



**Australian Government**

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**Department of the Environment and Heritage**

Assessment of the  
**Queensland River and Inshore (Beam) Trawl Fishery**

**February 2006**

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This document is an assessment carried out by the Department of the 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 Queensland River and Inshore (Beam) Trawl Fishery

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## EXECUTIVE SUMMARY

### Background

The Department of Primary Industries and Fisheries (DPI&F) has submitted a document for assessment under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The draft document *Ecological Assessment of the Queensland River and Inshore (Beam) Trawl Fishery* (the submission) was received by the Department of the Environment and Heritage (DEH) in March 2004. The submission was released for a thirty-day public comment period that expired on 23 August 2004. One public comment was received. DPI&F provided a response to the issues raised but no changes were made to the submission as a result of public comment.

The submission reports on the Queensland River and Inshore (Beam) Trawl Fishery (RIBTF) against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. The DEH assessment considers the submission, associated documents, public comments and DPI&F's response to the comments.

**Table 1: Summary of the Queensland River and Inshore (Beam) Trawl Fishery (RIBTF)**

<b>Area</b>	Rivers and inshore waters of the Queensland east coast (including Commonwealth waters) between the Townsville region (19°S) and Moreton Bay (27°30'S).
<b>Fishery status</b>	The target species are thought to be fully exploited.
<b>Target Species</b>	Penaeid prawns, consisting mainly of greasyback prawns ( <i>Metapenaeus bennettiae</i> ), school prawns ( <i>M. macleayi</i> ) and banana prawns ( <i>Penaeus merguianus</i> ), as well as small catches of tiger and endeavour prawns.
<b>Byproduct Species</b>	Blue swimmer crabs and squid (other species catches shown in the ecological assessment have been attributed to otter trawling by a check of the catch database late in 2005).
<b>Gear</b>	Beam trawl gear with gear and vessel specifications in place. Includes mandatory use of bycatch reduction and turtle exclusion devices on all nets.
<b>Season</b>	66 spatial and temporal closures relevant to the RIBTF are in force under the Trawl Plan.
<b>Commercial harvest 2004</b>	Principal species - 556 tonnes (Unpublished harvest estimate revised late 2005) Permitted species - 1.5 tonnes
<b>Value of commercial harvest</b>	Approximately \$3 million annually.
<b>Recreational harvest</b>	Relatively small, estimated at 55 tonnes of prawns, 46 tonnes of blue swimmer crabs and 26 tonnes of squid and cuttlefish (NRIFS, 2003 data).
<b>Commercial licences issued</b>	Reduced from 222 in 1996 to 153 in 2004.
<b>Management arrangements</b>	<u>Commercial sector</u> <ul style="list-style-type: none"> <li>• Fishing effort capping and reduction;</li> <li>• Boat replacement and effort unit trading;</li> <li>• Licence surrender/transfer provisions;</li> <li>• Spatial and temporal trawl area closures;</li> </ul>

	<ul style="list-style-type: none"> <li>• Gear restrictions;</li> <li>• Engine power restrictions; and</li> <li>• Size, gender and quantity restrictions for some species.</li> </ul> <p><u>Recreational sector</u></p> <ul style="list-style-type: none"> <li>• ‘In possession’ limit for banana prawns (10 litres per person);</li> <li>• Recreational fishers must not possess prawns if more than 10 prawns have had their head or any other part removed, unless the removal was to process the prawns for immediate consumption.</li> </ul>
<b>Export</b>	Catch from the RIBTF is mainly destined for domestic markets. No export market exists currently, but there is growing interest and scope for species products to be exported in the future.
<b>Bycatch</b>	Bycatch has not been quantified, but is likely to include a range of finfish species including yellowfin bream, river perch, winter whiting and mud flathead.
<b>Interaction with Threatened Species</b>	Considered low. Possible interactions (non-lethal) with turtles, dugongs, seabirds, syngnathids and sea snakes.

The Queensland RIBTF is a small component of the Queensland East Coast Trawl Fishery, harvesting just 5% of the total catch of the East Coast Trawl Fishery. Trawling occurs in rivers and inshore waters of the Queensland east coast between the Townsville region and Moreton Bay. Part of the fishery area is in Commonwealth waters, however the entire fishery is managed by Queensland under an Offshore Constitutional Settlement between the Australian Government and the Government of Queensland. The RIBTF is zoned into five areas, each of which is associated with a distinct fishery symbol (T5-T9). Each symbol represents a licence endorsement that allows fishers to harvest in a specified area.

The fishery targets a variety of prawn species, particularly greasyback prawns (*Metapenaeus bennettiae*), school prawns (*M. macleayi*) and banana prawns (*Penaeus merguianus*). These three species constitute approximately 90% of the total prawn catch from the RIBTF, with the remaining being smaller catches of tiger and endeavour prawns. Beam trawlers typically, although not exclusively, take juvenile prawns, while otter trawlers are more likely to take adult prawns. Species retained as byproduct are squid and blue swimmer crab, although byproduct constitutes a minor part of the total catch from the RIBTF.

School prawns are endemic to waters off the east coast of Australia and are found in coastal regions from southeast Victoria to the central Queensland coast. Juvenile school prawns are typically found in seagrass areas within estuaries, while adults are usually found in oceanic waters. The species spawns between February and May in the sea off New South Wales and southern Queensland and individuals live for 12-18 months. Females are usually larger than males, growing to 160 mm total length, while males grow to 130 mm total length. Size at maturity varies along the coastline, with sexual maturity first evident at an average carapace length (CL) of 22.5 mm in the Clarence River, and at 25 mm CL for males and 23 mm CL for females in the Hunter River (Kailola *et al.*, 1993). Research has demonstrated that this species may be migratory, moving along the coast in a northerly direction.

Greasyback prawns are found along the east coast of Australia from northern Victoria to Cooktown in northern Queensland. This species spawns between late October and May and its lifecycle is unusual in that it is spent almost entirely in estuaries or coastal lakes, although it will migrate to the

sea if possible. Greasyback prawns reach a maximum size of approximately 25 mm CL. The size at sexual maturity is 16 mm CL for males and 20 mm CL for females (Kailola *et al.*, 1993). There is a significant relationship between size and distance from the river mouth for greasyback prawns, with those individuals that enter rivers growing as they move downstream (Kailola *et al.*, 1993).

Banana prawns are found in the Indo-Pacific region between 67°E and 166°E longitude and from 25°N to 29°S latitude, and occur in all Queensland inshore waters. Sexual maturity for this species occurs at 26-34 mm CL for females (Kailola *et al.*, 1993). The mating season occurs during autumn and spring with two generations being produced per year in some locations. In contrast to greasyback prawns, banana prawns usually spawn in open waters, although they are known to spawn in estuarine waters in the southern part of their Queensland distribution. During the larval development stages, banana prawns slowly migrate toward river estuaries, while adolescents and adults later migrate seaward to complete their lifecycle.

Much of the total catch from the RIBTF is comprised of 'bay prawns', which are described as a mixture of small prawn species and juvenile prawns of larger growing species taken from bays and estuaries of southern Queensland. This grouping consists mainly of greasyback prawns, with a variable proportion of school prawns, hardback prawns, small king prawns, tiger prawns and, occasionally, banana prawns.

Approximately 556 tonnes of prawn were harvested in the RIBTF in 2004 at an estimated value of AUS \$3 million. Banana prawns constitute a significant part (40%) of the fishery catch, supplemented by greasyback and school prawns (a further 40%) and small catches of king, tiger and endeavour prawns.

The RIBTF is Queensland's original trawl fishery and began operating in the Brisbane River in the early 1940s. Today, the fishery is a low technology, low capital fishery operated by family-based operators. Fishers have typically used displacement hull vessels in estuaries in southern Queensland although more efficient technology has been introduced into the fishery through higher powered planning hulled vessels. These vessels are much more efficient than their predecessors because they are able to access shallower water and their speed and mobility allows them to be used over a much larger area. By the mid 1980s these vessels were being used in the majority of the fishery. However, according to the submission, effort creep has been addressed through the management arrangements for the RIBTF, which includes measures such as limited licensing (sunset clause for T7), closures and gear restrictions.

In 1983 limited licensing was introduced and applied to the river estuary systems of Moreton Bay and Pumicestone Passage and to the Noosa and Burnett river systems. By the end of 1984, the five zones (that are still current today) had been implemented and beam trawling became prohibited in the waters of the Gulf of Carpentaria and under Northern Prawn Fishery management arrangements. Along with the zoning arrangements, performance requirements were also implemented, which resulted in the number of licenses, and therefore effort, in the fishery being substantially reduced.

The RIBTF supplies two domestic markets with both bait prawns and premium banana prawns for human consumption. Currently product from the RIBTF is not exported, however there is growing interest and scope for product to be exported in the future depending on market forces.

The fishery uses beam trawl gear of specific dimensions, which can be modified to suit particular bottom types or target species. In the RIBTF fishers are permitted to use a single 5 m headrope trawl made of mesh no smaller than 28 mm in rivers and creeks and a maximum combined net length of 10 m with mesh size no less than 38 mm and no greater than 60 mm in inshore areas. All

nets used in the RIBTF are also required to have bycatch reduction and turtle exclusion devices fitted. Other management measures employed in the RIBTF include spatial and temporal closures and effort capping and reduction. Effort has been significantly reduced in recent years and as of 30 June 2005 there were 153 licences.

Direct information on bycatch in the fishery is limited, but as in any trawl fishery, bycatch to target ratios are high with a large variety of species caught incidentally. Some species that may be affected by this fishery are currently listed protected species under the Commonwealth EPBC Act. Possible protected species interactions in this fishery include the incidental capture of seasnakes, marine turtles and dugongs, and the provisioning and possible habituation of dolphins and seabirds. These interactions are assessed under Principle Two of this report.

Some of the species taken in the RIBTF are also targeted by recreational fishers, although take by this sector is relatively small. Possession limits for the recreational take of prawns are in place and the recreational take of prawns in 2002 was estimated at 55 tonnes (Henry and Lyle, 2003). Recreational fishers are also estimated to take approximately 46 tonnes of blue swimmer crab, a byproduct species of the RIBTF (Henry and Lyle, 2003). The recreational take of this species has been taken into account in the assessment of the dedicated Queensland Blue Swimmer Crab Pot Fishery and is not assessed in this report. Recent estimates from the National Recreational and Indigenous Fishing Survey (NRIFS) has also shown that recreational fishers harvested approximately 61 225 individual squid in 2000-01 (Henry and Lyle, 2003). Indigenous take is also relatively small, with annual indigenous take of penaeid prawns estimated at 131 158 individuals (Henry and Lyle, 2003).

The fishery is managed under the *Fisheries (East Coast Trawl) Management Plan 1999* (the Trawl Plan), which obtains its authority from the Queensland *Fisheries Act 1994*.

## **Overall assessment**

The material submitted by DPI&F demonstrates that the management arrangements for the RIBTF meet most of the requirements of the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. Management measures include limited entry, spatial and temporal closures, effort reduction measures, gear restrictions (specifically the compulsory use of bycatch reduction devices (BRDs) and turtle excluder devices (TEDs)) and size, gender and quantity restrictions for some species.

While the fishery is adequately managed, DEH has identified a number of risks that must be managed to ensure that their impacts are minimised and that management is able to respond appropriately to impacts into the future:

- Lack of commercial catch and effort data validation and the reliance on this unvalidated data when analysing catch per unit effort (CPUE) trends;
- No stock or risk assessments for target of permitted species;
- The take of juvenile eastern king prawns and tiger prawns in the RIBTF is not factored into stock assessments undertaken for these species to determine whether the total take in the East Coast Otter Trawl Fishery (ECOTF) and the RIBTF is sustainable;
- A lack of robust performance measures and a clear process and timeline for management action when performance measures are not met; and
- The absence of bycatch monitoring and performance measures, which hinders the ability of DPI&F to monitor and respond to changes in the fishery.

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 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 while ensuring the stocks are fished sustainably.

Overall, the management regime aims to ensure that fishing is conducted in a manner that does not lead to over-fishing and for fishing operations to be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem. On balance, the fishery is being managed in an ecologically sustainable manner and is working to address existing problems and minimise environmental risks.

The operation of the fishery is consistent with the objects of Part 13A of the EPBC Act. Given the relatively small scale of the RIBTF, DEH considers 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 Wildlife Trade Operation (WTO) with the actions specified in the recommendations to be undertaken by DPI&F to contain the environmental risks in the long term. DEH considers 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 3 years. The WTO declaration will require annual reporting on the progress of implementing the recommendations of this report and other managerial commitments. The implementation of the recommendations will be monitored and reviewed as part of the next DEH review of the fishery in 3 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.

Protected species occurring in the fishery area include marine turtles, dugong, seabirds, syngnathids and seasnakes. The fishery has no recorded interaction with these species groups. The actual and potential impact on Part 13 species under the management arrangements is considered low and adequate protection is provided. There are no listed threatened ecological communities in the fishery area.

DEH recommends that the Queensland *Fisheries Regulation 1995* and the Queensland *Fisheries (East Coast Trawl) Fishery Management Plan 1999*, to the extent the Regulation and Plan relate to the RIBTF, be declared an accredited management plan under sections 208A, 222A, 245 and 265 of the EPBC Act. In making this judgement, DEH considers that the fishery to which the management plan relates does not, or is not likely to, adversely affect the survival in nature of listed threatened species or a 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 plan 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 considers that an action taken by an individual fisher, acting in accordance with the Queensland *Fisheries Regulation 1995* and the Queensland *Fisheries (East Coast Trawl) Fishery Management Plan 1999*, would not be expected to have a significant impact on a listed threatened species or listed migratory species protected by the EPBC Act.

The assessment also considered the possible impacts on the World Heritage values of the Great Barrier Reef Marine Park (GBRMP) and the ecological character of the Moreton Bay, Bowling Green Bay, Shoalwater and Corio Bay Area and Great Sandy Strait Ramsar wetland sites.

Given the management arrangements in place for the RIBTF, including effort capping, spatial and temporal trawl area closures and gear restrictions, DEH considers that an action taken by an individual fisher, acting in accordance with the Queensland *Fisheries Regulation 1995* and the Queensland *Fisheries (East Coast Trawl) Fishery Management Plan 1999*, would not be expected to have a significant impact on the World Heritage values of the GBRMP or the ecological character of the Moreton Bay, Bowling Green Bay, Shoalwater and Corio Bay Area and Great Sandy Strait Ramsar wetland sites.

The implementation of recommendations and other commitments made by DPI&F in the submission will be monitored and reviewed as part of the next DEH review of the fishery in 3 years time.

## **Recommendations**

1. DPI&F to inform DEH of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on byproduct, bycatch, protected species or the ecosystem.
2. As part of the review of the Trawl Plan, DPI&F to, by the end of 2006:
  - Incorporate RIBTF data into the development of review events and performance measures being undertaken for ECOTF principal and permitted species; and
  - Revise current review events and develop appropriate performance measures, including limit reference points, for those inshore species predominantly harvested by the RIBTF.
3. DPI&F to monitor the status of the fishery in relation to the performance measures (review events and/or reference points) specified in the Trawl Plan. Within three months of becoming aware that a performance measure has not been met, DPI&F to finalise a clear timetable for the implementation of appropriate management responses.
4. By the end of 2007, DPI&F to develop a system to ensure that catch and effort data collected in compulsory logbooks is validated on an ongoing basis.
5. DPI&F to incorporate RIBTF research priorities into the strategic research plan being developed for the ECOTF within one year. The research plan will identify information gaps in the knowledge required to manage the fishery sustainably, priorities for future research, and consider strategies through which research needs can be met on a continued basis.
6. DPI&F to include RIBTF catch estimates of juvenile ECOTF target species, where relevant, in future stock assessments undertaken for these species.
7. By the end of 2007, DPI&F to implement a system to collect data on the composition (species and life-stage) of bay prawn catches in the RIBTF for use in species specific stock assessments.
8. In conjunction with work being undertaken on ECOTF principal and permitted species, DPI&F to develop a robust and regular fishery assessment process for the RIBTF, that provides a basis for management decisions, which are precautionary and recognise the uncertainty and level of risk. The assessment process will examine the ecological sustainability of the target and permitted species within three years, using stock or risk assessments. Appropriate management responses will be developed to reduce risks to any high-risk species or groups.

9. By the end of 2007, DPI&F to develop and implement a system sufficient to identify changes in the composition and quantity of bycatch in the RIBTF over time.
10. DPI&F to continue to pursue a reduction in the amount of bycatch taken in the RIBTF through the refinement of bycatch mitigation technology and to support the investigation of methods for increasing the survivability of bycatch species. Any effective and appropriate methods identified should be implemented under legislation within eighteen months.
11. DPI&F to, by the end of 2008, implement precautionary performance measures related to bycatch in the RIBTF. In the interim, DPI&F to develop bycatch related performance measures based on the best available information by the end of 2006.
12. DPI&F to continue to take all reasonable steps to reduce protected species interactions. Each year, DPI&F to report publicly on interactions with protected species, incorporating the latest research findings.

## PART I – MANAGEMENT ARRANGEMENTS

The RIBTF is managed by DPI&F.

The management regime is described in the following documents, all of which are, or will be publicly available:

- The Trawl Plan;
- The Queensland *Fisheries Act 1994*; and
- The Queensland *Fisheries Regulation 1995*.

Fishery resource status reports, annual catch statistics, licensing information and updates on fishery and habitat management changes are also relevant to the RIBTF, and such information is readily available on the DPI&F website.

DEH considers it important that management arrangements remain flexible to ensure timely and appropriate managerial decisions. Because of the importance of the management plan 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. In order to ensure that these decisions remain valid, DEH 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:** *DPI&F to inform DEH of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on byproduct, bycatch, protected species or the ecosystem.*

The Trawl Management Advisory Committee (Trawl MAC) was established in 1995 and provides advice to DPI&F on matters relating to the management of the East Coast Trawl Fisheries, including the RIBTF. Trawl MAC members include commercial and recreational fishers, scientists, representatives of conservation agencies and non-government organisations, and an independent Chair. In addition external scientific advice is incorporated into management arrangements through the Scientific Advisory Group (SAG) and a Technical Working Group, who advise the Trawl MAC. Such expert advice has been sourced from DPI&F, as well as from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the University of Queensland.

Management of the RIBTF is also largely guided by the Trawl Plan. The Trawl Plan was developed following extensive discussions with Trawl MAC and a public consultation process. The Trawl Plan is also subject to regular review, at which time fishing industry groups, all levels of government, interest groups (including conservation groups and Aboriginal and Torres Strait Islanders) and members of the public are invited to comment on reviews of the Trawl Plan. All submissions received are taken into account in any changes to the Plan. DEH considers that the consultative process in place for the RIBTF is sound and that appropriate levels of expert and community interest are incorporated into management of the fishery.

The Trawl Plan contains five objectives, actions to achieve these objectives and a series of performance measures (review events) that will trigger a review if they are not met that relate to target, byproduct, bycatch and protected species and to the ecosystem. Of particular relevance to the RIBTF is the review event related to bay prawns. Concerns have been raised over the appropriateness and effectiveness of these objectives and performance measures in the DEH assessment of the ECOTF.

A review event is triggered if the CPUE for prawns falls below 70% of the average catch rate in the period 1988-1997. Intrinsic problems have been identified with using CPUE reference points, including triggering at high population levels and causing inappropriate changes to fishing effort or, conversely, failing to trigger at low population sizes. In the assessment of the ECOTF and for the RIBTF, DEH has made recommendations (see **Recommendation 8**) that DPI&F develop a robust fishery assessment process. This should ensure that future assessments do not rely solely on CPUE data. To support this new framework for fishery assessments, DEH also recommends that DPI&F include RIBTF data in the development of review events and appropriate limit and target reference points for ECOTF principal and permitted species and revise current review events and develop appropriate performance measures, including limit reference points, for those inshore species predominantly harvested by the RIBTF, by the end of the 2006. DEH notes that a review of the Trawl Plan is required to commence between November 2004 and November 2006 and is supportive of DPI&F implementing this recommendation as part of the Trawl Plan review.

**Recommendation 2:** *As part of the review of the Trawl Plan, DPI&F to, by the end of 2006:*

- *Incorporate RIBTF data into the development of review events and performance measures being undertaken for ECOTF principal and permitted species; and*
- *Revise current review events and develop appropriate performance measures, including limit reference points, for those inshore species predominantly harvested by the RIBTF.*

DEH is also concerned that if a performance measure is not met, there is no timeframe for reviews to be undertaken and appropriate management responses implemented and recommends that DPI&F develop a process for this.

**Recommendation 3:** *DPI&F to monitor the status of the fishery in relation to the performance measures (review events and/or reference points) specified in the Trawl Plan. Within three months of becoming aware that a performance measure has not been met, DPI&F to finalise a clear timetable for the implementation of appropriate management responses.*

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

- Fishing effort capping and reduction;
- Boat replacement and effort unit trading;
- Licence surrender/transfer provisions;
- Spatial and temporal trawl area closures;
- Gear restrictions;
- Engine power restrictions; and
- Size, gender and quantity restrictions for some species.

The Queensland Boating and Fisheries Patrol (QBFP) is responsible for ensuring compliance in the RIBTF. This is achieved through inspections conducted by shore-based officers at wharves and unloading facilities, and inspections of unattended product during transport to and from wholesale or retail outlets, live holding facilities and processing plants. In addition, inspections during trawl operations of catching apparatus, including bycatch reduction/exclusion device installation and use, are conducted. Such field inspections also include the monitoring of logbooks, licences and possession limits on permitted species restricted by number, size, volume and/or gender. Voluntary compliance has also been enhanced through the implementation of the 'Fishwatch Hotline'; a 24-hour toll-free service that allows people to report suspected illegal fishing activity to the QBFP from anywhere in the State.

Compliance in the RIBTF is reported as being very high, with only limited offences being reported in 2002 and 2003. The Trawl Plan details a range of 'serious offences' and associated lengths of suspension that should apply in the case of a person being convicted for one to four separate serious fisheries offences. DEH considers that the compliance measures outlined above, along with the ability of QBFP to enforce the penalties in accordance with the Trawl Plan, contain the means of enforcing critical aspects of the management arrangements for the fishery.

Management arrangements and strategies outlined in the Trawl Plan are regularly reviewed by DPI&F, both through the Trawl MAC and its subcommittees. In particular, the Trawl Plan describes a number of reviews that are required to be undertaken to ensure that management arrangements are achieving the objective of ecological sustainability. These include a fishing effort review, a general review of the entire fishery, and a number of reviews to be undertaken in the event of a breach of a performance measure. In addition, state-wide summaries of annual statistics of Queensland's major trawl fishery resources are released publicly as fishery status or 'Condition and Trend' reports. More recently DPI&F have produced annual status reports for the wider East Coast Trawl Fishery, which include specific information on the RIBTF. The 2004 status report included RIBTF catch and effort data and a report on review events included in the Trawl Plan (DPI&F, 2005a). The status reports will also include an update on implementation of recommendations arising from the EPBC Act assessment of the RIBTF.

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 II of this report.

An 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 contained under Principle Two of this report.

A number of the target and byproduct species taken in the RIBTF are also harvested in other fisheries, managed by both Queensland and other states. To facilitate cross-jurisdictional management, Queensland participates in the Australian Fisheries Managers Forum (AFMF) and the Northern Australian Fisheries Management Workshop (NAFMW). A more detailed discussion of cross-jurisdictional issues is included in Part II of this report.

No Threat Abatement Plans are implemented in areas open to the RIBTF, although a number of Recovery Plans are relevant to the fishery. In particular, prescribed actions in the *Recovery Plan for Marine Turtles in Australia* (Environment Australia, 2003) have been implemented under the Trawl Plan. DPI&F also acknowledges that actions under the *National Plan of Action for the Conservation and Management of Sharks* (Shark Advisory Group and Lack, 2004) will need to be implemented, even though the small size and relatively low speed of beam trawl gear means sharks are rarely taken as bycatch in the RIBTF. In addition, the Trawl Plan adheres to the guiding principles of the National Policy on Fisheries Bycatch. DEH also expects that DPI&F will ensure compliance with any future plans or policies as they are developed.

No regional or international management regimes, to which Australia is a party, are of direct relevance to the fishery. The prime international regime affecting the fishery is the United Nations Convention on the Law of the Sea (UNCLOS). The management regime essentially complies with this. Other international regimes are applicable to fisheries management but do not explicitly involve this fishery, for example the 1992 Convention on Biological Diversity and in particular the 1995 Jakarta Mandate requiring that, in relation to the sustainable use of marine and coastal biological diversity, the precautionary principle should apply in efforts to address threats to biodiversity. While these agreements are not specifically addressed in the submission, the fishery's compliance with their requirements can be assessed by examination of Part II of this report. The

application of the International Convention for the Prevention of Pollution from Ships (MARPOL) to vessels operating in the fishery is explicitly discussed under Principle 2, Objective 3.

DEH considers it is incumbent on all authorities to develop a thorough understanding of the framework of national, regional and international agreements and their applicability to export-based fisheries for which they are responsible.

## **Conclusion**

DEH considers that the RIBTF management regime is documented, publicly available and transparent, and is developed through a consultative process. The management arrangements are underpinned by objectives and performance criteria, however DEH has made a recommendation to develop more appropriate performance measures for the RIBTF (**Recommendation 2**). DEH considers that the effectiveness of the management arrangements can be measured, enforced and reviewed. The implementation of **Recommendation 3** will ensure that any breaches of these performance measures are addressed in a timely manner.

The management arrangements are capable of controlling the harvest through a combination of input and output controls appropriate to the size of the fishery and periodic review of the fishery is provided for. The means of enforcing critical aspects of the management arrangements is also provided for.

The management regime takes into account arrangements in other jurisdictions, and adheres to arrangements established under Australian laws and international agreements.

DEH considers that there is scope to further refine the management arrangements and has provided a number of recommendations for improvements in the longer term.

## **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 for the RIBTF is collected from commercial logbooks, which have been implemented in the fishery since 1988. Prior to this, catch and effort data was collected as part of short to medium term research projects. The Commercial Fisheries Information System (CFISH) database has been established since 1992, and it allows fishery dependent data to be readily accessed by fisheries researchers and management.

Concerns have been raised regarding the reliability of this fishery-dependent information and DPI&F acknowledges that there are a number of limitations associated with the data available for the RIBTF. Between 1988 and 1992, fishing activity was recorded in ‘mixed fishery logbooks’, with the trawl logbook only introduced in 1992. Even then, the catch harvested by beam trawling was not reported separately from the catch taken by otter trawlers until the OT07 logbook was introduced in 2000 (this was later succeeded by the OT08 in 2002). Consequently, it is difficult to interpret historical data for the RIBTF and DPI&F acknowledges that this must be taken into account when interpreting CPUE information for the fishery. While recognising these limitations, DEH considers that the current logbook recording system is valuable in that information is collected on:

- Location of fishing effort;
- Total shot time;
- Total hours trawled;
- Depth;
- Catch of individual target species (kg);
- Catch of byproduct species; and
- Interactions with protected species.

DEH also recognises that effort in the fishery can now be better estimated. Prior to the implementation of the OT07 logbook, 30 nm grids were used for reporting fishing activity, while 6 nm were used in the OT07 logbooks. This has been further improved by the use of 6’ x 6’ grids since July 2000 for target and byproduct species and for some protected species.

DPI&F requires the logbooks currently implemented in the RIBTF to be completed on a daily basis and returned within 15 days of the end of each month. While this regular reporting is likely to provide valuable information, DEH is concerned that limited validation of catch and effort data is available. DPI&F notes that a vessel monitoring system for the RIBTF is impractical given the small vessels used in the fishery. DEH accepts this conclusion, but considers that some form of data validation for fishery dependent data is necessary, particularly given the reliance on this data for analysing fishery trends and the need to incorporate this data into stock assessments.

**Recommendation 4:** *By the end of 2007, DPI&F to develop a system to ensure that catch and effort data collected in compulsory logbooks is validated on an ongoing basis.*

Regular surveys on recreational catch and effort are conducted in Queensland and the data collected is held in the Recreational Fisheries Information System. A broad based telephone survey was conducted in 1996, 1998 and 2001 and a fisher diary program was also run throughout 1997, 1999 and 2001. These surveys have provided estimates on the extent of recreational harvest of major species in Queensland, and reports on the findings of these surveys have been collated and published. Additional information on recreational harvest can be derived from the NRIFS (Henry and Lyle, 2003). This project is also likely to provide some information on the level of indigenous take, however apart from this project, no data are collected on indigenous harvest. DEH notes that no validation of recreational catch data is undertaken, but recognises the difficulties associated with validating data on such a large scale. However, DEH urges DPI&F to investigate and implement ways in which recreational catch and effort data can be validated.

DPI&F recognise that, while fishery-dependent data is readily available and inexpensive, it has intrinsic problems when used to provide measures of stock abundance, particularly in the case of the RIBTF. In recognition of the need to collect long-term trend data for the stock assessment of target species, DPI&F initiated a state wide, fishery-independent Long Term Monitoring Program (LTMP) in 1999.

The LTMP monitors a suite of 'priority' species including two species of tiger prawn, scallops, blue swimmer crab and bugs. The LTMP has identified the development of a fishery independent estimator of tiger prawn stock biomass as a priority. This is due to the aggregating nature of both the species and of fishing activity which may mask changes in catch rate estimated from fishery dependent data. This is relevant to the RIBTF since juvenile tiger prawns constitute part of the catch from the RIBTF known as bay prawns. However, while the LTMP also includes surveys that provide results for byproduct species such as blue swimmer crab, scallops and bugs, there is no targeted research conducted in the area of the RIBTF for banana, school or greasyback prawns – the target species in the fishery. The submission notes that school and greasyback prawns were not found to be priority species for the LTMP because the total harvest of these species is relatively small. However, DEH considers it important that fishery independent information is collected for each of the three target species taken in the RIBTF, as well as for species comprising bay prawns. This is particularly important for the RIBTF given the limitations of the fishery dependent data and the reliance on this data for analysing fishery trends. DPI&F are currently developing a strategic research plan for the ECOTF, and DEH recommends that RIBTF research priorities be incorporated into this plan.

**Recommendation 5:** *DPI&F to incorporate RIBTF research priorities into the strategic research plan being developed for the ECOTF within one year. The research plan will identify information gaps in the knowledge required to manage the fishery sustainably, priorities for future research, and consider strategies through which research needs can be met on a continued basis.*

DEH is satisfied that DPI&F has made an effort to improve the logbooks implemented and hence the quality of fishery dependent data generated, and considers that, over time, this source of data will become increasingly valuable. DEH does, however, consider that the information collection systems could be improved through validating data and by conducting targeted, fishery independent research programs relevant to the RIBTF, and has made a number of recommendations to this effect (see **Recommendations 4** and **5**).

## Assessment

Target species taken in the RIBTF are short-lived, one-year lifecycle penaeid prawns, with some species completing two generations in one year. The fishery is not managed to allow the harvest of a set proportion of the potential catch since estimates of productivity can vary annually due to high recruitment variation resulting from environmental influences.

While good estimates of growth and natural mortality rates of banana prawns, greasyback prawns, school prawns, tiger prawns and eastern king prawns are available, no specific stock assessments are conducted for any of the target species taken in the RIBTF. Instead, fishery assessments are mainly based on analyses of catch rate trends derived from CFISH catch and effort data. These analyses are conducted for target species (banana and bay prawns) and for byproduct species (squid, bugs and blue swimmer crabs). While recognising that such analyses can provide a basic understanding of the stock status of species taken in the RIBTF, DEH is concerned that no rigorous assessments are undertaken for species taken in this fishery. The primary reason for the lack of detailed stock assessments is that the catch taken in the RIBTF is so small compared to that taken in other parts of the Queensland East Coast Trawl Fishery.

Catch and effort data from 1988 to 2002 for banana prawns has indicated that no consistent trends in the catch were evident and that annual variability was high. The mean daily harvest per boat has also remained relatively stable with no apparent long-term decline. While these results appear positive, DEH is concerned that the ability of this analysis to accurately depict the status of the banana prawn stocks is limited given the species tendency to aggregate and the influence of environmental factors (particularly rainfall and flow patterns) on recruitment and subsequent harvest levels. However, it is noted that DPI&F plans to conduct a stock assessment of banana prawns that will incorporate environmental parameters and preliminary results are expected by mid-2006. DEH is highly supportive of this work and encourages DPI&F to perform this assessment as a priority and to use the results to guide future management.

As with banana prawns, no stock assessments have been undertaken for greasyback prawns or school prawns, although such an assessment for greasyback prawns has been identified as a priority research project. Annual harvest of these species between 1998 and 2002 was also highly variable, although no consistent upward or downward trends were evident. Environmental factors have a significant impact on greasyback prawn stocks, with infusions of freshwater to their habitats resulting in a significant increase in abundance. Drought conditions in the Gold Coast have caused localised declines in both greasyback and school prawns. For these reasons, DEH considers that a robust assessment of the stock status of greasyback and school prawns is warranted and encourages DPI&F to conduct this priority research project for greasyback prawns in a timely manner. Effort directed toward school prawns appears to have been reducing over the last five years, potentially as a result of the species aggregating nature and the implementation of statutory limits on fishing time in the RIBTF. This has caused fishers to be reluctant to spend time searching for low value species such as the school prawn, resulting in reduced exploitation levels of this species. While DEH recognises that these factors are likely to reduce the risk of overfishing this species, DEH encourages DPI&F to examine the feasibility of conducting an assessment of school prawn stocks if the need arises in the future.

Relative recruitment levels for tiger, endeavour and eastern king prawns are monitored annually through the fishery independent LTMP. Research is also currently in progress to attempt to establish a maximum sustainable yield for eastern king prawns. Eastern king prawns are a major species taken in the Queensland East Coast Trawl Fishery, although most of this catch is taken by the otter trawl sector. The species is only taken in small quantities (approximately 3.5 t in 2003) as byproduct in the RIBTF. The mean CPUE for this species has remained relatively stable with a

slight upward trend evident, although no detailed stock assessment has been undertaken. DEH recognises that the small catch of this species from the RIBTF, but given the eastern king prawn stock was identified as being fished at maximum sustainable yield levels in the General Effort Review (Kerrigan *et al.*, 2004), DEH considers that the RIBTF catch data should be incorporated into future stock assessments undertaken for eastern king prawn.

While the status of tiger prawn stocks is based on an analysis of CPUE data and on a quantitative stock assessment (based on results of the LTMP), DEH raised concerns about the status of the tiger prawn stock in its assessment of the ECOTF. This concern was based on the uncertainties surrounding the data used in the stock assessment and on the fact that analysis was conducted on pre-2002 data. While catches of tiger prawns in the RIBTF are relatively low compared to the ECOTF, DEH has encouraged DPI&F to review the analysis as soon as more current data are available and would expect results from the review to be applied in management of the RIBTF.

Bay prawns are a major target of the RIBTF and harvest has varied greatly between 1988-2002. The take of juvenile prawns was raised as a concern during the public comment process. DPI&F responded to this concern by claiming that the minimum mesh sizes allowed in the RIBTF would not enable the capture of juvenile prawns and that the closures of nursery areas (described in Table 2) would provide some protection to bay prawn stocks. However, examination of the catch data provided in the submission indicates that bay prawns have consistently comprised a large portion of the total catch from the RIBTF. No detailed assessment of the status of bay prawn stocks has been conducted and this concerns DEH given that bay prawns as a group are comprised of juveniles of species taken in large quantities in other east coast trawl fisheries (including eastern king prawns, tiger prawns and banana prawns). While stock assessments for eastern king prawns and tiger prawns have been undertaken for the ECOTF, it is not clear that they have taken account of the harvest of juveniles of these species by the RIBTF. It is noted in the submission that a future stock assessment has been put forward as a priority research project for bay prawns. DEH considers it important that the harvest of juvenile eastern king prawns, tiger prawns and banana prawns by the RIBTF is included in stock assessments carried out for these species and that the impact of this level of juvenile harvest of such species is taken into account when determining sustainable harvest levels.

**Recommendation 6:** *DPI&F to include RIBTF catch estimates of juvenile ECOTF target species, where relevant, in future stock assessments of these species.*

The General Effort Review (Kerrigan *et al.*, 2004) conducted on the East Coast Trawl Fishery highlighted the need to collect data on the composition of bay prawn catches before more detailed assessments could be completed. Given **Recommendation 6** requires that RIBTF bay prawn catch data be incorporated into species specific stock assessments, DEH recommends that DPI&F implement a system to collect data on the composition, in terms of both species and life-stage, of bay prawn catches in the RIBTF.

**Recommendation 7:** *By the end of 2007, DPI&F to implement a system to collect data on the composition (species and life-stage) of bay prawn catches in the RIBTF for use in species specific stock assessments.*

DEH is concerned at the general lack of data regarding stock status of target species and most byproduct species taken in the RIBTF. While the catch and effort information collected can provide a general indication of CPUE, DEH considers it is not sufficient to guide management of the RIBTF, particularly given the limitations of the data outlined in the previous section. Biomass dynamic models have been prepared for tiger and eastern king prawns and have shown that both

species are fully exploited. According to the submission it is reasonable to assume that those species that have not been modelled in detail (except school prawns) are also being fully exploited. Consequently, it is important that stocks of all these species are managed in a precautionary and ecologically sustainable way. DEH recognises that the catch taken in the RIBTF is relatively small, but considers that more detailed assessments of stock status that take into account growth, spawning and recruitment of the target species would be beneficial for ensuring the ecological sustainability of stocks given the impact of environmental variables on prawn stocks. DEH notes the considerable overlap between species harvested in the ECOTF and the RIBTF and considers any fishery assessment process should incorporate both fisheries.

**Recommendation 8:** *In conjunction with work being undertaken on ECOTF principal and permitted species, DPI&F to develop a robust and regular fishery assessment process, that provides a basis for management decisions, which are precautionary and recognise the uncertainty and level of risk. The assessment process will examine the ecological sustainability of the target and permitted species within three years, using stock or risk assessments. Appropriate management responses will be developed to reduce risks to any high-risk species or groups.*

The spatial distribution of target species in the RIBTF is known from CFISH data and from a range of published accounts of research into the species distributions. DEH considers that this distribution has been taken into account in management of the fishery. Known locations of major nursery, recruitment and spawning areas are closed to fishing activity and closures appropriate to the location and timing of abundance in the areas have also been progressively implemented over a period of 20 years to increase protection of the stocks from overfishing. These closures are outlined in Table 2.

**Table 2:** Closures implemented in the RIBTF in response to the spatial structure of target species stocks.

<b>Species</b>	<b>Spatial structure/distribution</b>	<b>Associated closure</b>
Bay	Use sub tidal flats and seagrass beds as nurseries in Moreton Bay, Sandy Straits and other southern estuaries.	Large areas of Moreton Bay, Sandy Straits and other southern estuaries closed to trawling.
School	Limited distribution between southern Victoria and Tin Can Bay in Qld. Use sub tidal flats and seagrass beds as nurseries in Moreton Bay, Sandy Straits and other southern estuaries.	Large areas of Moreton Bay, Sandy Straits and other southern estuaries closed to trawling.
Banana	This species is widespread in the Indo-West Pacific region. Spawning occurs offshore and they use estuarine nursery areas for postlarval and juvenile growth.	Multiple coastal strip closures and other estuary closures along east coast.
Tiger and endeavour	These species occur on the Australian east coast between 12°S and 28°S. They have extended distributions across the Indo-Pacific. Juveniles and pre-recruits use coastal grounds, typically within 10 km of coastline, depths less than 30 m.	Multiple coastal strip closures protect seagrass habitats along Qld east coast, seasonal closures limit take of juvenile prawns.
Eastern king prawns	Occur between 22°S and 37°S. Juveniles and adolescents migrate northward, larvae disperse south into estuaries from NSW into southern Qld.	Closures in Moreton Bay and Great Sandy Strait protect juveniles post settlement. Southern (6 week) closure reduces catch during latter part of spawning period.

Potential removals from populations of the target species include direct harvest by the RIBTF, direct harvest from other Queensland east coast trawl fisheries and recreational and indigenous harvest.

The weight or number of target species and landed byproduct species are monitored through the compulsory CFISH logbook program. Although the quality of this data has varied over time as the location of fishing activity has been recorded at a finer scale, it is clear that DPI&F have utilised this data and taken into account removals from the RIBTF. DEH is concerned that there is currently no validation of catch and effort data (see **Recommendation 4**). DPI&F note in the submission that onboard observer and buyer return monitoring programs are being designed to validate logbook data for high priority species in high priority areas of the Queensland East Coast Trawl Fishery and that catch validation in the RIBTF will be incorporated into these programs.

DPI&F has gained a good understanding of the level of recreational harvest of trawled species through surveys that have been implemented. Take by this sector does not appear to be taken into account since it is so low relative to that of the commercial sector (7 tonnes of prawns and 270 tonnes of blue swimmer crabs). DEH accepts this reasoning but encourages DPI&F to continue to monitor take by the recreational sector and to take removal by this sector into account in the event that it increases over time.

Indigenous take of trawl species, apart from that taken by licensed individuals, is also likely to be low given that only basic fishing equipment such as cast nets is used.

### **Management response**

The RIBTF aims to maintain ecologically viable stock levels through a range of measures including effort capping and reduction, licence number limitation, spatial and temporal closures and gear restrictions.

The fishery is primarily managed through effort caps that control the harvest of target species. The number of licenses in the RIBTF has been reduced from 222 in 1996 to 153 in 2003 and have remained steady since. The largest reduction in effort occurred in 1997-98 when 57 fishery symbols were removed from the fishery. While effort has fluctuated over the years from 4214 days in 1988 to 8479 days in 1998 before decreasing again to 6438 days in 2002, DPI&F considers that effort in the RIBTF is unlikely to increase in the future. This is mainly because T7 licenses cannot be transferred, so as existing fishers leave the fishery, effort will be contracted. In addition, the fishery is somewhat seasonal and largely based upon annual recruitment of target species that transit beam trawl grounds from shallow, inshore flats to deeper offshore waters. Because transit time is normally quite short for the target species, there is little incentive to increase the length of the fishing season. DEH considers that effort in the RIBTF is well managed and likely to control the level of take in the RIBTF.

The Trawl Plan, the *Fisheries Act 1994* and its associated Regulation, describe closures that can be implemented in the event that a need to control or reduce take from the fishery arises. These include:

- Emergency powers to close a fishery for a short period (usually 28 days) in the event of a crisis, or to implement significant short term changes to its management regime, without reference to the normal legislative process required to develop a Regulation under the *Fisheries Act 1994*;

- A capacity to introduce a Regulation for almost any purpose to do with meeting the objectives of the Act, under section 223 of the Act;
- The capacity to bring about spatial and/or temporal closures to protect spawning and/or nursery grounds or spatial closures to protect fished stocks. For some species it is possible to identify where the majority of the catch is harvested from and closure of this area would provide protection to the stock as a whole;
- Temporal closures that allow a stock to rebuild;
- Changing the species from a principal fish to a permitted fish (could not be targeted);
- Amending provisions for gear that can be used in certain areas, to minimise the take of the species; and
- Prohibiting the take of a species.

In addition, the Trawl Plan contains 66 specific closures in force that are relevant to the RIBTF. These include 55 permanent closures, 5 seasonal closures, 4 weekend closures, one permanent night closure and one permanent midnight closure. While many of these closures were implemented to minimise conflict between commercial and recreational fishing sectors, others were introduced as bycatch avoidance measures; for example the closure of the Brisbane River mouth area is implemented to reduce the bycatch of winter whiting. In addition, the large seasonal northern closure was introduced to prevent growth overfishing of tiger prawns. Most parts of the RIBTF have temporal closures either in the form of weekend or daylight closures. There are also instances (such as the Burnett River) where specific parts of the fishery area are closed at defined times of the year. While it is not possible with the data available to determine the total proportion of the area that is closed to fishing activity, DEH considers that the closures described above, as well as the fact that many whole river/creek systems are completely closed to beam trawl fishing, all help to control the level of take by the RIBTF.

Of the species targeted in the RIBTF, only banana prawns are also targeted by the recreational sector. However, take by this sector is now controlled through the implementation of a volume limit whereby a recreational fisher must not take or possess more than 10 L of prawns. A recreational fisher must also not possess prawns if more than 10 prawns have had their heads or any other part removed, unless the removal was to process the prawns for immediate consumption. DEH considers that this management measure will help to ensure that take by the recreational sector is controlled.

The Trawl Plan includes an objective to ensure fisheries resources taken in the fishery are taken in an ecologically sustainable way. This objective is supported by a number of review events. A review event is triggered if the CPUE for prawns falls below 70% of the average catch rate in the period 1988-1997. This limit is based on a percentage decline in CPUE in a recruitment overfishing event for tiger prawns in Western Australia. The submission does not specify why the reference points are static values between 1988 and 1997 rather than dynamic points that incorporate new CPUE data from fishing in subsequent years.

A working group was formed under the SAG to discuss improvements to the review events used in trawl fisheries, including the use of '70% of CPUE' as a reference point. The review identified some intrinsic problems with using CPUE reference points including triggering at high population levels and causing inappropriate changes to fishing effort or, conversely, failing to trigger at low population sizes. DEH has made a recommendation previously (see **Recommendation 8**) that DPI&F develop a robust fishery assessment process. This should ensure that future assessments do not rely solely on CPUE data. To support this new framework for fishery assessments, DEH has also recommended that DPI&F revise the current review events and develop appropriate performance measures, including limit reference points, for those inshore species predominantly harvested by the RIBTF (**Recommendation 2**). DEH notes that a review of the Trawl Plan is

required to commence between November 2004 and November 2006 and is supportive of DPI&F implementing this recommendation as a part of the Trawl Plan review.

A clear process for responding to breaches is included in the submission. In the event of a breach, DPI&F would obtain expert advice on the state of the relevant species from the SAG and other relevant experts. After reviewing available data and determining the cause of the breach, appropriate management responses to ensure stock recovery, such as closures, possession limits, reduction in fishing effort units or prohibiting the take of species, would be implemented. DEH considers that the range of management measures available to DPI&F to respond to a review event being triggered are sound, but is concerned that no timeframes for the implementation of management responses are described. This concern has been addressed by **Recommendation 3**.

While fishers in the RIBTF are required to record permitted (byproduct) species as a separate category, this has only been so since the implementation of the OTO7 logbook. This limitation therefore needs to be considered when interpreting catch and effort trends for byproduct species.

The Trawl Plan describes species that may be taken in the RIBTF as byproduct. These include Moreton Bay bugs, Balmain bugs, barking crayfish, blue swimmer crabs, pinkies, squid and cuttlefish although, of these, only blue swimmer crabs, squid and cuttlefish are likely to be harvested in the RIBTF as a result of natural distribution. A number of species such as sharks, winter whiting, goatfish and whiptails have been removed as permitted species in the East Coast Trawl Fisheries. Since the introduction of the Trawl Plan, the number and quantity of byproduct taken in the RIBTF has declined and now constitutes less than 2% of the total harvest from the fishery.

A Fisheries Research and Development Corporation (FRDC) project to study the biology, ecology and stock status of many of the byproduct species taken in the RIBTF has been conducted and information has also been gained from results of the LTMP. There does not appear to be any concerns in regard to the sustainability of byproduct species, mainly due to the low levels of catch in the RIBTF and the fact that known locations of major nurseries, recruitment and spawning areas of a number of these species are protected through spatial and temporal closures (Table 2). As a result of the Permitted Species Review conducted in 2001, additional management measures for byproduct species have been implemented including:

- Limiting the take of blue swimmer crabs by possession limits and gender and size restrictions;
- Limiting the take of octopus and cuttlefish by volume (66 L); and
- Limiting the take of bugs by implementing minimum size limits and prohibiting the take of egg bearing females.

DEH concurs with the assessment that byproduct levels in this fishery are low and notes that the data validation required in **Recommendation 4**, along with improved catch data as the OTO8 logbooks are used into the future, will help to confirm this assessment. No reference points to trigger a management response have been developed for byproduct species yet, although DPI&F are currently developing appropriate reference points and review events in response to a DEH recommendation made on the ECOTF. In conjunction with the work being carried out on ECOTF principal and permitted species, DEH has recommended that DPI&F review the current review events contained within the Trawl Plan and develop appropriate performance measures for RIBTF species (see **Recommendation 2**).

## Conclusion

DEH considers that the management regime in the RIBTF is appropriately precautionary and provides for the fishery to be conducted in a manner that does not lead to over-fishing. DEH considers that the information collection system 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. However, DEH is concerned that the limited assessment of stock status trends relies on CPUE data, which DPI&F acknowledges as having intrinsic problems.

DEH 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’*

This objective is not applicable to the RIBTF at present. The submission notes that biomass dynamic models for tiger and eastern king prawns have shown both species to be fully exploited and DPI&F also state that it is reasonable to assume that those species that have not been modelled in detail (except school prawns) are also being fully exploited. The level of harvest in the RIBTF is small compared to that of the ECOTF, which targets many of the same species. DEH accepts that the RIBTF is likely to have little impact on stock levels relative to the ECOTF, but given that the stocks would be shared stocks, considers it important that any management measures aimed at protecting stocks targeted in the ECOTF are also applied to the RIBTF.

DEH understands that it is difficult to determine appropriate reference points for single year class fisheries, particularly since recruitment variation can be high and strongly influenced by environmental factors. However, DPI&F recognises the need to develop more appropriate reference points and DEH has made a recommendation to address this concern (**Recommendation 2**). DEH has also made recommendations regarding the need to develop a robust fishery assessment process (**Recommendation 8**) and to implement a timeframe for triggering reviews and management responses in the event that a performance measure is breached (**Recommendation 3**). DEH expects that through the implementation of these recommendations, stock levels will be managed at precautionary levels.

## Conclusion

DEH considers that the prawn stock is not below a defined reference point but should that occur in the future, 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.

## **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**

Fishers in the RIBTF are not required to report discarded bycatch species that are not of conservation interest. The logbooks currently implemented in the RIBTF do, however, require fishers to record the use of BRDs and TEDs. Fishers are required to report on protected species interactions and this is discussed further under Principle Two, Objective Two.

Studies that examined the commercial prawn catch, including bycatch, from a number of Queensland estuaries have been conducted. Results generally demonstrated that the impact of beam trawling and bycatch was not the main cause of changes in species composition and abundance, but rather that this could be attributed to other anthropogenic impacts such as urban and agricultural runoff. The studies also described some of the species that are likely to be taken as bycatch during beam trawling operations in estuarine environments. DEH recognises that these studies are useful in that they provide some data on bycatch, but is concerned that there is no ongoing monitoring of bycatch composition and abundance. Experimental trawls in the banana prawn sector of the ECOTF have shown that bycatch has been reduced by an estimated 55% through the use of BRDs. While this result is encouraging, without a means of monitoring bycatch on a long term basis, it is impossible to assess the effectiveness of BRDs in the RIBTF.

**Recommendation 9:** *By the end of 2007, DPI&F to develop and implement a system sufficient to identify changes in the composition and quantity of bycatch in the RIBTF over time.*

### **Assessment**

No risk analysis of the impacts of the RIBTF on bycatch species has been undertaken. DPI&F note that the complexity of bycatch fauna and communities over the range of the fishery means that such an analysis would be difficult to perform. There has also been no assessment of the survivability of bycatch species, although anecdotal evidence suggests that river perch have a high mortality rate while adult yellowfin bream have a high post-trawl survival rate, actively returning to the water upon release.

A risk assessment process for bycatch components using a modified approach to that developed by Stobutski *et al.* (2000) has been proposed. However, no timelines or requirements have been specified for this risk assessment. DPI&F claim that impacts to bycatch species are likely to be negligible given that the area in which the fishery operates (relatively shallow estuaries that adjoin coastal embayments) have been highly modified by other anthropogenic activities such as agriculture, urbanisation, sewage disposal and water use. While DEH accepts that the environment in which the RIBTF operates is likely to be highly modified, an impact from fishing activity in the RIBTF cannot be discounted given that DPI&F acknowledge approximately 200 species are taken as bycatch in this fishery. DEH does, however, acknowledge that the relatively small scale of the RIBTF means that the application of a robust risk assessment for the RIBTF is not a priority. The implementation of **Recommendation 9** is likely to provide baseline data on bycatch abundance and

composition. DEH urges DPI&F to monitor this data and to perform a bycatch risk assessment in the event that this data indicates one is warranted.

## **Management response**

A number of measures are in place in the RIBTF for the purpose of minimising impacts on bycatch species. These include trawl closures, effort reductions and the use of BRDs.

Under the Trawl Plan, 66 closures have been implemented in the RIBTF. Areas that were previously open to trawling provide extensive refugia for a range of species, including those that would have been taken as bycatch in those areas. In addition to permanent closures, many of the 66 closures are seasonal and implemented for the purpose of protecting and maintaining principal, permitted and bycatch species from overfishing. The rezoning of the GBRMP has also closed a number of areas to trawling and the implementation of the complementary, State managed Great Barrier Reef Coast Marine Park in 2004, also help to protect bycatch species.

Under the Trawl Plan licenses endorsed with the 'T7' symbol are not transferable. Consequently, the number of participants in the fishery is decreasing and it is expected that this component of the RIBTF will be phased out within 15-20 years. In addition, the Trawl Plan includes a review event that would be triggered if the amount of unit efforts had not decreased by at least 13% in the first effort year. The reduction in the first effort year (2001) was 14%, which met this performance target. Effort has been further reduced since then, with the number of licences reduced from 222 in 1996 to 153 in 2004. DEH accepts that these reductions in effort in the RIBTF would have reduced the amount of bycatch taken, but notes that the relationship between effort and bycatch is unlikely to be linear. However, effort reduction is only one measure employed by DPI&F to reduce bycatch in the RIBTF.

Since 1 July 2001, the use of BRDs has been compulsory in the RIBTF under the Trawl Plan. Prior to this, BRDs had been used on a voluntary basis as a means of reducing the amount of bycatch and improving the value of the catch. Compliance with the requirement to use BRDs in the RIBTF is high with only 3 BRD/TED related offences reported in 2002-03 out of 97 inspections. Five designs of BRDs are currently described under the Trawl Plan, although DPI&F acknowledge that the design of a BRD that will increase the chances of escape of bycatch species without resulting in significant target or byproduct species losses is likely to be an ongoing process. Potential bycatch reduction targets of up to 55% have been demonstrated in the ECOTF banana prawn sector, although it is not known whether BRDs are being similarly successful in the RIBTF.

**Recommendation 10:** *DPI&F to continue to pursue a reduction in the amount of bycatch taken in the RIBTF through the refinement of bycatch mitigation technology and to support the investigation of methods for increasing the survivability of bycatch species. Any effective and appropriate methods identified should be implemented under legislation within eighteen months.*

No specific bycatch species or species group is being monitored. The Trawl Plan contains a review event that required a 40% reduction in bycatch by January 2005. This target was a recommendation from the Premier's Working Group on the fishery after negotiation with the industry and was developed without specific knowledge regarding the levels of reduction required to achieve sustainability. DEH is concerned about the measurability of this review event given that no information on bycatch has been collected in the RIBTF. DEH is also concerned that the timeframe for this review event has now passed and is therefore invalid. DPI&F note that the composition and abundance of bycatch taken in the RIBTF is complex and likely to vary both spatially and temporally. However, the implementation of **Recommendation 9** will provide information on the abundance and composition of bycatch, upon which DPI&F could base a more meaningful

performance measure for bycatch. A research program assessing species at high risk from trawling is also underway and results from this project may also provide results that could be used in the development of bycatch performance measures.

**Recommendation 11:** *DPI&F to, by the end of 2008, implement precautionary performance measures related to bycatch in the RIBTF. In the interim, DPI&F to develop bycatch related performance measures based on the best available information by the end of 2006.*

## **Conclusion**

DEH considers that, given the effort reduction measures, fisheries closures and BRDs implemented in the RIBTF, there is a high likelihood the fishery is conducted in a manner that does not threaten bycatch species. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that DPI&F would undertake appropriate actions to ensure that bycatch species are not threatened by this fishery.

Recommendations have been developed to 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**

Prior to the introduction of the OTO7 logbook in 2000, fishers in the RIBTF were not required to record interactions with protected species. The OTO7 logbook required fishers to record interactions with turtles, including data on the species, the number of interactions and the condition of the turtle when released (alive or dead). However, data on interactions with other protected species was not recorded. The OTO8 logbook was introduced into the RIBTF in 2003. This logbook provides for fishers to record whether they had any interactions with species of conservation interest by circling 'yes' or 'no'. Where interactions are recorded, fishers are also required to complete a Species of Conservation Interest (SOCI) logbook, which was introduced in 2003. The SOCI logbook records data on interactions with turtles (species specific), syngnathids, seasnakes, dugong, cetaceans and grey nurse sharks. DEH considers that this logbook will provide sound fishery-dependent information on interactions with protected species. To support the introduction of the SOCI logbooks, an education program for fishers has been implemented to enable accurate reporting, promote appropriate handling techniques and highlight the importance of minimising interactions with protected species. In 2005, DPI&F released *Looking after protected species in Queensland – a brief guide for commercial fishers* (DPI&F, 2005b) and *Looking after protected species in Queensland – seabird care & handling* (Waterbird Rescue Queensland and DPI&F, 2005). DEH congratulates DPI&F for its proactive approach to information collection on and education regarding protected species interactions.

Data is also available from the Queensland Parks and Wildlife Service (QPWS) who have compiled a Wildlife Stranding and Mortality Database for several species of conservation interest including dugongs, cetaceans, pinnipeds and turtles.

## **Assessment**

A number of species of conservation interest, including turtles, dugongs and dolphins occur within the area of the RIBTF. The introduction of the SOCI logbook for commercial fishers, along with the education program referred to above, is likely to enhance information to be used in any future assessments of the type and level of interactions between the RIBTF and protected species.

Five of the six species of turtle that are listed as threatened under the EPBC Act occur in Queensland coastal waters where capture by beam trawlers is possible. Despite this, the RIBTF logbook data has not reported any turtle captures or mortalities. Although this form of data has only been collected for a relatively short amount of time, these results are supported by those from the QPWS Stranding and Mortality database which found that, of the 495 strandings of sea turtles that occurred during 2000, none could be attributed to capture in trawl nets. DPI&F claim, and DEH concurs, that this result can likely be attributed to the use of TEDs, which have been compulsory since 2001.

Four species of sea snake also occur in the area of the RIBTF. These species have been recorded as bycatch in the ECOTF banana prawn sector and interactions with these species in the RIBTF may occur given the inshore location of the fishery and the fact that it is adjacent to the banana prawn fishery. However, there have been no recorded interactions with sea snake species in the RIBTF. While sea snakes have been taken as bycatch in the ECOTF, the mortality rate of those taken is low and this is believed to be attributed to the short shot times (average  $55 \pm 28$  minutes) employed in that fishery. Given that the shot times in the RIBTF are even shorter than this (15-30 minutes), it is likely that if sea snakes were taken as bycatch there would be a high survival rate of discarded sea snakes. DEH therefore considers that the RIBTF is unlikely to have a significant impact on sea snake populations.

There have been no reported interactions with dugongs in the RIBTF and this is most likely due to the small size of the trawl gear used in the fishery and the short shot times. In addition, areas designated as Dugong Protection Areas are permanently closed to net fishing and DEH considers that this is likely to ensure that interactions with dugongs in the RIBTF are minimised.

There are also no reported interactions with seabirds in the RIBTF. Although no studies of the effects of the RIBTF on seabirds have been conducted, DPI&F have compiled a risk assessment based on species distributions and their feeding habitats within the area of the fishery. Based on the results of this assessment, of all the species found within the fishery area, none are likely to be at high risk of capture in the fishery.

Syngnathids have not been recorded as being taken as bycatch in the RIBTF and it is assumed that these species are not directly impacted by the RIBTF. DEH expects that better information regarding interactions with these and other protected species will become available as SOCI logbooks continue to be used in the RIBTF. DEH would expect DPI&F to implement appropriate management responses in the event that interactions with protected species were found to be greater than previously thought, or increasing.

There are no listed ecological communities in the fishery area.

## **Management response**

A number of measures have been implemented in the RIBTF for the purpose of minimising interactions with protected species. The use of TEDs has been compulsory since 2001 and was introduced as a management measure despite the risk of interactions with turtles being considered

minimal. Since the introduction of compulsory reporting of turtle interactions, none have been recorded. Apart from the use of TEDs, this could also be attributed to the area and seasonal closures implemented in the RIBTF to protect turtle nesting and/or feeding grounds. For example, trawling is prohibited north of 22°S (approximately midway between Mackay and Rockhampton) between 20 September and 1 November. In addition, the northern tip of Fraser Island is closed to trawling since it contains known loggerhead turtle nesting areas. DEH considers that these measures, as well as the short shot times employed in the RIBTF, are likely to ensure that impacts of the RIBTF on turtle species are unlikely.

The RIBTF also has potential to interact with dugongs and sea snakes given that it operates in relatively shallow, inshore areas. However, the use of TEDs and BRDs, are likely to minimise such interactions. In addition, the closures implemented in the RIBTF are also designed to minimise the impact of trawling on sensitive habitats, such as shallow water seagrass beds, which in turn is likely to protect important dugong habitat.

DEH considers that the ongoing use of the SOCI logbooks along with the education program that has been implemented should improve knowledge and data reliability over the coming years. The submission claims that syngnathids are not directly impacted by the fishery, although this assumption appears to be based on literature, rather than results from bycatch or protected species monitoring. DEH considers that the implementation of a system to monitor the composition and abundance of bycatch (**Recommendation 9**) and the education program that has been implemented in Queensland will ensure that any incidental catch of these species is identified and recorded. If the bycatch of these species were to become a significant problem, DEH would expect DPI&F to respond appropriately.

**Recommendation 12:** *DPI&F to continue to take all reasonable steps to reduce protected species interactions. Each year, DPI&F to report publicly on interactions with protected species, incorporating the latest research findings.*

## Conclusion

DEH notes that interactions with protected species in this fishery are minimal and considers 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 expects that appropriate actions will be undertaken to ensure the fishery avoids mortality or injury to these species and avoids or minimises impacts on threatened ecological communities.

A recommendation has been developed to ensure that the risk of unacceptable impact on protected species is minimised in the longer term.

## 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

While fishers in the RIBTF are not required to explicitly report on any environmental effects of their fishing activity, they are now required to report fishing activity within 6 minute grids. DEH

recognises that this enables a more detailed spatial analysis and the discrimination of effort between habitats within the area of the fishery.

A number of fishery independent studies have been conducted that are relevant to the RIBTF and its impact on the general ecosystem. These include a study of the Moreton Bay Beam Trawl Fishery including the estuarine habitat (Hyland, 1988), the beam trawl fishery in the Bundaberg region including the environmental disturbance caused by the fishery (Dredge, 1983) and an analysis of the RIBTF and the environmental degradation it causes (Reid and Campbell, 1998). Information is also available on provisioning of discards from research trawl surveys in the general East Coast Trawl Fishery and from the Torres Strait Prawn Fishery, while numerous studies on seagrasses in the area of the RIBTF have been conducted.

DEH is concerned at the lack of information collection and research covering the fisheries impact on the ecosystem and environment generally. However, DEH understands that this lack of information is the case across a range of Australian and International fisheries and, until appropriate research techniques and programs are developed and implemented, this will continue to be the case. DEH strongly supports research in this area.

### Assessment

The submission reports that beam trawling has potential to impact upon the environment in three main ways:

- Disturbing the macrobenthic community that some estuarine fish are dependent on as a food source;
- Removing fallen mangrove timber or other structures which reduces the habitat available for fish that utilise such snags; and
- Offering a temporary concentrated food source to predators and scavengers through discarding (provisioning).

An additional impact on the ecosystem is that caused by the removal of the target and byproduct species from the ecosystem and associated ecological impacts.

DPI&F note that the impacts to ecological communities as a result of fishing activity is likely to be negligible compared to the impacts caused by other human induced changes such as agricultural and urban runoff. DEH acknowledges that such impacts are likely to have had significant impacts on the inshore and riverine communities targeted by the RIBTF, however fishing related impacts cannot be ignored. DEH does, however, consider that such impacts are likely to be limited given the limited nature of fishing effort and the closures implemented in the fishery.

The RIBTF has the potential to impact upon food chains both through the removal of macrobenthos and through the removal of target and byproduct species from the ecosystem. A study of a well used estuary in New South Wales found that otter trawling did not cause any observable changes to macrobenthic communities. Similarly, another study in Queensland tropical estuaries found that, while commercial net fishing did reduce target fish species relative to areas with no fishing activity, the abundance of prey and competing predator species was not significantly altered. These results are positive, however it has not been determined whether they can be applied to the RIBTF. DEH encourages DPI&F to further examine the impact of the RIBTF on the general ecosystem particularly in terms of food chain effects, and considers that such research could be incorporated into the strategic research plan required under **Recommendation 5**.

The fishery also has the potential to impact local food chains through the provisioning of discards. Species likely to take advantage of discards include common inshore predators and scavengers such

as sharks, dolphins, crabs and seabirds. However, DEH would not expect such a practise to cause a significant impact.

The RIBTF is likely to have the most potential to impact on the physical environment through disturbing the substrate and associated macrobenthos. The most damage to substrate is done when beam and tickler chains are used, although these are not always used in the RIBTF. Instead, trawlers in Moreton Bay usually utilise either a drop chain hung from the lead (bottom) line or a very thick rope-wrapped ‘mud-rope’ as the lead line so as not to get bogged. While a study by Dredge (1983) found that physical disturbances did result from trawling activity, such disturbances were minimal relative to larger catchment scale disturbances. Hyland (1988) reached a similar conclusion. DEH considers that trawling is likely to result in physical disturbances to the environment however the measures employed in the RIBTF (the non-use of beam and tickler chains and the spatial closures of important habitats) are likely to minimise such impacts.

### **Management response**

A number of management measures used in the RIBTF minimise the risk of significant impacts of fishing on ecosystems and their components. While most management measures have been established to protect target species and their habitats, some have been implemented to protect and conserve non-retained and protected species.

The compulsory use of TEDs and BRDs in the RIBTF serves to minimise the impact of the fishery on food chain structure and productivity by reducing the amount of bycatch (and therefore biological material) taken out of the ecosystem. DEH acknowledges the steps that DPI&F have already taken to minimise bycatch and has recommended DPI&F continue to refine and implement bycatch mitigation technology into the RIBTF (see **Recommendation 10**) to further reduce this impact.

Sensitive ecosystems, such as seagrass areas, are well protected from fishing activity in the RIBTF through spatial closures and through marine plant species protection legislation under the *Queensland Fisheries Act 1994*. These closures, as well as temporal closures, are likely to protect important habitat for a range of species, including protected species such as the dugong, which will in turn lessen any ecosystem impacts.

Apart from the compulsory use of TEDs and BRDs, fishers in the RIBTF must also comply with gear restrictions relating to the maximum size limits applying to the thickness of ground and tickler chains of inshore and deepwater trawl nets. While such apparatus is not routinely used in the RIBTF, DEH is supportive of these restrictions as they are likely to minimise impacts to the benthic communities and substrate where they are used.

Impacts on water quality through the discharge of plastic wastes and pollution from vessels are controlled under MARPOL legislation. Operators are required to comply with the legislation and must retain any plastic waste and dispose of it only when the vessel returns to port.

The Trawl Plan contains a requirement for a scientific study to be undertaken before 1 January 2005, and for the results of this study to be used by the Chief Executive to assess the level of reduction of benthic impact compared to a pre-November 1999 baseline. In November 2004, a preliminary analysis of impact reduction of the otter trawl fishery on benthos was conducted and reported on in the Annual Status Report for the Queensland East Coast Trawl Fishery 2004 Effort Year (Gaddes & Zeller 2005). The analysis concluded that, despite several constraints to direct measurement of benthos impact reduction, it is likely that the East Coast Trawl

Fishery (combined otter trawl and beam trawl) achieved the 25% reduction required under the Management Plan. Given the relatively small size of the fishery, together with the management measure implemented under the Trawl Plan, DEH is confident that the fishery will continue to be managed in a manner that aims to minimise ecosystem and broader environmental impacts.

## **Conclusion**

DEH considers that the fishery is conducted in a sufficiently precautionary manner to minimise the impact of fishing operations on the ecosystem generally.

As the fishery operates in the GBRMP World Heritage Area and several Ramsar wetland sites, consideration needs to be given to potential impacts of the RIBTF on these matters of national environmental significance. DEH considers that the fishery, if operated consistently with the current management regime and given the large areas of the GBRMP protected from trawling, is unlikely to have a significant impact on the World Heritage values of the GBRMP or the ecological character of the Moreton Bay, Bowling Green Bay, Shoalwater and Corio Bay Area and Great Sandy Strait Ramsar wetland sites.

## REFERENCES

- Department of Primary Industries and Fisheries. 2005a. *2004 Annual Status Report - Queensland East Coast Trawl Fishery*. 59 pages.
- Department of Primary Industries and Fisheries. 2005b. *Looking after protected species in Queensland – a brief guide for commercial fishers*.
- Dredge, M. 1983. *A study of the beam trawl fishery and its impact on other fisheries in the Bundaberg region*. Report to the Queensland Fish Management Authority.
- Environment Australia. 2003. *Recovery Plan for Marine Turtles in Australia*.
- Gaddes, S. and Zeller, B. (2005) *Annual Status Report for the Queensland East Coast Trawl Fishery 2004 Effort Year*. The State of Queensland, Department of Primary Industries and Fisheries, Brisbane, 2005.
- Henry, G. and Lyle, J. (eds). 2003. *The National Recreational and Indigenous Fishing Survey*. Fisheries Research and Development Corporation Final Project Report 99/158. Australian Government Department of Agriculture, Fisheries and Forestry.
- Higgs, J. 2001. *Recreational catch estimates for Queensland residents*. RFISH Technical Report number 3, Results from the 1999 diary round. 62 pages. Queensland Fisheries Service, Department of Primary Industries.
- Hyland, S. 1988. *The Queensland Moreton Bay beam trawl fishery for penaeid prawns*. Fisheries Research Branch, Department of Primary Industries.
- Kailola, P., Williams, M., Stewart, P., Reichelt, R., McNee, A. and Grieve, C. 1993. *Australian Fisheries Resources*. Bureau of Rural Sciences and the Fisheries Research and Development Corporation, Canberra. 422 pages.
- Kerrigan, B., Gaddes, S. and Norris, W. (eds). 2004. *Review of the Sustainability of Fishing Effort in the Queensland East Coast Trawl Fishery*. Queensland Department of Primary Industries and Fisheries.
- Reid, C. and Campbell, H. 1998. *Bioeconomic analysis of the Queensland Beam Trawl Fishery*. The University of Queensland, Brisbane.
- Shark Advisory Group and Lack, M. 2004. *National Plan of Action for the Conservation and Management of Sharks (Shark-plan)*. Prepared for the Australian Government Department of Agriculture, Fisheries and Forestry.
- Stobutski, I., Blaber, S., Brewer, D., Fry, G., Heales, D., Jones, P., Miller, M., Milton, D., Salini, J., Van der Velde, T., Wang, U., Wassenbery, T., Dredge, M., Courtney, A., Chilcott, D. and Eayrs, S. 2000. *Ecological sustainability of bycatch and biodiversity in prawn trawl fisheries*. Fisheries Research and Development Corporation Final Report 96/257.
- Waterbirds Rescue Queensland and the Department of Primary Industries and Fisheries. 2005. *Looking after protected species in Queensland - Seabird Care and Handling*. DVD.

## LIST OF ACRONYMS

AFMF	Australian Fisheries Managers Forum
BRDs	Bycatch Reduction Devices
CFISH	Commercial Fisheries Information System
CL	Carapace Length
CPUE	Catch per Unit Effort
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEH	Department of the Environment and Heritage
DPI&F	Department of Primary Industries and Fisheries
ECOTF	East Coast Otter Trawl Fishery
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FRDC	Fisheries Research and Development Corporation
GBRMP	Great Barrier Reef Marine Park
LTMP	Long term Monitoring Program
MARPOL	International Convention for the Prevention of Pollution from Ships
NAFMW	Northern Australian Fisheries Management Workshop
NRIFS	National Recreational and Indigenous Fishing Survey
QBFP	Queensland Boating and Fisheries Patrol
QPWS	Queensland Parks and Wildlife Service
RIBTF	River and Inshore Beam Trawl Fishery
SAG	Scientific Advisory Group
SOCI	Species of Conservation Interest
TEDs	Turtle Excluder Devices
Trawl MAC	Trawl Management Advisory Committee
UNCLOS	United National Convention on the Law of the Sea
WTO	Wildlife Trade Operation