

Cockburn Sound:	**Under review**
Peel Harvey:	**40 - 90 tonnes**
Other West Coast fisheries:	**Under review**

The new catch range for Cockburn Sound crabs will need to be developed when the management arrangements are 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.

New management initiatives (2012/13)

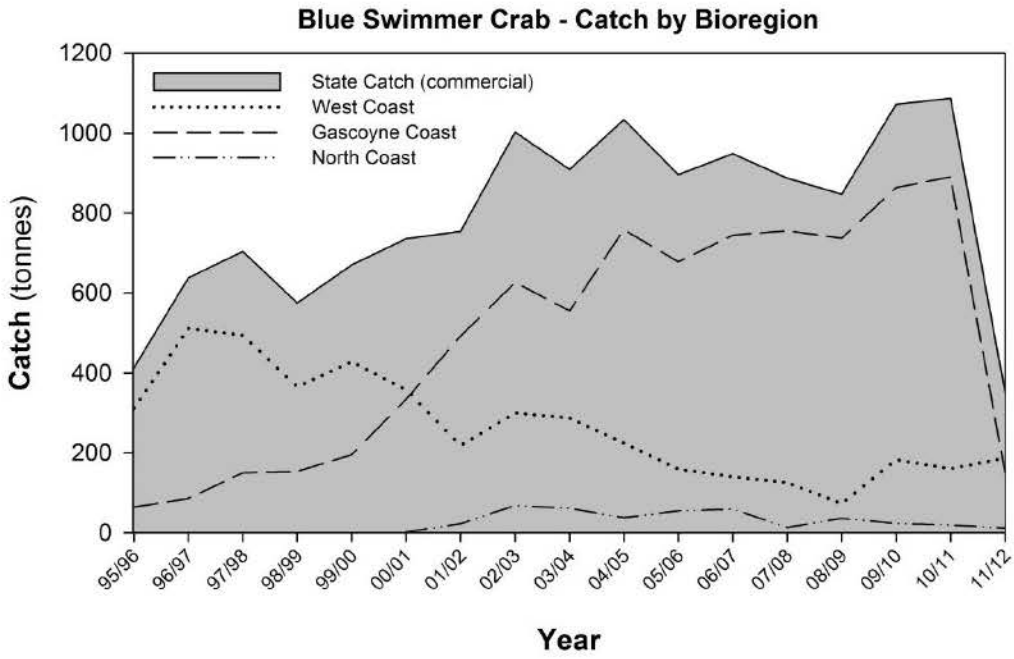
As an outcome of a review into the management for Cockburn Sound, the following arrangements were implemented in December 2012 for this fishery:

- Maintenance of the commercial fishing season from 15 Dec to 15 June;
- Maintenance of the recreational fishing season from 15 Dec to 30 July;
- A decrease in commercial size limit for female blue swimmer crabs from 135 to 130 mm CW;
- Retention of the commercial size limit for male blue swimmer crabs at 130 mm CW;
- Maintenance of the current 20% pot reduction in the commercial fishery.

The Mandurah to Bunbury Developing Fishery underwent its final review by the Developing Fisheries Assessment Committee (DFAC) in mid-2007 as part of the 'Developing New Fisheries' process. The Department of Fisheries is considering the recommendations of the DFAC.

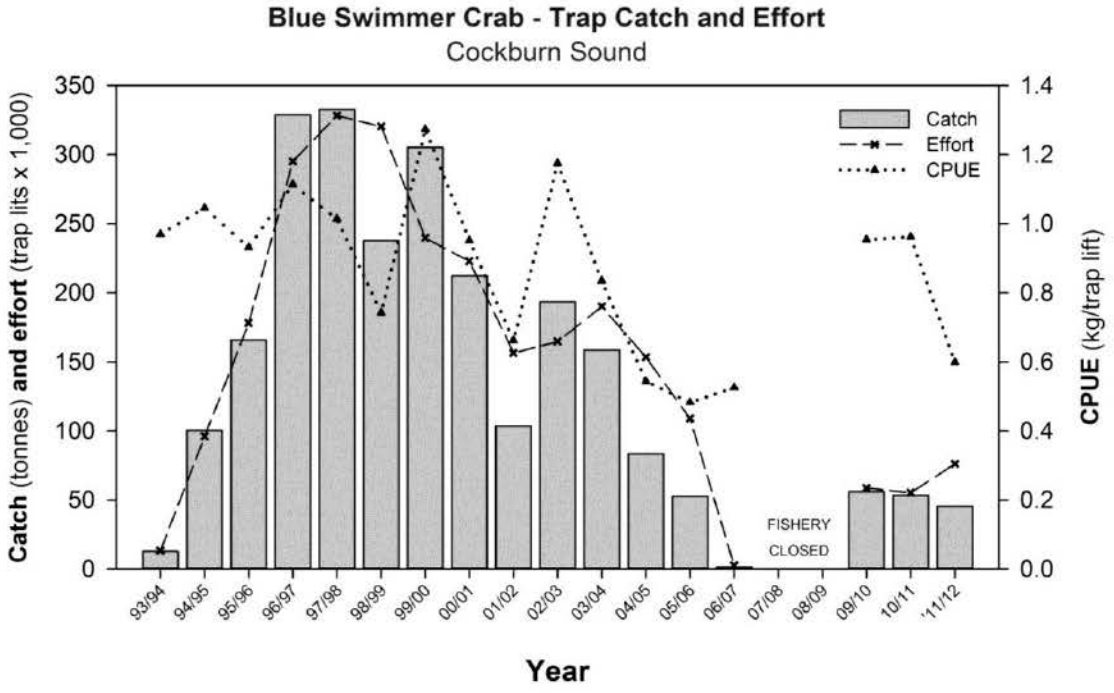
External Factors

Levels of recruitment to many of the crab fisheries fluctuate considerably. While the causes of these variations are not fully understood, it is considered most likely due to environmental influences (e.g. water temperature) both on spawning success and larval survival through to recruitment. The relationship between environmental factors, recruitment and catch is being further evaluated as data becomes available.



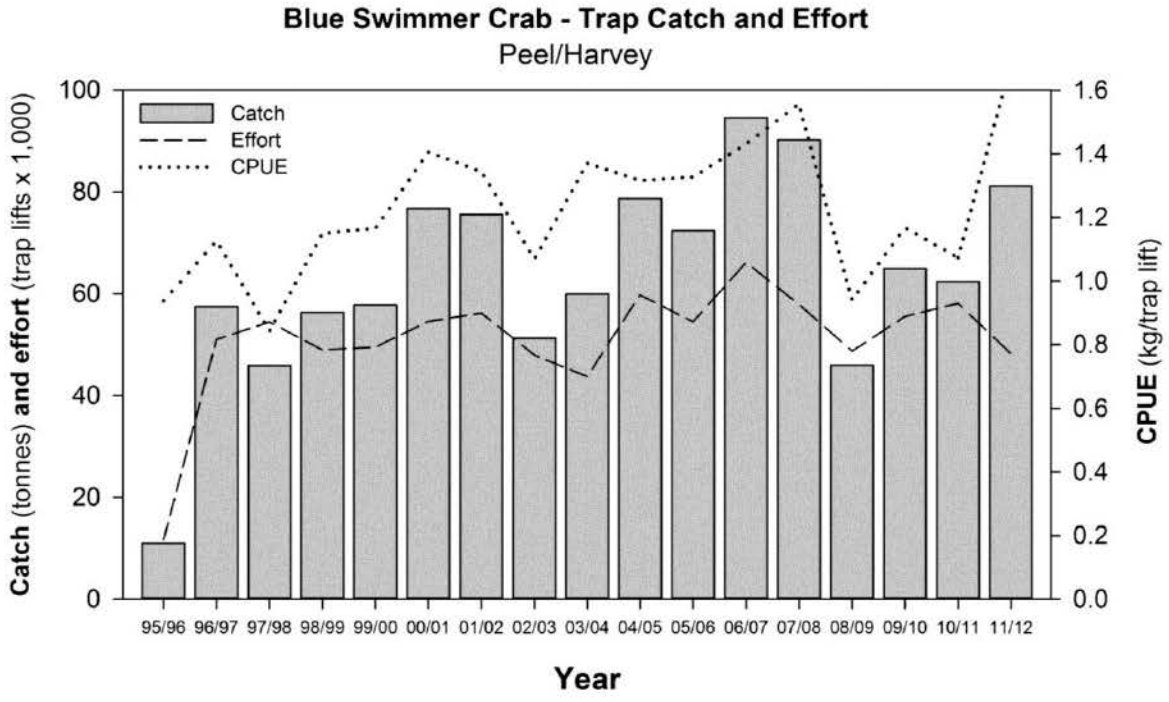
WEST COAST BLUE SWIMMER CRAB FIGURE 1

State and bioregion commercial catch history for the blue swimmer crab in Western Australia since 1995/96.



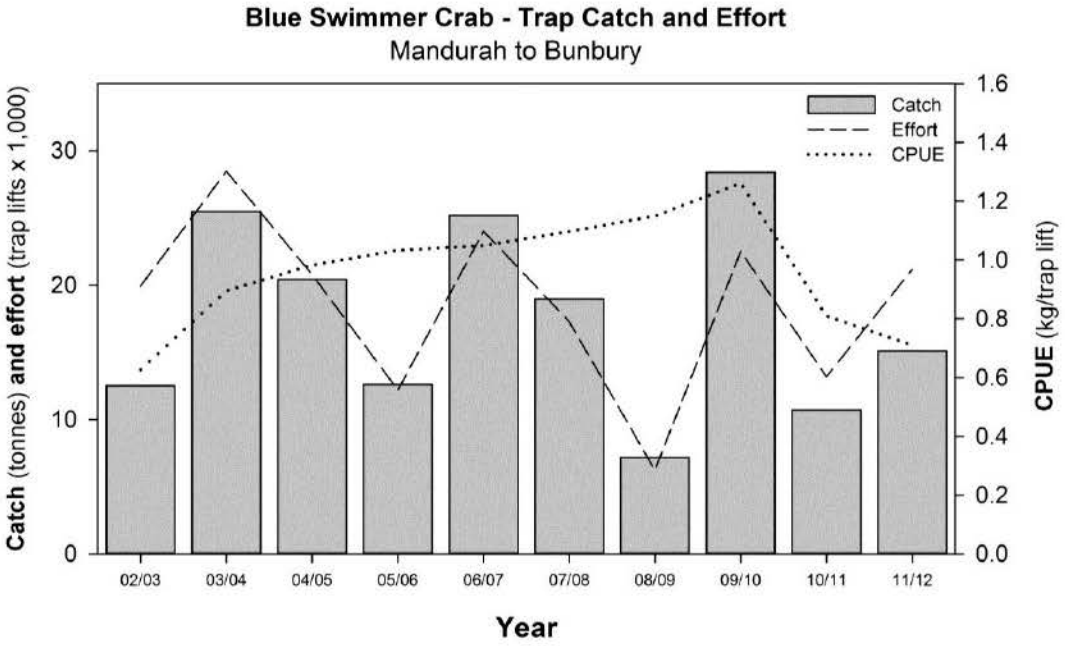
WEST COAST BLUE SWIMMER CRAB FIGURE 2

Blue swimmer crab catch (t), effort (trap lifts x 1,000) and catch per unit effort (kg/trap lift) in the Cockburn Sound Crab Fishery using traps since 1993/94.



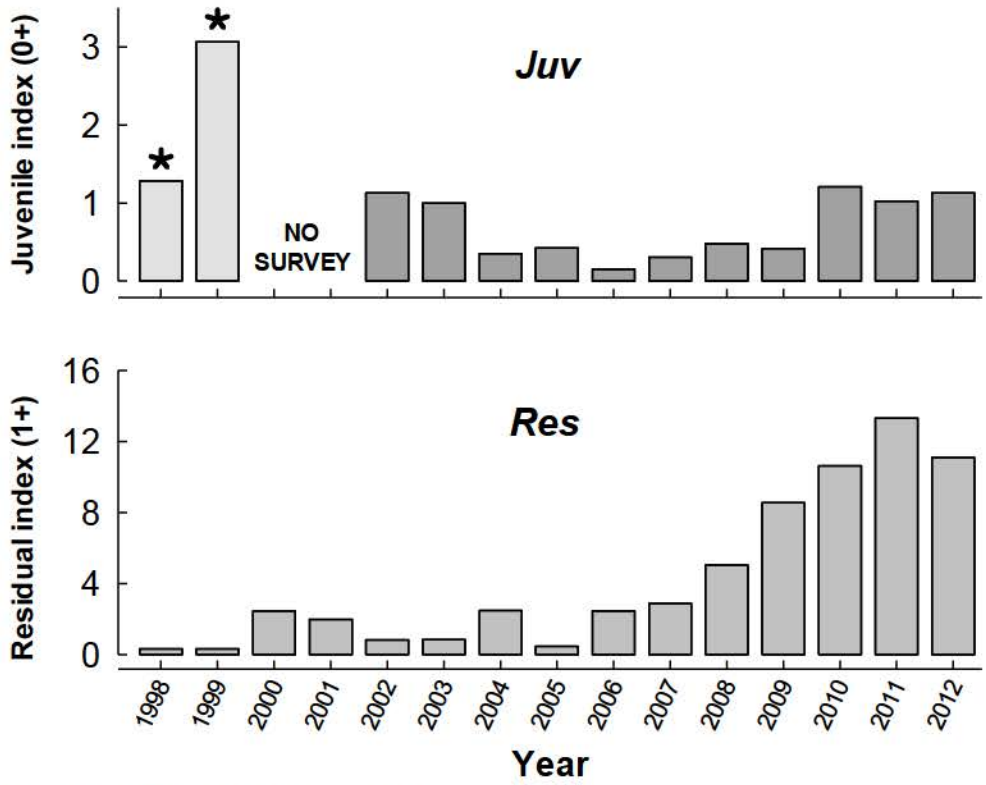
WEST COAST BLUE SWIMMER CRAB FIGURE 3

Blue swimmer crab catch (t), effort (trap lifts x 1,000) and catch per unit effort (kg/trap lift) in Area 2 of the West Coast Estuarine Fishery (the Peel-Harvey Estuary) using traps since 1995/96.



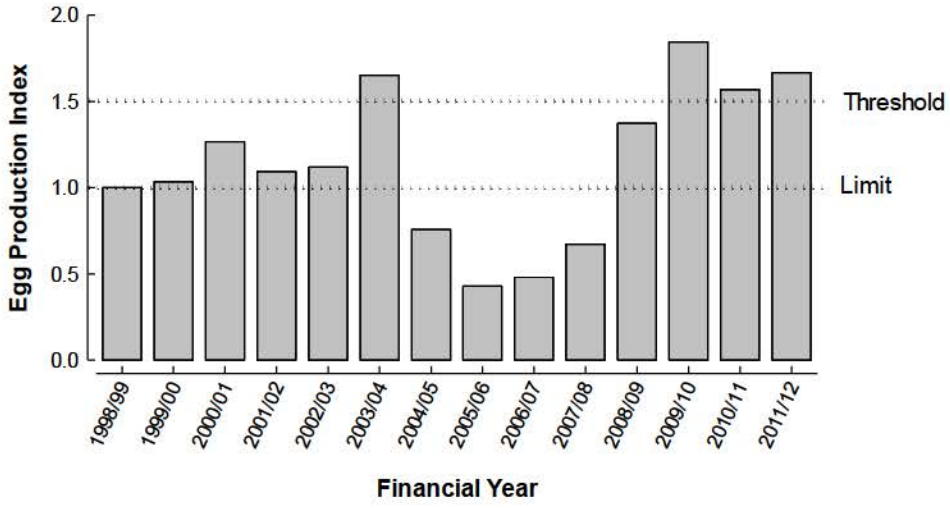
WEST COAST BLUE SWIMMER CRAB FIGURE 4

Blue swimmer crab catch (t), effort (trap lifts x 1,000) and catch per unit effort (kg/trap lift) in the Mandurah to Bunbury Developing Crab Fishery since 2002/03.



WEST COAST BLUE SWIMMER CRAB FIGURE 5

Annual standardized index of juvenile (0+) recruitment and residual (1+) blue swimmer crabs in Cockburn Sound. Juvenile recruitment data was derived from juvenile research trawl conducted in April, May and June of each year, and residual data was derived from catch monitoring surveys aboard commercial crab vessels in August and September of each year. * Daytime trawling (conversion factor (5.84) used for comparison with night trawling).



WEST COAST BLUE SWIMMER CRAB FIGURE 6

Annual standardized egg production index based on numbers and carapace widths of sexually mature female blue swimmer crabs captured during all juvenile trawl surveys between 1996 and 1999, all trawl surveys aboard the Fisheries Research trawlers *RV Flinders* (1999 –2001) and *RV Naturaliste* (2001-2012), and all catch monitoring surveys aboard commercial crab vessels in Cockburn Sound (1999-2012). Proposed threshold (1.5) and limit (1.0) levels are indicated.