Annual status report
Blue Swimmer Crab Fishery

December 2006

Queensland Government
Department of **Primary Industries and Fisheries**

PR06–2621

The Department of Primary Industries and Fisheries (DPI&F) seeks to maximise the economic potential of Queensland's primary industries on a sustainable basis.

Introduction

Blue swimmer crabs (*Portunus pelagicus),* often known as sand crabs, are found in coastal and estuarine waters in the southern part of Queensland. They are an important species for both recreational and commercial fishers. The blue swimmer crab is fished in all Australian states other than Victoria and Tasmania. This report covers the calendar year of 2005.

Fishery profile 2005

Total harvest from all sectors: approximately 870 t

Commercial harvest: 709 t

Recreational harvest in 2002: approximately 160 t

Indigenous harvest in 2000: less than 1 t

Charter harvest: considered negligible

Commercial Gross Value of Production (GVP): approximately $5.2 million

Number of licences: 858 (including 77 held by the Commonwealth Department of the Environment and Heritage (DEH) under the Great Barrier Reef Marine Park (GBRMP) Structural Adjustment Package) as of August 2006

Commercial boats accessing the fishery: 187

Fishery season: Year round, mainly targeted January–May; November–December.

Description of the fishery

Fishing methods

Crab pots and collapsible traps (Figure 1) are the main apparatus used by commercial blue swimmer crab fishers. Recreational fishers use the same apparatus and are also permitted to use dillies.

Figure 1: Collapsible trawl mesh trap.

Fishing area

The fishery comprises tidal waters in the following areas (Figure 2):

1. east of longitude 142°31'49"
2. north of latitude 10°48' south and between longitude 141°20' east and longitude 142°31'49" east
3. in the Gulf of Carpentaria between the 25 nautical mile line and the shore, south of latitude 10°48' south.

Main management methods used

The Department of Primary Industries and Fisheries (DPI&F), Queensland, manages the Blue Swimmer Crab Fishery (the fishery) in accordance with ecologically sustainable development principles. The fishery is managed under the Queensland *Fisheries Act 1994* and in accordance with the Queensland Fisheries Regulation 1995. Fishers taking blue swimmer crab for trade or commerce must hold an authority endorsed with a C1 or T1 trawl fishery symbol. A range of input and output controls are in place to manage the harvest of blue swimmer crabs by commercial and recreational fishers, including:

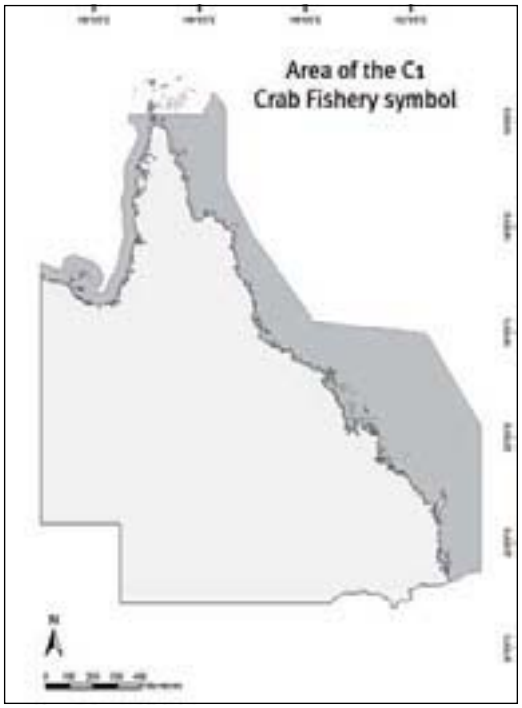

Figure 2: Boundary of the Blue Swimmer Crab Fishery.

- a minimum legal size limit that applies to both commercial and recreational fishers (11.5 cm carapace width)
- a prohibition on taking female crabs
- apparatus restrictions (50 pots per licence for the commercial sector and four pots per person for the recreational sector)
- a limit on the number of blue swimmer crabs that can be retained by trawl operators (100 in Moreton Bay and 500 elsewhere)
- a limit on the number of commercial operators with the potential to access the fishery
- restrictions on the number and size (no longer than 14 m) of commercial vessels
- spatial closures, with areas of the fishery being closed to fishing under the Queensland Fisheries Regulation 1995 and through Marine Park zoning plans established under the Commonwealth *Great Barrier Reef Marine Park Act 1975* and *Queensland Marine Parks Act 2004*.

Approximate allocation between sectors

The fishery is predominantly commercial. The majority of blue swimmer crabs are taken commercially by pot fishers (75%) and trawl fishers (7%). In 2002, recreational fishers took approximately 18% of the total harvest.

Fishery accreditation under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

The fishery was granted a Wildlife Trade Operation (WTO) approval on 15 October 2004 under Part 13A of the EPBC Act. This accreditation acknowledges that the fishery is being managed in an ecologically sustainable manner and allows the export of the catch. The approval expires 10 October 2007.

Catch statistics

Commercial

The total commercial catch of blue swimmer crabs is predominantly composed of product caught by pot. Blue swimmer crabs are listed as permitted species in the East Coast Otter Trawl Fishery and a small amount of product (approximately 7%) is harvested in this fishery (Figure 3).

With the introduction of the Fisheries (East Coast Trawl) Management Plan 1999, trawl operators were restricted to an in-possession limit of 100 blue swimmer crabs in Moreton Bay and 500 elsewhere. The effect of this regulation can be seen in declining trawl catch and catch rate since 1999 (Figure 3). It should be noted that blue swimmer crabs were reported as 'crab unspecified' prior to 1999 and consequently, total catch figures during the 1990s may include some three spot crabs.

The reported commercial pot catch of blue swimmer crabs in 2005 decreased from the high catches reported from 2001 to 2004. The reported catch in 2005 has returned to a similar level of that reported during 1999 and 2000 (Figure 3, Table 1).

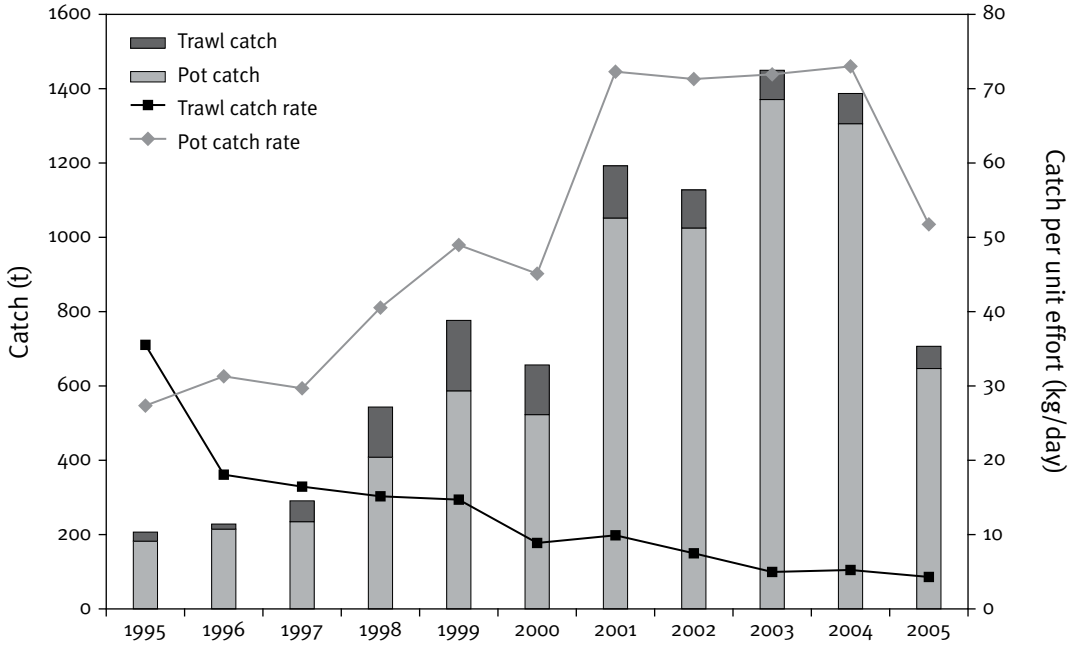

Figure 3: Total commercial catch and effort of blue swimmer crabs, 1995–2005.

Table 1: Fishery details for the commercial pot harvest of blue swimmer crabs since 2000.

Year	Catch (t)	Days fished	Boats	Catch rate (kg/day)	Days/ boat	Catch/ boat (t)	GVP ($m)
2000	523	11 635	178	44.9	66	2.9	4.2
2001	1 053	14 651	198	72.0	74	5.3	8.4
2002	1 028	14 539	219	71.0	66	4.7	8.2
2003	1 372	19 160	262	71.6	73	5.2	11.0
2004	1 303	18 011	239	72.6	75	5.5	10.4
2005	652	12 583	187	51.8	67	3.5	5.2

In 2005, commercial fishing effort in the fishery continued to trend downward from its peak in 2003 (Figure 4). Of the 858 commercial fishers that can potentially access the fishery, approximately 190 harvested blue swimmer crab in 2005.

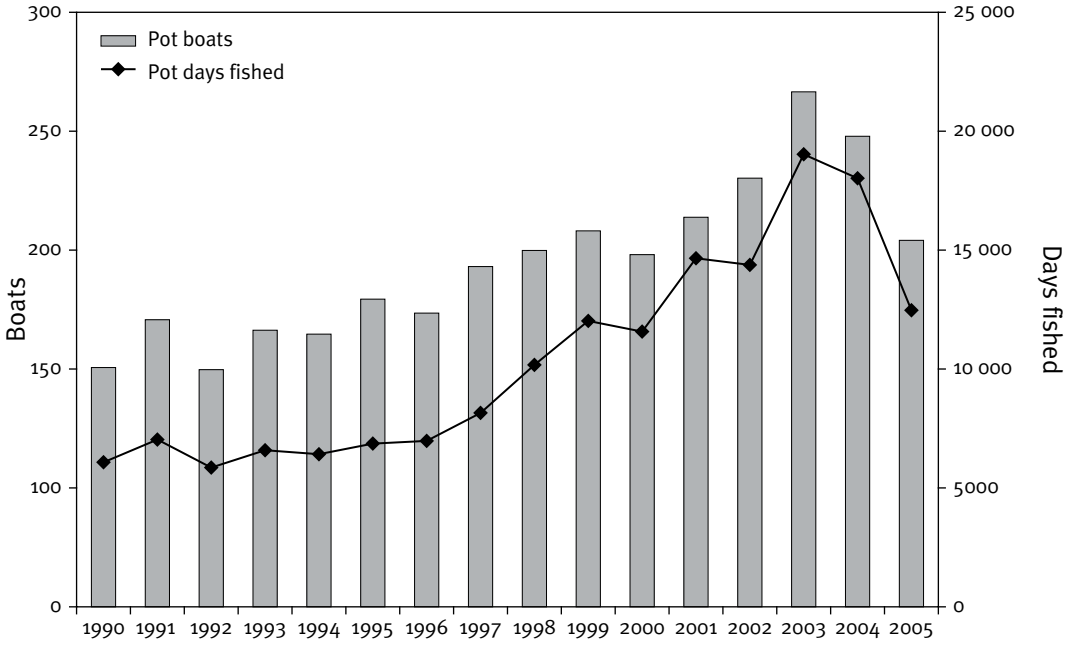

Figure 4: Effort in the Blue Swimmer Crab Fishery (pot), 1990–2005.

Figure 5 indicates that approximately 85% of the fleet catch less than 10 t a year. Approximately 25% of the fleet take only a small amount of blue swimmer crab product (less than 0.2 t). A large proportion of the blue swimmer crab fleet is multi-endorsed with blue swimmer crab commercial fishers participating in other fisheries.

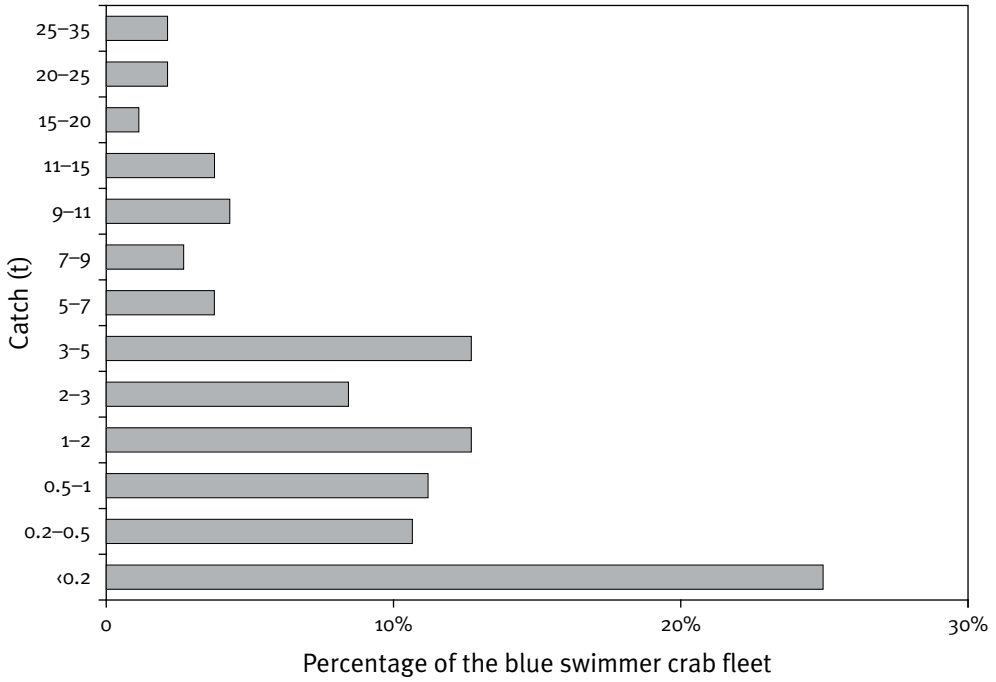

Figure 5: Fleet characteristics of the Blue Swimmer Crab Fishery in 2005.

Moreton Bay

The annual reported catch from Moreton Bay decreased from 367 t in 2004 to 274 t in 2005 (Figure 6). Moreton Bay has historically dominated the total harvest, with annual reported catches regularly around 300 t. The low reported catch in Moreton Bay is consistent with the entire fleet and is likely to be associated with the observed decline in the number of days fished, from approximately 9200 in 2004 to 7400 in 2005.

Catch per unit effort (CPUE) has remained relatively stable from 1999 onwards, excluding the observed peak in 2001 (Figure 6).

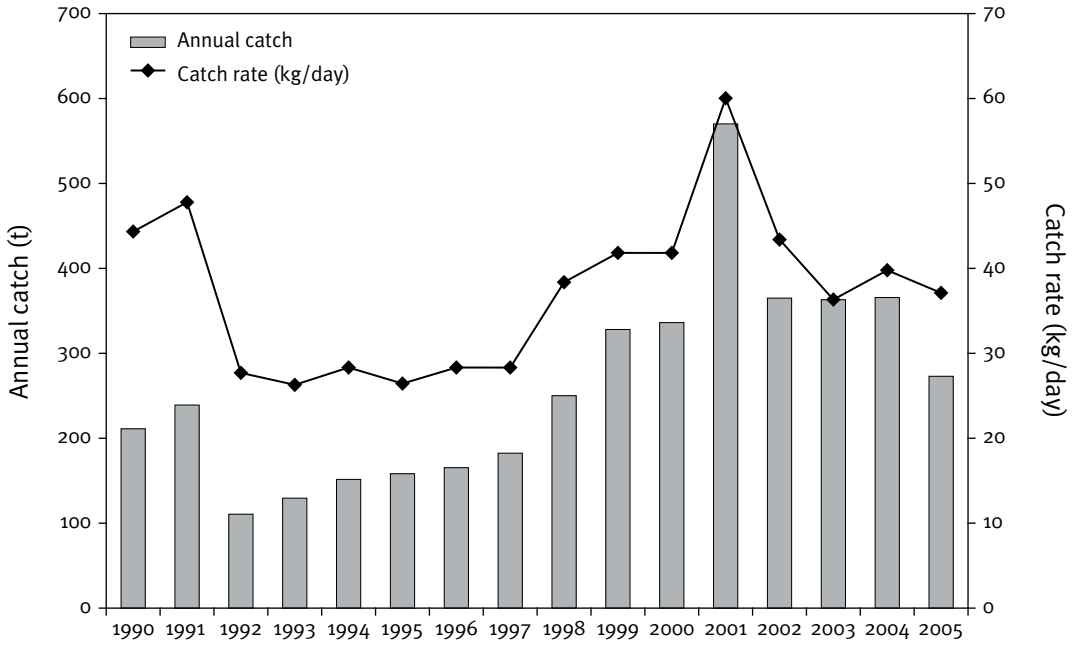

Figure 6: Catch and effort in Moreton Bay (pot), 1990–2005.

Fraser Island/Burnett region

Reported catch in the Fraser/Burnett region decreased from 633 t in 2004 to 188 t in 2005 (Figure 7). The decrease is likely to be associated with the number of days fished dropping by almost half since 2004, and the number of boats accessing the region decreasing from 78 in 2004 to 56 in 2005. The drop in catch observed in 2005 is likely to be annual catch moving back to historical levels. The major decrease in catch in the Fraser/Burnett region has contributed to the overall decrease in catch observed for the entire fishery in 2005.

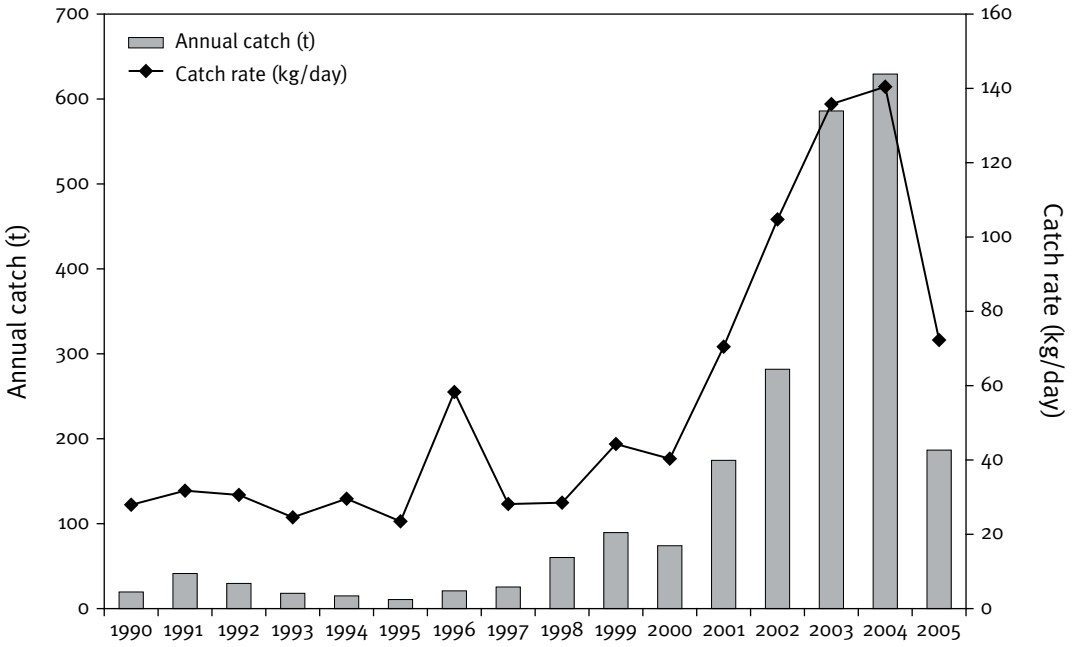

Figure 7: Catch and effort in Fraser/Burnett (pot), 1990–2005.

Recreational

The recreational harvest of blue swimmer crabs is significantly less than the commercial harvest, contributing approximately 18% of the total fishery harvest in 2002. The most recent Recreational Fishing Information System (RFISH) diary survey, conducted in 2002, estimated that approximately 485 000 blue swimmer crabs were harvested, with around 1 million released (Table 2).

Table 2: Recreational catch of blue swimmer crabs estimated from RFISH surveys (1999 and 2002).

	1999	2002
Number caught	1 129 000	1 487 015
Number released	657 800	1 001 515
Total estimated harvest	471 400	485 499
Estimated weight of total harvest	Approximately 155 t	Approximately 160 t

The National Recreational and Indigenous Fishing Survey (NRIFS)[1] estimated that recreational fishers in Queensland harvest approximately 46 t of blue swimmer crabs annually, which is significantly lower than the estimates provided by the RFISH surveys. Factors contributing to the discrepancy between the two sets of figures include different survey methods used (telephone versus diary), the number of fishers surveyed and the eagerness of anglers surveyed. DPI&F concluded that RFISH and NRIFS estimates were incomparable.

Charter

Charter logbook data indicates that the charter harvest of blue swimmer crabs is negligible, with less than 60 kg a year having ever been taken. In 2005, charter operators reported a harvest of 47 kg.

Indigenous

The Indigenous harvest of blue swimmer crabs in northern Queensland was estimated via the NRIFS. The study found that only 882 blue swimmer crabs (less than 1 t) were harvested by Indigenous fishers. The low levels of reported catch in northern Queensland reflect the greater abundance of the species in the southern part of Queensland.

Spatial issues/trends

Two key blue swimmer crab fisheries regions, Moreton Bay and Hervey Bay, have developed over different time periods throughout the history of the fishery. Moreton Bay has been fished longer with a higher proportion of the effort expended in the Moreton Bay region (Figure 8). Expansion of fishing effort has recently occurred in the Fraser/Burnett region and in offshore areas of south-east Queensland.

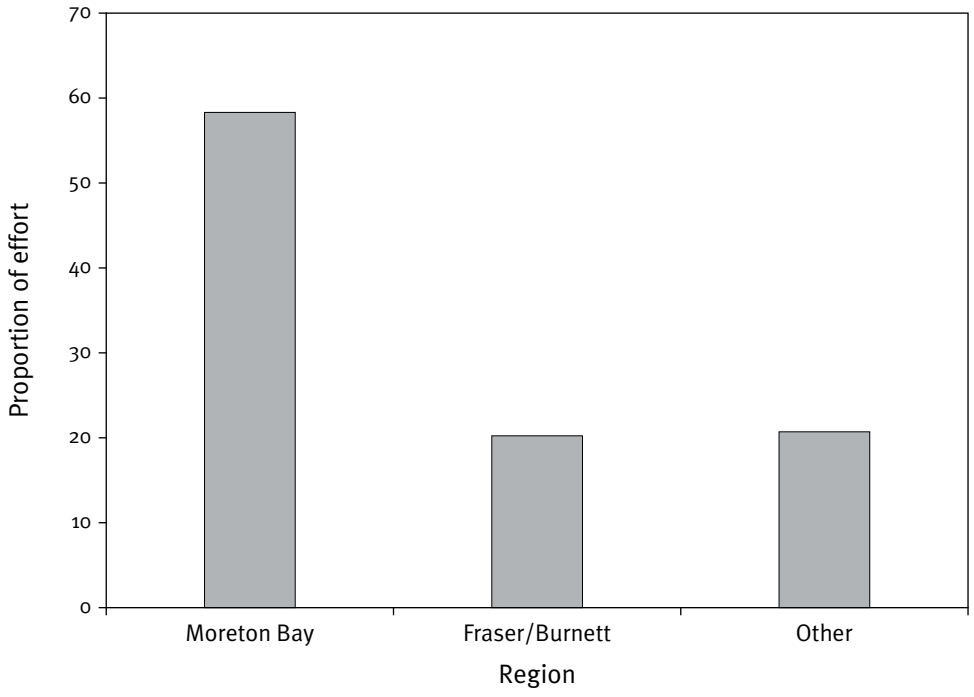

Figure 8: Distribution of effort in the Blue Swimmer Crab Fishery for 2005.

[1]Henry, GW and Lyle, JM 2003, *The National Recreational and Indigenous Fishing Survey*, FRDC Project No. 99/158, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, Australia.

Socio-economic characteristics and trends

Figure 9 shows the income distribution for the commercial sector of the fishery in 2005. Excluding commercial fishers who take less than $2000 worth of product, the modal income from blue swimmer crabs is between $20 000 and $40 000 a year.

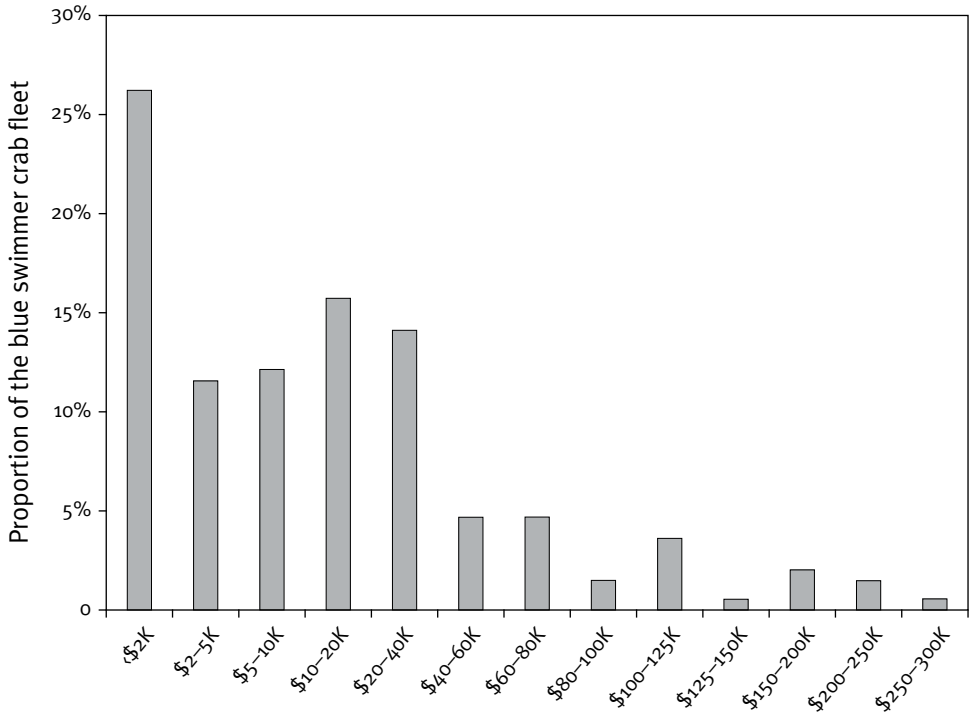

Figure 9: Income distribution in the Blue Swimmer Crab Fishery in 2005.

Figure 10 shows the contribution of blue swimmer crab harvest to total annual income for commercial fishers in 2005. For the majority of commercial fishers, blue swimmer crab harvest contributes to less than 60% of their total fishery-based annual income. For approximately 25% of commercial fishers, blue swimmer crab harvest contributes to less than 5% of the annual income, and only 1% of the entire commercial fleet can be considered totally dependent on the fishery.

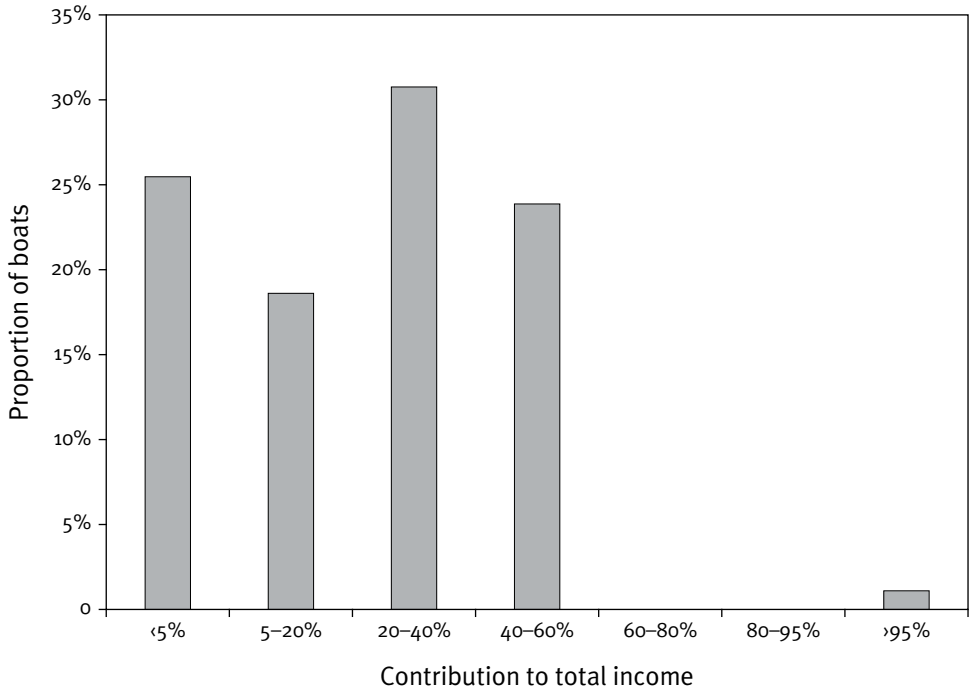

Figure 10: Contribution of blue swimmer crab harvest to commercial fishers' annual income (2005).

Fishery performance

Appraisal of fishery in regard to sustainability

Reported logbook data suggests that although total annual catch and CPUE has recently decreased, CPUE, annual catch and total number of days fished are returning to historical levels. There are fewer boats operating in the fishery and the average number of days fished per year has decreased (see Catch statistics, Table 1). It should also be noted that the majority of reduction in catch and effort is observed in the Fraser/Burnett region where the offshore component of the fishery is undertaken (see Catch statistics, Figure 5).

RFISH surveys conducted in 1999 and 2002 indicate that the recreational harvest had increased slightly over this period.

The prohibition on taking female and undersized crabs in Queensland is a precautionary approach to management that has the capacity to reduce the impact of increased effort in the fishery on blue swimmer crab stocks. It should be noted that the restrictions placed on the trawl harvest of blue swimmer crabs also contributes to the sustainable management of the stock. In 2006, an ecological risk assessment (ERA) was undertaken for the fishery and performance measures are being developed. DPI&F have also implemented a Long Term Monitoring Program (LTMP) in the fishery (see Research and results). These measures are being taken to ensure that blue swimmer crab stocks in Queensland are being adequately monitored and that the fishery continues to be managed in a sustainable manner.

Progress in implementing Department of the Environment and Heritage (DEH) recommendations

Recommendation	Progress
DPI&F to inform DEH of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on bycatch, protected species or the ecosystem.	*Ongoing* Proposal to prescribe a maximum size opening in crab apparatus to minimise interactions with juvenile turtles. Proposal subject to community consultation.
DPI&F to actively engage with New South Wales in pursuit of collaborative or complementary management and research of shared blue swimmer crab stocks.	*Ongoing* DPI&F meets with New South Wales Department of Primary Industries on an annual basis to pursue opportunities for collaborative or complementary management and research of shared species.
As part of the management planning process, or no later than December 2006, DPI&F to develop fishery-specific objectives linked to performance indicators and performance measures for target, bycatch, protected species and impacts on the ecosystem.	*In progress* Performance measurement system (PMS) to be finalised in late 2006/early 2007 and will be applied to the fishery from 2007 onwards.
DPI&F to monitor the status of the fishery in relation to the performance measures once developed. Within three months of becoming aware that a performance measure is not being met, DPI&F to finalise a clear timetable for the implementation of appropriate management responses.	*Ongoing* Performance measures will be assessed annually once developed.
DPI&F to develop a compliance strategy for the Blue Swimmer Crab Fishery. The strategy will explicitly address the following issues and provide for the periodic review of the effectiveness of the strategy (by end 2007): • commercial and recreational catch and effort data validation • compliance with commercial and recreational gear restrictions (type and number) • compliance with restrictions on the take of female crabs and minimum size limit in the commercial and recreational sectors • the potential for Queensland-harvested female and undersize crabs to be laundered in other jurisdictions with different management measures • the black market sale of recreationally caught crabs.	*In progress* The Queensland Boating and Fishing Patrol (QBFP) are coordinating compliance risk assessments and strategy development across all Queensland fisheries. Development of a compliance strategy for the Blue Swimmer Crab Fishery is scheduled for 2007.
From 2005, DPI&F to report publicly on the status of the fishery on an annual basis, including explicit reporting against each performance measure once developed.	*Ongoing* This annual status report is the second to be completed for the Queensland Blue Swimmer Crab Fishery.
DPI&F to develop a system to ensure that catch data collected in compulsory logbooks is validated on an ongoing basis and to investigate methods for documenting and validating effort in the fishery.	*In progress* An ongoing logbook validation program has been put in place by DPI&F's Assessment and Monitoring Unit. Crab fisheries are scheduled for 2007.
As part of the management planning process, or no later than December 2006, DPI&F to assess the appropriateness and effectiveness of current management arrangements for the offshore component of the fishery with regard to the sustainable harvest of the target species, minimisation of bycatch and interactions with threatened species.	*Partially complete* An ecological risk assessment (ERA) development workshop was held in May 2006. Draft outcomes were presented to DPI&F's Crab Management Advisory Committee (CrabMAC) in July 2006. The ERA will be submitted to DEH in late 2006.

Recommendation	Progress
By 31 December 2004, DPI&F to develop a strategy to remove or substantially reduce the amount of latent effort in the fishery. The strategy is to influence clearly defined management actions linked to specific timeframes. DPI&F to implement the strategy prior to the introduction of the management plan.	*In progress* DPI&F proposed to DEH that a new licensing and fees system will considerably reduce retention of unused licences, thereby addressing the issue of latency in the Blue Swimmer Crab Fishery. This system was implemented progressively from July 2006 and its effectiveness at removing latent effort will be reviewed annually during its phase-in period to 2010.
As part of the management planning process, DPI&F to review existing management measures designed to control blue swimmer crab harvest by recreational fishers, to ensure that these measures are appropriate and adequately constrain recreational effort to within sustainable levels. Should the review indicate that existing measures are not appropriate, DPI&F will develop new measures in a timely manner.	*Not started* The management planning process has not commenced. Current management arrangements are considered very precautionary. A size limit ensures that more than 50% of male crabs reach maturity before being harvested. Take of females continues to be prohibited. In 2006, DPI&F established a fishery-independent monitoring program for blue swimmer crabs. An annual index of abundance of juvenile blue swimmer crabs in Moreton and Hervey bays has been identified as the most suitable and cost-effective indicator of the status of stock in these regions of high catch and effort.
DPI&F to identify fishery areas at risk of overfishing within two years. DPI&F to undertake independent surveys in these areas with a view to detecting any significant changes in crab abundance and take appropriate management action to address resource sustainability concerns.	*In progress* Areas at highest risk from overfishing were assessed in a review of commercial and recreational catch, and effort data in 2005.[2] A blue swimmer crab LTMP has been designed and trialled and data collection began in March 2006.
DPI&F to develop a system for the collection and monitoring of information on discarded undersize and female blue swimmer crab and key bycatch species, sufficient to enable identification of long-term trends in bycatch and discards.	*In progress* Species of Conservation Interest (SOCI) logbooks are used to document interactions with species listed in the EPBC Act. DPI&F is currently monitoring the use of other methods to collect information on composition and rate of discards in the Blue Swimmer Crab Fishery.
Within one year, to support the implementation of the SOCI logbooks, DPI&F to ensure that an education program for fishers, both recreational and commercial, is developed and implemented to promote the importance of protected species protection and accurate incident reporting.	*Completed* A comprehensive education program was provided to fishers in September 2005. This information is available through the DPI&F Business Information Centre (13 25 23).
DPI&F will implement measures to mitigate interaction with protected species at risk of interacting with the fishery, in particular measures to mitigate against capture and entanglement of marine turtles, to ensure that any risks to protected species can be minimised. DPI&F to also identify areas of the fishery where the risk of protected species interactions is higher, and to take appropriate management actions.	*Not started* This recommendation will be reviewed following finalisation of the protected species component of the ERA, in late 2006 (see first recommendation).

[2]Webley, J 2005, *Fisheries Long Term Monitoring Program—Addressing the Department of the Environment and Heritage's recommendations for monitoring Queensland's Mud Crab and Blue Swimmer Crab fisheries*, Department of Primary Industries and Fisheries, Brisbane, Australia.

Management performance

DPI&F held a workshop in early April 2006 to develop performance measures for the fishery. The performance measurement system is to be finalised in late 2006 and will be applied to the fishery post-submission to DEH and reported on annually.

Resource concerns

DEH raised concerns in the ecological assessment that the amount of latent effort in the Blue Swimmer Crab and Mud Crab fisheries may be a risk to the long-term sustainability of Queensland crab stocks. DPI&F considers that the latent effort in the Blue Swimmer Crab Fishery poses minimal risk to the sustainability of blue swimmer crabs, given the precautionary minimum size limits in place and the prohibition on taking females, which, in theory, effectively caps the proportion of the population that can be harvested to approximately 25%.[3] Notwithstanding this, DPI&F has advised DEH that it intends to monitor the effects of the new licensing and fee arrangements, which were implemented on 1 July 2006, to determine if C1 licence holders surrender previously unused fishery symbols. If this does not result in the removal of latent effort, alternative approaches will be investigated. It should be noted that the intention of the new licensing and fee arrangements was not to remove latent effort; however, they may have this effect. It should also be noted that the GBRMP Structural Adjustment Package removed 77 crab licences from the fishery.

DEH raised concerns in the ecological assessment regarding recreational harvest of blue swimmer crabs, which is already affected by anthropogenic pressures from large coastal populations. DPI&F acknowledges that expanding coastal populations may lead to increased recreational pressure on the blue swimmer crab. It should be noted that DPI&F RFISH surveys have shown a decline in the number of recreational fishers fishing in the preceding 12 months compared with those fishing in 1996 to 2004.

The precautionary management arrangements that protect all female and undersized male blue swimmer crabs from harvest ensure that approximately 75% of the population is protected. These precautionary management arrangements, along with the life history characteristics of the blue swimmer crab, render it robust to fishing impacts. Notwithstanding this, DPI&F have implemented a LTMP to monitor blue swimmer crab stocks to ensure that they are harvested at sustainable levels.

Ecosystem

Non-retained species/bycatch

Observations made during research surveys[4] indicated that the level of bycatch associated with the fishery is low. Economic considerations such as the time associated with sorting the catch, damaged target species and decreased value of by-product have prompted commercial fishers to address bycatch issues since the fishery was first developed.[5] The composition and rates of bycatch were found to be associated with the substrate of the region being fished—pots placed close to reefs and rubble areas were found to experience an increase in bycatch compared with more open sandy/mud areas, which are common in Moreton Bay. The surveys also indicated that gear with larger mesh size resulted in lower levels of bycatch.

[3]M Doohan (Department of Primary Industries and Fisheries), discussion, October 2006.

[4]Sumpton, W, Gaddes, S, McLennan, M, Campbell, M, Tonks, M, Good, N, Hagedoorn, W and Skilleter, G 2003, *Fisheries biology and assessment of the blue swimmer crab (*Portunus pelagicus*) in Queensland*, FRDC Project No. 98/117, Department of Primary Industries, Brisbane, Australia.

[5]Ibid.

The species composition of bycatch that was observed included spanner crabs and three spot crabs, as well as fish species such as leatherjackets, juvenile snapper, pearl perch and red emperor. Survival of bycatch after discard is considered to be high given that pots are checked regularly and are typically set in shallow areas, minimising the possibility of fish experiencing barotrauma.

Interactions with protected species

A total of eight interactions[6] with protected species were recorded for crab fishers (including mud, blue swimmer and spanner crab) over the 2005 fishery season. Table 3 provides details on the interactions recorded in the Species of Conservation Interest logbooks. Interactions with turtles have reduced from three in 2004 to no reported interactions in 2005.

Table 3: Species of Conservation Interest that were reported for the 2005 crab fishery season.

Common name	Numbers	Condition
Sea snake	2	Released alive
False water mouse	3	Dead
Humpback whale	1	Alive
Saltwater crocodile	2	Dead

Fishery impacts on the ecosystem

The impact of the fishery on the ecosystem is considered to be low. The apparatus used to harvest the crabs is believed to have little, if any, impact on the physical environment because of its lightweight and stable structure, and also because pots are typically laid on sandy substrates.

Other ecosystem impacts

Blue swimmer crabs can be susceptible to impacts from habitat modification or pollution due to juvenile blue swimmer crab reliance on protected inshore areas such as seagrass beds, sand and mud banks. Recent research[7] indicated that estuaries throughout the world are increasingly subjected to anthropogenic impacts that result in changes in land cover. These changes can affect organisms at various stages of their life cycles and thus compromise ecosystem functions and services.

Loss of habitat in highly populated regions around south-east Queensland, and in particular Moreton Bay, may pose a threat to the long-term sustainability of blue swimmer crabs. DPI&F has undertaken a comprehensive baseline coastal habitat mapping project to facilitate long-term monitoring of changes in these habitat areas.[8]

Hydrological drought is associated with periods of low-flow of coastal rivers[9] and previous research has found that high river flow into marine environments can have positive effects on productivity of commercial fisheries.[10] It is possible that the drought conditions Queensland has been experiencing in recent years may have an impact on blue swimmer crab stocks.

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[6]'Interaction' means any physical contact an individual has with a protected species. These include all catching (hooked, netted, entangled) and collisions with an individual of these species.

[7]Zharikov, Y, Skilleter, GA, Loneragan, NR, Taranto, T and Cameron, BE 2005, 'Mapping and characterising subtropical estuarine landscapes using aerial photography and GIS for potential application in wildlife conservation', *Biological Conservation*, vol. 125, pp. 87–100.

[8]De Vries, C, Danaher, KF and Dunning, MC 2002, 'Assessing and monitoring Queensland's fish habitats using Landsat TM and ETM+ imagery', *Proceedings of the 11th Australasian Remote Sensing and Photogrammetry Conference*, Brisbane, Australia.

[9]Humphries, P and Baldwin, DS 2003, 'Drought and aquatic ecosystems: an introduction', *Freshwater Biology*, vol. 48, pp. 1141–1146.

[10]Loneragan, NR and Bunn, SE 1999, 'River flows and estuarine ecosystems: Implications for coastal fisheries from a review and a case study of the Logan River, southeast Queensland', *Australian Journal of Ecology*, vol. 24, pp. 431–440.

Research and monitoring

Recent research and implications

There has been no recent research regarding blue swimmer crabs in Queensland since the ecological assessment submitted to DEH in early 2004.

A recently published study indicated that the catch rates of blue swimmer crab may be related to the extent of mangrove habitat.[11] The study found a correlation between the catch rate of blue swimmer crabs and the extent of mangrove habitat. Blue swimmer crabs do not directly rely on mangroves for habitat—mangroves create a protected shallow inshore environment that is highly productive and rich in nutrients.

Monitoring programs and results

Long Term Monitoring Program

The blue swimmer crab monitoring program was expanded in 2006. The first year of the expanded program was designed as a pilot study with the primary objective of determining the feasibility of estimating an annual index of abundance of juvenile blue swimmer crabs in Moreton Bay and Hervey Bay. A secondary objective was to evaluate collecting blue swimmer crab data during fishery-independent surveys of tiger/endeavour prawns in north-east Queensland. Fishery-independent data on blue swimmer crabs has also been collected as part of the annual scallop survey in waters between approximately 22.5˚ and 24.5˚ south since 1999.

Results of fishery-independent surveys of blue swimmer crabs undertaken by DPI&F[12] in 2000 and 2001 were used to stratify Moreton Bay into strata of expected high and low abundance. Both Moreton and Hervey bays were also stratified by depth, with shallow sites occurring in waters between approximately 3 m and 10 m, and deep sites in waters between approximately 10 m and 20 m. Trawls were not carried out in conservation zones, buffer zones or protection zones defined under the Moreton Bay Marine Park zoning plan. This will also apply in future years to surveys in Hervey Bay, which has recently been zoned under the Great Sandy Marine Park.

The gear utilised to undertake the survey consisted of a 5 m beam trawl. Trawls were towed for approximately 1 nautical mile. All blue swimmer crabs caught were sexed and measured (notch to notch) to the nearest millimetre using callipers. Water quality (surface salinity and temperature) was also measured during the trawl.

The results of the initial pilot survey will assist in fine-tuning the monitoring program. In the long term, the monitoring program will provide fishery-independent data that are appropriate for assessing the status of the blue swimmer crab stock. These data will be used to monitor long-term trends in the fishery to ensure that it continues to operate in a sustainable manner.

Collaborative research

No collaborative research projects are currently underway. Informal networks between government researchers have been established over time, particularly between Queensland, Western Australia and South Australia. DPI&F will continue to work with researchers from other jurisdictions whenever possible.

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[11]Mason, FJ, Loneragan, NR, Harch, BD, Skilleter, GA and Williams, L 2005, 'A broad-scale analysis of links between coastal fisheries production and mangrove extent: a case study for northeastern Australia', *Fisheries Research*, vol. 74, pp. 69–85.

[12]Sumpton, W, Gaddes, S, McLennan, M, Campbell, M, Tonks, M, Good, N, Hagedoorn, W and Skilleter, G 2003, *Fisheries Biology and Assessment of the Blue Swimmer Crab (*Portunus pelagicus*) in Queensland*, Department of Primary Industries and Fisheries, Brisbane, Australia.

Fishery management

Compliance report

Compliance and enforcement in the fishery is the responsibility of the DPI&F Queensland Boating and Fisheries Patrol (QBFP).

During 2005, 1306 commercial and recreational crabbing units (mud crab and blue swimmer crab) were inspected in Queensland.

During this period, four fisheries infringement notices (FINs) and several cautions were issued for offences in the Blue Swimmer Crab Fishery. Two FINs were issued for the take or possession of undersized blue swimmer crabs; one FIN for a commercial fisher failing to place a mark on the boat as required; and one FIN for a commercial fisher failing to comply with keeping required documents.

One prosecution is still pending for the 2005 season for a commercial fisher using more than the prescribed number of crab pots, the take/possession/sale of undersized crabs and obstructing an officer.

In addition to the above inspections, 539 unattended/incorrectly marked pots were seized and several marketer premises were inspected.

A compliance risk assessment will be completed for the fishery in 2007 in order to determine compliance priorities and allow the most effective use of QBFP resources.

Changes to management arrangements in the reporting year

CrabMAC has proposed to prescribe a maximum size opening in crab fishing apparatus to minimise interactions with juvenile turtles.[13] Industry-proposed models are currently being investigated. Any implementation by DPI&F of the proposed changes to crab fishing apparatus will be subject to stakeholder consultation.

Complementary management

Queensland's management of blue swimmer crab stocks is unique in Australia in that it prohibits the harvest of females and has no recreational possession limit in place. Despite the differences in management arrangements, DPI&F continues to collaborate with other states and the Commonwealth Government on complementary management arrangements for blue swimmer crab stocks.

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Image

Blue swimmer crab (*Portunus pelagicus*)

[13] M Doohan (Department of Primary Industries and Fisheries), discussion, October 2006.