

**A Report Prepared for Environment
Australia on the Management of the
South Australian Giant Crab
(*Pseudocarcinus gigas*) Fishery**

For the Purposes of section 303FN (Approved Wildlife Trade Operation) of the
Environment Protection and Biodiversity Conservation Act 1999

October 2002

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**PRIMARY INDUSTRIES
AND RESOURCES SA**

FOREWORD

The marine and freshwater fisheries resources of South Australia are community owned resources. The role of the Government, as custodian of these resources on behalf of the broader community and future generations, is to ensure that they are used in an ecologically sustainable and economically efficient manner, while at the same time maximising returns to the community.

Experience world-wide has demonstrated that where unrestricted use of marine and freshwater fisheries resources is allowed, there is little incentive for individuals harvesting the resource to conserve fish stocks. The resulting competition among and between user groups often leads to reduced biological and economic productivity. Left unmanaged, the increase in fishing effort that results from competition is reflected in lower individual catches in the recreational fishing sector, and over-capitalisation and reduced financial returns in the commercial fishing sector. Loss of these resources to the community can result in significant regional economic problems.

In managing fisheries resources, Governments have the primary responsibility of ensuring long term sustainability. Governments must also ensure that the basis for sharing fisheries resources among all users is clearly understood and accepted as equitable, and that the allocation of fisheries resources and their level of utilisation are consistent with the needs of present and future generations.

To facilitate better decision-making by the Government in managing South Australia's fisheries resources, a number of fishery-specific stakeholder-based fishery management committees have been established to provide expertise-based advice to the Minister for Agriculture, Food and Fisheries. These committees are comprised of Government managers, research scientists, commercial and recreational fishers, fish processors, members of the general community; and are convened by an independent chairperson. Appointment of members and the terms of reference of the committees are embodied in the *Fisheries (Management Committees) Regulations 1995*.

Where there is considered to be threats of serious or irreversible damage to fisheries resources, or the environment upon which they depend, a lack of full scientific certainty or insufficient information will not prevent the Government from making a resource management decision. Where resource management decisions must be made in an environment of uncertainty the Government, in partnership with the fisheries management committee, will take a precautionary approach to the management of South Australia's fisheries resources.

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1 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide a detailed outline of the management policy framework established for the management and ecologically sustainable development of the South Australian Giant Crab Fishery, consistent with the objectives outlined in Section 20 of the *Fisheries Act 1982* (the Fisheries Act).

This document details the harvest strategy which has been developed for the fishery and provides direction to the formulation of the Regulations contained within the *Scheme of Management (Miscellaneous Fisheries) Regulations 1991*. This document contains relevant background information to the fishery and describes current and potential future research and monitoring regimes.

This document is designed to meet the annual reporting requirements, set out in the 31 March 2001 controlled specimens declaration prepared in accordance with subsection 10A(2) of the *Wildlife Protection (Regulation of Exports and Imports) Act 1982* (the Wildlife Protection Act), or now, section 303FN (Approved Wildlife Trade Operation) of the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act).

1.2 Scope of the Policy

The Fisheries Act provides the broad statutory framework to ensure the management and ecologically sustainable development of South Australia's marine and freshwater fisheries resources. In the administration of the Fisheries Act, the Minister for Agriculture, Food and Fisheries, the Director of Fisheries and the established Fisheries Management Committees must pursue the following objectives, outlined in Section 20 of the Fisheries Act:

(a) ensuring, through proper conservation, preservation and fisheries management measures, that the living resources of the waters to which this Act applies are not endangered or overexploited; and

(b) achieving the optimum utilisation and equitable distribution of those resources.

This Management Policy covers all forms of fishing activity for giant crabs undertaken in South Australian waters and provides a statement of the harvest strategy employed to ensure the sustainable management of the South Australian Giant Crab Fishery.

The South Australian Giant Crab Fishery is a single-species, single-method fishery. The specific Regulations that govern the management of the South Australian Giant Crab Fishery are established in the *Scheme of Management (Miscellaneous) Regulations 2000* and the *Fisheries (General) Regulations 2000*. This Management Policy should be read in conjunction with these Regulations.

This Management Policy does not form part of the *Scheme of Management (Miscellaneous) Regulations 2000* and does not have any statutory basis. The area of waters to which this Management Policy applies include all waters adjacent to the coast of South Australia, from the low water mark out to 200 nautical miles, as provided for under the Offshore Constitutional Settlement (OCS) Agreement between the South Australia and Commonwealth (Cwt) Governments.

This Management Policy shall be periodically reviewed and updated annually as significant advances in knowledge occur. It is important to note that a review of the Fisheries Act is currently being undertaken by the South Australian Department of Primary Industries and Resources (PIRSA), in consultation with key stakeholder groups. This review, which is expected to be completed by 2003/04, is likely to result in changes to the principal objectives of the Fisheries Act and, in turn, the broad sustainability framework established by the Fisheries Act.

1.3 Controlled Specimens Declaration

Since 1999, the export of giant crab has been controlled under the Wildlife Protection Act. Under Section 10A (2) of the Wildlife Protection Act, giant crabs are declared as controlled specimens, which requires PIRSA Fisheries to submit annual reports to Environment Australia on the management of the giant crab resource, including the results of research and monitoring activities.

The controlled specimens declaration for giant crabs, made under subsection 10A(2) of the Wildlife Protection Act, is recognised as an approved wildlife trade operation under the transitional arrangements of the EPBC Act. It is understood that this declaration will continue to be in force until the date on which the original declaration is due to cease (1 March 2003).

The current declaration requires that:

1. Collection of giant crabs (*Pseudocarcinus gigas*) is to be carried out in accordance with the management program for giant crab in South Australia, submitted by the Department of Primary Industries and Resources South Australia;
2. The Department of Primary Industries and Resources will annually submit to the designated authority a report detailing the setting of each year's total allowable catch by 28 September, each year of this declaration;
3. The Department of Primary Industries and Resources South Australia will provide information demonstrating that satisfactory progress is being made on the development of a joint stock assessment research program with Tasmania by 25 January 2002;
4. The Department of Primary Industries and Resources South Australia will provide the designated authority with an annual report on the harvest of giant crabs which will include: total harvest by weight; catch per unit effort; results of any size

sampling of the catch; and a summary of current and recently completed research programs and their impact on the setting of management arrangements such as trigger limits, size limits and total allowable catch by 28 September each year of this declaration; and

5. This declaration is valid until 1 March 2003.

2 MANAGEMENT OF THE FISHERY

2.1 General Background and History of the Fishery

The giant (king) crab, *Pseudocarcinus gigas* (Oziidae) is endemic to Australia and has been taken as a by-catch by rock lobster fishers in southern Australia for over 80 years. Targeted commercial fishing for giant crab was initiated in Tasmanian waters in 1990/91 and began in South Australian waters in 1992.

At this time two South Australian based fishers, who were not rock lobster fishers, began targeting giant crabs in Cwt waters adjacent to South Australia under the provision of Cwt Fishing Permits. These two fishers were subsequently issued with South Australian miscellaneous fishing licences in January 1997, under the provisions of the Fisheries Act.

Prior to 1992, access to giant crabs off the South Australian coastline was controlled by the Cwt Government through the Australian Fisheries Service. Joint Cwt-State management regimes were established in 1992. Since January 1997, giant crabs targeted off the South Australian coastline have been managed by the South Australian Government under an OCS Arrangement between the South Australian and Cwt Governments.

PIRSA Fisheries, is the agency responsible for the sustainable management of South Australia's marine and freshwater resources. These resources are managed consistent with the provisions of the Fisheries Act and in accordance with the principal objectives for management, outlined in Section 20 of the Fisheries Act.

Since taking over management responsibility of the South Australian giant crab resource, PIRSA Fisheries has been working towards implementing a management system based on individually transferable quota units to ensure sustainability of the resource.

2.2 Aim of the Current Management Policy

This Management Policy is considered to form part of a process of continual improvement which reflects current understanding of the South Australian Giant Crab Fishery and, as such, is intended to be improved over time.

This Management Policy will be periodically reviewed as major advances in knowledge are achieved and more information on the biology, distribution and

abundance of the species becomes available.

The aim of this management policy is to ensure that the South Australian Giant Crab Fishery is managed in accordance with the principles of ecological sustainable development and, moreover, in line with the objectives of the Fisheries Act.

2.3 Management Objectives and Strategies

Management Objectives	Management Strategies
<p>To ensure sustainable harvests from the giant crab resource</p>	<ul style="list-style-type: none"> • To establish a 5-year strategic research and monitoring plan for the fishery. • To establish and maintain systems for collecting information required to assess the status of giant crab populations and the fishery. • To measure the following fishery performance indicators on an annual basis: <ul style="list-style-type: none"> - Catch (in relation to TAC); - effort (pot lifts); - catch-per-unit-effort; - sex ratio; - size composition; - mean weight; and - reproductive state. • To restrict the catch to a pre-defined precautionary total allowable catch limit for each zone. • To stabilise the catch in each zone by maintaining the TACs in each zone during the period in which ITQs are being implemented. • To restrict the catch to animals above the minimum size limit of 150mm. • To conserve egg-production by prohibiting the retention of egg-bearing females. • To restrict the quantity of gear used to target giant crabs to a maximum of 100 pots per licence. • To ensure adequate levels of egg-production by prohibiting fishing during spawning periods. • To restrict all commercial rock lobster fishers to a 5 crab by-catch trip limit. • To institute a cost-effective compliance and quota monitoring program to limit the opportunity for illegal activity. • To restrict the size at first capture by ensuring all giant crab pots comply with design specifications.

<p>To minimise any disruption to the structure, productivity, function and biological diversity of the marine ecosystem, within which the fishery operates.</p>	<ul style="list-style-type: none"> • To monitor by-catch in the fishery. • To monitor interactions with threatened or endangered species in the fishery. • To maintain and/or refine existing management arrangements for minimising the impact of giant crab fishing on the marine environment. • To identify impacts on the Giant Crab Fishery from other sources, such as pollution. • To undertake research into optimal escape gap dimensions for giant crab pots. • To protect any threatened or endangered ecological communities by supporting the development and implementation of a representative marine protected area strategy in South Australia.
<p>To provide efficient and cost effective management of the fishery.</p>	<ul style="list-style-type: none"> • To identify and recover attributable costs of management, research and compliance from the commercial sector each year; • To refine the suite of performance indicators used to assess the annual performance of the fishery.
<p>To maximise the economic returns and social benefits associated with the exploitation of the giant crab resource.</p>	<ul style="list-style-type: none"> • To establish systems for the routine collection of economic information. • To measure the following key economic indicators on an annual basis: <ul style="list-style-type: none"> - ratio of costs to expenditure; - returns on capital; - unit value and profit margins compared with other states; and - cost of management as a percentage of GVP and compared to similar fisheries in other states. • To formalise a management system based on Individually Transferable Quota's (ITQs). • To use economic information to assist in maintaining the regional development nature of the fishery; • To maintain high levels of support for the management arrangements through consultation and public accountability; and • To encourage high levels of responsibility for management to stakeholder groups through consultative management processes.
<p>To ensure equitable distribution of the giant crab resource.</p>	<ul style="list-style-type: none"> • To establish and maintain an equitable system for allocating access shares between sectors and individuals. • To maintain equitable levels of public access and recreational opportunities. • To develop monitoring systems to ensure that each sector operates within established catch restrictions.

2.4 Management Arrangements

2.4.1 Area of the Fishery

The Giant Crab Fishery encompasses the waters of the South Australian Northern Zone and Southern Zone Rock Lobster Fisheries. As such, the Giant Crab Fishery is divided into two zones (southern and northern) to which access is limited, depending on the nature of the access entitlement held.

The Northern Zone and Southern Zone Rock Lobster Fisheries extend west to the Western Australian border and east to the Victorian border ($140^{\circ}58.0'E$) respectively, from a line that extends generally south, south westerly from the River Murray mouth:

“a line commencing at the point where the meridian of longitude $139^{\circ}E$ intersects the shore of South Australia, then due south to position latitude $36^{\circ}20.0S$ and longitude $139^{\circ}E$, then due west to position latitude $36^{\circ}20.0S$ and longitude $138^{\circ}40.0E$, then due south to position latitude $36^{\circ}40.0S$ and longitude $138^{\circ}40.0E$, then due west to position latitude $36^{\circ}40.0S$ and longitude $138^{\circ}20.0E$, then due south to position latitude $37^{\circ}S$ and longitude $138^{\circ}20.0E$, then due west to position latitude $37^{\circ}S$ and longitude $138^{\circ}E$, then continuing due south along the meridian of longitude $138^{\circ}E$.” (Figure 1).”

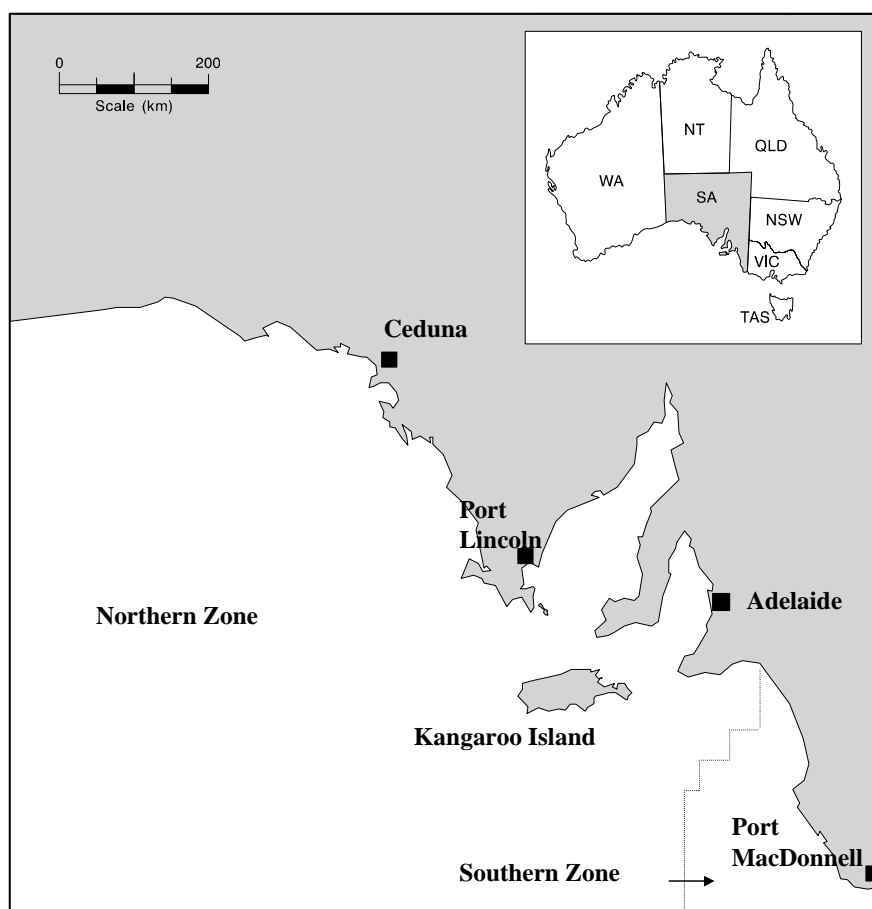


Figure 1. The northern and southern zones of the South Australian Giant Crab and Rock Lobster Fisheries.

2.4.2 Access to the Fishery

Formal access to the Fishery is limited to the following three specific groups:

- 2 miscellaneous licence holders that do not hold rock lobster fishery entitlements;
- 6 Northern Zone Rock Lobster Fishery entitlement holders with access to giant crab quota; and
- 15 Southern Zone Rock Lobster Fishery entitlement holders with access to giant crab quota.

All other Rock Lobster Fishery licence holders in both zones maintain access to a 5 crab trip limit. Licence holders with access to the giant crab resource operate under either the *Scheme of Management (Miscellaneous Fisheries) Regulations 1991* or the *Scheme of Management (Rock Lobster Fisheries) Regulations 1991*. PIRSA Fisheries has a limited entry policy for all established fisheries, including the Giant Crab Fishery. No additional licences for the taking of giant crab will be issued.

All miscellaneous fishing licences issued in South Australia are non-transferable, however giant crab Individually Transferable Quota (ITQ) units issued to the miscellaneous giant crab fishers are intended to be fully transferable. All Rock Lobster Fishery licence holders, with giant crab quota endorsements, are fully transferable. All other Rock Lobster Fishery licence holders are permitted to purchase giant crab quota, but in doing so relinquish the right to take 5 crabs per trip as by-catch.

Recreational fishers are permitted to take giant crabs from throughout South Australian waters, subject to the minimum size limit of 150 mm carapace length. No recreational bag or boat limit is in place for the recreational sector. Recreational fishers seldom take giant crabs due mainly to the depth in which the species is found.

2.4.3 Outline of Management Controls

The current management arrangements involve a mix of input and output controls including an ITQ system. PIRSA Fisheries is in the final stages of implementing the ITQ system. The fishery will operate under ITQ management arrangements for the first time at the beginning of the 2002/03 fishing season. Previously, the fishery has operated under a competitive Allowable Catch (TAC) fishing. The allocation process associated with the implementation of ITQs has been (and continues to be) the subject of legal dispute which has significantly delayed the implementation process.

A minimum carapace size limit of 150mm and a prohibition on the retention of egg-carrying females is in place for both commercial and recreational fishers to protect spawning animals and avoid recruitment and growth overfishing. The minimum size limit is about two moult increments above the female size at maturity (125mm) which on average allows female giant crabs about 10-15 years of spawning before growing to a harvestable size (McGarvey *et al* 1999).

Modelling work undertaken by McGarvey *et al* (1999) suggested that under the current size limit, female egg production in the South Australian Fishery is being maintained at 50% of virgin egg production levels. This exceeds conventional crustacean egg production reference points of 10-30%. The same modelling work suggested that only limited protection may be being provided for males under the existing size limit because of issues associated with male functional maturity.

All other Rock Lobster Fishery licence holders are limited to a by-catch limit of 5 crabs per trip. Those Rock Lobster Fishery licence holders with access to giant crab quota are not permitted to take 5 giant crabs per trip as by-catch.

There is currently no bag or boat limit in place for the recreational sector, mainly because the species is rarely taken by recreational fishers. Recreational fishers are required to purchase a gear registration for a maximum of two rock lobster pots per person, which is the only recreational device with the capacity to catch giant crabs. All recreational rock lobster pot fishers fill out voluntary catch and effort logbooks, which are returned to PIRSA Fisheries and include details of any by-catch taken.

Additional input controls include:

- a limited entry policy restricting access to existing licences;
- gear restrictions in relation to the design specifications of pots and a limit of 100 pots per licence;
- spatial and temporal closures which currently restrict fishing for giant crabs to waters deeper than the 60 fathom isobath and to within the existing rock lobster fishing seasons for each zone; and
- vessel length and capacity restrictions.
- Dual rock lobster/giant crab fishers are only permitted to fish in one fishery (lobster or giant crab) on any one trip – prior reporting arrangements are in place to ensure compliance with this arrangement.

Rock lobster taken as by-catch during targeted giant crab fishing is not permitted to be retained (including that taken by dual rock lobster/giant crab fishers). All fishers are required to submit monthly catch and effort returns to the Aquatic Sciences Division of the South Australian Research and Development Institute (SARDI) and catch and disposal records to PIRSA Fisheries at the end of each trip (including that taken as by-catch by other lobster fishers).

The two miscellaneous Fishery licence holders are permitted to fish zone-specific ITQs in each zone, while Rock Lobster Fishery licence holders with giant crab quota are restricted to fishing for giant crabs in the zone for which they hold a rock lobster licence. All Rock Lobster Fishery licence holders with giant crab quota entitlements are permitted to transfer these entitlements to other rock lobster and miscellaneous fishers, within a particular zone. All Rock Lobster Fishery licence holders can purchase giant crab quota from other rock lobster or miscellaneous fishers. This arrangement has been changed. Under the new ITQ management system, the two miscellaneous fishers are permitted to transfer their full quota entitlements within each zone.

2.4.4 Setting the TAC

An annual Total Allowable Catch (TAC) was established for each zone prior to the commencement of the 1999/00 fishing season. Since 1999, competitive TAC fishing arrangements have been in place. These arrangements were established to restrict the total catch to a pre-defined limit, until ITQ management arrangements could be implemented. It is intended that the fishery will be managed under ITQ management arrangements for the first time in the 2002/03 fishing season.

Under the *Fisheries Act 1982*, both the Director of Fisheries and the Minister for Agriculture, Food and Fisheries have the capacity to establish sustainable catch and/or effort limits for individual species or fisheries. The legislation provides sufficient flexibility to adjust catch and effort limits within or between fishing seasons.

As there are currently insufficient quantitative data to determine TACs in the Giant Crab Fishery using conventional numerical methods, an empirical precautionary approach has been adopted by PIRSA Fisheries to set annual TACs for the fishery¹. All available information has been analysed, including past catch and effort data, information from fishers and experiences from other State fisheries management agencies. Nominal (unstandardised) catch per unit effort information is currently used in the analyses.

Comprehensive daily catch and effort data have been collected for the Giant Crab Fishery by PIRSA Fisheries and SARDI Aquatic Sciences since 1997. All South Australian commercial fishers are required, under Section 46 of the Fisheries Act, to furnish SARDI Aquatic Sciences with accurate catch and effort returns. This information forms the basis of the empirical TAC setting process for the Giant Crab Fishery. Table 1 outlines the TAC established for each zone since 1999 and the total catch (target and by-catch) taken in each zone since 1997.

¹ Note that the catch limits currently in place for the Tasmania and Victorian Giant Crab Fisheries are 100 and 25 tonnes, respectively.

Table 1. Total catch (kg) of giant crab taken in South Australian waters in each zone since the 1997/98 fishing season and TACs established for each zone since 1999.

Year	Catch form	Northern Zone	Southern Zone	Total Catch (kg)
1997/98	Target	11,516	15,004	26,520
	By-catch	2,161	1,709	3,870
	Total	13,677	16,713	30,390
	TAC	N/A	N/A	N/A
1998/99	Target	14,499	14,987	29,486
	By-catch	1,798	2,138	3,936
	Total	16,297	17,125	33,422
	TAC	N/A	N/A	N/A
1999/00	Target	12,854	10,648	23,502
	By-catch	1,069	805	1,874
	Total	13,923	11,453	25,376
	TAC	13,400	12,600	26,000
2000/01	Target	14,039	7,659	21,698
	By-catch	1,891	756	2,647
	Total	15,930	8,415	24,345
	TAC	13,400	8,700	21,100
2001/02	Target	9,456	6,914	16,370
	By-catch	2,759	1,605	4,364
	Total	12,215	8,519	20,734
	TAC	13,400	8,700	21,100

The TAC in each zone is reviewed annually and adjusted, if necessary, on the basis of information available through the fishery dependent catch and effort data collection system.

Management performance indicators currently used to assess the performance of the fishery against established management objectives and, moreover, the appropriateness of the TACs, primarily include nominal catch per unit effort and total catch relative to each TAC. Other performance indicators also used as indicators of fishery performance include pre-recruit abundance (undersize crab abundance), mean size, sex ratio and size composition of the commercial catch. The analyses used to estimate values for these performance indicators are not considered to be robust, due largely to insufficient data. All of the performance indicators currently used are considered to require further refinement. As further advances in knowledge are made, biological reference points will be established for key performance indicators in each zone.

Observed and predicted by-catch levels have been taken into account in establishing the current TACs for each zone. In addition, under the ITQ system, an allocation of 50 units (from 1000) has been directly allocated for by-catch in each zone. Under the existing TACs for each zone this equates to approximately 670 and 435 kg for the northern and southern zones respectively. These provision will be in place from the start of the 2002/03 fishing season, commencing in the southern zone on 1 October and 1 November in the Northern Zone. If by-catch exceeds the allocated amount in either zone, the TAC could be adjusted to account for the over-catch, if significant.

Southern Zone

In 1999, the TAC established for the southern zone was 12,600 kg. In 2000, the TAC for the southern zone was adjusted to 8,700 kg, which represents 60% of the average catch taken in the zone during the period between 1997/98 and 1999/2000. This precautionary TAC was established in response to indications that nominal catch per unit effort in the zone had declined during the years following the period in which the fishery was managed under Commonwealth jurisdiction. PIRSA Fisheries also consulted with other management jurisdictions and experienced South Australian commercial giant crab fishers when considering the TAC adjustment.

On the basis of current assessment, the southern zone is considered to be fished at close to optimal levels. This classification will be reviewed following more refined quantitative assessment of the fishery by SARDI Aquatic Sciences during 2002/03, and through collaborative work with Tasmania.

The southern zone TAC has been maintained at 8,700kg for the 2001/02 and 2002/03 fishing seasons. This approach is consistent with the current precautionary management strategy, aimed at stabilising the catches and catch rates in each zone, during the period in which ITQs are being implemented in the fishery.

Northern Zone

In 1999, the northern zone TAC was set at 13,400kg. This TAC has been maintained in order to continue the controlled development of the fishery in the northern zone. The northern zone TAC represents 90% of the average catch taken during the period between 1997/98 and 1999/2000.

On the basis of current assessment and consultation with managers and commercial fishers from other jurisdictions, the northern zone is currently considered to be under-exploited. This classification will be reviewed following more refined quantitative assessment of the fishery by SARDI Aquatic Sciences during 2002/03, and through collaborative work with Tasmania.

While there has been pressure from commercial fishers to increase the TAC in the northern zone, PIRSA Fisheries has maintained the TAC at 13,400kg for the 2002/03 fishing season. This approach, while promoting limited development, is consistent with the current precautionary management strategy aimed at stabilising the catches in each zone during the period in which ITQs are being implemented in the fishery.

2.4.5 TAC Monitoring

During the period in which competitive TAC fishing arrangements were in place for the Giant Crab Fishery (1999/00 – 2001/02), PIRSA Fisheries used Notices issued under Section 43 of the Fisheries Act to close access to the Fishery each year prior to the TAC in each zone being taken. To do this, the total catch in each zone is closely monitored by PIRSA Fisheries throughout the season. As the total catch approaches the TAC a decision is made to close access to the fishery to avoid the TAC being exceeded. The fishery may also be closed (by default) if the TAC is not taken prior to the end of the established fishing season. No over-catch or under-catch provisions apply.

Each year, the majority of the competitive TAC in each zone has been taken prior to the end of the fishing season. In the 2001/02 fishing season (as in previous seasons), access to each fishery was closed at separate times in advance of each TAC being taken in accordance with the process outlined above. Using this mechanism to close access to the fishery each year can result in marginal over and under-catches because management aims to predict, as near as possible, when the TAC will be taken prior to the end of each season. The total catch taken from both zones in the 2001/02 fishing season was 20,735 kg (Table 1), which is marginally less than the established TACs. This marginal under-catch reflects the process outlined above, rather than low abundance (and catchability) of giant crabs.

This process to close the fishery will not be necessary during the 2002/03 fishing season because each individual licence holder with giant crab quota will be required to stop fishing once their ITQ has been taken.

Compliance with the quota monitoring system is ensured through a paper audit trail from the time of landing to the point of sale. At the point of landing, licence holders that target giant crab are required to complete a giant crab Catch and Disposal Record (CDR). The CDR provides information including total estimated weight, numbers, port and time of landing, name of the receiving processor and if the crabs were processed or live. The CDR then accompanies the giant crab to the processor where, upon immediate receipt of the giant crabs, the processor must accurately weigh the giant crab and complete Part B of the CDR with the certified accurate weight. The CDR is then forwarded to a PIRSA Fisheries compliance office by the fish processor within 24 hours. CDR information is entered onto a database and individual catches are subtracted from the competitive TAC. CDR information is also used to audit the accuracy of logbook reporting. In the 2002/03 fishing season, each individual catch will be decremented against allocated ITQs.

ITQs for giant crabs and rock lobster are introduced through a licence condition under section 37 of the *Fisheries Act 1982*. Breaches of licence conditions are deemed prescribed offences under the Fisheries Act, and provisions exist for the court to cancel a licence, should a licence holder be convicted of three prescribed offences.

2.4.6 A Global TAC

As the giant crab population in southern Australia is thought to consist of a single genetic stock, future management of the resource would ideally involve some consideration of a global TAC. PIRSA Fisheries will continue to develop communication links with other State fisheries management agencies with a view to establishing a more coordinated and integrated approach to the future management of the resource, wherever this is possible.

The University of Tasmania has made progress on the FRDC funded project entitled 'Development of the Tools for Long Term Management of the Giant Crab Resource: Data Collection Methodology, Stock Assessment and Harvest Strategy Evaluation' (FRDC Project 2001/042). PIRSA Fisheries intends to adopt the population model and industry-based sampling program being developed through this project, if it is considered appropriate and compatible with the South Australian Giant Crab Fishery.

A copy of a brief progress report on milestones for this project is enclosed, for information (provided by University of Tasmania) at Appendix A. The complete annual FRDC milestone report on the project will be available in November 2002. Progress has been made in preparing input data for the model from different management jurisdictions across southern Australia. Standardised and corrected CPUE estimates are due to be completed by November 2002, which may assist the TAC setting process for the South Australian fishery in 2003/04. The population model is scheduled to be completed by December 2003, at which time PIRSA Fisheries and SARDI Aquatic Sciences will evaluate the usefulness of the model for the South Australian Giant Crab Fishery. PIRSA Fisheries will continue to liaise with the University of Tasmania on the projects progress. A previous (September 2001) milestone report on the project is attached at Appendix C.

2.4.7 Fishing Season

The fishery currently operates during the period in which the Southern and Northern Zone Rock Lobster Fisheries are open. The Southern Zone Rock Lobster Fishery currently operates between 1 October and 31 April and the Northern Zone Rock Lobster Fishery operates between 1 November and 31 May, every year. The closure periods correspond with the period when the highest proportion of female giant crabs (and rock lobster) are known to carry eggs. In addition, giant crab moulting occurs during winter. The Giant Crab Fishery season will be reviewed by PIRSA Fisheries, in consultation with all stakeholder groups, following the implementation of ITQ management arrangements in the 2002/03 fishing season.

The fleet operates from a number of South Australian ports between Port MacDonnell in the south east and Ceduna on the far west coast of the Eyre Peninsula, which are traditionally used by the Southern and Northern Zone Rock Lobster Fishery fleet. Vessels may stay at sea for up to 14 days during a single trip.

2.4.8 Vessels and Gear

Consistent with the arrangements in place for the Rock Lobster Fisheries, vessels are restricted to 18 metres in length and a total engine capacity of 1,200 brake horse power. In the Rock Lobster Fisheries there has been a shift over time away from traditional displacement hulled vessels to planing hulls, enabling fishing over greater distances during a day and arguably facilitating greater mobility of the fleet. Other advancements in technology have resulted in an increased capital investment by the majority of rock lobster fishery licence holders, which is associated with increased profit expectations. These increases in technology have been linked to increases in effective fishing effort in the Rock Lobster Fisheries. This issue is being addressed through other mechanisms, particularly in the Northern Zone Rock Lobster Fishery, which is currently managed principally under an input control system.

Pots of wire mesh on steel frames or 50 x 75 mm weldmesh with moulded plastic necks are used in the fishery. The dimensions of pots and the requirement for enabling escape of undersized rock lobster are specified in the *Scheme of Management (Rock Lobster Fisheries) Regulations 1991*. Most dual giant crab/rock lobster fishers use rock lobster pots to target giant crabs, although some operators have developed dedicated giant crab pots. PIRSA Fisheries will continue to encourage innovation in pot design to enable the development of a dedicated giant crab pot, within reasonable constraints. Pots are baited with a range of fish products, and are usually set overnight and hauled at first light with an average soak time of 12 to 24 hours. A total of 100 pots are permitted to be used by each licensed fisher.

2.4.9 Independent Allocation Advisory Panel

In 1998 the Giant Crab Fishery Management Sub-committee was established to develop long-term management options for the fishery. Representatives on the Sub-committee included the two dedicated miscellaneous giant crab fishers, rock lobster fishers from both zones, scientific researchers, PIRSA Fisheries managers and was chaired by the South Australian Fishing Industry Council (SAFIC). The Sub-committee agreed that an ITQ management system should be introduced in the fishery, but was unable to reach agreement on appropriate access and quota allocation arrangements for the fishery.

In 1999 a Giant Crab Fishery Independent Allocation Advisory Panel (AAP) was established by PIRSA Fisheries to determine the most appropriate method for distributing access rights to the giant crab resource among different key resource user groups (miscellaneous fishers and rock lobster fishers, with endorsements to take giant crab). The AAP was comprised of an Adelaide-based barrister, an economic analyst and a commercial fishing representative with no pecuniary interest in the Rock Lobster or Giant Crab Fisheries. The AAP requested submissions from interested stakeholder groups and conducted a series of public port meetings.

The panel provided two reports to the Director of Fisheries. The final report recommended that 1000 units of quota be established for the northern zone and 1000 units of quota for the southern zone, and recommended guidelines for the allocation of

quota to individual fishers, based on their catch history. The AAP recommended a qualifying period be established for the period between 1 January 1997 and 30 June 2000.

In addition, the AAP recommended that in each zone 555 units be allocated to the two miscellaneous licence holders and 445 units be allocated to rock lobster licence holders with Giant Crab endorsements. The 445 units that the AAP recommended be allocated to rock lobster licence holders with giant crab endorsements included 285 units based on their catch history and 160 units in recognition of the potential inequity created by granting the two miscellaneous fishing licences in 1997.

During 2000, the method recommended by the AAP to allocate access shares to the giant crab resource was challenged on the basis that by-catch should not be taken into account in determining access shares for the resource. PIRSA Fisheries undertook further stakeholder consultation, including written submissions and personal interviews, on the basis of the arguments presented. In 2001 the Director of Fisheries implemented a decision on access to the resource, taking into account the submissions lodged by all stakeholder groups and the AAP recommendations in relation the relative access shares for each group.

Following this decision, 1000 quota units for each zone were allocated in the following manner:

Six hundred units in each zone for the two miscellaneous fishery licence holders, to be split between them in a ratio derived by dividing (1) their individual catch summed across both zones by (2) the sum of the individual catches of the two fishers summed across both zones; three hundred and fifty units in each zone for the rock lobster fishers with unlimited access to the Giant Crab Fishery as at 1 January 1997, to be allocated between them on the basis of their individual catch history, of the combined total catch by rock lobster fishers in each zone; and fifty units to be allocated in each zone to facilitate continued access for all other rock lobster fishers to a 5 crab by-catch trip limit in each year.

Only catches taken within the prescribed fishing season were used in calculating catch history, ie. no research data collected during the closed fishing season were used. All crabs landed by fishers with access to the global quota were included in the catch history calculations, ie. giant crabs taken as by-catch, by rock lobster fishers with access to the global quota, were included in the catch history determinations.

2.4.10 Environmental Impacts

Pots used to take giant crabs and rock lobster are generally considered to cause minimal environmental disturbance and limited damage to the benthos (Casement and Svane, 1999). Casement and Svane (1999) indicated that several factors minimise impacts on the environment:

- Pots are relatively small and only affect correspondingly small areas of habitat;
- By-catch is low and legislation specifically prohibits the taking of by-catch species;
- A pilot study for a research project to investigate the total annual by-catch, and

spatial and temporal variations in the species composition of the by-catch is underway;

- Incidental capture of pinnepeds is not an issue of concern, as pots must be set in depths of greater than 120m;
- Rates of pot loss are low;
- The effectiveness of pots is limited to the period when the bait is present;
- Potential for ghost fishing is limited, but this issue may warrant additional consideration; and
- Ecological implications of unused or discarded bait are limited as only small quantities of bait are used in each pot.

2.4.11 Stakeholder Consultation

A Giant Crab Fishery Management Sub-committee was established in 1998 and is the principal forum established to allow stakeholder consideration of issues relevant to the management of the fishery. The Management Sub-committee provides advice to the Northern and Southern Zone Rock Lobster Fishery Management Committees (FMC's), which are established by the Minister for Agriculture, Food and Fisheries, under the *Scheme of Management (Fisheries Management Committees) Regulations 1991*. FMC membership is expertise based and is comprised of commercial and recreational fishers, fishery managers, scientists, fish processors and community representatives. The Minister for Agriculture, Food and Fisheries appoints an chairperson to each FMC, who is independent of any stakeholder interest group.

2.4.12 Markets

A total of 24 tonnes of giant crab were taken from South Australian waters in the 2000/01, with an estimated total landed value of \$638,000 AUD. Giant crabs are sold in four forms; live, fresh green, cooked, and pickled, the majority of which is sold on overseas markets. As with many State based fisheries, the total value of the industry to the South Australian community is considerably higher than the total landed value, due to the flow of economic and social benefits to other support industries, particularly in rural and regional communities. Table 2 provides catch value information on the South Australian Giant Crab Fishery.

Table 2. Catch and value (landed beach price) of the Giant Crab Fishery. Source: SARDI Aquatic Sciences Research Report Series No. 52 (Knight, Tsolos and Doonan 2002).

Year	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01
Catch (t)	7	12	29	16	12	30	33	31	24
Value (\$,000)	73	100	385	260	203	757	1008	907	638

3 BIOLOGICAL AND ECOLOGICAL CHARACTERISTICS

3.1 General

The giant crab reaches a maximum size of at least 13 kg. Giant crab morphology is typical of a xanthid, having a heavy exoskeleton and large crushing claws. Males grow to more than double the size of females, which is thought to be largely attributed to the advantages which relate to the development of an enlarged right cheliped, following sexual maturity (Kailola *et al.* 1993).

3.2 Distribution and Habitat Description

The giant crab is endemic to southern Australia. It is found between southern Western Australia and central New South Wales (Kailola *et al.* 1993) inhabiting waters between 18 and 400 m in depth and in temperatures between 10 and 18°C. The highest population densities occur at the shelf break, where the continental shelf and slope meet (~200 m in depth). Size distribution is stratified by depth (Levings *et al.* 2001). Circumstantial evidence suggests that females move onto soft muddy substrate when they moult (Levings *et al.* 2001). Males are captured across a broader depth range than females. Most of the crabs taken as by-catch of the lobster fisheries (within depths shallower than 120 metres) are males (Levings *et al.* 2001).

3.3 Stock Structure

The structure of the population is better understood following genetic studies undertaken by Levings *et al.* (2001), in which allozyme and DNA techniques suggested that genetic homogeneity across populations throughout southern Australia is likely. During a tagging study (Levings *et al.* 2001) journeys of up to 400km were recorded. A strong capacity for larval dispersal (3-4 month planktonic larval phase) and evidence of significant movements support the hypothesis that genetic homogeneity exists. There is a long inter-moult phase (2-3 years for males, 5-15 years for females), and exoskeletons are subject to extensive fouling. Moulting occurs during winter, and moult frequency decreases with age (Levings *et al.* 1999).

3.4 Reproduction

The estimated maximum size for males and females is 13.6 and 6.0 kg, respectively. Approximately 50% of females mature at 125 mm carapace length. Determining the functional maturity of males has proven to be problematic, as breeding opportunities are subject to heavy competition among physiologically mature males of different size groups. This issue is addressed in greater detail in the research section of this document. Females only bear eggs in non-moulting years. Reduction in moult frequency with age means that large females reproduce more often than smaller ones. Clutch size ranges from approximately 0.5 to 2.0 million eggs per year, and is less strongly correlated with female size than in most crustaceans. Mating occurs in June-July. Females carry eggs for approximately four months. As hatching approaches (October to November) females are thought to migrate to the shelf break. As with many crustaceans, patterns of larval settlement are poorly understood.

3.5 Feeding Ecology

Giant crabs feed on a range of slow-moving benthic organisms, including gastropods, asteroids and decapods, especially other crabs (including other *P. gigas*). Smaller crabs, especially females, feed mainly on gastropods whereas larger crabs, especially males, consume more asteroids and decapods (Levings *et al* 1999).

4 CURRENT RESEARCH AND MONITORING

4.1 Previous Research

All field-based research conducted on giant crabs in southern Australia (Deakin University, Tasmanian Fisheries and SARDI Aquatic Sciences) was reviewed by Dr Steven Kennelly (formally University of Sydney) in 2000. The review concluded that the range of research undertaken has provided considerable information on the biology and ecology of the giant crab (e.g. Gardner 1997; Gardiner *et al.* 1998; Ford 1998; Levings *et al.* 1999; McGarvey *et al* 1999) and facilitated the establishment of a suitable minimum legal size (150 mm) for South Australia, but provides little information that can be used to establish TACs. Tasmanian Fisheries has also conducted research designed to assist the development of the aquaculture sector (Gardiner and Northam 1997; Gardiner and Maguire 1998). Additional information has been provided in the recently published report entitled 'Fisheries Biology of the Giant Crab, *Pseudocarcinus gigas*, (Levings *et al.* 2001). This final report on FRDC projects 93/220 and 97/132 was submitted in 2001.

From a fisheries management perspective, one of the most useful documents available on giant crabs is the report by McGarvey *et al.* (1999). This document provides a yield-per-recruit analysis for Western Australia, South Australia and Victoria, which suggests that the legal minimum length is appropriate for females but may only protect the first mature male instar. This assessment led to the recommendation (Kennelly 2000) that females should be monitored for male spermathacae depletion by periodic examination of the female spermathacae pouches formed at mating time, in particular large females, for evidence of decreased mating frequency. It was suggested that this monitoring would provide a simple and cost-effective way to monitor the possible impact of the size limit on male reproductive success.

In the November 2000 PIRSA Fisheries' report to Environment Australia on the Giant Crab Fishery management policy it was noted that further information on male giant crab reproductive biology was required, and that this would be provided in the Deakin University's final report to FRDC on projects 93/220 and 97/132. The final report on projects 93/220 and 97/132 were submitted to FRDC in the latter part of 2001. The report (Levings *et al* 2001) found that the issue of male maturity and the estimation of an appropriate minimum size of capture was problematic, as physiological maturity does not necessarily mean that all males can achieve reproductive success.

Levings *et al* (2001) suggested that males must also become dominant over other rivals to secure reproductive opportunities and function as adults. During the transition from physiological maturity to functional maturity (morphological maturity) one of the chela,

usually the right, becomes enlarged. Chela growth was found to be disproportionate to carapace growth (chela grow at almost twice the rate of carapace length, after a certain point, as individual size increases). The relationship between chela length and carapace length showed linearity for smaller (physiologically mature) sizes, below a certain point, and allometry (disproportionate growth) above that point. Levings *et al* (2001) determined that the point at which allometric growth commences in the South Australian population was approximately 141mm, which is below the 150mm minimum size. The onset of functional maturity in a population was recognised as likely to be a dynamic relationship that can change spatially, temporally and randomly and may be density dependent.

This understanding of the rate of change from physiological maturity to functional maturity in males confirms that the current minimum size limit of 150mm provides adequate protection for physiological mature males and much of the functionally mature population of males before they are subjected to commercial harvesting. This said, management of the resource would benefit from gaining further knowledge of the potential for spermathecae depletion in males, as suggested by McGarvey *et al* (1999).

Kennelly (2000) recommended that the most suitable direction for future research was for Tasmanian Fisheries to develop a population model using both State-based data and data obtained by Deakin University. It was suggested that this approach would overcome the current lack of information available for setting TACs. It was recommended that the model should be developed in conjunction with a project to establish an industry based sampling program to provide additional data. Upon completion of the model and establishment of the industry-based sampling program, it was suggested that these be adopted by the other State agencies. Kennelly (2000) also suggested that it would be useful to conduct the spermathecae monitoring project recommended by McGarvey *et al* (1999).

Commercial fishers in South Australia have indicated a desire to undertake research to enable a suitable pot escape gap size to be determined, to allow pre-recruits to be released prior to pot hauling, and to ensure that interactions with other species such as rock lobster are minimised.

4.2 Current Monitoring Program

Since 1997, South Australian commercial giant crab fishers have provided daily data on their fishing activities each month to SARDI Aquatic Sciences. Fishers are required to provide information on fishing location, depth, soak time, sex ratio, number of soft, berried, undersized and dead crabs, and catch weight.

4.2.1 Commercial Catch

Data available prior to 1997 can not be verified, and can not be separated by zone. Information available suggests that the total annual catch of giant crabs in South Australian waters has ranged from approximately 7,500 kg in 1992-93 to 33,422 kg in 1998/99 (Fig. 2). The drop in catch during the 1998/99 and 1999/00 seasons was due to the introduction of quota management arrangements at the beginning of the

1999/00 fishing season. The drop in catch between the 1999/00 and 2001/02 fishing seasons is due to a reduction in the southern zone TAC from 12,600 to 8,700 kg. In the 2001/02 fishing season, both the southern zone and northern zone TACs were taken; each fishery was closed immediately prior to the TAC being caught.

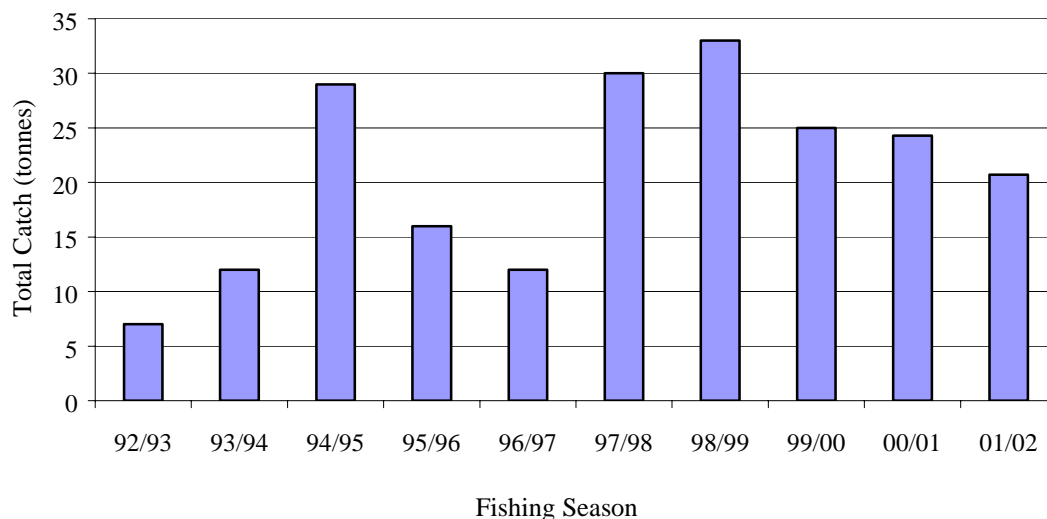


Figure 2. Annual catches of giant crab in South Australia between 1992/93 and 2001/02.

Detailed and reliable catch and effort data are available from 1997/98 onwards. Catches by each sector are shown in Table 3. Data on monthly catches are only available from 1994/95 onwards and are incomplete, but provide some insights into seasonal variations in catches. No fishing (except for research purposes) has been conducted in the southern zone between May and September, or in the northern zone between June and October, due to seasonal closures.

Table 3. Total catch (kg) of giant crab by all fishers from 1997/98 to 2000/01.

Zone and Sector	1997/98	1998/99	1999/00	2000/01	2001/02
NZ RL Target	2,105	2,582	814	1,558	1,695
SZ RL Target	3,412	5,444	6,113	1,364	1,401
NZ & SZ Misc.	21,003	21,459	16,575	18,776	13,274
Total Target	26,520	29,485	23,502	21,698	16,370
NZ RL By-catch	2,161	1,798	1,069	1,891	2,759
SZ RL By-catch	1,709	2,138	805	756	1,605
Total By-catch	3,870	3,936	1,874	2,647	4,364
Total	30,261	33,442	25,376	24,345	20,734

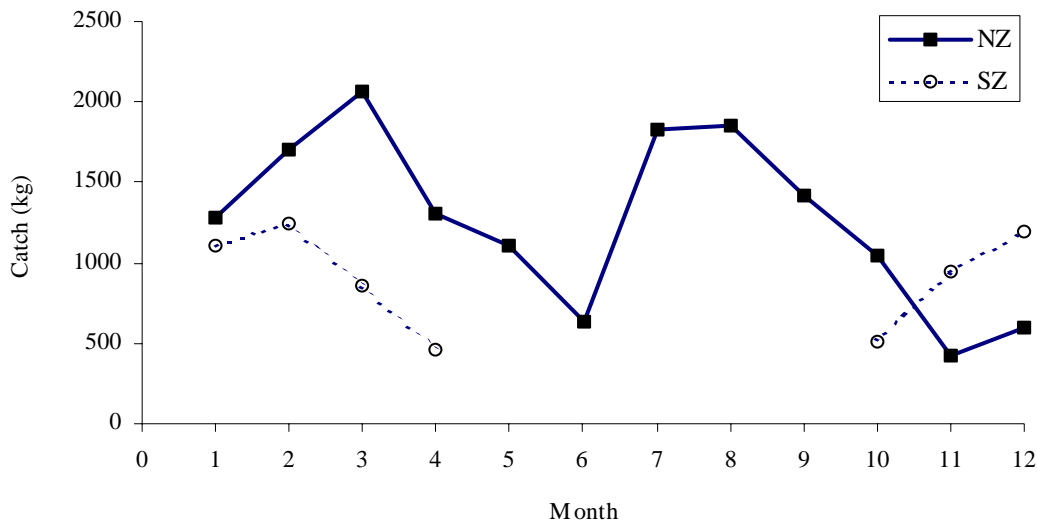


Figure 3. Monthly catches (kg) of giant crab in the northern and southern zones. Includes research catches taken in the northern zone during the closed season.

4.2.2 Catch Per Unit Effort

Effort data (numbers of pot lifts) were not collected prior to 1997 while the species was under Commonwealth management, and catch per unit effort (CPUE) data are only available from 1995/96 onwards. Nominal (unstandardised) annual mean CPUE has ranged from approximately 1.6 to 3 kg per pot lift between the 1995/96 and 2001/02 fishing seasons.

Nominal CPUE estimates indicate that a possible decline in the abundance of giant crabs may have occurred in the southern zone from 1996 onward. Catch limits have been reduced in response and the southern zone is currently considered to be fished at close to optimal levels. In contrast, nominal CPUE estimates for the northern zone, which is considered to be under-exploited, have increased steadily since 1996. Monthly nominal CPUE estimates range from approximately 1.3 to 3.8 kg per pot lift. Nominal CPUE is generally high during summer-autumn and low during winter when spawning and moulting occurs.

Note that the research catch and CPUE data presented in Figure 3 and 5 for the northern zone during the winter period are not directly comparable to the rest of the data set, due to the specific research design characteristics employed. This explains the higher northern zone catch and CPUE figures presented in Figure 4 and 5 during winter months.

Catch per unit effort records require standardisation to improve the robustness of estimates. Effort standardisation is intended to be undertaken by PIRSA Fisheries and SARDI Aquatic Sciences during the 2002/03 financial year.

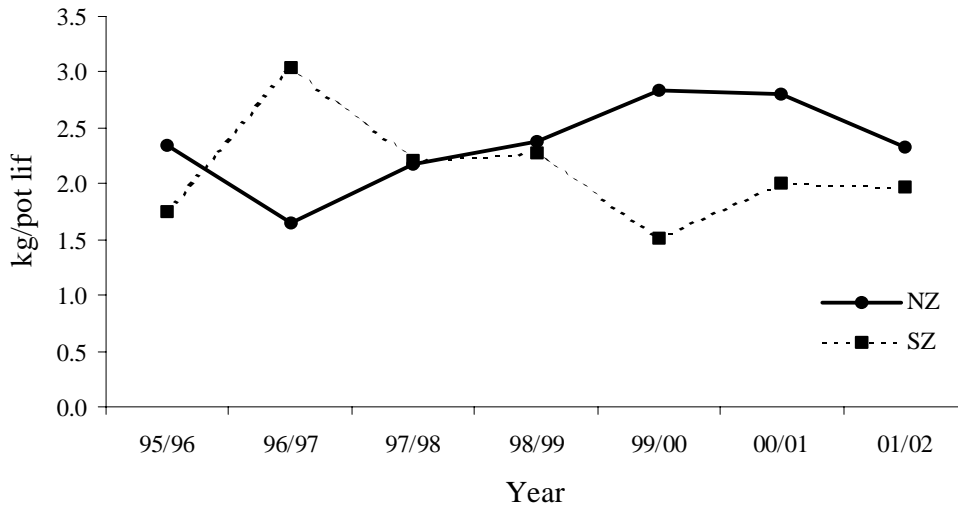


Figure 4. Annual catch-per-unit-effort of giant crab in the northern and southern zones.

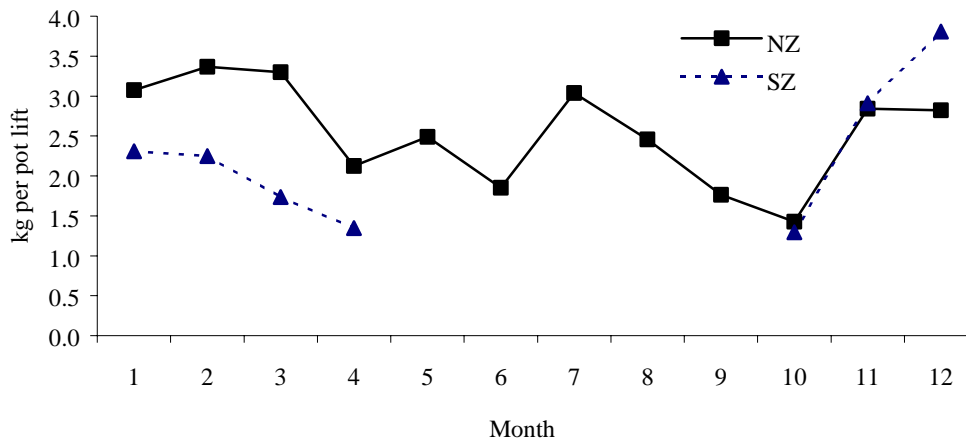


Figure 5. Monthly catch-per-unit-effort of giant crab in the northern and southern zones.

5 GENERAL DISCUSSION

5.1 Future Research and Management

The most pressing research need for the Giant Crab Fishery in South Australia remains the development of a quantitative population assessment model that will provide a quantitative basis for establishing annual TACs. Despite the pressing need for this model, it is appropriate for PIRSA Fisheries to follow the advice of Kennelly (2000) and wait until the University of Tasmania has developed a quantitative population model (FRDC project 2001/042) and established techniques for obtaining additional data from commercial fishers, before commissioning or encouraging the establishment of such a research project in South Australia. PIRSA Fisheries has instituted conservative TACs for each fishing zone in South Australia, pending the development of a quantitative assessment model.

As previously advised, if the University of Tasmania fail to make significant progress towards the development of a quantitative giant crab population assessment model and an industry-based sampling program within a reasonable timeframe, PIRSA Fisheries will consider the need to develop a population model, either independently or in conjunction with other State fisheries management agencies. At this stage, good progress is being made by the University of Tasmania in both areas and PIRSA Fisheries will continue to liaise with the principal researcher coordinating the FRDC research project. It is recognised that as the giant crab population in southern Australia is considered to consist of a single genetic stock, future research should be conducted collaboratively, wherever possible.

Until the population model is developed, it will be necessary to continue to apply a precautionary approach to the annual TAC setting process. It will also be necessary to continue monitoring nominal CPUE in the fishery, along with other fishery performance indicators. Improved information may be particularly useful in the southern zone where there is some evidence that CPUE has declined over recent years. However, monitoring nominal CPUE may provide fewer insights in the northern zone, where controlled expansion continues, and high nominal CPUE in previously unfished areas may mask possible declines in nominal CPUE in areas that have been fished more heavily.

The analyses of catch, effort and nominal CPUE data provided in this document is considered provisional. One of the highest priorities for management of the Giant Crab Fishery in South Australia will be to commission an annual stock assessment process, following completion of the Tasmanian project to develop a quantitative stock assessment model. Such an assessment process will include more detailed spatial analyses of catch, effort and CPUE information and will involve consolidating all South Australian data available, including those data currently held by Deakin University.

An initial preliminary assessment process is intended to be undertaken by PIRSA Fisheries during the 2002/03 financial year, following the implementation of ITQ arrangements and the review of cost recovery arrangements in the Giant Crab Fishery.

PIRSA Fisheries has initiated cost recovery negotiations with commercial giant crab fishers and has provisioned funding for a preliminary stock assessment report to be prepared by SARDI Aquatic Sciences during the 2002/03 financial year. This initial preliminary report is intended to focus initially on effort standardisation to improve the robustness of information supporting the TAC setting process, as well as instituting an improved on-board catch sampling program. A service level agreement between PIRSA Fisheries and SARDI Aquatic Sciences detailing the scope of work proposed is at Appendix B.

The aim of this preliminary study will be to analyse catch and effort data with a view to monitoring stock status and identifying any unsustainable trends as early as possible. Although undertaking a large research project on giant crab in South Australia is not considered a priority at this stage, it may be suitable to monitor mating rates (through the abundance of sperm pouches in females) for evidence of changes in the frequency of mating, especially in large females, as recommended by McGarvey *et al* (1999). This issue may be a suitable topic of research for a post-graduate student and is currently under consideration.

It may also be appropriate to conduct investigations of the potential ecological effects of the fishery. Commercial fishers have expressed interest in undertaking research to determine suitable pot escape gap dimensions, to ensure pre-recruits are released. If escape gaps were introduced, some level of ongoing monitoring of pre-recruit abundance would be necessary.

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Appendix A

Summary of project FRDC2001/042. Development of the tools for long term management of the giant crab resource: data collection methodology, stock assessment and harvest strategy evaluation.

Milestones

01-September-2001	Exchange of project agreements between states.
30-November-2002	Completion of fisher and processor interviews. Completed correction of historical database and standardisation of CPUE.
31-March-2003	Completed initiation of fisher sampling in other states using methods developed in Tasmania. Completion of construction of stock assessment model frame.
30-July-2003	Completion of sensitivity analyses of model and model refinement.
01-September-2003	Draft final report submitted.
01-December-2003	Final report submitted.

Progress summary

PIRSA is requested by EA to utilise outputs from this project for future assessments of the South Australian giant crab resource. This mainly relates to incorporating logbook and size structure data into the stock assessment model to assist with monitoring trends in giant crab biomass. Development of the stock assessment model is the final phase of the project and is scheduled for release with the final report, December 2003.

Work to date has been on preparing input data to the model. This includes:

- a) testing of data collection techniques for obtaining size-structure data;
- b) accumulating commercial log book data from state agencies in SA, Vic and Tas.
- c) obtaining consistency in data types between states and through time (eg definition of targeting crabs vs bycatch; spatial recording of effort), plus database corrections (eg errors in weight estimations due to unloadings).
- d) collecting interview data and interpreting in relation to tracking historical trends in CPUE

Major issues have been data errors in Tasmanian series and effort records in South Australian data pre 2000. Standardised and corrected CPUE estimates are due at the end of November 2002. The ability of State Agencies to incorporate model outputs into stock assessments will be possible after the distribution of the assessment model, scheduled for December 2003.

Appendix B – Preliminary Stock Assessment Project Scope

Client – PIRSA Fisheries Policy Group

Project 1 – Preliminary assessment of the Giant Crab Fishery.

Brief

To analyse catch and effort data for the Giant Crab Fishery and to evaluate and develop methods for sampling and monitoring the sex ratio, size structure and reproductive status of the catch/population. To provide a report to PIRSA Fisheries Policies Group that provides a preliminary assessment of the status of the fishery.

Service Level Provided

Collection of basic biological information

- Undertake onboard catch sampling program and develop a voluntary catch sampling program.
- Develop methods for measuring and monitoring reproductive output of females

Collection of basic fisheries statistics

- Manage a fishery logbook program.
- Collate fishing logbook returns and provide a secure and in-confidence service.
- Validate returns (consultation with fishers to correct errors).
- Enter and store data
- Provide monthly (or as required by the PIRSA Fisheries Policy Group) statistical reports for the northern and southern zone rock lobster fisheries.

Analysis and interpretation

- Analyse catch and effort data.
- Identify methods for monitoring status of stock and fishery

Project management, and production of Stock Assessment Report

- Produce a Stock Assessment Report.
- Supervise project, manage deliverables and milestones.

Reporting to FMC

- Produce quarterly reports and Stock Assessment Report for PIRSA Fisheries Policy Group.
- Provide verbal and written advice to Sub-committee meetings

Costing

The costing provided is the total cost for SARDI Aquatic Sciences to provide the services described. The costing has not been adjusted to reflect any agreements that may exist on the proportional attribution of costs to licence fees.

GIANT CRAB FISHERY – Biological reference points	2002/03 FULL ACCRUAL	
	FTE	BUDGET
TOTAL SALARIES	0.20	\$12394
TOTAL OPERATING		\$1200
REDUCED OVERHEAD (0.65 Salaries)		\$8056
TOTAL		\$21,650

Deliverables and Milestones

Quarterly reports documenting activities during the quarter including progress towards completion of stock assessment report.

Draft Stock Assessment Report 2002/2003 to PIRSA – July/August 2003

Final Assessment Reports for 2002/03 – 31 August 2003

Payment Schedule

Payment (25%) on receipt of quarterly reports documenting appropriate progress towards completion of deliverables.