



# **Australian Government**

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## **Department of the Environment and Water Resources**

### Assessment of the **South Australian Giant Crab Fishery**

**March 2007**

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Assistant Secretary  
Marine Environment Branch  
Department of the Environment and Water Resources  
GPO Box 787  
Canberra ACT 2601

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This document is an assessment carried out by the Department of Environment and Water Resources of a commercial fishery against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. It forms part of the advice provided to the Minister for the Environment and Water Resources on the fishery in relation to decisions under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999*. The views expressed do not necessarily reflect those of the Minister for the Environment and Water Resources or the Australian Government.

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**Assessment of the ecological sustainability of management arrangements for the South  
Australian Giant Crab Fishery**

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## EXECUTIVE SUMMARY

### Background

An assessment under Part 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was conducted by the Department of the Environment and Water Resources (DEW)<sup>1</sup> for the South Australian Giant Crab Fishery (SAGCF) in 2004. A decision was made to declare the SAGCF an approved Wildlife Trade Operation (WTO) under Part 13A of the EPBC Act until 19 March 2007 and to accredit the fishery under Part 13 of the EPBC Act in relation to impacts on protected species. DEW's initial assessment report of this fishery and copies of the declarations made can be found on the DEW website at: <http://www.environment.gov.au/coasts/fisheries/index.html>.

The Department of Primary Industries and Resources, South Australia (PIRSA) has submitted a document for consideration of a further declaration under Part 13A of the EPBC Act. The document - *Ecological Assessment of the South Australian Giant Crab (Pseudocarcinus gigas) Fishery* (the submission) was received by DEW in January 2007. The submission was released for a twenty-day public comment period that expired on 9 February 2007. No public comments were received.

The submission reports against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries* (the Guidelines) and on the progress made by PIRSA in addressing the recommendations made in the 2004 assessment of the SAGCF. The DEW assessment considers the submission and associated documents.

**Table 1: Summary of the SAGCF**

<b>Area</b>	State and Commonwealth waters adjacent to South Australia. Fishery area is divided into 2 zones: Southern and Northern Zones.
<b>Fishery status</b>	Some key fishery performance indicators are outside reference ranges.
<b>Target Species</b>	Giant (or king) crab ( <i>Pseudocarcinus gigas</i> ).
<b>By-product Species</b>	None permitted for the 2 specialist giant crab fishers. Rock lobster fishers with giant crab quota are permitted to retain by-product pursuant with rock lobster licences.
<b>Gear</b>	Beehive pot – maximum of 100 per licence - restrictions on dimensions and use apply.
<b>Season</b>	Closed: 1 May-30 September (Southern); 1 June-31 October (Northern).
<b>Commercial harvest 2004-05</b>	19.3 tonnes [below the 22.1 tonne total allowable commercial catch (TACC)].
<b>Value of commercial harvest 2004/05</b>	\$218,000.
<b>Recreational harvest</b>	No significant recreational take of target species.
<b>Commercial licences issued</b>	2 dedicated giant crab licences; all 250 commercial rock lobster licensees may hold giant crab quota or have access to a giant crab bycatch trip limit (currently 20 rock lobster licence holders have

<sup>1</sup> The Department of the Environment and Water Resources was formerly named Department of the Environment and Heritage.

	giant crab quota entitlements).
<b>Management arrangements</b>	Zonal management; TACC 8.7 tonnes (Southern) and 13.4 tonnes (Northern); 5 crab/trip limit for non-quota holders; limited entry, boat and gear restrictions; Vessel Monitoring System; Catch and Disposal Record documentation; spatial (no fishing in waters shallower than 60 fathoms) and temporal closures; legal minimum length; and prohibition on the take of egg-bearing females.
<b>Export</b>	Most of the catch is sold live to Asian markets.
<b>Bycatch</b>	While specific bycatch studies have not been undertaken in the fishery, bycatch is considered likely to be undersized and egg-bearing giant crabs and rock lobsters, fish and other invertebrate species.
<b>Interaction with Threatened Species</b>	Potentially seals, whales, dolphins and turtles but little information directly implicating this fishery.

The assessment report of the SAGCF in 2004 provided a detailed analysis of the SAGCF management characteristics, including fishery area and history, species taken, management structures, harvest control measures, bycatch and protected species interactions, and ecosystem impacts. PIRSA has advised in the 2007 submission that there have been no changes to the management arrangements of the SAGCF.

As a small scale, single-gear and single-species fishery the SAGCF was considered by DEW to pose limited risk to the general ecosystem. The DEW assessment in 2004 focussed on addressing areas of management where changes were required to improve the ecologically sustainable management of the fishery.

In 2004 the key issues DEW considered needed addressing were:

- inadequate information on critical elements of giant crab biology, including stock recruitment relationships and potential productivity of the resource;
- the absence of a robust assessment model and robust indicators of stock status;
- reliance on unstandardised effort data;
- risk of and inability to detect localised depletions; and
- declining catch per unit effort trend in the Northern Zone.

DEW made 11 recommendations for improvement in the management of the fishery to address these issues. Over the last 3 years PIRSA has made progress against several of the key areas raised in the last assessment. These include:

- stock assessment reports were completed by the South Australian Research and Development Institute (SARDI) in 2005 and 2006 and will be ongoing to assess the status of the giant crab resource and to identify future research needs for the fishery;
- a working group has been established to engage a wider group of stakeholders in the management process;
- a new logbook for all commercial fisheries has been developed and will be implemented in 2007 which includes reporting of threatened, endangered and protected species interactions; and

- a population model developed as part of a Fisheries Research Development Corporation (FRDC) funded project was incorporated into the 2006 fishery stock assessment. While unsuccessful in delivering meaningful biological outputs it has assisted in identifying deficiencies in current data requirements for the fishery.

DEW acknowledges that progress has been made towards addressing some of the issues raised in the 2004 assessment. Additionally PIRSA has indicated in the submission that some of the recommendations will be implemented as part of the formal Management Plan currently being developed which will be ratified under the new Fisheries Management Act to be passed by Parliament in the first half of 2007. However, DEW considers that there are still a number of sustainability concerns with the SAGCF such as the inability to determine a reliable estimate of the giant crab stock due to the reliance on inconsistent catch and effort data; the continued decline in catch rates in the Northern Zone and high proportion of the TACC not being harvested in either zone; and the lack of ongoing bycatch monitoring within the fishery. These issues warrant attention and action from PIRSA in order for the fishery to be managed in an ecologically sustainable manner.

The SAGCF continues to be a small fishery and while separate from the Rock Lobster Fishery, it is closely linked in terms of its history and current management arrangements. While the South Australia (SA) Rock Lobster Fishery has been assessed under a separate DEW assessment, information on the management and assessment of the Rock Lobster Fishery has been provided as this information contributes to the management and overall knowledge of the Giant Crab Fishery.

The fishery continues to be managed under the *Fisheries Act 1982*, the *Scheme of Management (Miscellaneous Fisheries) Regulations 2000* and the *Fisheries (General) Regulations 2000*. The submission indicates PIRSA's progress in developing a formal Management Plan for the fishery which will be ratified under a new Fisheries Management Act in early 2007. Specific management arrangements for the fishery are described and discussed under Part II of this report.

Although no specific research has been undertaken in the fishery, bycatch for specialist giant crab fishers is thought to comprise of non-retained (i.e. undersized, egg bearing or damaged) giant crabs and small numbers of a variety of species of scalefish and invertebrates such as hermit crabs. For rock lobster fishers who take giant crabs, the bycatch comprises non-retained giant crabs and rock lobsters and small numbers of many scalefish, small sharks, crabs and other invertebrates. None of these species are currently listed as protected under the EPBC Act. While the potential for entrapment and entanglement of seals, whales, dolphins and turtles in giant crab gear exists, the incidence is believed to be rare. There is very little information directly implicating giant crab fishing in these interactions and the available information suggests that these interactions are at a very low level. While there is limited information about ecosystem impacts, in particular the role of giant crabs in the ecosystem, given the small quantities harvested in this fishery, DEW considers that the fishery poses limited risk to the general ecosystem. Bycatch, protected species interactions and ecosystem impacts are discussed under Part II, Principle Two of this report.

## **Overall assessment**

The material submitted by PIRSA demonstrates that the management arrangements for the fishery continue to meet most of the requirements of the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. The SAGCF is relatively well-managed,

with a range of management measures in place to promote the ecologically sustainable harvesting of species from the fishery. These measures include limited entry; a TACC limit; maximum pot numbers; minimum legal length for both sexes; prohibition on take of berried females; and seasonal and spatial closures.

While the fishery is relatively well managed and the impending formal Management Plan will likely provide for more comprehensive management arrangements, DEW has identified a number of risks and uncertainties that must be managed to ensure that their impacts are minimised. These are:

- inadequate data on which to base stock assessments, including lack of spatially explicit size frequency data and standardised catch and effort data;
- the need for a Management Plan which addresses the continued decline of catch per unit effort in the Northern Zone and implements PIRSA's commitments to improve the management of the fishery; and
- lack of bycatch monitoring.

These concerns reflect some of those raised in the early assessment in 2004. As such, recommendations to address these issues have been developed to ensure that the risk of impact is minimised in the longer term. Through the implementation of the recommendations and the continuation of a responsible approach to the management of the fishery, management arrangements are likely to be sufficiently precautionary and capable of controlling, monitoring and enforcing the level of take from the fishery while ensuring the stocks are fished sustainably.

In the submission, PIRSA has indicated the impending move to a formal Management Plan under the new SA fisheries legislation to be passed by Parliament shortly. In providing updates on implementing the WTO recommendations, PIRSA has committed to formally addressing many of the recommendations as part of the Management Plan. DEW therefore considers the formalisation of the Management Plan a priority for the fishery and has made a recommendation to address this (**Recommendation 2**).

On balance, DEW is satisfied that the fishery will not be detrimental to the survival or conservation status of the taxon to which it relates in the short term. Similarly, it is not likely to threaten any relevant ecosystem in the short term. To contain and minimise the risks in the longer term the recommendations listed below have been made. The key issues for this fishery will be the impending finalisation and implementation of a Management Plan and the declining catch rate in the Northern Zone. DEW considers that, until it can be demonstrated that these issues have been adequately dealt with, a three-year WTO declaration rather than a five-year exemption would be more appropriate. DEW therefore recommends that the fishery be declared an approved WTO with the actions specified in the recommendations to be undertaken by PIRSA to contain the environmental risks in the long term. DEW is satisfied that the fishery, as managed in accordance with the management regime is not likely to cause serious or irreversible ecological damage over the period of the export decision. The WTO declaration will require annual reporting from PIRSA on the progress of implementing the recommendations of this report and other managerial commitments.

As part of the 2004 assessment, the fishery was assessed under Part 13 of the EPBC Act in regards to the impact of the fishery on listed threatened species, listed migratory species, cetaceans and listed marine species. The fishery was accredited under sections 208A, 222A, 245

and 265 of the EPBC Act in 2004 and as there have been no management changes since the last assessment, DEW considers that this accreditation still stands for the SAGCF.

Once the new Management Plan comes into affect for this fishery, PIRSA will need to advise DEW of the changes so that a determination can be made on whether new decisions under Part 13 and 13A of the EPBC Act are needed.

Based on this assessment, the following recommendations have been made with regards to the management of the fishery, which will be monitored as part of the annual reporting required as part of the WTO declaration and reviewed at the next DEW review of the fishery in three years time.

### **Recommendations**

1. PIRSA to inform DEW of any material change to the SAGCF management arrangements that could affect the criteria on which the EPBC Act decisions are based, within three months of any change being made.
2. Within 18 months, PIRSA to finalise and implement the SAGCF Management Plan which should include the commitments made by PIRSA in the SAGCF 2007 submission.
3. PIRSA to develop and implement measures to enhance the stock assessment and future management arrangements of the SAGCF including:
  - taking into account giant crab population dynamics;
  - standardising fishing effort data; and
  - accounting for removals of giant crab from other sectors and jurisdiction where appropriate.
4. PIRSA to collaborate, where appropriate, with other jurisdictions to actively pursue consistent and/or complementary research needs and management arrangements for the southern Australian giant crab stock.
5. PIRSA to monitor the status of the target species in relation to performance indicators. Within 3 months of becoming aware of a performance indicator being triggered, PIRSA to develop a clear timetable for the implementation of appropriate management responses.
6. PIRSA to develop and implement a system for the monitoring and assessment of bycatch to ensure that changes in bycatch can be monitored and verified over time.

## PART I - MANAGEMENT ARRANGEMENTS

The SAGCF is managed by PIRSA.

The management regime is described in the following publicly available documents:

- *Fisheries Act 1982*;
- *Scheme of Management (Miscellaneous Fisheries) Regulations 2000*;
- *Fisheries (General) Regulations 2000*;
- *Fisheries (Management Committees) Regulations 1995*; and
- relevant Gazetted notices and licence conditions.

There are a number of other documents, including research reports, scientific literature and discussion papers, which are utilised by PIRSA to guide management of the SAGCF. In particular the 2005 and 2006 fishery assessment reports completed by SARDI which are available on the PIRSA website at [www.pir.sa.gov.au](http://www.pir.sa.gov.au) or SARDI website at <http://www.sardi.sa.gov.au>, provide an assessment of the status of the resource using the current performance indicators for the fishery. The PIRSA submission represents an updated statement of the management policy framework and harvest strategy for the ecologically sustainable management and development of the SAGCF.

DEW considers it important that management arrangements remain flexible to ensure timely and appropriate managerial decisions. Due to the importance of the documents referred to above to DEW's assessment of the fishery, an amendment could change the outcomes of our assessment and decisions stemming from it. In order to ensure that these decisions remain valid, DEW needs to be advised of any changes that are made to the management regime and make an assessment that the new arrangements are equivalent or better, in terms of ecological sustainability, than those in place at the time of the original decision.

**Recommendation 1:** *PIRSA to inform DEW of any material change to the SAGCF management arrangements that could affect the criteria on which the EPBC Act decisions are based, within three months of any change being made.*

In the 2003 submission, PIRSA indicated their intention to commence a process for developing a formal Management Plan for the fishery following the DEW assessment process. In the 2007 submission PIRSA reports that development of a Management Plan commenced in October 2006 and is likely to be ratified under the new Fisheries Management Act to be passed by Parliament in the first half of 2007. The enactment of the new Fisheries Management Act will require that all SA fishery Management Plans become statutory documents with a statutory consultative process.

In reporting on progress against the recommendations, PIRSA has committed to formally addressing a number of the recommendations from the initial assessment within the Management Plan for the fishery, including:

- updated performance indicators and reference values;
- a strategic research plan;
- a data improvement strategy; and
- outcomes of an ecological risk assessment for the fishery.

As these commitments will now be incorporated within the impending Management Plan for the SAGCF, DEW regards the formalisation of the Plan a priority for the fishery.

**Recommendation 2:** *Within 18 months, PIRSA to finalise and implement the SAGCF Management Plan which should include the commitments made by PIRSA in the SAGCF 2007 submission.*

DEW also considers that the SAGCF Management Plan should contain the detailed management arrangements currently used in the fishery following any necessary reviews including management triggers, decision rules, performance measures and define the objectives, targets, monitoring requirements and management responses. As highlighted in DEW's assessment of the SAGCF in 2004, periodic review of management objectives, strategies and performance measures should also be built in as a standard feature of the ongoing management of the fishery. PIRSA has indicated that other jurisdictions will be included in the development of the Management Plan. This will be important in terms of considering consistent and complementary management arrangements with other jurisdictions that manage giant crab fisheries.

Currently SA's statutory Fisheries Management Committees (FMC) established under the *Fisheries (Management Committees) Regulations 1995* provide for the co-management process for fisheries management. These committees provide the principle forum for stakeholder and broader community input on management and policy issues – and the development of management plans - as a key feature of their role in advising and assisting the Director of Fisheries and the responsible Minister in the management of SA fisheries.

Significant management issues relating to the SAGCF are considered by the Southern Zone Rock Lobster FMC and Northern Zone Rock Lobster FMC, or to an informal giant crab fishery management working group. DEW understands that, given the small scale of the fishery and SA's cost recovery policy, this fishery may not be in a position to warrant a dedicated fisheries management committee. Under these circumstances, and given its historical and continuing links with the Rock Lobster Fishery, the current arrangements continue to be adequate. In 2004 DEW noted that there was no direct representation of specialist giant crab fishers on the Rock Lobster FMCs and as such, recommended PIRSA enhance their consultative process for engaging the dedicated giant crab fishers within the Rock Lobster FMCs. DEW is encouraged by PIRSA's progress in addressing this by establishing an ongoing working group to engage giant crab stakeholders in the management process. Membership of the working group includes the two dedicated giant crab fishers and representatives from PIRSA and SARDI. Any rock lobster fishers with giant crab quota are also invited to participate. DEW also notes that as part of the new Fisheries Management Act community consultation will be a requirement in the development of all formal management plans which will also include strategic research plans.

In the latest submission, PIRSA has indicated that the new Fisheries Management Act is expected to result in changes to the FMC membership and operation. In particular, the new Act will provide for the establishment of an overarching Fisheries Council with advisory committees replacing current FMCs. As part of this new process negotiation will occur with each industry sector to develop an advisory structure to suit that particular industry needs. DEW considers that a wide range of stakeholder interest should be represented within these new advisory councils and in particular, specialist giant crab fishers should be afforded adequate input into management decisions and considered within the development of the advisory structure when this occurs. Conservation and community interests should also be directly represented on the advisory committees. Noting the process for establishing these committees involves negotiating

a structure that best suits a particular fishery industry needs, there should be scope to pursue these options in the near future.

SA's management arrangements and harvest strategy for the fishery sets out the management objectives, strategies and linked performance indicators for the fishery. DEW considers that these goals and objectives are appropriate as the basis for managing the fishery. The management arrangements include performance indicators, limit reference points and management responses in relation to the fishery as a whole. An assessment of the effectiveness of these measures is included in Part II of this report.

The SAGCF is managed as two discrete fishing zones – the Southern Zone and Northern Zone to be consistent with the boundaries of the rock lobster fisheries. In addition to zonal management, the management regime is also based on a mixture of input and output controls which include:

- quota management system using individual transferable quota (ITQ) and a TACC for each zone;
- mandatory fitting of a vessel monitoring system (VMS) to all vessels;
- real time pre-landing reporting;
- catch disposal records (CDRs) at the point of landing;
- minimum giant crab size limit (150 mm);
- limited entry;
- gear and spatial restrictions;
- seasonal closures; and
- prohibition on the harvest of berried females.

The critical aspects of these management arrangements are underpinned by compliance and quota monitoring. The major emphasis of the enforcement arrangements for this output controlled fishery is the monitoring of landings, involving in-port inspections, use of VMS technology, prior reporting of landings and CDRs completed immediately upon landing with copies accompanying catches to processors for final completion. Further details on the compliance arrangements in place for the SAGCF are outlined in the submission. DEW is satisfied that these compliance measures contain the means of enforcing critical aspects of the management arrangements.

The performance of the fishery and the effectiveness of the management arrangements are assessed annually against a suite of biological performance indicators as part of the fishery assessments undertaken by PIRSA and SARDI. DEW has received copies of the 2005 and 2006 fishery assessment reports as part of the SAGCF WTO requirement for annual reporting against fishery performance. DEW considers the performance indicators are appropriate for the scale of the fishery but would expect that, as part of the development of the Management Plan and continued periodic review, the performance indicators will be reviewed and amended as necessary.

In 2003 PIRSA indicated its intention to utilise a giant crab population model being developed as part of a FRDC funded project "Development of the tools for long term management of the giant crab resource: data collection methodology, stock assessment and harvest strategy evaluation" (project 2001/042) to provide a quantitative assessment for establishing an annual TACC for the fishery. DEW notes that this model was incorporated in the 2006 fishery assessment for the SAGCF, however the model failed to provide biologically meaningful outputs. This issue is discussed further under Part II of this report. The 2006 SARDI fishery assessment report also provides recommendations relating to the performance indicators, data

requirements and methodologies used for the fishery. DEW notes PIRSA's intention to address these issues in the new Management Plan for the fishery.

Fishery-dependent data relating to the target species is collected through a compulsory catch and effort logbook system with daily fishing records submitted at monthly intervals. No fishery-independent data is currently collected from the SAGCF due to the small scale of the fishery. An independent monitoring program for non-target catches has however been undertaken in the SA Rock Lobster Fishery to record information on by-product, bycatch and non-target species. While this program will provide useful information in terms of possible impacts from rock lobster fishing, analysis of giant crab fishing bycatch cannot be directly correlated due to the difference in fishing depth and habitat.

The 2006 fishery assessment report identifies future research priorities to improve SA's capabilities in assessing the fishery and enhancing ecological monitoring. Discussion of the information collection system and future work can be found in Part II of this report. A full analysis of the fishery's capacity for assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem in which the target species lives and the fishery operates is also contained in Part II of this report.

DEW is satisfied that the current management arrangements are consistent with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies developed under that policy. The *Fisheries Act 1982* contains mechanisms that allow for amendments to management practices so that they comply with any future plans of these types.

## **Conclusion**

DEW is satisfied that the SAGCF management regime continues to be well documented, publicly available and transparent, and is developed through a consultative process. The management arrangements are strategic and underpinned by appropriate objectives and performance criteria by which the effectiveness of the management arrangements can be measured, enforced and reviewed.

The management arrangements are capable of controlling the harvest through a combination of input and output controls appropriate to the size of the fishery. Periodic review of the fishery is provided for, as are the means of enforcing critical aspects of the management arrangements. DEW considers that the impending adoption of a formal Management Plan for the fishery will enhance the management of the fishery by prescribing specific management objectives and arrangements for the fishery. The management regime also takes into account arrangements in other jurisdictions, and adheres to arrangements established under Australian laws and international agreements.

DEW considers that there is scope to refine the management arrangements in some of these areas including improvements in data collection and responses to breaches in trigger reference points. A number of recommendations for improvements in the longer term are discussed in Part II of this report.

## **PART II – GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES**

### **Stock Status and Recovery**

Principle 1: *‘A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover’*

### **Maintain ecologically viable stocks**

Objective 1: *‘The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability’*

### **Information requirements**

The SAGCF has a range of information collection and verification measures for the fishery which have not changed since the last DEW assessment. These include compulsory monthly catch and effort logbooks and CDRs. Commercial logbook data are periodically validated against CDRs and show a high level of agreement. Effort data is validated against VMS records. Enforcement sources also indicate high levels of industry support for and compliance with fishery reporting requirements.

The submission recognises the lack of independent monitoring in the fishery but states that collecting fishery-independent information is not cost-effective given the small scale of the fishery and high cost of independent monitoring. In 2004 DEW recommended that PIRSA establish regular dialogue with other jurisdictions to ensure research and management arrangements are complementary. In the submission PIRSA has reported that ongoing discussions with Tasmania regarding research priorities has occurred and funding proposals are being considered. DEW continues to acknowledge the difficulties associated with mounting a dedicated fishery independent monitoring program for the fishery and continues to encourage PIRSA to work closely with inter-state counterparts towards the application of the results to the SAGCF.

Daily logbook reporting requirements for specialist giant crab fishers include detailed information on the numbers of undersized, spawning and legal sized giant crabs which are discarded. DEW notes that in the 2006 fishery assessment report SARDI has identified specific data requirements which are currently inhibiting the assessment of the fishery. Specifically the absence of spatially explicit data on size-frequency distribution, the absence of fine scale catch and effort data and inconsistent reporting among giant crab and rock lobster fishers limits the ability of SARDI to undertake a robust assessment of the SAGCF. Subsequently SARDI has suggested two ways in which the assessment of the fishery could be enhanced and which DEW supports. These are to enhance the extent of fishery-dependent sampling by measuring and sexing a greater proportion of catch and standardising the catch and effort data to more accurately reflect the harvest of giant crabs by all fishers. This significant deficiency in the monitoring arrangements, particularly size composition data for the SAGCF was also previously identified in the 2004 DEW assessment report.

As the population model developed in the FRDC project has not proven to be successful for the stock assessment of the SAGCF, DEW considers that PIRSA should endeavour to adopt the recommendations made in the SARDI report to ensure improved assessment of the status of the SA giant crab resource. DEW notes that a data improvement strategy is being included in the

SAGCF draft Management Plan and encourages PIRSA to include these specific measures as identified in the SARDI 2006 fishery assessment report as a priority.

**Recommendation 3:** *PIRSA to develop and implement measures to enhance the stock assessment and future management arrangements of the SAGCF including:*

- taking into account giant crab population dynamics;*
- standardising fishing effort data; and*
- accounting for removals of giant crab from other sectors and jurisdiction where appropriate.*

The logbook information required by rock lobster fishers varies substantially from the dedicated giant crab fishers in that information is only collected on retained giant crab. In 2004 DEW highlighted the lack of information being collected on giant crabs as by-product and bycatch of rock lobster fishing but noted that an independent monitoring study on by-product and bycatch in the Rock Lobster Fishery was being undertaken. PIRSA advise that on-going bycatch monitoring is continuing in the Rock Lobster Fishery and it will be integrated into the Fishery Independent Monitoring program for 2007. DEW strongly supports the continuation of bycatch monitoring in the Rock Lobster Fishery so as to provide an indication of the level of giant crab discarding by rock lobster fishers. DEW also notes that new logbooks have been developed by PIRSA for implementation in all SA fisheries in 2007 which will include endangered, threatened and protected species reporting.

In the last submission PIRSA indicated that there may be potential to commence an industry-based on-board catch sampling program following the preliminary stock assessment in 2004/05. While PIRSA advise that this is not presently occurring in the fishery, DEW would encourage PIRSA to further investigate an on-board catch sampling program as it would be an important source of information to complement catch and effort data as inputs to stock assessments, TACC setting processes and fishery performance measurement. Noting **Recommendation 3**, a sampling program could address some of the information needs for the fishery.

As part of the 2006 fishery assessment research priorities for the fishery were reviewed by SARDI due to the ongoing uncertainties in the assessment process. The research priorities identified were:

- the determination and documentation of the reasons why the TACC has not been reached in either zone since 2001/02;
- a review of the current performance indicators and associated reference periods and reference ranges;
- the interrogation of the commercial catch and effort data at finer spatial scales; and
- the collection, collation and analysis of spatially explicit commercial length-frequency and sex-ratio data.

The submission indicates that the performance indicators and reference points will be reviewed as part of the new Management Plan for the fishery and further research on determining why the TACC has not been reached has been initiated. DEW considers that the remaining two areas of research should be addressed as a priority and included within the proposed 5 year strategic plan within the new Management Plan.

Overall DEW is satisfied that the information system to date has been appropriate to the nature and scale of the fishery. Recent deficiencies identified in the SARDI fishery assessment report, however need to be addressed by PIRSA as a priority to provide ongoing monitoring of giant crab abundance and ensure the ecological sustainability of the fishery.

### **Assessment**

Giant crab stock assessments were conducted in 2005 and 2006 by SARDI and will continue on an annual basis. PIRSA use the results of these assessments to consider the appropriateness of the annual TACC. In the last PIRSA submission the highest priority research need for this fishery was a quantitative stock assessment model. This model was applied to the fishery in the 2006 fishery assessment but did not provide biologically meaningful outputs. The latest submission suggests that a probable cause for this is the mismatch in information provided to the model by the long-term rising trend in the catch rate, compared to the expected steady erosion of larger crabs from the initially largely unexploited population evident in length-frequency data.

Despite several collaborative attempts between Tasmania and SA to overcome this obstacle, use of the model was not successful. It is now apparent that the anticipated length-based assessment model has not been useful in assessing the performance of the SAGCF and as such, PIRSA must now focus on improving data requirements to obtain an enhanced understanding of the fishery resource.

DEW acknowledges that reliance on catch and catch per unit effort (CPUE) has and will be necessary and considers this an appropriate approach in the absence of more robust tools. However, as highlighted in the last assessment, DEW has concerns about the continued reliance on unstandardised fishing effort data in the estimation and application of catch rates as the key assessment and performance measure. This issue continues to be significant in this fishery and while PIRSA has indicated that a data improvement strategy will be incorporated within the new Management Plan, DEW has included a specific recommendation for PIRSA to standardised fishery catch and effort data as part of the enhancement of the fishery stock assessment in

### **Recommendation 3.**

The performance indicators used to assess the performance of the SAGCF including CPUE, total effort, catch relative to TACC, and mean crab weight. Annual performance is measured against a set of values for the reference period 1999-00 to 2002-03. This period was chosen on the basis of the historical performance of the fishery which was considered to be relatively stable in terms of measures such as catch, catch rate, gear and fishing technology following the introduction of the TACC in 1999. In the absence of a solid time series of fishery data and desirable benchmarks (e.g. estimates of unfished stock biomass and egg production), DEW accepts this approach, which is also being used effectively in the management of SA's Rock Lobster Fishery. DEW notes PIRSA's acknowledgement of the limitations associated with the current performance indicators, which means they should be applied very conservatively until further improvements can be made.

The use of CPUE to assess stock status can also be an issue for accurately assessing abundance of the fishery resource. DEW notes from the SARDI 2006 report that a high CPUE in some of the previously un-fished areas may mask possible declines in CPUE in areas that have been fished more consistently. This raises concern over the ability of PIRSA to monitor the potential for localised depletion. This issue was also raised during DEW's assessment in 2004. In the 2006 fishery assessment report SARDI suggested that interrogation of the commercial catch and effort data at finer spatial scales and effort standardisation should be considered to improve

fishery assessments. DEW would encourage PIRSA to consider these recommendations and where appropriate, incorporate them into the data improvement strategy.

DEW is satisfied that to date, the assessment approach has been adequate to enable the status of the stock given the developing phase and small scale of the fishery, and to develop and implement appropriate management controls. Assessment of the fishery should also be informed by any available independent information collected by this and/or other giant crab fisheries in other jurisdictions (e.g. future, existing or previous research, surveys etc) where possible. DEW is encouraged by PIRSA's progress in exploring collaborative research opportunities with other jurisdictions and considers this an ongoing measure to assist the ecologically sustainable management of giant crab fisheries in jurisdictions around Australia.

The potential productivity of the giant crab stock off SA and elsewhere off southern Australia is not well understood. Initially in SA the TACCs were set at 90% of the mean annual catch between 1997-98 and 1999-00. DEW recognises that PIRSA's approach has been to set a conservative minimum size limit and TACCs and to respond to the signs of a possible decline in abundance in the Southern Zone by reducing the TACC for that zone. However, the continued decline in catch rates in the Northern Zone and the inability for the TACC to be reached in either the Northern or Southern Zones is of concern. PIRSA has advised in the submission that research has been initiated to determine why the TACC has not been harvested in recent years. DEW notes that SARDI has also indicated in the 2006 assessment report that the current performance indicators encompass an appropriately broad range of fishery-dependent data. However the assessment of the fishery could be enhanced by clearly defining the data and methods that should be used to calculate the indicators; selecting a reference period during which data to determine the upper and lower reference points for each performance indicators are available; and incorporating approaches that account for statistical variance in data.

As highlighted in DEW's 2004 assessment report, studies of giant crabs from different localities across southern Australia have indicated genetic homogeneity across the species' range and as such, potential removals from other jurisdictions and mortality from damage caused by trawling operations could impact the overall population. PIRSA has indicated its commitment to collaborate on cooperative research and management for stocks shared with other jurisdictions and has held discussions with Tasmania on key research priorities. As giant crab is also harvested in managed commercial fisheries in Tasmania, Victoria and Western Australia and is taken in small quantities as by-product in the Great Australian Bight Trawl Fishery (GABTF), DEW continues to consider that ongoing cross-jurisdictional cooperation should be encouraged between all jurisdictions with giant crab fisheries. This includes factoring in giant crab removals from other jurisdictions within the SAGCF stock assessments. Due to the offshore, deepwater nature of the fishery, recreational and indigenous take of giant crabs is not significant.

In addition, the uncertain influence of trawling activities in giant crab fishing grounds on the giant crab stock, directly through harvesting and indirectly through habitat impacts, is not factored into assessments. As a result there remains a risk that fishing in one jurisdiction could impact on that part of the stock and fishery in another. The need for cross-jurisdictional work in management is well recognised and some collaborative efforts are in place, however DEW believes that collaboration should be conducted on a regular basis and any results incorporated in the assessment of the fishery.

**Recommendation 4:** *PIRSA to collaborate, where appropriate, with other jurisdictions to actively pursue consistent and/or complementary research needs and management arrangements for the southern Australian giant crab stock.*

The Commonwealth GABTF has historically taken a small amount of giant crab bycatch and PIRSA advise that while an expansion of the fishery could pose a risk to the SAGCF, current levels of bycatch taken by this fishery are not of concern. PIRSA has also indicated that they will continue to monitor the giant crab bycatch in the GABTF and would liaise with the Australian Fisheries Management Authority to determine a suitable management response should an increase occur.

### **Management response**

The current SAGCF management regime aims to maintain ecologically viable stock levels through a range of output and input controls. These measures are outlined in Table 1 and Part I of this report.

The biological performance of the fishery is monitored by performance indicators which are total catch rate, catch-vs-TACC, mean weight and pre-recruit abundance. Limit reference points are set for the fishery as a whole for these key performance indicators. In the absence of a more objective reference point, these limits have been based arbitrarily on the range of values estimated for the fishery during the established reference period 1999-00 to 2002-03 (the period immediately following the introduction of the TACC). DEW has previously noted above the recommendations given by SARDI on enhancing the assessment against the current performance indicators.

A management strategy review, which may result in a reduction of the TACC, will be triggered if the annual commercial catch is more than 15% above or below the TACC or any of the average catch rate, mean weight or pre-recruit abundance measures fall more than 15% above or below their respective reference ranges. While DEW notes the prescribed management responses involve ministerial notification, examination of causes and consultation with stakeholders, there is currently no time frame for implementation of action following the triggering of a reference point. DEW considers that a 3 month timeframe should be applied to the management response in order to determine a timely and appropriate response to the deviation. Setting this timeframe for a management response is important as DEW notes that some of the indicators have recently fallen outside the reference ranges for the SAGCF, and no management action has been taken to date.

**Recommendation 5:** *PIRSA to monitor the status of the target species in relation to performance indicators. Within 3 months of becoming aware of a performance indicator being triggered, PIRSA to develop a clear timetable for the implementation of appropriate management responses.*

While DEW accepts that both fishing zones are considered to have conservative management controls in place, it is concerned that some of the fishery performance indicators have been outside the reference ranges. In particular the catch rate for both the Southern and Northern Zone are well outside the performance trigger of more than 15% outside the reference range. PIRSA has reported in the submission that six of the seven interim performance indicators were assessed in each zone and DEW notes the Northern Zone has 3 which are outside the reference points and the Southern has 5 indicators outside the reference points.

While the total catch has increased substantially since commercialisation of the fishery in the early 1990s, the introduction of quotas has seen the total catch decline annually. The catch rate for the fishery has generally increased across the fishery, however there is a notable variance in

CPUE in the two fishery zones. The Northern Zone has shown declining catches and stable levels of effort over the last 5 years resulting in a declining CPUE. The disparity in the Southern Zone has shown stable catches and declining effort resulting in substantial increases in CPUE.

It is noted that declining catch rates may be an artefact of many factors, including seasonal changes in the fishing patterns of the two dedicated giant crab fishers and changes linked to exploratory activity targeted at traditionally unfished areas. While effort standardisation (as required under **Recommendation 3**) and finer spatial reporting will help identify concerns over stock status in the Northern Zone, an investigation into the reasons for the declining CPUE in the Northern Zone is necessary. PIRSA advise that research has begun to examine this issue. As with the Southern Zone, DEW would expect PIRSA to take action appropriately should a management response be required in the Northern Zone. Additionally the TACCs in both the Northern and Southern Zone have not been reached and should also be investigated.

DEW is confident that the combination of input and output controls and consequent management actions specified in the submission are appropriate to ensure viable stock levels with acceptable levels of probability in the short term. PIRSA has demonstrated ongoing adaptive measures for management of this fishery, however, the improvement of stock assessment through enhanced data requirements and review of performance measures and reference ranges is a matter requiring action and recommendations have been made to address these deficiencies.

In accordance with the giant crab quota entitlements, the two dedicated giant crab fishers are only permitted to retain giant crabs and therefore retain no by-product species. SA's rock lobster fishers generally take giant crabs in the deeper reefs at depths over 50 m where they are caught with rock lobsters. Their take of giant crabs is often the by-product of targeted fishing for rock lobsters. PIRSA advise that the research suggests that when rock lobster fishers target giant crabs, their by-product – apart from rock lobsters – comprises small quantities of a wide range of fish and invertebrate species. The main by-product species are octopus (*Octopus maorum*), rock lobster and pink ling (*Genypterus blacodes*). These are also by-product species in SA's rock lobster fishery. Rock lobster fishers are also required to report as part of their logbook, ongoing catch of giant crab, octopus and other marine scalefish by-product. The impacts on by-product species from the SA Rock Lobster Fishery have been assessed under a separate DEW assessment.

Given that dedicated giant crab fishers are not permitted to take by-product and by-product taken in giant crab fishing grounds by rock lobster fishers is being monitored, DEW considers that the SAGCF poses minimal threat to by-product species.

## **Conclusion**

DEW is satisfied that the current management regime in the SAGCF is appropriately precautionary and provides for the fishery to be conducted in a manner that does not lead to over-fishing. DEW is satisfied that the information collection system, stock assessment and management arrangements generally are sufficient to ensure that the fishery is conducted at catch levels that maintain ecologically viable stock levels with acceptable levels of probability.

DEW considers that there is scope to further refine some of the existing information collection, assessment and management responses and has provided a number of recommendations for improvements in the longer term.

## Promote recovery to ecologically viable stock levels

Objective 2: *‘Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes’*

PIRSA has indicated in the submission that this objective is not applicable to the fishery at present as the fishery is considered to be performing well against management objectives and performance measures. However since the last DEW assessment some performance indicators for the SAGCF are now outside the reference ranges set for the fishery. PIRSA suggest that small changes in fisher behaviour can result in significant changes to the data collected and the inferences drawn from performance indicator estimates. As mentioned in the 2006 SARDI report the decline in catch rate in the Northern Zone and the inability to catch the TACC are patterns which could suggest that the exploitable biomass of giant crabs in this zone has declined. DEW notes that PIRSA are currently undertaking research to examine this issue.

Improved research, assessment and management arrangements are proposed by PIRSA and should further strengthen confidence in the maintenance of the stock at an ecologically viable level. PIRSA’s positive and rapid response to declining annual catch rates in the Southern Zone through a reduction in the TACC suggests that PIRSA is responsive to issues arising in the fishery. DEW is therefore confident that PIRSA will pursue any necessary measures so that the fishery is conducted such that there is a high degree of probability the stock would recover to ecologically viable stock levels within nominated timeframes.

## Conclusion

While PIRSA has made progress on monitoring and assessing the SAGCF, uncertainties still exist within the fishery. DEW has made a number of recommendations which will assist with management and help stocks be maintained at ecologically viable levels, including the development of measures to enhance stock assessment and management arrangements (**Recommendation 3**) and developing a management response timeframe within 3 months of a performance indicator being triggered (**Recommendation 5**).

## Ecosystem impacts

Principle 2: *‘Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem’*

## Bycatch protection

Objective 1: *‘The fishery is conducted in a manner that does not threaten bycatch species’*

## Information requirements

Bycatch reporting in the SAGCF is limited and has not been considered a priority in the fishery to date. It is believed that due to the duration, depths of fishing, general ecological character of the fishing grounds and pot construction, including escape gaps, the bycatch by crab pots is small. Non-retained giant crabs are likely to be the main component of the bycatch, with the overall numbers and variety of other bycatch being extremely small because of the limited number of boats, the nature and application of the gear, and the depth and substrate of fishing grounds.

The only bycatch component which specialist giant crab fishers are required to record are those giant crabs returned to the water alive because they are carrying eggs, out of season, damaged or undersized. Otherwise, daily commercial catch records make no provision for recording bycatch and there is no independent monitoring of bycatch from their operations. PIRSA has advised that the new commercial logbooks for SA fisheries will include reporting of interactions with threatened and protected species. However, bycatch has not been addressed within the impending new logbooks for the giant crab fishery. Rock lobster fishers who take giant crabs are required to record by-product but not bycatch. However, a bycatch monitoring program has been in place for the rock lobster fishery, which covers dual giant crab/rock lobster fishers.

In DEW's last assessment of the fishery, the lack of bycatch information gathered by giant crab fishers was considered a concern. While DEW accepts the probability that – at present - the fishery may not pose an unacceptable threat to non-retained species, there is continued reliance on indirect and incomplete data and a need for the ability to monitor and detect changes in bycatch on an ongoing basis. PIRSA's giant crab management regime continues to include a management strategy to "Monitor and quantify non-target species interactions" as a key management objective to minimise disruption of the marine ecosystem. The "availability of data to undertake assessment of non-target species interactions and fishery impacts" is also shown as a performance indicator. Noting these statements DEW recommend that a system for monitoring bycatch be implemented within the fishery.

**Recommendation 6:** *PIRSA to develop and implement a system for the monitoring and assessment of bycatch to ensure that changes in bycatch can be monitored and verified over time.*

### **Assessment**

PIRSA advise that there has been no risk assessment of the vulnerability of bycatch species to giant crab fishing, nor is there any estimate of the current level of bycatch. The submission proposes that the risk posed by giant crab fishing to bycatch species is low "Based on the current understanding".

In the last assessment DEW recommended PIRSA conduct an ecological risk assessment for the SAGCF to assess the impacts of the fishery on bycatch and protected species, ecological communities, deepwater habitats and the marine environment to confirm that the fishery poses minimal risk to these components. PIRSA has indicated in the submission that a risk assessment framework is currently being developed for all of SA's commercial fisheries which will be applied to the SAGCF. As with other recommendations PIRSA has committed to addressing this recommendation as part of the impending Management Plan. DEW therefore considers this action will be addressed once the Management Plan is finalised and as such has made **Recommendation 2** to ensure that this and other commitments are formalised.

Overall DEW considers that the SAGCF is being conducted in a way that minimises the impact on bycatch species generally.

### **Management response**

The capture and mortality of non-target species in the specialised offshore component of the fishery is constrained by the tight controls on vessel numbers, pot numbers and dimensions and by spatial and season restrictions. Escape gaps are used voluntarily by both dedicated giant crab fishers and PIRSA are considering formalising escape gaps as part of the new Management Plan. Rock lobster fishers in the Northern Zone are required to use escape gaps and while voluntary in

Southern Zone they are used widely. Along with the minimum mesh size specified for all pots, escape gaps contribute to the low retention of non-target species as well as discarded giant crabs.

As mentioned previously, the submission sets out PIRSA's intention to monitor the "trend in the relationship between target and non-target species catch levels" as a performance indicator against the goal of minimising disruption to the ecosystem. When implemented, DEW believes that the monitoring program designed to enable this performance measurement should provide PIRSA with the basis for determining the sustainability of bycatch in the fishery and implementing appropriate responses if needed. This issue is addressed in **Recommendation 6**.

DEW notes that PIRSA is anticipating formalising the use of escape gaps which are considered to minimise the interaction between giant crab and rock lobster fishing operations and non-target species as part of the Management Plan for the fishery. SARDI has also suggested among other things, the evaluation of suitable pot escape-gap dimensions to ensure the release of pre-recruits is a lesser research priority. Research to identify ways of maximising the effectiveness of escape gaps is welcomed and DEW encourages PIRSA to include minimising catches of non-target species as well as undersized giant crabs as an objective of the strategic research plan.

### **Conclusion**

DEW is satisfied that due to the small scale of the fishery, there is a high likelihood the fishery is conducted in a manner that does not threaten bycatch species. However DEW is concerned that the overall lack of information on bycatch from the dedicated giant crab fishers inhibits PIRSA's ability to monitor any potential changes and manage the fishery in an ecologically sustainable way. As such DEW considers that there is scope to further refine some of the existing information collection, assessment, performance measurement and management responses and has recommended improvements in the longer term.

### **Protected species and threatened ecological community protection**

Objective 2: *'The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities'*

### **Information requirements**

Recording of protected species interactions is not currently required for the two dedicated giant crab fishers. PIRSA has advised in the submission that compulsory reporting on threatened, endangered and protected species interactions will be introduced in all SA fisheries during 2007, with the SAGCF reporting by the start of the 2007/08 season. This action is consistent with DEW's recommendation to develop and implement a mandatory reporting system for protected species. DEW considers that this move is an important step and would encourage PIRSA to validate the data against fishery independent observations wherever possible to maximise the reliability of information used for monitoring interactions and assessing the impact of the fishery on those species. Fishers should also be provided with training or information material to facilitate accurate species recognition and to raise awareness of the importance of reliable reporting.

There are no threatened or endangered species or ecological communities identified in the submission as occurring in area of the SAGCF.

## **Assessment**

Protected wildlife species occurring in the area of the SAGCF include seals/sea lions (mainly Australian fur seals *Arctocephalus pusillus doriferus*), whales, dolphins and leatherback turtles (*Dermochelys coriacea*), all of which have the potential for interactions with giant crab and rock lobster pots and buoy lines. The submission states that while there has been no formal risk assessment of the vulnerability of endangered, threatened or protected species completed for the fishery, the impact of the SAGCF on protected species is considered to be low or negligible. The submission describes the nature and infrequent occurrence of interactions between the rock lobster/giant crab fishery and protected wildlife species and the extreme unlikelihood of interactions by the specialised giant crab fishery. However DEW believes that PIRSA should continue to adopt a risk assessment approach to confirm assumptions that risks to protected species are minimal. As PIRSA has committed to undertake an ecological risk assessment for the fishery as part of the Management Plan, a recommendation addressing DEW's concern has previously been made as part of **Recommendation 2**.

## **Management response**

The submission outlines the industry-led initiatives in the Rock Lobster Fishery to minimise occurrences and impacts of the most frequent events – entry to pots by seals – and to eliminate the discarding of debris at sea. PIRSA also believe that management measures in place for the SAGCF including limited entry and effort, and fishing restricted to water deeper than 60 fathoms assist in minimising the capture and mortality of endangered, threatened and protected species.

As mentioned above, PIRSA's implementation of a new logbook which incorporates mandatory reporting of interactions with protected species will be an important achievement for monitoring the SAGCF interactions with protected species. As in the last assessment DEW considers the improved universal reporting an essential precursor to providing confidence that the fishery is minimising impacts on, and avoiding interactions with, protected species.

## **Conclusion**

DEW notes that based on the information provided by PIRSA there are minimal interactions with protected species in this fishery and is satisfied that the fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities.

Should the information collected by the new logbooks indicate an increase in protected species interactions DEW suggests that appropriate actions be undertaken to ensure the fishery avoids mortality or injury to these species and avoids or minimises impacts on threatened ecological communities.

## **Minimising ecological impacts of fishing operations**

Objective 3: *'The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally'*

## **Information requirements**

The submission states that no specific information on the broader ecosystem impacts of the SAGCF is currently collected, but notes that the information gathering and research leading into the SA Government's planned establishment of a representative system of Marine Protected Areas may shed further light on these impacts. Monitoring of the Rock Lobster Fishery and

SARDI's bycatch and by-product study is providing information on the occurrence and some biological characteristics of the wide range of species caught in pots across the range of the fishery.

DEW notes that research is currently being undertaken as part of a FRDC funded project, *Understanding Shelf Break Habitat for management of fisheries with spatial overlap* (FRDC 2004/066) which should provide valuable information on habitat structure and fishery interactions in the shelf break zone. One of the key objectives of the project is to evaluate the vulnerability of shelf-edge habitat to damage by trawl and trap fishing gears. Once the report has been finalised PIRSA should consider assessing the results of this project and the implications for the management of the SAGCF.

### **Assessment**

The submission outlines the potential areas of risk to ecosystem components and considers the current knowledge to gain some understanding of the susceptibility of ecosystem components to the fishery. No formal assessment has been conducted to confirm assumptions that ecological impacts are minimal. DEW recognises that, in cases where it is impractical to obtain comprehensive information on which to base a decision, a risk assessment implemented in a precautionary way can provide a suitable decision making system and guide for future actions including management and information collection. Again DEW notes that following a recommendation made by DEW in the initial assessment of the fishery, a risk assessment will be incorporated in the impending Management Plan for the fishery which has been addressed in **Recommendation 2**.

### **Management response**

PIRSA advise that specific management actions are not in place to prevent significant damage to ecosystems arising from the fishery. However, the management emphasis is on controlling the catch to maintain the giant crab stock at a viable and productive level. Fishing gear and activities are managed in a way that adds to the sustainability of fishing and help to minimise impacts on the ecosystem. DEW recognises that managing the fishery on a sustainable basis in relation to target, by-product and bycatch species has the important consequence of helping to minimise ecological impacts.

There are no decision rules to trigger management responses to identified impacts on ecosystem indicators outside prescribed limits or to other situations where the need for a precautionary approach is indicated. In the absence of formal risk assessment or specific direct evidence, PIRSA cites the sustainability of giant crab catches over a long term as evidence of the ecologically benign nature of the fishery. However as the current assessment of the fishery suggests a decline in giant crab catches, DEW considers the risk assessment required under the original DEW assessment as an important step in identifying risks and management responses appropriate to the scale of the fishery. PIRSA has committed to undertaking a risk assessment as part of the development of the Management Plan for fishery. A requirement for the finalisation of the Management Plan is addressed in **Recommendation 2**.

### **Conclusion**

DEW is satisfied that the fishery is conducted in a manner that minimises the impact of fishing operations on the ecosystem generally. DEW notes that should circumstances alter significantly in the fishery appropriate assessments and additional actions will be developed by PIRSA.

## REFERENCES

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## LIST OF ACRONYMS

CDR	Catch Disposal Record
CPUE	Catch Per Unit Effort
DEW	Department of Environment and Water Resources
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FMC	Fisheries Management Committees
FRDC	Fisheries Research and Development Corporation
GABTF	Great Australian Bight Trawl Fishery
ITQ	Individual Transferable Quota
PIRSA	Department of Primary Industries and Resources, SA
SA	South Australia
SARDI	South Australian Research and Development Institute
SAGCF	South Australian Giant Crab Fishery
TACC	Total Allowable Commercial Catch
VMS	Vessel Monitoring System
WTO	Wildlife Trade Operation