



**Australian Government**

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**Department of the Environment and Heritage**

Assessment of the  
**Tasmanian Giant Crab Fishery**

July 2006

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This document is an assessment carried out by the Department of Environment and Heritage 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 Heritage 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 Heritage or the Australian Government.

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

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## EXECUTIVE SUMMARY

### Background

The Tasmanian Giant Crab Fishery (TGCF) was first assessed by the Australian Government Department of the Environment and Heritage (DEH) in July 2003 under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in accordance with the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries* (the Guidelines). This assessment was based on the submission provided by the then Tasmanian Department of Primary Industries, Water and Environment in December 2002. In light of a number of concerns that needed to be addressed to manage environmental risks in the long term, the TGCF was declared an approved Wildlife Trade Operation (WTO), under Part 13A of the EPBC Act. This declaration allowed the export of product from the fishery for three years.

As the 2003 WTO declaration for the TGCF expires in 2006, the Tasmanian Department of Primary Industries and Water (DPIW) has submitted a document for assessment under Parts 13 and 13A of the EPBC Act. The draft document *Assessing the Ecological Sustainability of the Tasmanian Giant Crab Fishery* (the submission) was received by DEH in April 2006. The submission was released for a public comment period that expired on 2 June 2006. No public comments were received. A final submission was received from DPIW in June 2006.

The submission reports on the TGCF against the Guidelines. The DEH assessment considers the submission and associated documents.

**Table 1: Summary of the TGCF**

<b>Area</b>	Waters adjacent to the State of Tasmania (Commonwealth and State waters).
<b>Fishery status</b>	When this fishery was first assessed in 2003, the target giant crab species was considered to be growth over-fished. There are indications to suggest that the fishery continues to be growth overfished.
<b>Target Species</b>	Giant crab ( <i>Pseudocarcinus gigas</i> ).
<b>By-product Species</b>	Mainly rock lobster ( <i>Jasus edwardsii</i> ), pink ling ( <i>Genypterus blacodes</i> ) and octopus ( <i>Octopus pallidus</i> and <i>O. maorum</i> ).
<b>Gear</b>	Traps which include escape gaps of prescribed dimensions.
<b>Season</b>	Fishing for males can occur year-round. The closed season for females is between June-October (inclusive).
<b>Commercial harvest 2004/05</b>	49.3 tonnes of giant crab.
<b>Value of commercial harvest 2004/05</b>	Approximately AU\$2 million.
<b>Recreational harvest</b>	Considered negligible.
<b>Commercial licences issued</b>	90 licences, with 12 fishers taking the majority of the catch in 2004/05.
<b>Management arrangements</b>	Output controlled through a Total Allowable Catch limit (TAC) and Individual Transferable Quotas (the TAC has been set at 62.1 tonnes). Minimum and maximum size limits for both sexes also apply.  Input controlled through:

	<ul style="list-style-type: none"> <li>• limited entry (fishers must also hold a rock lobster entitlement);</li> <li>• prohibition on take of berried females;</li> <li>• closed season for females;</li> <li>• limits on number, dimensions and structure of traps; and</li> <li>• Vessel Monitoring System (VMS) required on all vessels with more than 15 quota units, or those which unload crabs in Victoria.</li> </ul>
<b>Export</b>	Live export, primarily to Asia.
<b>Bycatch</b>	Bycatch consists primarily of antlered crab ( <i>Paramola petterdi</i> ) and hermit crabs ( <i>Strigipagurus strigimanus</i> and <i>Dardanus arrosor</i> ).
<b>Interaction with Threatened Species</b>	Potential interactions with seals, cetaceans, seabirds and marine turtles, although considered low.

The area of the fishery includes waters surrounding the state of Tasmania generally south of 39°12' and out to the outer edge of the Australian Exclusive Economic Zone. Part of the fishery area is in Commonwealth waters however the entire fishery is managed by Tasmania under an Offshore Constitutional Settlement (OCS) between the Commonwealth Government and the Government of Tasmania.

The fishery targets giant crab (*P. gigas*). The only limit to the quantity or species that may be taken as byproduct by the fishery are the limits applied to holders of a fishing licence (rock lobster), in which a fishing licence (giant crab) must remain attached to. Species currently retained by the TGCF as byproduct include fish (pink ling, wrasse, dory), octopus and southern rock lobster. Total reported byproduct catches of pink ling in pots for the last 5 years total just over 300 kg. Other reported byproduct from the fishery over the last decade includes morwong, cod, ling, conger eel, gurnard and other crab species. The take of octopus and southern rock lobster is assessed under the other relevant fishery submissions and is therefore not discussed significantly in this report.

The target species is endemic to the waters of southern Australia, extending from Perth in Western Australia to Victoria and the waters surrounding Tasmania. The species is harvested in several trap or pot fisheries throughout its distribution. Giant crabs are predominately taken at the edge of the continental shelf at depths between 150 and 300m, although the depth range of the species is 18-500m; it is rarely found intertidally (Jones and Morgan 2002).

The species is slow growing and long-lived and may require strict management controls to ensure sustainability of harvest (Yearsley *et al* 1999; Kailoa *et al* 1993). Males attain a maximum size of more than double females, moult more frequently and have larger moult increments than females. The frequency of moulting diminishes for both sexes as individuals become larger (McGarvey *et al*, 2002).

Jones and Morgan (2002) suggest that giant crabs are not considered rare, but because they are a deepwater species they are only found regularly on offshore fishing operations. Along-shelf migrations into the current occur and are believed to be part of the species' reproductive strategy. Females are highly fecund, store sperm and usually spawn in years when they do not moult (FRDC, 2002). There is some evidence to suggest animal size decreases with depth (Gardner *et al* 2002).

Approximately 49.3 tonnes of giant crab were harvested in the TGCF in 2004-05, at an estimated value of \$2 million. The fishery began in 1992, although giant crab had previously been taken as a

bycatch in the rock lobster, shark and trawl fisheries. The fishery quickly expanded to a maximum take of 290 tonnes of giant crabs in 1994, with catch rates declining steadily for five years following this peak. The fishery was closed in 1998 to prevent a transfer of effort to the fishery during the introduction of an Individual Transferable Quota (ITQ) regime to the rock lobster fishery. Management measures since November 1999 have included the use of ITQs under a Total Allowable Commercial Catch and controls over the gear that may be used.

Giant crabs are marketed live in both domestic (mainly Melbourne and Sydney) and export markets. Although the species can reach 45cm carapace width (CW) and over 17.5 kg weight, market preferences mean it is commonly marketed at less than 20cm CW and less than 4kg (Yearsley *et al* 1999).

The fishery initially harvested giant crabs with modified rock lobster pots, however larger, heavier steel pots are now being used in targeted giant crab fishing (Gardner *et al*, 2002). There are limits on the number, dimensions and structure of giant crab traps that can be deployed from each licensed vessel. Each trap must have one or two escape gaps of defined minimum dimensions. Fishery management arrangements include temporal closures, maximum and minimum size limits, and a prohibition on the take of berried females. In addition to gear limitations, there is limited entry to this fishery and a TAC. There are currently 90 licences.

Direct information on bycatch in the fishery is limited, however available information indicates bycatch to target ratios in similar crustacean fisheries (notably rock lobster) are low. Bycatch composition appears to be dominated by three crustacean species, the antlered crab (*P. petterdi*) and hermit crabs (*S. strigimanus* and *D. arrosor*). Some species that may be affected by this fishery are currently listed protected species under the EPBC Act. Potential species interactions in this fishery include entanglement of marine turtles in fishing gear, the impact on seals from discarded rubbish and incidental capture of seals (particularly juveniles) in pots, especially those set in shallower water. Interactions with cetaceans and protected seabirds may also occur, however limited evidence to date suggests that interaction with any protected species is low. These interactions are assessed under Principle Two of this report.

Take of giant crab by the indigenous and recreational sectors is not significant. Recreational fishers are permitted to a possession limit of one giant crab and only crabs with a CW between 150-215mm. Giant crab forms part of the bycatch of the Tasmanian Rock Lobster Fishery, where it is subject to a 5 tonnes upper harvest limit in that fishery (performance measure) and restricted to a possession limit of up to 10 giant crabs at any one time. Giant crabs can only be retained as byproduct by Tasmanian Rock Lobster Fishers and Commonwealth trawl operators.

The fishery is managed under the *Fisheries (Giant Crab) Rules 2006* (the management plan), which obtains its authority from the Tasmanian *Living Marine Resources Management Act 1995*. The management plan is supported by the Giant Crab Fishery Policy Document of May 1999.

## Overall assessment

The material submitted by DPIW demonstrates that the management arrangements for the TGCF meet most of the requirements of the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*.

The TGCF 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 TAC limit and ITQ's; minimum and maximum size limits for both sexes; prohibition on take of berried females; closed season for females; and limits on number, dimensions and structure of traps.

Some changes to the TGCF management arrangements have occurred since the fishery was first assessed by DEH in July 2003. Major amendments to the TGCF management arrangements, since 2003, include: a reduction in the TAC (from 103.5 to 62.1 tonnes in 2004/05); the introduction of new triggers which specifically relate to total catches by region (east and west coasts); extending the season for male crabs from November to August to all year round; and increasing the number of traps allowed per trip. While progress has been made across a range of issues, a number of commitments prepared in the initial assessment of the fishery in 2003, including a number of recommendations arising from the assessment, do not appear to have been fully implemented by DPIW. These include: the implementation of performance indicators and trigger points relating to legal size biomass and egg production; a system to validate byproduct data; undefined longer term sustainable yield and biomass levels for giant crabs, creating some uncertainty as to the appropriateness of the existing TAC level; and a lack of bycatch monitoring and validation. While this will not affect the immediate sustainability of the target species, these issues and recommendations need to be addressed for the longer term sustainability of giant crab stocks.

A size-based stock assessment model for giant crabs has been developed by DPIW, as part of the FRDC funded project. While this is a significant step in providing the biomass of giant crabs is maintained at ecological viable levels, the model is still under development and uncertainties, discussed later in this report, still remain. In light of a number of these concerns, DPIW have advised that the development of a new strategic policy document incorporating a review of existing trigger points and performance indicators and the development of new indicators will commence towards the end of 2006.

While the fishery is relatively well managed, DEH has identified a number of risks and uncertainties that must be managed to ensure their impacts are minimised:

- longer term sustainable yield and biomass levels for giant crabs not defined, creating some uncertainty as to the appropriateness of the existing TAC level;
- lack of byproduct data validation;
- lack of bycatch monitoring and validation; and
- lack of monitoring general ecosystem impacts.

Conditions to the proposed WTO declaration for the fishery and specific recommendations to address these issues have been developed to ensure that the risk of impact is minimised in the longer term. In conjunction with the implementation of the conditions and recommendations and the continuation of a responsible attitude 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, to ensure the stocks are fished sustainably.

The key concern for the fishery is the uncertainty with the status of the target giant crab stocks and the need to address some potential risks to the long term sustainability of these stocks. In light of

these concerns, DEH has developed a specific condition (**Condition 4**) to be met as part of the WTO accreditation that requires a strategy to be developed in the short term to provide a more structured and precautionary approach to the ongoing harvesting of giant crabs.

The operation of the fishery is consistent with the objects of Part 13A of the EPBC Act. Given the management arrangements specified in the Giant Crab Policy Document, the existing review of management arrangements and the implementation of a strategy to confirm sustainable stock limits for giant crabs (**Condition 4**), DEH 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. DEH therefore recommends that the fishery be declared an approved WTO with the actions specified in the conditions and recommendations to be undertaken by DPIW to contain the environmental risks in the long term. DEH 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. Specifically, the WTO declaration would allow the export of product from the fishery for a period of three years. The WTO declaration will require annual reporting on the progress of implementing the conditions and recommendations of this report and other managerial commitments. The implementation of the conditions and recommendations will be monitored and reviewed as part of the next DEH review of the fishery in three years time.

As the official fishery area encompasses Commonwealth as well as State waters, consideration under Part 13 of the EPBC Act is required regarding the impact of the fishery on listed threatened species, listed migratory species, cetaceans and listed marine species.

The TGCF, in force under the *Fisheries (Rock lobster and Giant crab) Rules 2001* was accredited under sections 208A, 222A, 245 and 265 of the EPBC Act in 2003 when it was first assessed. However, the rules were changed under the relevant legislation, now outlined in the *Fisheries (Giant Crab) Rules 2006*. Due to this change in the management regime, consideration under Part 13 of the EPBC Act is required regarding the impact of the fishery, operating under the *Fisheries (Giant Crab) Rules 2006*, on listed threatened species, listed migratory species, cetaceans and listed marine species.

A number of protected wildlife species occur in the fishery area, including marine turtles, seals, cetaceans and seabirds, however the fishery has minimal interaction with these species. A revised logbook was implemented into the TGCF in March 2006 which now includes a component on protected species to assist with data collection. From 2003 – 2006 there were no recorded interactions with any protected wildlife species directly linked to the TGCF. DEH considers that the fishery is unlikely to have an unacceptable impact on protected species. DEH recommends that the management regime, operating under the *Fisheries (Giant Crab) Rules 2006*, be accredited under sections 208A, 222A, 245 and 265 of the EPBC Act. In making this judgement, DEH considers that the fishery to which the regime relates does not, or is not likely to, adversely affect the survival in nature of listed threatened species or population of that species, or the conservation status of a listed migratory species, cetacean species or listed marine species or a population of any of those species. DEH also considers that the management regime requires that all reasonable steps are taken to avoid the killing or injuring of protected species, and the level of interaction under current fishing operations is low. On this basis, DEH is satisfied that an action taken by an individual fisher, acting in accordance with the management regime, would not be expected to have a significant impact on a listed threatened species or listed migratory species protected by the EPBC Act.

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

### **Conditions to the WTO declaration**

**Condition 1:** Operation of the TGCF will be carried out in accordance with the management regime in force under the *Living Marine Resources Management Act 1995*.

**Condition 2:** DPIW to advise DEH of any material change to the TGCF management arrangements that could affect the criteria on which EPBC Act decisions are based, within three months of that change being made.

**Condition 3:** Reports to be produced and presented to DEH annually, and to include:

- i. Information sufficient to allow assessment of the progress of DPIWE in implementing the recommendations made in the *Assessment of the Tasmanian Giant Crab Fishery 2006*;
- ii. A description of the status of the fishery and catch and effort information;
- iii. A statement of the performance of the fishery against objectives, performance indicators and measures once developed; and
- iv. Research undertaken or completed relevant to the fishery.

**Condition 4:** DPIW, by end July 2007, to develop a strategy that provides for defining and monitoring robust target levels of sustainable yield and biomass for giant crab stocks in the TGCF. The strategy should include provision to review and minimise the impacts of discarded giant crabs and review and address any requirements for additional giant crab assessment and monitoring data.

### **Recommendations**

**Recommendation 1:** *DPIW to continue to collaborate with AFMA and implement measures to mitigate against impacts of harvest of and incidental damage to giant crabs and their habitat by trawling activity in the TGCF. In particular, DPIW to consult further with AFMA to ensure accurate reporting by Commonwealth trawl operators of giant crab catch from the area of the TGCF for inclusion in the stock assessment and TAC setting processes.*

**Recommendation 2:** *Within 18 months, DPIW to develop and implement a program for reporting byproduct species taken in the fishery and develop measures to periodically validate byproduct species taken in the TGCF. DPIW to also develop and implement preliminary performance measures for key byproduct species within two years.*

**Recommendation 3:** *DPIW to implement, within 18 months, measures to monitor changes in the composition and quantity of bycatch species. The effectiveness of these measures should be periodically reviewed to ensure the validity of bycatch estimates.*

**Recommendation 4:** *DPIWE, in collaboration with industry, to continue to encourage and monitor the adoption of the environmental code of practice, the 'Clean Green Program', in particular those measures that minimise the impacts of trap loss and potential ghost fishing.*

## Part I - Management Arrangements

The TGCF is managed by DPIW, previously titled the Tasmanian Department of Primary Industries, Water and Environment. The fishery was previously managed under the *Fisheries (Rock Lobster and Giant Crab) Rules 2001* under the *Living Marine Resources Management Act 1995*. On 28 February 2006 the rules were altered under the relevant legislation, now outlined in the *Fisheries (Giant Crab) Rules 2006*.

The management arrangements for the fishery are outlined in the Giant Crab Fishery Policy Document (May 1999). The policy that details the management of this fishery is subject to a statutory review process (including public consultation) every 5 years, and was due for revision in 2003/04. This review has not occurred at present, however DPIW have advised that the policy document will be reviewed at the end of 2006.

All of the following documents associated with the management regime of this fishery are publicly available:

- the *Fisheries (Giant Crab) Rules 2006* (the management plan);
- the Giant Crab Policy Document 1999;
- the Rock Lobster and Giant Crab Fisheries Management Plan Review Information Paper;
- the Tasmanian *Living Marine Resources Management Act 1995*; and
- relevant Gazetted notices and licence conditions.

There are a number of other documents, including fishery assessment reports, research reports, scientific literature and discussion papers, which are utilised by DPIW to guide management of the giant crab fishery.

DEH considers it important that management arrangements remain flexible to ensure timely and appropriate managerial decisions. Because of the importance of the management arrangements and documents referred to above to DEH's assessment of the fishery, an amendment could change the outcomes of the assessment and decisions stemming from it. Decisions resulting from this assessment relate to the arrangements in force at the time of the decision. Therefore, in order to ensure that these decisions remain valid, DEH needs to be advised of any changes that are made to the management regime (such as the review process of the policy document) 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.

The *Living Marine Resources Management Act 1995* prescribes a consultative process for both the development and review of a management plan. Management and the review process of the fishery incorporates a sound range of consultative mechanisms and a clear commitment to effectively consult with a variety of stakeholders.

For the review process of the giant crab fishery management plan, DPIW included the following consultation mechanisms:

- identification of issues for review with the Crustacean Fisheries Advisory Committee (CFAC), and the Recreational Fishery Advisory Committee (RecFAC) and focus groups;
- preparation and distribution of an issues paper and questionnaire to all licensees and interest groups;
- feedback from Issues Paper considered;
- 60 day period for public submissions on the information paper;
- personal notification of all licensees and interest groups;

- conduction of regional port meetings to discuss the draft proposals;
- submissions from Review Information Paper (99 received) considered and advice sought from CFAC and RecFAC; and
- following the *Minister for Primary Industries and Water's decision*
  - public notice declaring alteration of management plan;
  - commercial licence holders notified of changes; and
  - changes advised in media and fishing magazines.

The CFAC is the expertise based committee which provides management advice to the TGCF. The committee meets four to five times per year and the term of appointment is for two years. The 17 representatives on the CFAC consist of an executive officer (provided by DPIW), an independent chair, DPIW Chief Fisheries Investigations Officer, a Tasmanian Aquaculture and Fisheries Institute (TAFI) research representative, DPIW fishery manager, a Marine Police representative, representative of the Tasmanian Fishing Industry Council, a rock lobster fisher not on the Tasmanian Rock Lobster Fishermen's Association (TRLFA) Board, two giant crab fishers, an executive officer of the TRLFA, two processing sector representatives and a conservation/community representative (nominated by the Tasmanian Conservation Trust).

The Crustacean Research Advisory Group (CRAG), which meets one to two times per year, is appointed by the Director of TAFI to provide strategic research planning advice for the rock lobster and giant crab fisheries, to TAFI and the Tasmanian Fisheries Research Assessment Board. It consists of scientists from the Commonwealth Scientific and Industrial and Research Organisation (CSIRO), the Australian Maritime College and TAFI, the fishery manager, commercial and recreational representatives and one conservation/community representative.

The Crustacean Fisheries Assessment Working Group, which meets one to two times per year, is responsible for providing advice to TAFI, DPIW and the CFAC relating to the assessment of the fishery and the TAC. Representatives on the working group include TAFI research scientists, the commercial and recreational fishery managers, commercial and recreational representatives.

DEH considers the level of consultation to be adequate and is confident that DPIW will continue to ensure interested parties are consulted appropriately.

The fishery is managed according to the policy regime described in the Giant Crab Policy Document 1999 and includes the following objectives:

- to maintain fish stocks at optimum sustainable levels by constraining the total catch and the size of individual giant crabs taken by the commercial sector;
- sustaining yield and reducing incidental fishing mortality;
- to mitigate any conflict that results from competition between different fishing methods for access to shared fishing grounds;
- providing socio-economic benefits to the community; and
- providing high quality produce (to promote and maintain handling and processing practises which ensure the highest quality giant crab product for human consumption).

The document also outlines a series of performance indicators and trigger points relating to catch per unit effort (CPUE), total annual commercial catch (including bycatch), size and sex distribution of commercial catch, changes in fishing area and changes in the size of the giant crab fleet. In 2004/05 new triggers were introduced that specifically relate to total catches by region (east and west coasts), to minimise the risk of a shift in effort from the west to the east coast. An assessment of the effectiveness of these measures is included in Part Two of this report.

Management of the fishery is based on a mixture of input and output controls. Such controls include:

- annual TAC (62.1 tonnes) and ITQ;
- limited entry - 90 licences, with fishers required to hold an entitlement to the rock lobster fishery;
- gear restrictions;
- closed season between June and October (inclusive) for females (aiming to limit harvesting during the months when the giant crab are breeding and carrying eggs);
- minimum (150mm CL) and maximum size limits (215mm CL, to protect a portion of large males) for both sexes;
- prohibition on the take of berried females; and
- provisions for limited overshooting of quota, including "payback" against following season quota.

Commercial landings are subject to a monitoring system based on the ITQ regime. The giant crab catch and effort logbook program has been in place since 1999 and the provision of log sheets on a monthly basis is mandatory. Fishers cannot renew their giant crab licence unless all their log sheets have been submitted. The Quota Monitoring System (QMS) involves a detailed document trail including quota docket, catch and effort records, unloading reports, fish cauf and dispatch reports, real time telephone reports prior to landing (excluding direct sales of 5 or less crabs at the site of unloading or from a cauf), completion of documentation including an accurate weight of giant crab before it is transported from the wharf to a processing premise. The processor is required to validate the weight of landed crabs. Rock lobster fishers who land giant crab as byproduct are subject to similar reporting requirements in the rock lobster QMS which provides an accurate weight of giant crab landed by rock lobster fishers.

Annual auditing of the catch effort logbook, unloaded weight, and comparison with the weights declared on quota dockets, provides an additional check on the catch effort data. At sea police inspections by the Tasmanian Police Department, and the penalties associated with breaches of the reporting requirements, provide a significant deterrent to non-compliance with the management system.

In addition, the 1999 Policy Document required that all vessels participating in the TGCF, with more than 10 quota units attached to the licence, or those that unload crabs in Victoria, need to have a VMS fitted and operational during the giant crab season. However, when the TAC was reduced from 103.5 tonnes to 62.1 tonnes, the kg/unit was consequently reduced from 100kg to 60kg per unit. Since the policy was that the 10 unit requirement was based on 1000kg of catch, the reduction of the TAC meant that a fisher only had to have 600kg for VMS to be required. This resulted in an increase to the giant crab VMS threshold from 10 units to greater than 15 units before VMS is required on a fishing vessel.

The TGCF is assessed annually through the preparation of a fishery assessment report. The assessment is conducted by the TAFI and is based on the fishery-dependent data collected (e.g. logbooks etc.).

Following completion of a Fisheries Research and Development Corporation (FRDC) funded project which involved the development of a new stock assessment model, future annual assessments will now incorporate use of this model. The fishery is evaluated against the performance indicators and trigger points specified in the 1999 Giant Crab Fishery Policy Document. The assessment also provides other analyses including bycatch of other species, byproduct species, protected species interactions, ecosystem impacts and interactions, spatial

distribution of catch and effort, structure of catches including undersize, male/female and discards. In addition, the management plan for the fishery is reviewed every five years, while the objectives contained in the policy document are to be reviewed towards the end of 2006.

Fishery-dependent data relating to the target species is collected on a regular basis in the fishery. Some fishery independent information is also collected. Discussion of the information collection system can be found in Part Two of this report.

An analysis of the fishery's capacity for assessing, monitoring and avoiding, remedying or mitigating and adverse impacts on the wider marine ecosystem in which the target species lives and the fishery operates is contained under Principle Two of this report.

DEH 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 *Living Marine Resources Management Act 1995* contains mechanisms that allow for amendments to management practices so that they comply with any future plans of these types.

### **Conclusion**

The management regime for the TGCF is developed through a transparent and consultative process. The management arrangements are strategic, underpinned by objectives and performance criteria by which the level of harvest in the fishery can be controlled, and which allows the effectiveness of the management arrangements to be measured, enforced and reviewed.

DEH is satisfied with the measures in place for periodic review of the fishery, provided a review of the Giant Crab Fishery Policy Document (including performance measures and trigger levels) is undertaken in 2006 as committed to by DPIW in their submission. This will allow the new information provided by numerous associated FRDC projects to be incorporated into management arrangements to enhance the ecologically sustainable management of this fishery.

## **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**

Fishery dependent data is obtained through compulsory giant crab catch and effort logbooks. Fishers are required to complete daily catch and effort data sheets by midnight for every day of fishing undertaken and cannot renew their licences unless all required log sheets have been submitted. Compulsory data fields included on the giant crab log sheets are: date, time, depth, species targeted, position, number of traps set, date and time traps are hauled, weight unloaded, number of male and female crabs retained and number of undersized or legal sized crabs discarded. In March 2006 changes were made to the giant crab logbook with a number of additional data fields incorporated. Additions included: interactions with protected species, numbers placed in fish cauf, numbers unloaded from vessel, markers to indicate which sets contributed to each unloading, and the number remaining on board at the start of a fishing trip. The record of discards was also expanded to collect data on numbers of oversize male discards and numbers of berried and un-berried females discarded, however from 1 March 2006, the discard section was made voluntary instead of mandatory. Five of the twelve major fishers are also voluntarily recording length-frequency data using electronic callipers (which will be used to inform the stock assessment model). The giant crab logbook does not require fishers to record or specify the amount of byproduct species retained or record other species bycatch. Byproduct is only recorded in the Tasmanian general fishing log.

Fishery independent data collection is limited. DPIW collects data from a wide range of sources (logbooks, processor records, quota management docketts and voluntary catch sampling) in an effort to counteract the lack of fishery-independent data. Fisheries independent information has been collected from the catch associated with an FRDC project, however DPIW have indicated that ongoing routine collection of fishery independent data is not economically feasible for the TGCF, hence future data collection will be on an ad hoc basis.

Landings of giant crab are subject to reporting requirements of the giant crab QMS. The QMS involves completion of documentation including an accurate weight of giant crab before the crabs leave the wharf and real time telephone reports prior to landing and transport to a processing premise. The processor is required to validate the weight of landed crabs. A direct sale of five or less crabs at the site of unloading does not require specific telephone reporting or weight verification. Rock lobster fishers who land giant crab as byproduct are subject to similar reporting requirements in the rock lobster QMS. This system provides an accurate weight of giant crab landed by these fishers. The Australian Fisheries Management Authority (AFMA) provides DPIW with a total weight of crabs (recorded as king crabs or giant crabs) declared in the relevant logbook for Commonwealth trawlers. The weight is validated against catch disposal records.

In the previous assessment of the TGCF in 2003, DEH highlighted the importance of discard data for stock assessment purposes due to giant crab discard information in the fishery historically being collected on a purely ad-hoc basis, albeit from the majority of fishers. A recommendation was therefore developed in 2003 for DPIW to develop and implement an ongoing data collection and monitoring system to enable identification of long term trends in giant crab discards. Although recording of discards will now be voluntary under the revised logbook that requires more detailed information to be recorded (data on numbers of oversize male discards and numbers of berried and un-berried females discarded), DPIW are confident that higher quality data will be obtained from those fishers that currently report, resulting in more useful data for monitoring discard trends (discarding is discussed in greater detail under Principle Two of this report).

DEH is concerned that the data validation mechanisms available in the fishery largely relate to landed target species and there is no validation of data relating to byproduct species. The Tasmanian Giant Crab Fishery Assessment Report 2004/05 also highlights the fact that there appears to be a problem with byproduct reporting in the fishery. Byproduct is only recorded in a Tasmanian general fishing log. The giant crab catch record logbook does not require fishers to record or specify the amount of byproduct species retained. This is discussed in further detail later in this report.

Any discrepancies on the Tasmanian catch effort log sheets are followed up by staff in the logbook monitoring section with the fisher concerned. Annual auditing of the catch effort logbook unloaded weight and comparison with the weights declared on quota dockets provides an additional check on the catch and effort data. At sea police inspections and the penalties associated with breaches of the reporting requirements also provide a significant deterrent.

### **Assessment**

A formal assessment of the fishery occurs annually through the preparation of a fishery assessment report. The assessment uses all the data described in the previous section (collected by the logbook system) to provide an assessment of the fishery evaluated against the performance indicators and trigger points specified in the Giant Crab Fishery Policy Document 1999. The performance measures and trigger limits against which the fishery is assessed relate to CPUE, total annual commercial catch, including bycatch, size and sex distribution of commercial catch, changes in fishing area and size of the giant crab fishing fleet.

At the time of the last assessment (2003), a number of trigger limits had been breached and the stock was considered growth over-fished. Recommendations were consequently developed by DEH in 2003 to ensure effective action was taken to recover stocks to ecologically viable levels. This included recommendations for DPIW to ensure that further research and analysis be undertaken on giant crab biology to enable estimation of recruitment to the fishery and fishing mortality and to develop and implement meaningful indicators and trigger points relating to legal size biomass and egg production. Further discussion on performance measures is provided later in this report.

DPIW has taken some significant steps since the last DEH assessment of the TGCF to provide for sustainable harvesting of giant crab stocks in the fishery. These include a cut in the TAC from 103t to 62t in 2004/05, development of a size-based stock assessment model for giant crabs as part of an FRDC funded project (FRDC project 2002/238 *Development of the tools for long-term management of the giant crab resource: data collection methodology, stock assessment and harvest strategy evaluation*) and introducing an extra performance measure relating to catches on the east and west coasts. The assessment model has confirmed that total giant crab biomass is around 40% of virgin biomass. The above measures are supported by relatively conservative maximum (215 mm CL) and minimum (150 mm CL) legal size limits that provide for a reasonably sound level of ongoing egg production to help maintain biomass levels. DPIW also indicates that the assessment model is informed by ongoing length frequency data that is provided from around 10% of the sampled catch,

along with a continuous time series of catch data from 1989/90 and standardised catch rates from 1995/96 and a range of biological information such as growth data.

While DEH acknowledges that this provides a sound basis on which to assess and maintain the sustainability of giant crab stocks, DEH also notes a number of outstanding factors or signals in the fishery that should be addressed to provide more certainty with the ongoing sustainable yield of giant crabs and the appropriateness of management measures in place. These factors include:

- the acknowledgement in the 2004/05 stock assessment that, given the slow growth rate of giant crabs, it will be at least a few more years before the stock response to the current TAC will become clearer;
- evidence of continued growth overfishing of giant crabs;
- exploitable biomass declining to 15.4% of the original biomass;
- no defined long term sustainable yield limit;
- the high proportion of females in the overall catch; and
- the breach of triggers in 2002/03, 2003/04 and 2004/05 relating to total annual catch, proportion of catch above 5 kgs and declines in CPUE over 2 years.

DEH also notes that limited data is available to confirm the survival of discarded giant crabs to offset the risks with existing growth overfishing.

While DPIW has expressed confidence in the indications from the new stock assessment model that giant crab stocks are gradually rebuilding, it also concedes that the relatively short time period of data informing the model provides limited information on key indicators such as recruitment trends. There are also many uncertainties associated with modelling the stock dynamics of giant crabs (e.g. description of growth), however the model is still under development and is expected to improve with the collection of a longer data time-series.

Given the above risks and uncertainties DEH considers that DPIW needs to more clearly define the strategies that will be implemented to provide greater confidence that the TAC levels are sustainable in the longer term and ensure that the biomass is maintained at ecologically sustainable levels. DEH notes that this issue has remained outstanding since the last assessment and should be actioned in the next 12 months.

DEH notes that DPIW, in light of the recent completion of the relevant FRDC projects, intends to give priority to the development and implementation of meaningful indicators and trigger points relating to legal size biomass and egg production. DEH agrees that these will be key components in an overall strategy that should include determination of long term sustainable yields and target biomass levels.

Given the potential risks of continued growth overfishing on longer term stock recruitment, DPIW should also make provision in the strategy to further examine measures to mitigate any adverse impacts of discarding of giant crabs in the fishery, either through reduction in discard rates or confirmation of post-release survival of discarded crabs. Provision should also be made in the strategy to review the adequacy of existing stock assessment data and stock monitoring programs and implement further data collection measures as required to ensure stocks are maintained above sustainable limits.

**Condition 4 to the WTO declaration:** *DPIW, by end July 2007, to develop a strategy that provides for defining and monitoring robust target levels of sustainable yield and biomass for giant crab stocks in the TGCF . The strategy should include provision to review and minimise the impacts of discarded giant crabs and review and address any requirements for additional giant crab assessment and monitoring data.*

The logbook and associated Quota Management System provide accurate weights of commercial giant crab landings. Logbook data is validated against processor returns. The weight of giant crab landed as byproduct by rock lobster fishers is also taken as a part of the QMS for that fishery. Although not accurately reported, the giant crabs landed as byproduct by Commonwealth South East Trawl Fishery trawlers operating in the area of the TGCF are also estimated based on AFMA logbook records (although giant crab catch was generally recorded generically as “crab” and could thus include king crabs and spider crabs) and voluntary recording by one trawl operator. The total weight of giant crab recorded for the South East trawl fishery for the 2004/05 quota year was 2,194 kg. The level of byproduct by Commonwealth trawlers is controlled by a trip limit of five giant crabs.

Take of giant crab by rock lobster fishers (who do not also hold an associated giant crab licence) is controlled by an annual limit of 100 kgs per fisher and a possession limit of up to ten giant crabs at any one time. Trigger limits are set to monitor the take of giant crabs by rock lobster fishers without giant crab licences (i.e. if bycatch of giant crabs by rock lobster fishers exceeds 5 t in any year).

Recreational fishers have a daily bag limit of one giant crab, however limited information to date suggests that recreational take is negligible due to the deep water in which giant crabs inhabit. Similarly, indigenous fishing activity is believed to be nil, as the fishery is concentrated in deeper waters not traditionally associated with indigenous fishing activity. There is no estimate of illegal catch, but it is thought to be negligible, again due to the depth of giant crab habitats. Compliance with the fisheries rules is managed by Tasmanian Police and includes random at sea inspections, regular inspections of unloading at the wharf, checks at processor premises and covert surveillance. Police records indicate that detected illegal activity is low.

While the level of giant crab harvest in the fishery is known in terms of retained catch, there is some concern about the level of discarding in the fishery and the degree to which discards are factored into stock assessment and management. As previously mentioned, in the previous assessment of the TGCF in 2003, DEH highlighted the importance of discard data for stock assessment purposes due to giant crab discard information in the fishery historically being collected on a purely ad-hoc basis. A recommendation was therefore developed for DPIW to develop and implement an ongoing data collection and monitoring system to enable identification of long term trends in giant crab discards.

While DPIW state that giant crab discards are not considered a removal as they are returned alive, discard data is important for stock assessment purposes and to measure the overall impact the fishery may be having on not only the target species, but other components of the marine environment. DPIW have therefore expanded the record of discards to include data on numbers of oversize male discards and numbers of berried and un-berried females discarded. DPIW has recently advised that the newly expanded section on discards in the logbooks will be voluntary. DPIW believe that making this section voluntary reduces the risk of collecting spurious data. DEH considers the ongoing collection of data and monitoring for discards is an important component in providing confidence in the TAC and the stock assessment process and believes the newly expanded discard section in the logbooks will provide for a more robust collection of discard data.

At the time of the first assessment of this fishery in 2003, DEH identified the need for further attention to be given to two issues involving Commonwealth trawl operators – the need to

accurately account for the removal of giant crabs by trawlers (discussed previously in this report) and the conflict between crab fishers and certain Commonwealth trawl operators and the potential impact of trawling operations on crab habitat and ecosystems. Recommendations were consequently developed by DEH in 2003 to address these issues. Although the level of trawl fishing effort in the crab fishing grounds appears to have decreased over the last few years, there are still some concerns regarding the potential impact of trawling operations on the TGCF.

A voluntary agreement between the fisheries that trawlers would stay out of certain waters where the TGCF operates has been established. Trawlers are required to record crab as bycatch in their fishing logs. However, DEH is still concerned with the amount of giant crabs taken by trawlers and the possible under-reporting of this catch. Statistics for crab bycatch from the south east trawl sector of the SESSF were not available at the time of compiling the TGCF Fishery Assessment Report 2003/04 and was not discussed in the 2004/05 Report. In addition, data on retained bycatch of crabs from trawlers is not species-specific, although anecdotal information from trawl operators suggests that they are recording crabs in their logbook with their common name. It is also possible that crabs recorded as bycatch from trawlers is being generically recorded as 'crab' onto the AFMA database. DEH considers that further consultation with AFMA is required to ensure accurate and species-specific data collection systems are in place for trawlers operating outside the TGCF and that all giant crab removals are taken into account in the stock assessment and TAC setting processes

A TAFI report (*A Preliminary Assessment of the Interaction Between the Giant Crab and the South East Trawl Fisheries Along the West Coast of Tasmania*) does indicate that the proportion of crabs with missing limbs increases towards the depths where trawling activities occur. DEH is still concerned about the impact by Commonwealth trawlers on the TGCF, in particular, the impact on juvenile giant crab microhabitats and subsequent impacts on recruitment levels, given the uncertain status of giant crab stocks.

DPIW have indicated that the recommendation developed in 2003 regarding the collaborative approach to manage the potential impact of trawling operations (*Recommendation 11*) is being addressed through a major 3 year FRCD funded research project, *Understanding Shelf Break Habitat*. This project is scheduled for completion in late 2006. Completion of this work should provide valuable information in determining the extent of impact caused by trawling and guide future management of the issue to ensure impacts are minimised. Nonetheless, DEH recommends DPIW continue to collaborate with AFMA to ensure effective mitigation measures are in place to preserve key crab habitat and support the rebuilding of giant crab stocks.

**Recommendation 1:** *DPIW to continue to collaborate with AFMA and implement measures to mitigate against impacts of harvest of and incidental damage to giant crabs and their habitat by trawling activity in the TGCF. In particular, DPIW to consult further with AFMA to ensure accurate reporting by Commonwealth trawl operators of giant crab catch from the area of the TGCF for inclusion in the stock assessment and TAC setting processes.*

Dedicated giant crab fisheries are also operating in other jurisdictions. Existing information on the spatial distribution and structure of giant crab stocks suggests that one homogeneous stock exists. Ideally, management arrangements affecting a single stock should be under a single jurisdiction, or at least complementary across jurisdictions. DEH believes it would be beneficial, for both giant crab stocks and DPIW governance, for DPIW to be involved in cross-jurisdictional actions to address shared stock concerns. Furthermore, removals of the species in other jurisdictions should be factored into stock assessments in the Tasmanian fishery.

## Management response

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

DEH is satisfied that the combination of the input and output controls should ensure adequate protection of the target stocks, but notes that this is contingent upon the TAC being set at a sustainable level. DEH is concerned with current evidence suggesting that the longer term sustainable yield and biomass levels for giant crabs is not defined, creating some uncertainty as to the appropriateness of the existing TAC level (**Condition 4**). DEH is also concerned with the lack of byproduct data validation, lack of bycatch monitoring and validation and the need to monitor general ecosystem impacts. This is discussed further in this report.

Performance indicators and trigger points are documented in the 1999 Giant Crab Fishery Policy Document. They include triggers relating to CPUE (statewide), total commercial catch (including bycatch of giant crabs by the rock lobster fishery), size and sex distribution of the commercial catch and fishing area and fleet size.

The performance indicators and trigger points are virtually unchanged from the first assessment in 2003, with the exception of the new east/west coast total catch triggers, introduced in 2004/05. This performance indicator has been developed to monitor any shift in fisher's effort to other regions within the giant crab fishing grounds.

As outlined in the 1999 Giant Crab Policy Document, when one or more of these trigger points are exceeded, the Secretary of the relevant department is required to undertake the following actions:

1. Notify the Minister, the Giant Crab Fishery Advisory Committee and participants in the fishery;
2. Undertake an examination of;
  - a. The status of the giant crab fishery, at the State and regional levels, via the performance indicators and any other indicator of the fishery or its stocks;
  - b. A variety of management options which would start rebuilding the stock to above the trigger level within a single year;
  - c. The implications of such management options for the fishery;
3. Consult with the industry, and the community as appropriate, on the development of alternative management strategies;
4. Report to the Minister and industry, within three months of the initial notification, on the outcomes of the examination of the fishery and the proposed management actions.

The results of the review must be forwarded to the Minister within three months, and must include proposed management responses.

In the previous assessment of the TGCF by DEH in 2003, a recommendation was made that DPIW continue to actively respond to the activation of trigger points by developing and implementing specific management strategies. These trigger limits have since been met and/or exceeded on a number of occasions, with some changes made to management arrangements, including a reduction in the TAC. While trigger limits have been previously met, DEH considers that the changes to management arrangements are adequate and believes that the implementation of **Condition 4** to the proposed WTO accreditation should provide appropriate measure to ensure more meaningful indicators and trigger points are developed and provide for the ongoing sustainable harvesting of giant crabs.

In the first assessment of this fishery by DEH in 2003, a recommendation was made that DPIW develop and implement meaningful indicators and trigger points relating to legal size biomass and egg production. This recommendation was developed due to the importance of these indicators in determining and monitoring sustainable stock levels.

DPIW indicated in their 2006 submission that this was not able to be undertaken as it relied upon the completion of an FRDC project (FRDC project 2002/238), which was unable to commence until 18 months later than was anticipated when the first assessment report was drafted. DPIW have indicated that, because this project is now complete, a review of meaningful indicators and triggers for the crab fishery is scheduled as a high priority. It is anticipated that development of a new strategic policy document incorporating a review of existing trigger points and performance indicators and the development of new indicators will commence towards the end of 2006. The implementation of **Condition 4** to the WTO declaration should also provide for defining sustainable yield and biomass levels for giant crab stocks in the TGCF.

During the first round of DEH assessment for this fishery in 2003, DPIW advised that processor returns would be used on an ongoing basis to validate by-product data collected through the giant crab logbooks. As a result, no recommendation was developed at the time to address byproduct validation. However, it is understood that processor returns are still not required to validate byproduct species harvested in the TGCF, with only the target weight of giant crabs received being recorded. It is unclear from the recent DPIW submission what proportion of the total catch constitutes byproduct.

The main reported byproduct species from the fishery include octopus, rock lobster, pink ling, wrasse, morwong, cod and other crabs, although this is anecdotal. Byproduct is only recorded in a Tasmanian general fishing log, which is not validated. The giant crab catch record logbook does not require fishers to record or specify the amount of byproduct species retained.

DEH is concerned that the data validation mechanisms available in the fishery largely relate to landed target species and there is no validation of data relating to byproduct species. The Tasmanian Giant Crab Fishery Assessment Report 2004/05 also highlights the fact that there appears to be a lack of byproduct reporting in the fishery.

Although the level of risk to stocks of byproduct species is considered low, there is no formal reporting or validation of the type or weight of byproduct landed with that received by the processing sector. In addition, byproduct species taken in the TGCF, such as octopus, rock lobster and pink ling are important catch species for other fisheries. DEH suggest that DPIW develop and implement a program for reporting and periodically validating byproduct species taken in the fishery. Furthermore, while DEH acknowledges that initial byproduct data may be limited, some assessment and monitoring of relevant trends in byproduct catch should be undertaken on the main byproduct species to detect any changes in targeted fishing or any emerging impacts on stocks apart from the target giant crab species. DEH therefore recommends that preliminary performance measures be developed to allow some form of monitoring of key byproduct species so that further management measures can be implemented if required.

**Recommendation 2:** *Within 18 months, DPIW to develop and implement a program for reporting byproduct species taken in the fishery and develop measures to periodically validate byproduct species taken in the TGCF. DPIW to also develop and implement preliminary performance measures for key byproduct species within two years.*

## Conclusion

DEH is satisfied that the information collection system and management arrangements are generally sufficient to ensure that the fishery is conducted at catch levels that maintain ecologically viable stock levels with acceptable levels of probability.

The major concern for the fishery is the uncertainty with the status of the target giant crab stocks and the need to address some potential risks and threats to the longer term sustainability of these stocks. In light of these concerns, DEH has developed a specific condition (**Condition 4**) to be met as part of the WTO accreditation that requires a strategy to be developed in the short term, to ensure the ongoing sustainable harvesting of giant crabs.

DEH considers there is scope to further refine some of the existing information collection, assessment and management responses and, in addition to **Condition 4**, 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’*

At the time of the last assessment in 2003, a number of trigger limits had been breached and the stock was considered growth over-fished. A recommendation was consequently made by DEH in 2003 for DPIW to develop and implement a recovery strategy to promote the recovery of giant crab stocks to ecologically viable stock levels.

As previously mentioned, DPIW has taken some considerable steps since the last DEH assessment of the TGCF to provide for sustainable harvesting of giant crab stocks in the fishery, including reducing the TAC, the development of a size-based stock assessment model for giant crabs and introducing an extra performance measure relating to catches on the east and west coasts.

While the TAC was cut from 103t to 62t in 2004/05 and an extra performance measure relating to catches on the east and west coasts was introduced, the giant crab fishery still has significant sustainability challenges. Given the uncertainty with the biomass levels and long term sustainable yield for giant crab stocks, there is a possibility that the TAC for the fishery was set too high and has impacted heavily on the giant crab stock. Given the slow growth rate of giant crabs, the 2004/05 stock assessment indicates it will be at least a few more years before the stock response to the current TAC will become clearer.

Given the uncertainties noted earlier in this report such as growth overfishing, biomass levels and species reporting, DEH still considers a more structured approach is required to monitor and address key uncertainties with stock status on sustainable fishing levels.

As previously discussed in this report, **Condition 4** to the proposed WTO accreditation will require DPIW to develop a strategy within 12 months to more effectively define and monitor sustainable yield and biomass levels for giant crab stocks in the TGCF and take account of the impacts of discarded giant crabs and the need for further scientific information to promote sustainable stocks levels. In conjunction with the management measures in place, DEH considers this approach should provide greater certainty with long term ecologically viable stock levels.

## **Conclusion**

While DPIW have made progress on providing more sustainable harvesting of giant crab stocks, uncertainties still exist within the TGCF. DEH 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 mitigate against impacts of harvest of and damage to giant crabs and their habitat by trawling activity (**Recommendation 1**) and the implementation of a program for reporting byproduct species taken in the fishery (**Recommendation 2**). DEH also considers **Condition 4** to the proposed WTO accreditation an appropriate measure to provide for the ongoing sustainable harvesting of giant crabs.

## **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**

Although the impacts to bycatch species in the TGCF is believed to be low, giant crab fishers are not required to record other species of bycatch in their logbooks. However, DPIW have initiated a program where fishers will use disposable cameras to record bycatch species.

Collection of bycatch species occurred in 2001/02 as part of a catch sampling component of an FRDC project intended to improve giant crab assessment techniques. According to this project and the 2004/05 Fishery Assessment Report, the most common species other than giant crab which are caught by these fishers includes antlered crab (*P. petterdi*), hermit crabs (*S. strigimanus* and *D. arrosor*), pink ling (*G. blacodes*), octopus (*O. pallidus* and *O. maorum*) and rock lobster (*J. edwardsii*). However, no additional bycatch data have become available since 2001/02, when this project was undertaken.

The FRDC project *'Understanding the Shelf Break Habitat'* has collected additional data about the biotic communities within the area of the fishery, which will be reported at the end of 2006. This project should increase the level of bycatch information within the fishery.

Giant crabs can only be retained as byproduct by Tasmanian rock lobster fishers and Commonwealth trawl operators. No bycatch or discard data is collected from rock lobster fishers. The majority of rock lobster fishing occurs in shallower waters outside normal crab habitat. The submission indicates that some information on giant crab discard is collected from the scientific observer program for the South East Trawl sector of the Southern and Eastern Scalefish and Shark Fishery.

## **Assessment**

In the first assessment of this fishery by DEH in 2003, no formal risk analysis of bycatch in the TGCF has been undertaken and there was no mechanism for collecting bycatch data for other species. A recommendation was therefore developed to investigate strategies to assess changes in bycatch levels in the fishery.

DEH notes that DPIW are considering appropriate economically feasible strategies in relation to bycatch in the TGCF, including the use of disposable cameras for operators to record bycatch for post fishing analysis. While trials of this strategy have commenced, there is no indication of when, or if, all giant crab fishers will adopt this strategy. DPIW have indicated that disposable cameras would continue to be used to record bycatch in the fishery for at least two years.

Although past monitoring projects and anecdotal information suggests that the impact on bycatch species in the TGCF is low, no formal risk analysis of bycatch has been undertaken and giant crab fishers are not required to record other species bycatch in their logbooks. While DEH notes the photographic approach, this measure should not exclude other strategies that could be developed and implemented to assess and monitor changes in the composition and quantity of bycatch. DEH recommends DPIW give priority to this outstanding issue and implement measures to monitor, on a periodic basis, changes in bycatch trends. Given the potential use of untested measures such as disposable cameras, DPIW should also make provision to review the effectiveness of bycatch monitoring measures to ensure the data used, on which the management of bycatch impacts is based, remains valid. Furthermore, collection and monitoring of sound information on bycatch levels and the degree of target species discarding will allow for a more reliable detection of changes in fishing behaviour should they occur.

**Recommendation 3:** *DPIW to implement, within 18 months, measures to monitor changes in the composition and quantity of bycatch species. The effectiveness of these measures should be periodically reviewed to ensure the validity of bycatch estimates.*

### **Management response**

The Giant Crab Policy Document includes an objective that the fishery be conducted in a manner that minimises the effect on bycatch species. In addition, a performance measure exists relating to the total annual commercial catch, including bycatch. The trigger point for management review occurs when the bycatch of giant crabs taken by rock lobster fishers exceeds 5 tonnes in any year. Coupled with this is the management strategy to limit the duration on which traps can be set in the TGCF, to reduce mortality of bycatch species. In the event that future bycatch assessment reveals that the use of heavier steel pots increases bycatch in the fishery, DPIW will need to develop appropriate management measures.

The primary measure in place to avoid capture and mortality of bycatch species is the mandatory escape gap in each pot. In accordance with the *Fisheries (Giant Crab) Rules 2006*, a trap must have at least one rectangular escape gap that is at least 57mm high and at least 400mm wide and at least two rectangular escape gaps, each of which is at least 57mm high and 200mm wide. The work of Frusher and Gibson (1999) details the effectiveness of escape gaps to reduce bycatch in traps, however the submission does not provide any indication of exactly how effective the escape gaps are. An additional measure for traps set in waters less than 120m is a maximum soak time rule of 48 hours. This measure aims to minimise mortality of bycatch species.

The submission indicates that all hermit crabs and 90% of antlered crabs were observed to be released unharmed. These animals do not contain air spaces and thus show no apparent effect of the pressure change experienced during hauling to the surface.

No bycatch species has been determined to be suitable as an indicator species. Given the low number of bycatch species, DPIW suggests that monitoring general trends of all bycatch appears to be a more appropriate strategy. The development of a new strategic policy document for the fishery will include investigation of whether there are any appropriate triggers that could be developed for bycatch.

The Tasmanian *Living Marine Resources Management Act 1995* provides for amendments to the management plan and emergency responses that could be used, should a bycatch species be considered to be under threat from the fishery. As recommended above, a monitoring system to detect changes in the composition and quantity of bycatch species over time would seem appropriate for the future management of the fishery.

## **Conclusion**

DEH is satisfied that there is a high likelihood the fishery is conducted in a manner that does not threaten bycatch species, although data demonstrating this is limited. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that DPIWE would undertake appropriate actions to ensure that bycatch species are not threatened by this fishery.

A recommendation has been developed to monitor changes in bycatch and ensure that the risk of unacceptable impact on bycatch species is detected and minimised 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**

A protected species interaction monthly record was introduced into the giant crab catch and effort logbook on 1 March 2006. Fishers are required to tick the protected species interaction field on the catch effort log sheet for any day when an interaction occurs. They are also required to complete the protected species interaction monthly record at the back of the logbook to provide full details about the interaction. A list of protected species is provided at the front of the logbook. The implementation of a protected species interaction monthly record was anticipated during the last assessment in the fishery in 2003, but was subject to a number of delays. There is therefore no reliable information on the interaction with endangered, threatened or protected species.

The logbook instructions state that the EPBC Act requires all interaction information to be collected by all fishers. In practice fishers tend to only consider interactions with protected species as those that involve snagging or mortality of animals. Interactions can be more benign than this, which isn't well documented through data collected in log books. Fisheries independent data on protected species interactions is through the extensive monitoring conducted for the rock lobster fishery.

For the period 2004/05, 237 protected species interactions were reported by lobster fishers in Tasmania. While gear used between the rock lobster fishery and the TGCF are similar, the TGCF operates in much deeper water. Therefore, the above figure cannot be a clear indication of the level of interactions occurring in the TGCF. No estimates have been made in the TGCF, although the submission indicates that potential impacts on protected species are believed to be low. The main group of protected species that may be negatively impacted by giant crab fishing are whales, seals, turtles and seabirds.

### **Assessment**

The 2002/03 and 2003/04 Fishery Assessment Reports state that no interaction between fishers and protected species were reported, although due to the lack of protected species interaction monthly

records for that period, information was collected only in an ad hoc manner by encouraging fishers to report interactions. In 2002/03 benign interactions occurred with seabirds and other protected species but were not reported.

As previously mentioned, 237 protected species interactions were reported by lobster fishers in Tasmania for the period 2004/05. The majority of these reports simply indicated that an interaction has occurred, so the species and fate of the protected species was unknown.

Interactions with protected species are considered low in the TGCF due to the habitat where giant crab fishing occurs. Possible interactions in this fishery include entanglement of marine turtles in pot lines, incidental capture of seals in pots, particularly those set in shallower waters and interactions with discarded rubbish. Interactions with cetaceans and seabirds may occur but appear to be low. Bird (particularly commorats) and seal drowning tend to occur in shallow depths and near breeding sites, although occasional drowning of juvenile seals in pots has been reported in Tasmania (Anon, 2002). Positive interactions, such as seabirds resting on fishing vessels, may also occur.

DEH believes that given the gear type, and the small scale of the crab fishery in terms of vessel numbers, catch, effort and offshore fishing grounds, the likely risk of a negative interaction is very low. Trends will be monitored through the analysis of protected species interactions data collected via logbooks, in the fishery assessment process which is undertaken annually.

There are no known threatened ecological communities within the crab fishing grounds, however the knowledge about the shelf break habitat (giant crab habitat) will be greatly enhanced on completion of the FRDC project later in 2006.

### **Management response**

Management of protected species interactions in the fishery relies upon the limited number of fishers and pots, combined with the depth of operation. Fishers must not set a trap for a continuous period exceeding 48 hours in waters that are less than 120m deep. This should limit the risk of incidental capture of most protected species. Data on protected species interactions in this fishery are not very robust, as they were largely an extrapolation of data previously obtained from the rock lobster fishery. DEH recognises that the recent introduction of the Protected Species Interaction Monthly Record should address this gap (implemented in March 2006), but notes that one of the biggest barriers to successful commercial reporting of protected species interactions is the capacity of the fishers to identify the species involved. In addition, many operators may not be aware of the importance of this reporting. Both of these barriers can be reduced through education programs and opportunistic advice from observers and researchers as appropriate. A recommendation was made in 2003 for DPIW to develop and implement an education program for fishers to promote the importance of protected species protection and accurate incident reporting, in addition to the implementation of the Protected Species Interaction Monthly Records.

DPIW has indicated in their submission that they have developed an education program for fishers to promote the importance of protected species protection and accurate incident reporting. This is being undertaken in several ways: direct office or phone contact with fishers by data entry and monitoring staff, correspondence with giant crab licence holders (letter from DPIW to all giant crab licence holders) and port meetings (10 State-wide port meetings for rock lobster and giant crab fishers has been scheduled). DEH encourages DPIW to maintain the education programs for fishers to promote the importance of protected species protection and accurate and ongoing incident reporting.

Entanglement by protected species in discarded rubbish and rope is addressed through fishers being encouraged to retain all rubbish on board and return it to port. The proposed Australian Government

Marine Protected Areas (MPA) in the south-east of Australia (within the TGCF area) should also reduce the potential for interactions with protected species.

There are currently a number of locations where fishers cannot set giant crab traps, these include areas that have been established as marine protected areas. For example, an area is closed to fishing with traps to protect some unique habitat on the eastern side of King Island. New MPAs that have been declared since last assessment include no take areas for potting. Note that no habitats or ecological communities that support crab or lobster fisheries have been described.

DEH notes that in 2004, the peak industry body representing rock lobster and giant crab fishers, the TRLF, began promoting the adoption of an environmental management system called the 'Clean Green Program'. The environmental practice covered by the program includes, among other factors, avoiding seal breeding colonies and whale identification. The program is further discussed under Principle 2, Objective 3.

## **Conclusion**

DEH notes that the likelihood of interactions with protected species in this fishery is minimal 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 this situation change, or a risk assessment process indicate otherwise, DEH suggests that appropriate actions be undertaken to ensure the fishery avoids mortality, 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**

DEH notes that minimal data is collected on the impact of the fishery on the marine environment generally. Impacts are believed to be minimal due to the relatively benign method of fishing and the range of external drivers that prevent harvest in certain locations of the fishery area, such as areas closed to fishing.

The submission states that given the low level of bycatch for the fishery, and the nature of the pot gear type, the main focus in relation to the impact of fishing operations has been on the "footprint" of the fishery. The footprint is the calculated area of the seabed that would be impacted by all the pot lifts assuming that no pot lands in exactly the same spot twice. Significant information, such as improved information on food chains and structure, has also been collected during the FRDC project 'Understanding the shelf break habitat'.

### **Assessment**

As in most pot fisheries, the potential of the giant crab fishery to impact unacceptably and unsustainably on the environment generally is considered to be low.

The submission states that a risk assessment of the impact of the giant crab traps on a range of habitat was conducted by the Technical Working Group reporting to DEH on fishing risk

assessment for the development of MPAs. The risk assessment report indicates that the most significant interaction is through contact of the traps on the bottom. However, there is some concern that this risk assessment only considered the impact of the gear type on the surrounding environment and not the effects of the actual taking of fish from the environment (therefore does not consider risks to food chains).

The traps appear to be heavy enough to avoid movements with currents on the bottom, and the footprint is small. The consequences of the interactions were that settling traps could damage fragile species and there could be some long term damage to the habitat, with affected organisms taking some time to recover. However, these consequences were deemed to be negligible by virtue of the very small footprint and the overall risk rating is low. Improved information on food chains, structure and productivity flows will be available when the FRDC project, *Understanding the Shelf Break Habitat*, is complete.

From the last assessment of this fishery in 2003, DPIW indicated that the high catch rates during the 1990's, by reducing biomass, will have changed the relative abundance of predator and prey species. Given that females aggregate on bryozoan substrates (FRDC, 2002), changes in crab abundance caused by fishing could have the potential to affect the communities in this zone.

Ghost fishing is also another potential fishery impact on the environment. Giant crab fishers estimate that the number of traps lost per year ranges from 3 to 30. Extrapolating this number for all major crab fishers and adding a factor to cover the minor operators suggests that the number of lost pots per annum is likely to be less than 500. Although this figure appears low, over the 14 years of operation, potentially 7,000 traps have been lost to date, with more being lost each year as the fishery continues to operate. A recommendation was made in 2003 for DPIW to initiate research to assess the risk of ghost fishing. While the potential for crab traps to ghost fish is being assessed through a number of research investigations, it is unclear how this is progressing or what specific actions DPIW have taken. Consequently, a specific recommendation (**Recommendation 4**) has been developed by DEH to re-address the issue of ghost fishing.

The concern regarding the impact of Commonwealth-licensed trawlers on giant crabs and their habitat has been addressed through **Recommendation 1**.

### **Management response**

During the first DEH assessment of this fishery in 2003, a recommendation was made for DPIWE to work in collaboration with industry to develop and adopt a code of practice that encouraged operators in the fishery to minimise their impacts on protected species and the broader marine ecosystem. A key component of that recommendation was to monitor the uptake by fishers of the code of practice.

As previously mentioned in this report, the TRLFA, has promoted the adoption of the 'Clean Green Program' that contains standards of best practise covering environmental practise, seafood safety and quality and occupational health and safety.

The DPIW submission does not indicate how many of the fishers participating in the 'Clean Green Program' to date are giant crab fishers, nor the period of participation. It is possible that no giant crab fishers have participated.

DEH is encouraged by the initiatives in the 'Clean Green Program' but considers that further attention to operator involvement is required if the benefits are to be realised in the TGCF. In particular, DEH notes that concerns raised in the previous assessment regarding the potential impacts of trap loss and potential ghost fishing could be addressed through the 'Clean Green

Program'. A potential strategy that DPIW have suggested is to include an additional field on the giant crab logbook for trap loss. Another strategy mentioned in the submission includes a TAFI video camera project to examine crab entry and exit behaviour over an extended period of time. The initiative needs to be encouraged further and the measures to address gear loss (and ghost fishing) closely monitored to determine whether additional mandatory measures are required to further minimise fishing effects on species at risk and the broader marine ecosystem.

**Recommendation 4:** *DPIW, in collaboration with industry, to continue to encourage and monitor the adoption of the environmental code of practice, the 'Clean Green Program', in particular those measures that minimise the impacts of trap loss and potential ghost fishing.*

## **Conclusion**

DEH is satisfied that the fishery is conducted in a manner that minimises the impact of fishing operations on the ecosystem generally. A recommendation has been developed to ensure that the risk of significant impact by the fishery on the marine environment generally is minimised in the longer term.

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## LIST OF ACRONYMS

AFMA	Australian Fisheries Management Authority
CFAC	Crustacean Fisheries Advisory Committee
CL	Carapace Length
CW	Carapace Width
CPUE	Catch per Unit Effort
CRAG	Crustacean Research Advisory Group
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEH	Australian Government Department of the Environment and Heritage
DPIW	Tasmanian Department of Primary Industries and Water
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FRDC	Fisheries Research and Development Corporation
ITQ	Individual Transferable Quota
MPA	Marine Protected Area
OCS	Offshore Constitutional Settlement
QMS	Quota Monitoring System
RecFAC	Recreational Fishery Advisory Committee
TAC	Total Allowable Catch
TAFI	Tasmanian Aquaculture and Fisheries Institute
TGCF	Tasmanian Giant Crab Fishery
TRLFA	Tasmanian Rock Lobster Fishermen's Association
VMS	Vessel Monitoring System
WTO	Wildlife Trade Operation