

Annual status report 2008

River and Inshore Beam Trawl Fishery



Introduction

The River and Inshore Beam Trawl Fishery (RIBTF) is one of three sub-fisheries within the Queensland East Coast Trawl Fishery (ECTF).¹ Target species include banana prawns and greasyback prawns. Minor quantities of squid and Moreton Bay bugs are also landed. This report covers the status of the RIBTF during the 2007 calendar year.

The Queensland Fisheries (East Coast Trawl) Management Plan 1999 (Qld) (the Trawl Plan) was introduced in 1999 and amended in 2000. During the transition period for management arrangements significant changes occurred to fishing operations; 2001 is considered to be the first typical effort year in the post-Trawl Plan period. It is also the historical limit for comparative analysis between years in this report. Data for the years prior to introduction of the Trawl Plan can be found in previous fisheries Annual Status Reports.²

Fishery profile 2007

Principal species beam trawl harvest: 366 t (364 t prawn, 2 t squid and bug)

Permitted species beam trawl harvest: <1 t blue swimmer crab and cuttlefish

Recreational harvest 2005 (non-trawl): 200 t of banana prawns, 140 t of blue swimmer crabs and 50 t of squid

Indigenous harvest (non-trawl): uncertain but considered negligible³

Charter harvest (non-trawl): nil

Commercial Gross Value of Production (GVP): approximately \$4.8 million

Number of beam trawl licences: 143 as at June 2007

Commercial boats accessing RIBTF: 77 in 2007

Effort in the fishery: 5797 (days) in 2007

Fishery season: 1 January–31 December

* Harvest tonnages are best available estimate based on fisher logbooks

Description of the fishery

Fishing methods

River and inshore beam trawling is effectively confined to an estuarine and inshore operation involving vessels under 9 m in length. These vessels are entitled to work in specified areas in rivers and creeks, towing a single 5 m head-rope trawl made of mesh no smaller than 28 mm. A maximum combined net length of 10 m, with mesh size no less than 38 mm and no greater than 60 mm is specified for use on inshore fishing grounds. The only exception is Laguna Bay (near Noosa), where a small otter trawl net with a maximum head rope of 8 m may be used.

Fishing area

¹ The East Coast Otter Trawl Fishery, the Moreton Bay Trawl Fishery and the River and Inshore Beam Trawl Fishery make up the East Coast Trawl Fishery

² Available online at: www.dpi.qld.gov.au/fishweb

³ Statewide indigenous harvest estimates are not available for species harvested by beam trawl

The type of fishery symbol attached to a commercial fishing licence dictates the area that can be fished. Under the Trawl Plan, the use of the beam trawl gear is permitted between Cape York and the Queensland/NSW border. RIBTF operations use T5, T6, T7, T8, and T9 licence symbols (Figure 1).

Main management methods used

The Trawl Plan

The Trawl Plan provides the management regime for the ECTF. The Trawl Plan lists principal species that may be targeted using trawl fishing gear and by-product (permitted) species that are captured incidentally during trawling. Permitted species may be retained subject to in-possession limits based on size, quantity, sex and other criteria depending on the species.

Management Methods

The fishery is managed by a range of input (effort) and output (harvest) controls directed at ensuring the ecologically sustainable harvest of target and by-product species whilst minimising the impacts on bycatch and the environment. These include:

- limited entry restrictions in the number and size of boats that can operate in the fishery
- gear restrictions: vessel length, net head rope length and mesh restrictions apply depending on the areas of operation;
- numerous and extensive permanent area closures apply to the fishery, particularly in waters of the GBRWHA, Woongarra, Hervey Bay, Great Sandy Straits and Moreton Bay Marine Parks;
- daytime and weekend closures apply to trawling in estuaries and some inshore areas (e.g. Moreton Bay) to reduce any interactions with recreational users;
- mandatory use of bycatch reduction devices (BRDs) and turtle exclusion devices (TEDs) in areas other than a river or creek;
- logbooks and surveillance by fisheries enforcement officers (the Queensland Boating and Fishing Patrol) to monitor effort and compliance of fishing operations;
- fishing logbook data verification and bycatch monitoring by onboard observers; and
- a range of by-product harvesting protection arrangements (Table 1).

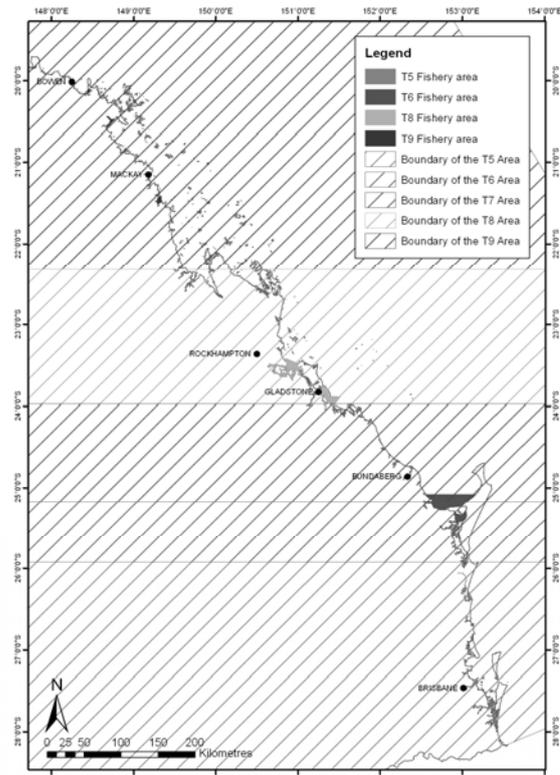


Figure 1: Fishing area of the RIBTF.

Table 1: Output controls on permitted species harvested in the East Coast Trawl Fishery.

Species	Trawl Management Arrangements	Desired Outcomes
Blue swimmer (BS) & red spot (RS) crabs	<ol style="list-style-type: none"> 1. Minimum legal carapace width (BS–11.5 cm; RS–10 cm) 2. Total ban on harvesting females 3. In possession limit (BS–500; Moreton Bay–100) 	<ol style="list-style-type: none"> 1. Protect spawners 2. Enhance egg production 3. Limits total harvest and targeting
Barking crayfish	Total ban on harvesting egg bearing females.	Enhance egg production
Mantis shrimp	In possession limit (max. 15 l)	Limits total harvest
Balmain bugs	<ol style="list-style-type: none"> 1. Minimum legal carapace width (10 cm) 2. Total ban on harvesting egg bearing females 	<ol style="list-style-type: none"> 1. Protect spawners 2. Enhance egg production
Octopus & cuttlefish	In possession limit (max. 66 l)	Limits harvest & targeting
Pinkies	In possession limit (max. 198 l)	Limits harvest & targeting
Pipefish	Trip limit of 50 individuals in total	Limits harvest & targeting

Approximate allocation between sectors

The RIBTF is a commercial fishery operating in inshore and estuarine areas where the target species are taken most effectively with beam trawl gear. Beam trawl species that are caught commercially using alternative fishing methods include: banana prawns, greasyback prawns, tiger prawns, king prawns, blue swimmer crabs, Moreton Bay bugs, squid and cuttlefish. The estimated take of these species in other east coast commercial fisheries in 2007 was 3742 t (prawn species combined), 752 t (blue swimmer crabs), 400 t (Moreton Bay bugs), 63 t (squid) and 27 t (cuttlefish). The beam trawl harvest as a percentage of the total commercial landings of these species was 10%, <1%, <1%, 2% and <1% respectively.

Recreational fishers also harvest banana prawns, squid and blue swimmer crabs. The estimated take of these species by recreational fishers in 2005 (the most recent recreational survey⁴ was 200 t, 140 t, and 50 t respectively, compared to 141 t, 1t and <1t of these species taken by beam trawlers in 2007.

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

The RIBTF was granted a WTO approval on 17 February 2006 under Part 13A of the EPBC Act. This approval acknowledges that the RIBTF is being managed in an ecologically sustainable manner and allows the export of the catch. The approval expires 15 February 2009.

Catch statistics

Commercial

Principal species

Annual catch statistics for the principal species harvested by the RIBTF are reported in Table 2. Prawns make up the main target catch. Landings of other principal trawl species (i.e. squid and bugs) are negligible. The increase in prawn catch that occurred immediately after the implementation of the Trawl Plan in 2000 has reversed since 2004.

⁴ Figures from the fourth Recreational Fisheries Information System (RFISH) telephone survey and diary round undertaken in 2005.

Table 2: Annual reported catch (tonnes) of principal fish species (beam trawl) (Source: DPI&F CFISH database, 21 October 2008).

Principal Species Group	2001	2002	2003	2004	2005	2006	2007
Prawn	369	390	417	552	385	387	364
Squid	1	1	1	1	2	2	1
Moreton Bay Bugs	0.16	0.09	0.38	0.02	0.03	0.1	0.28

Prawns

Prawns dominate the RIBT harvest. Greasyback prawns, banana prawns and school prawns are the main prawn species caught. The beam trawl fleet is split into five fishery symbols that determine the area where the vessels can operate – T5, T6, T7, T8 and T9 (Figure 2)⁵.

Since 2000, the highest proportion of the RIBT fishery catch has been taken in the T5 fishery symbol area—Brisbane River, Logan and Noosa Rivers and Laguna Bay—which since 2004 has typically produced three-quarters of the RIBT harvest (Figure 2). In order of decreasing harvest, the remaining one-quarter of the 2007 harvest was taken in:

- the T8 symbol area - rivers and creeks between Richards Point (Rodds Peninsula) and Reef Point, south of Townshend Island, Keppel Bay and Facing Island areas - accounting for 15% of the RIBT fishery harvest
- the T7 symbol area - all tidal waters of rivers and creeks between the northern bank of the Burrum River and Richards Point (Rodds Peninsula) - accounting for 5% of the RIBT fishery harvest
- the T6 symbol area - rivers and creeks between Double Island Point and the northern bank of the Burrum River, Hervey Bay and the Great Sandy Strait area, and T9 symbol area - rivers and creeks between Reef Point, south of Townshend Island, and the northern tip of Cape York Peninsula, and the Llewellyn, Repulse, Cleveland and Sinclair Bay areas - together accounting for 4% of the RIBTF harvest.

RIBTF total prawn landings declined 30% between 2004 and 2005, stabilised in 2006 but declined again by a further 7% in 2007 (Figure 2). Landings in 2007 were slightly lower compared to the previous year for all beam trawl symbols, with the exception of the T9 fishing area where the catch doubled.

Catch per unit effort (CPUE)⁶

In 2007 the average annual CPUE for prawns decreased slightly from the 2006 level but at 63 kg per day lies well within the range of CPUE values for the 2001 to 2007 period (Table 3). Very low catches

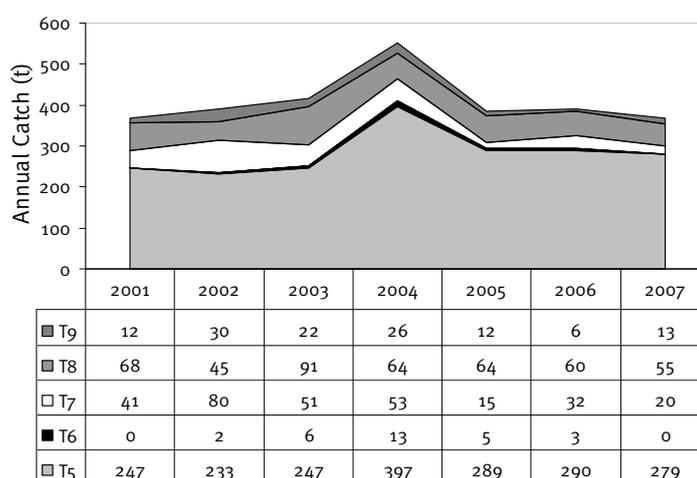


Figure 2: Annual reported catch of prawns by beam trawl fishery symbol 2001–07 (Source: DPI&F CFISH database, 21 October 2008).

⁵ More detailed definitions for the fishery symbol areas are documented in the Trawl Plan

⁶ For the purposes of this report, beam trawl target species effort was calculated based on the entire effort of the fleet.

of squid and bugs caught in the RIBTF translate into very low CPUE estimates for these species (e.g. 0 to 41 kg of squid per day and 0 to 20 kg of bugs per day during 2001–07). Identification of trends is difficult when CPUE is very low. Because only a minor part of these stocks is harvested in the RIBTF, greater significance is attached to monitoring the otter trawl CPUE. Recent research indicates that environmental factors such as extreme stream flow events during summer have a strong influence on the CPUE of banana prawns (Tanimoto *et al.* 2006)—one of the main target species in the RIBTF.

Table 3: Average annual CPUE (kg/day) trends 2000–07 (beam trawl) (Source: DPI&F CFISH database, 21 October 2008).

Species Group	2001	2002	2003	2004	2005	2006	2007
Prawns	53	59	52	72	58	65	63
Squid	0.13	0.11	0.08	0.18	0.28	0.41	0.23
Moreton Bay Bugs	0.02	0.01	0.05	0	0.01	0.02	0.05

Permitted species

The combined annual harvest of permitted (non-target by-product) species in the RIBT fishery is typically less than 1 t and is negligible compared with the otter trawl harvest of these species and the RIBT fishery prawn harvest. There has been a slight decrease in the annual RIBT fishery harvest of by-product species from 2004 to 2007 (Table 4).

Table 4: Annual reported catch (tonnes) of permitted species (beam trawl) (Source: DPI&F CFISH database, 21 October 2008).

By-product Species Group	2000	2001	2002	2003	2004	2005	2006	2007
Cuttlefish	0	0.02	0.03	0	0.02	0.36	0.29	0.12
Blue swimmer crabs	0.06	0.06	0.13	4.25	0.07	0.17	0.04	0.02
Octopus	0	0	0	0	0	0	0.03	0.02
Mantis shrimp	0	0	0	0.01	0	0	0.01	0.01

Fishing Effort

The beam trawl effort in 2007 continues a significant (30%) decline in effort since the 2003 effort year (Figure 3). Since 2003 effort reduction has also been associated with fewer boats active in the fishery.

Socio-economic characteristics and trends

The 2007 fishing season continued a 36% decline in the Gross Value of Production (GVP) of the RIBTF since 2004 (Figure 4). The reduction in GVP has tracked a large (nearly 30%) reduction of effort in the fishery since 2003. Increasing operational costs of fishing (e.g. high fuel prices and equipment) and increased supply of imported prawns is also depressing the price of wild-caught prawns on domestic markets.

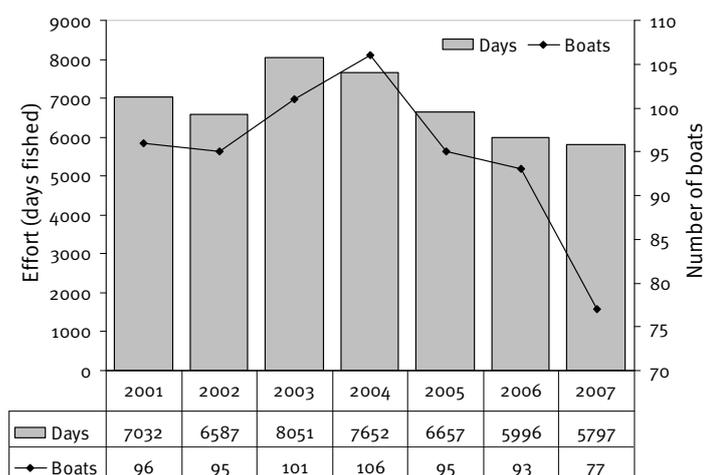


Figure 3: Annual number of reported beam trawl days fished and number of boats accessing the RIBTF (Source: DPI&F CFISH database, 21 October 2008).

Performance against fishery objectives

Appraisal of fishery with regard to sustainability

Since 2004 the RIBTF fleet has been subject to additional closures through GBRMP and State Marine Park rezoning. Reduction in effort and overall harvest in the fishery are related to the fishery adjusting to these changes. In addition increasing fuel prices and high availability of low cost imported prawns on the local market continue to impact upon the fishery.

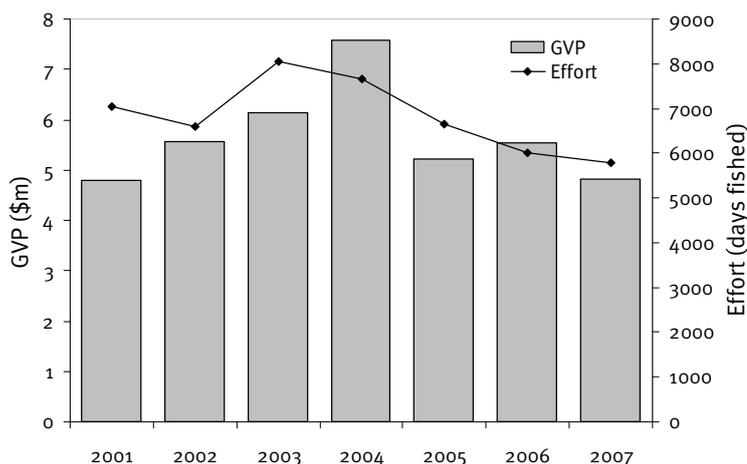


Figure 4: Annual GVP 2001–07 for the RIBTF (Source: DPI&F CFISH database, 13 November 2008).

The 2006 banana prawn stock assessment indicated that stocks are being heavily fished but that only 22% of the commercial harvest was taken in the RIBTF (Tanimoto et al. 2006). The continuation of the Fisheries Observer Program (FOP), Commercial Fishing Information System (CFISH) Logbook, Vessel Monitoring System (VMS) and the Long Term Monitoring Program (LTMP) will add to data and information available to fishery managers to ensure that the RIBTF continues to be managed in a sustainable manner. DPI&F's progress against the recommendations attached to the current RIBTF Wildlife Trade Operation approval (valid until 15 February 2009) are detailed in Table 5.

Table 5: Progress in implementing the Department of the Environment, Water, Heritage and the Arts (DEWHA) recommendations.

Recommendation	Progress
DPI&F to inform the DEWHA of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on by-product, bycatch, protected species or the ecosystem.	<i>Ongoing</i> No changes were made to management in 2007.
As part of the review of the Fisheries (East Coast Trawl) Management Plan 1999, DPI&F to, by the end of 2006: <ul style="list-style-type: none"> Incorporate RIBTF data into the development of review events and performance measures being undertaken for the East Coast Otter Trawl Fishery 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. 	<i>In progress</i> Development of performance measures for Queensland's trawl fisheries was undertaken as a priority in 2006. Preliminary performance criteria for principal species (banana prawns) and bycatch have been developed for the RIBTF. The annual landings of permitted trawl (byproduct) species in the RIBTF is negligible compared to byproduct landings in the East Coast Otter Trawl Fishery (ECOTF). Performance criteria for the RIBTF byproduct harvest will be incorporated when the East Coast Trawl Fishery (ECTF) Performance Measurement System (PMS) is

Recommendation	Progress
	updated in early 2009 for consideration by the Scientific Advisory Group of the Trawl Management Committee.
DPI&F to monitor the status of the fishery in relation to the performance measures (review events and/or reference points) specified in the <i>Fisheries (East Coast Trawl) Management Plan 1999</i> . 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.	<p><i>Ongoing</i></p> <p>DPI&F reports annually on review events currently in the Trawl Plan. Assessment of the review events for RIBTF harvested species that are taken substantially in the ECOTF will be included in the consolidated Annual Status Report 2008–ECTF currently in preparation. Upon completion in 2009, the ECTF PMS, will provide the basis from which to monitor the contribution of the RIBTF to the ecologically sustainable development of east coast trawl resources; performance measures relevant to the RIBTF will be regularly assessed and reported in future Annual Status Reports.</p>
By the end of 2007, DPI&F to develop a system to ensure that catch and effort data collected in compulsory logbooks are validated on an ongoing basis.	<p><i>Ongoing</i></p> <p>In 2007, fisheries observers monitored catch and effort, Species of Conservation Interest (SOI) interactions and bycatch composition in the RIBTF. These data will be used in the ongoing validation and assessment of fisher logbook data reliability next scheduled for 2009. Regular validation will ensure that issues of reporting accuracy and data quality are identified and managed. A data validation exercise was undertaken in January 2008 and recommendations made to improve logbook reporting accuracy.</p>
DPI&F to incorporate RIBTF research priorities into the strategic research plan being developed for the East Coast Otter Trawl Fishery 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 continual basis.	<p><i>In progress</i></p> <p>The research plan provides information to the public and research organisations on the DPI&F research priorities for the 2006 to 2011 period in the ECTF. There is significant overlap with research needs for the RIBTF and ECOTF, however, the draft strategic research plan has also incorporated specific beam trawl issues where appropriate. The strategic research plan has been publicly released and is available on the internet at: www.dpi.qld.gov.au</p>
DPI&F to include RIBTF catch estimates of juvenile East Coast Otter Trawl Fishery target species, where relevant, in future stock assessments	<p><i>Partially completed</i></p> <p>Stock assessment of banana prawns explicitly incorporates RIBTF banana prawn catch data with otter trawl catch and effort data and recreational</p>

Recommendation	Progress
<p>undertaken for these species.</p>	<p>catches for banana prawns.</p> <p>More than 95% of the total eastern king and tiger prawn harvest is assessed in regular stock assessments using otter trawl catch data. Only a minor part (5%) of the catch of these species is taken in the RIBTF. It is expected that the stock assessment models will continue to acknowledge the otter trawl catch of these species as the primary focus of regular assessments and the most significant fishery impact in their sustainable use.</p> <p>Observers have been introduced into the fishery with the aim of collecting information on catch composition, bycatch and interactions with protected species. The contribution to the RIBTF catch of juvenile ECOTF target species will be estimated through observer data.</p>
<p>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.</p>	<p><i>Not progressed</i></p> <p>(see Recommendation 7)</p>
<p>In conjunction with work being undertaken on the East Coast Otter Trawl Fishery principal and permitted species, DPI&F to develop a robust and regular fishery assessment process for the RIBTF, which 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.</p>	<p><i>In progress</i></p> <p>DPI&F has an ongoing commitment to undertake periodic stock assessments for banana prawns and risk assessments for permitted and bycatch species. A stock assessment for banana prawns was completed in 2006 as a product of an annually reviewed rolling program of stock assessments for priority species in Queensland fisheries. An ecological risk situation report is being prepared for the ECOTF and RIBTF preliminary to further development of the ECTF PMS in early 2009. It is anticipated that this report will act as a precursor to a comprehensive ecological risk assessment of the ECTF in 2011/2012.</p>
<p>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.</p>	<p><i>Ongoing</i></p> <p>Bycatch monitoring in the RIBTF is being addressed as part of the Fishery Observer Program ECTF Bycatch Monitoring Strategy. In 2007 bycatch data were collected by fishery observers for analysis and proposed development of RIBTF bycatch performance measures in early 2009. DPI&F are currently in the process of reviewing and evaluating</p>

Recommendation	Progress
	the outputs of the ECTF Bycatch Monitoring Strategy.
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.	<p><i>Ongoing</i></p> <p>Operators in the RIBTF are currently required to have BRDs fitted when trawling. Two new BRDs have recently been added to the list of recognised BRDs – the popeye fish excluder and the v-cut and bell codend.</p> <p>In certain areas, TEDs must also be used. However, the small size of the nets used precludes the use of TEDs in certain areas such as rivers and creeks. Due to the short shot times, the risk to turtles is considered low compared with the ECOTF.</p>
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.	<p><i>Completed</i></p> <p>In late 2005, the Trawl SAG developed interim precautionary performance measures for bycatch – that non-compliance with BRD and TED regulations should not exceed 5%.</p> <p><i>Proposed</i></p> <p>Development of additional performance measures is proposed for the fishery, scheduled for early 2009.</p>
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.	<p><i>Ongoing</i></p> <p>A comprehensive protected species education program was released in September 2005 and included information on how operators can minimise interactions with protected species.</p> <p>See also the Interactions with Protected Species section of this document for further detail.</p>

Performance measurement

Assessment of the 2007 data against the review events described in Schedule 2, Parts 2 and 3 of the Trawl Plan⁷ are not specific to the RIBTF. Previous assessments of these review events have focused mainly upon ECTF otter trawl catch and effort data. This is because the relative impact of otter trawling on retained (principal and permitted species) compared with the RIBTF is substantial and for most species considerably greater (e.g. tiger prawns and eastern king prawns) than those contributed by the RIBTF. The review events for principal species are therefore to be included in the consolidated ECTF Annual Status Report (in preparation).

In summary, assessment of Schedule 2 review events for principal species harvested in the RIBTF (e.g. bugs and bay prawns) requires an assessment of 2007 catch and effort data from both the RIBTF and ECOTF. Results of this assessment are currently unavailable but will be

⁷ Available online at: www.legislation.qld.gov.au.

reported in the consolidated Annual Status Report for the ECTF. The results of an assessment of other Schedule 2 review events relevant to the RIBTF are summarised in Table 6.

Performance with respect to ecosystem review events under Schedule 2 of the Trawl Plan for benthos and bycatch has been achieved as previously described in the 2007 ECTF Annual Status Report (Norris 2004) and summarised in Table 6. Sea turtle interactions are monitored annually and measured against the performance criterion for a review event set out in the Trawl Plan (Table 6).

Table 6: Summary results of Schedule 2 of the Trawl Plan review event monitoring for 2007.

Review event	Performance
<p>Compliance</p> <p>More than 5% of boats in the ECTF are used to commit an offence under the <i>Fisheries (East Coast Trawl) Management Plan 1999</i> in a year.</p>	<p><i>Not Triggered</i></p> <p>During the 2007 effort year 77 beam trawlers were active in the RIBTF. Although a single offence was committed against Fisheries Regulations 2008, no offence was committed under the Trawl Plan. A compliance review event has therefore not been triggered in the fishery.</p>
<p>Ecosystem</p> <p>By 1 January 2005:</p> <p>i. benthos is not reduced by 25 %</p> <p>ii. the amount of fish taken other than principal fish (bycatch) is not reduced by 40%</p> <p>iii. turtle capture or mortality for any turtle species is more than 5% of the average level of turtle capture or mortality as reported in Robins 1995 (Robins 1995).</p>	<p><i>Not Triggered</i></p> <p>No review events have been triggered under Schedule 2, Section 12 of the Trawl Plan.</p> <p>In order to meet the ecosystem performance measures in the Trawl Plan, a range of mitigations have been put in place, including BRDs, TEDs, permanent and temporal closures, and effort reductions, all of which have contributed to a significant reduction in overall quantities of benthos, bycatch & protected species interacting with the fishery.</p> <p><i>Not Triggered</i></p> <p>Reduction in the take of benthos by 25% since the implementation of the Trawl Plan has been achieved (Norris 2004).</p> <p><i>Not Triggered</i></p> <p>Reduction in the take of bycatch by 40% by since the implementation of the Trawl Plan has been achieved.</p> <p><i>Not Triggered</i></p> <p>Only one turtle interaction was recorded in 2007—a live release. At this level captures are much less than the 5% of 1991–92 turtle catch reference level (295 turtles) specified by the Robins report.</p> <p>In addition, no review event has been triggered for any individual turtle species, indicating that TEDs are effective at ensuring that the vast majority of turtles are able to successfully escape from a trawl.</p>

Performance Measurement System development

Beam trawl catch and effort data are being considered for the purposes of monitoring bay prawn and banana prawn CPUE in the ECTF. Once developed, it is proposed that fishery specific CPUE

indices for bay prawns will augment the combined fishery CPUE review event outlined in Schedule 2, Part 2 of the Trawl Plan that has been reported in previous ECTF Annual Status Reports. Upon completion the fully developed ECTF Performance Measurement System (PMS) will also contain a performance measurement index for banana prawns.

In previous ECTF Annual Status Reports, increased fishing power estimates adjusting for vessel gear and technology specifics and regional data have been used to analyse monthly CPUE for species harvested mainly in the ECOTF (O'Neill and Leigh 2006). Similar estimates are not available for species harvested substantially in the RIBTF (i.e. banana prawns and bay prawns). This would be required to monitor standardised CPUE of these species (Department of Primary Industries and Fisheries 2006). Until an annual fishing power estimate time series for banana prawns and bay prawns is developed similar to those developed to monitor standardised CPUE of other principal prawn species, it is proposed to use un-standardised CPUE. By early 2009 it is proposed that RIBTF- and ECOTF-specific performance criteria for un-standardised CPUE will be included in the draft ECTF Performance Measurement System currently under development.

Ecosystem

Non-retained species / bycatch

Species caught incidentally by trawl nets are discarded either because they hold low market value, are not permitted to be retained, or are outside the legal or market size requirements (Huber 2003).

Beam trawl bycatch consists mainly of small fish, crabs and other penaeid prawns. Larger vertebrate species that may enter beam trawl nets include turtles, sea snakes, sharks and rays can usually exit through specially designed excluder or escape devices built into the body of the net (see Interaction with Protected Species section).

A detailed bycatch monitoring strategy for the ECTF focuses on data collection by fishery observers and is assisting characterisation of the level and composition of bycatch in the RIBTF. The Strategy is currently being reviewed to evaluate the performance of ECTF bycatch monitoring to date and to identify options for future directions.

Interactions with protected species

In January 2003, the Species of Conservation Interest (SOCl) Logbook

(SOCl01) was introduced to the fishery. Fishers have since been required to report all interactions with protected species in a separate logbook to the general logbook used for recording retained catch. Any capture of marine species protected under Queensland and Australian Government

laws such as sea snakes, turtles, sea birds, dolphins, grey nurse and great white sharks, and dugongs must be recorded in the SOCl01 logbook. SOCl catch and release data for beam trawling in 2007 are given in Table 7. A total of 18 SOCl interactions were reported. Almost all interactions were live releases of sea snakes and a single sea turtle. There was only one other SOCl species interaction reported where a tern was released dead (Table 7).

Table 7: Reported beam trawl interactions with species of conservation interest in 2007 (Source: DPI&F CFISH database, 12 November 2008).

Species	Numbers		
	Caught	Released Alive	Released Dead
Sea snake	16	16	0
Green turtle	1	1	0
Tern	1	0	1
Total	18	17	1

Fisher awareness of reporting requirements for interactions with protected species is being enhanced through education by DPI&F onboard observers. The absence of sea snake mortality in the SOCI data indicates that within-trawl mortality rates are negligible because sea snakes survive the short trawl times in the RIBTF well (see Recent research and implications section).

In addition the single reported interaction with a live sea turtle indicates that the RIBTF operates largely in rivers and creeks where turtles are in low numbers. When on the rare occasion they are caught turtles are in the net for a relatively short time as beam trawl shots typically last for only about 30 minutes (Courtney et al. in prep.).

Fishery impacts on the ecosystem

The extent of impact from trawling on benthos is dependent on several factors, which includes the type of trawl gear being used, the spatial arrangement of the trawl gear, the habitat the gear is being utilised in and the frequency of use.

Studies have found that trawling has the capacity to reduce biomass and abundance of benthic organisms and lead to long-term shifts in benthic species composition (Drabsch *et al.* 2001). Trawling activity in the RIBTF is heavily focused on soft substrates (sand, silt, and mud)—the preferred habitat for the main species harvested. Repeated trawling over the same ground in areas supporting attached sedentary animals may be cause for the depletion of the animals in the region but are expected to recover once trawling is removed. The *Great Barrier Reef Marine Park Act 1975* and the *Marine Parks Act (Qld) 2004* place restrictions on the RIBTF through permanent closures to beam trawling.

Other ecosystem impacts

Hydrological drought is associated with periods of low-flow of coastal rivers (Humphries and Baldwin 2003) and previous research has found that high river flow into marine environments can have positive effects on productivity of commercial fisheries (Loneragan and Bunn 1999). It is possible that the observed decreases in reported total catch from the 2004 season to 2007 season may be in part associated with the drought conditions that Queensland has been experiencing in recent years.

Research and monitoring

Recent research and implications

FRDC Project 2005/053: “Reducing the impact of trawl fisheries on protected sea snakes”

Depending on location, there is an occasional to likely occurrence of sea snakes in the RIBTF bycatch.

In July 2005, the DPI&F commenced work on a three-year research project intended to quantify catch and mortality rates of sea snakes and investigate the effects of existing BRDs on sea snake catch rates in the ECTF. The project was funded by the FRDC and had three objectives:

1. Implement a crew-based data collection program to collect information on sea snake catch rates, species composition and distribution.
2. Quantify post-trawling mortality rates of sea snakes by undertaking survival trials at sea on commercial vessels.
3. Test the effect of existing BRDs on sea snake catch rates.

Preliminary results of the project for the RIBTF indicate that:

- Sea snake catch and mortality data were collected by a crew-member observer program (CMO) on multiple vessels and fishing trips across all sectors of the ECTF including 1423 trawls over 232 fishing days in the RIBTF.
- Sea snake catch and mortality data were also collected on 97 RIBTF trawls by DPI&F Fisheries Observers and on 44 RIBTF trawls by research project staff.
- 274 individuals of six sea snake species were sampled from the RIBTF with no within-trawl mortality reported.
- Mean sea snake catch rate in the RIBTF was 1.2 snakes per boat day and relatively high compared to catch rate estimates from a number of ECOTF sectors.
- The modelled mean within-trawl mortality rate for sea snakes in the RIBTF was negligible and lower than any ECOTF sector.
- Sea snakes are at relatively low risk from the RIBTF compared to other trawl sectors because of they experience almost zero within-trawl mortality – this is probably associated with the short (0.5 h) duration of trawls in the RIBTF which allows the snakes to be returned to the water alive.

As at November 2008 this project was nearing completion.

Monitoring programs and results

Long term monitoring program (LTMP)

Pre-recruit eastern king prawns

Findings from previous research into a sampling design for eastern king prawns have been considered in development of an abundance index using data from an annual survey of eastern king prawns prior to recruitment to the fishery. The first (pilot-scale) survey was conducted in late 2006 which provided an impetus for continued monitoring of the Queensland eastern king prawn stock. Information from the pilot survey has been reviewed and applied to refine the design of the 2007 survey. The survey was completed in November/December 2007 with preliminary results summarised below. As the surveys deploy beam trawl gear, recent zoning changes to the Moreton Bay Marine Park have required adjustment of the locations of some sites to be sampled in future years.

Results of the 2007 survey indicate the distribution of eastern king prawns in the survey area is patchy with densities ranging from 0–200 prawns per 0.5 nm trawl. The distribution of prawns is especially patchy in areas outside of Moreton Bay with higher densities localised around bar entrances (e.g. South Passage Bar). Results also indicate that catching areas identified in 2006 again produced the highest densities of prawns in 2007. Locating sites that are consistent in terms of allowing measurement of prawn recruitment strength to the fishery will assist further in development of the annual juvenile abundance index and the significance of future monitoring results.

Fishery Observer Program (FOP)

The primary objectives of the Fisheries Observer Program in the ECTF are to collect fishery dependent information to:

- validate the accuracy of catch and effort data detailed within logbooks

- detail composition and fate of SOCI, and validate data supplied through SOCI logbooks
- estimate bycatch amounts and determine composition of bycatch for the fishery.

These objectives are achieved by collecting information on:

- total catch retained (target and non-target species)
- catch per unit effort
- amounts of principal and permitted species discarded (estimated)
- total bycatch discarded (estimated)
- total species catch compositions (target, non-target and bycatch)
- vessel and gear information (number and sizes of nets, net mesh size, type of TED and BRDs used)
- interactions with SOCI.

During 2007, observers conducted a total of 15 days in the RIBTF. Observer survey data indicated that 67% of the catch (by weight) was retained as target product, 31% was discarded bycatch, 1% was discarded as unwanted target product and 1% was discarded ‘species of interest’⁸. From 88 trawl shots observed no interaction with sea turtle or other SOCI was recorded. This is strongly influenced by the use of TEDs which have dramatically reduced turtle landings since their introduction in 2000.

To meet continued demands placed upon the FOP for information to sustainably manage bycatch in the RIBTF and the ECTF in general, the Trawl Bycatch Monitoring Strategy that guides FOP bycatch monitoring priorities is under review. Proposed completion of the review is in 2009.

Collaborative research

DPI&F collaborated with CSIRO, GBRMPA and Queensland Seafood Industry Association in the Great Barrier Reef Seabed Biodiversity Project to identify key issues in relation to biodiversity assessment and provision of information for future Marine Park planning needs. DPI&F is currently using the project data to reduce uncertainty in decision-making for ecologically-based management of the ECTF and has been considered in:

- proposed management changes to RIBTF by-product species with a lower risk to their sustainability
- development of the east coast trawl fisheries ecological risk situation report (in preparation)
- development of new bycatch performance measures in the ECTF.

Fishery management

Compliance report

Compliance and enforcement in the ECTF are the responsibility of the Queensland Boating and Fisheries Patrol (QBFP). The Compliance Activity System is a key compliance monitoring tool that records detailed information on activities performed by QBFP.

⁸ ‘Species of interest’ comprises a number of species that the FOP monitor on a regular basis for a given fishery and include elasmobranchs and Rocky Reef Fin Fish Fishery species.

The system records:

- breach reports issued (including offences and court outcomes)
- unattended breach reports
- fisheries infringement notices (FINS) issued
- all field activities (from new field occurrence logs)
- complaints made via the Fishwatch hotline (including follow up actions).

All offences and field activities are recorded to six nm grids. This allows

Table 8: River and Inshore Beam Trawl Fishery Compliance 2007.

Units Inspected	Offences	Units not compliant	Compliance Rate (per unit)
37	1	1	97%

enforcement activities and offences to be located spatially and to guide reviews of compliance strategies. Of the units inspected in 2007, most were commercial vessel inspections while some marketer premises were also inspected. A high rate of compliance with the legislation governing the RIBTF was found (Table 8).

Offences are reported as either a Fisheries Infringement Notice (FIN); Caution (FIN Caution or official caution issued by DPI&F

Table 9: Offences recorded in the River and Inshore Beam Trawl Fishery (2007).

Offence	FIN	Prosecution	Caution
Take/possess/sell regulated fish	-	1	-
TOTAL	0	1	0

Note: Prosecutions data are from the QBFP prosecutions database as at 2/10/2008.

Legal); or Prosecution (to proceed by complaint summons). During 2007, only a single offence was reported in the RIBTF for possession of a species protected by regulation (Table 9). It should be noted that legal matters associated with this infringement have not been finalised its prosecution is still pending.

Compliance Risk Assessment

A compliance risk assessment was completed for Queensland's East Coast Trawl Fisheries in 2005. The risk assessment identified compliance with BRD provisions and closed water provisions as the highest priorities for enforcement and compliance for the trawl fisheries. There were also a number of activities rated as having a moderate risk, which are also being addressed. The ECTF compliance risk assessment is currently being reviewed and the outcomes will be reported in the 2009 Annual Status Report.

Changes to management arrangements in the reporting year

During 2007, there were no management changes that affected the RIBTF. As part of the Combined Fisheries Management Regulatory Impact Statement and draft Public Benefit Test (Combined RIS) it was proposed that a more detailed TED definition be provided in the legislation and phased in over a 12-month period. It is expected that this change will be finalised in late 2008 or early 2009.

A number of other potential amendments are being considered for the trawl fisheries, including changes relating to Moreton Bay bugs and cuttlefish. It is expected that these changes will be progressed in 2009.

Consultation/communication/education

Promotion of regulations applying to both commercial and recreational fishers, including those relating to the RIBTF, is an ongoing role for DPI&F.

Consultation with stakeholders in the fishery mainly occurs through Trawl Management Advisory Committee (Trawl MAC), with meetings generally held twice a year. Trawl MAC provides advice to DPI&F on management arrangements for the fishery.

Complementary management

DPI&F is committed to ongoing consultation with other jurisdictions to ensure sustainable management of shared fish stocks across their native range. DPI&F meets annually on fisheries matters with NSW Fisheries and routinely participates in regional inter-jurisdictional management forums through the Commonwealth Northern Prawn Fishery Management Advisory Committee and the Protected Zone Joint Authority Torres Strait Prawn Management Advisory Committee.

References

- Department of Primary Industries and Fisheries 2006, *Draft East Coast Trawl Fishery Performance Measurement System*, Department of Primary Industries and Fisheries, Brisbane, Australia.
- Drabsch, S., Tanner, J. and Connell, S. 2001, 'Limited infaunal response to experimental trawling in previously untrawled areas', *Ices Journal of Marine Science*, vol. 58, no. 6, pp. 1261-71.
- Huber, D. 2003, *Audit of the Management of the Queensland ECTF in the Great Barrier Reef Marine Park*, Great Barrier Reef Marine Park Authority, Queensland, Australia.
- Humphries, P. and Baldwin, D. 2003, 'Drought and aquatic ecosystems: an introduction', *Freshwater Biology*, vol. 48, no. 7, pp. 1141-6.
- Loneragan, N. and Bunn, S. 1999, 'River flows and estuarine ecosystems: Implications for coastal fisheries from a review and a case study of the Logan River, southeast Queensland', *Australian Journal of Ecology*, vol. 24, no. 4, pp. 431-40.
- Norris, W. 2004, *Estimating total bycatch reduction in the east coast trawl fishery using limited data sets*, Department of Primary Industries & Fisheries, Brisbane, Queensland, Australia.
- O'Neill, M. and Leigh, G. 2006, *Fishing power and catch rates in the Queensland east coast trawl fishery*, Department of Primary Industries and Fisheries, Brisbane, Australia.
- Robins, J. B. 1995, 'Estimated catch and mortality of sea-turtles from the east coast otter trawl fishery of Queensland, Australia', *Biological Conservation*, vol. 74, no. 3, pp. 157-67.
- Tanimoto, M., Courtney, A., O'Neill, M. and GM Leigh, G. 2006, *Stock Assessment of the Queensland (Australia) east coast banana prawn (*Penaeus merguensis*) fishery*, Brisbane, Australia.

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Cover Image

Beam trawl catch

