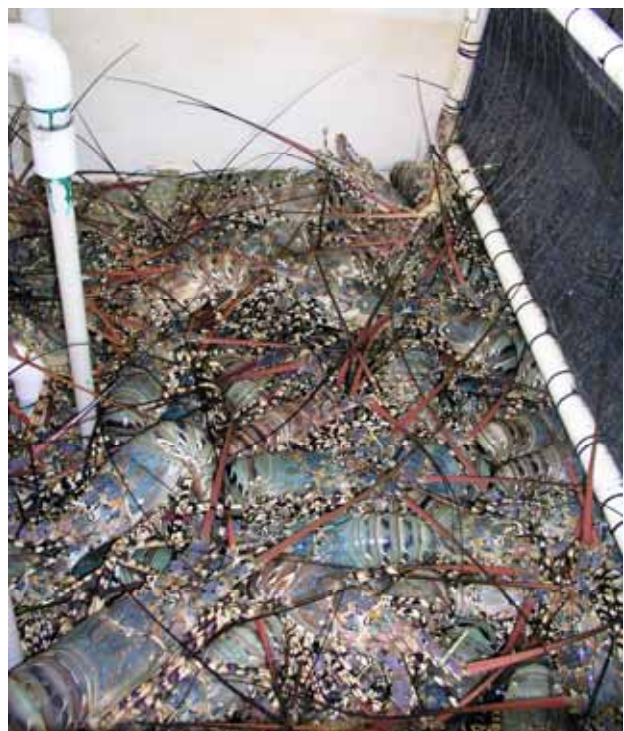




Australian Government
Australian Fisheries Management Authority

ANNUAL STATUS REPORT

Torres Strait Tropical Rock Lobster Fishery



September 2007

This report has been prepared by AFMA for consideration by the Department of the Environment and Water Resources in relation to the exemption of the Torres Strait Tropical Rock Lobster Fishery from export controls under the *Environment Protection and Biodiversity Conservation Act 1999*.

CONTENTS

Introduction	3
1. Description of the Fishery	4
1.1. Target and Bycatch Species	5
1.2. Management Arrangements Employed in the Fishery	6
1.3. Fishing Methods (gear types)	7
1.4. Fishing Area	7
1.5. Allocation between sectors	9
1.6. Governing legislation/fishing authority	9
1.7. Status of export approval/accreditation under <i>Environment Protection and biodiversity Conservation Act 1999</i>	10
2. Management	10
2.1. Changes to management arrangements	10
2.2. Performance of the fishery	11
2.3. Compliance risks present in the fishery and actions taken to reduce these risks	13
2.4. Consultation Processes	16
2.5. Description of cross-jurisdictional management arrangements	17
2.6. Outcomes of review processes	17
2.7. Demonstration of Compliance with TAPs, recovery plans, etc and also relevant domestic and international agreements	17
3. Catch data	18
3.1. Total catch of target species and species taken in other fisheries	18
3.2. Catch of byproduct/bycatch species	19
3.3. Harvest by each sector (commercial, recreational, indigenous and illegal)	19
3.4. Effort data including information on any trends	21
3.5. Spatial issues/trends	21
4. Status of target stock	22
4.1. Resource Concerns	22
4.2. Stock Assessments	23
5. Interactions with protected species	24
5.1. Frequency and nature of interactions	24
6. Impacts of the fishery on the ecosystem in which it operates	24
6.1. Results of any Ecological risk Assessments	24
6.2. Nature of impacts on the ecosystem	26
6.3. Management action taken to reduce impacts and results of such action	26
7. Progress in implementing recommendations and conditions resulting from the DEWR assessment of the fishery	26
7.1. Description of progress in implementing each recommendations and condition	26
8. Research and monitoring	27
ATTACHMENT A	28



Introduction

The Torres Strait Tropical Rock Lobster Fishery was granted export approval/accreditation under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 16 November 2004 for a period of 3 years and is valid until 24 November 2007. This accreditation was subject to a number of recommendations the outcomes of which are discussed in Attachment A.

The fishery is currently undergoing a period of transition from a fishery controlled by inputs to an output system. The rate of transition has increased and a process to remove significant capacity from the non-islander sector has commenced with the first round of a tender process completed at the end of August 2007 and a second round under way and expected to be completed by the end of October 2007.

Consultation on the new output management arrangements is continuing with one further meeting scheduled with the TRL working group towards the end of 2007 before the drafting instructions for the Management Plan will be completed. AFMA also expects to commence preparation of a Strategic Assessment later this year with a view to assessing the ecological sustainability and the likely impacts of actions under the new management arrangements under a statutory plan of management, in accordance with Parts 10, 13 and 13A of the EPBC Act. AFMA expects to implement the new management plan for the fishery in mid-2008. The management of the fishery should be viewed in the context of these continuing complex and difficult changes.



1. Description of the Fishery

At a glance	
Principal species	The ornate or tropical rock lobster (<i>Panulirus ornatus</i>)
Area of operation	From the tip of Cape York to the northern border of the Protected Zone – most of the catch comes from the western and south-eastern part of the fishery where the densities of lobsters are highest.
Fishing techniques	Taken by divers working from four to six metre tenders, using a short hand spear or snare either with the use of surface supplied air (hookah) or free diving. Only one diver works from each tender. Divers work to about 20 metres in depth and dive mainly during daylight hours. Some traditional inhabitants fish at night with a light.
Number of vessels	24 licensed primary vessels (2006) with a total of 63 attached dinghies (tenders or service vessels) Two non-transferable dinghy licences 400 Traditional Inhabitant Boat licences with lobster endorsements - many are unused. There is no limit on the issue of TIB licences.
Fishing Season	Commercial fishing occurs from December to September, with a fishery closure during October and November. The use of hookah equipment is banned during December and January.
Estimated catch and value 2005-2006	2006: 326 t live weight; Papua New Guinea: 136 t live weight 2005: Australia 893 t live weight; Papua New Guinea: 218 t live weight Value in the 2005-06 financial year was \$A12.3 million.
Main Markets	Frozen lobster tails are sold on the domestic and overseas markets (mainly the United States). The trade in live lobsters, which began in the mid 1990s, supplies both export markets (mostly China) and a small domestic market. Live lobsters fetch a lower price per kilogram than frozen tails, but overall a live animal is about 1.5 times more valuable than its frozen tail. Handling and shipping live lobsters require more sophisticated transport infrastructure than handling frozen tails, and there is always a risk of losing product between the point of harvest and its market.
Stock status	The <i>Fishery Status Reports 2006</i> produced by the Bureau of Rural Sciences (BRS) considers the fishery “not overfished and overfishing status uncertain”.
Current Management method	Input controls include a limited number of dinghies in the predominantly non-Islander freezer boat sector, but not in the TIB sector, and a boat replacement policy for upgrading vessels. Technical controls include a legal size limit, hookah-gear ban from December to January, commercial fishing ban in October and November inclusive. Interim measures by way of a week-long spring-tide hookah closure each month and a 30% tender reduction in the TVH sector have been in place since 2003 and negotiated each year. Lobsters can only be taken by divers and incidental trawl-caught lobsters must be returned alive.
Resource Competition	Australia and Papua New Guinea share the commercial fisheries of the Torres Strait Protected Zone under formal arrangements detailed in the Torres Strait Treaty.
Long term potential yield	The estimated MSY for the fishery is approximately 250 t tail weight (640 t live weight) for the combined Australian and Papua New Guinea jurisdictions.



1.1. Target and Bycatch Species

Target Species

The Torres Strait Tropical Rock Lobster (TRL) fishery is the second most valuable commercial fishery and very important to many Torres Strait Traditional Inhabitants. The fishery is based on a single species, the ornate or tropical rock lobster, *Panulirus ornatus*, which is taken by divers using hand held implements. Most fishing occurs during neap tides when currents are weaker and the water is less turbid. Fishing occurs from December to September with a peak during March-August.

Life cycle and biology

The life cycle of the tropical rock lobster is similar to many other Palinurids. After hatching the larvae go through a pelagic phase and pass through 11 instars, during which time the larvae are known as a phyllosoma. The final larval stage that bridges between the lobsters' pelagic and benthic existence is the puerulus. At this stage the larvae is an active swimmer and probably actively seeks out suitable benthic habitat on which to settle.

The spawning season is from December to March and larvae appear in the Torres Strait during the winter months. The larval life is about four to six months, which is relatively short compared to many related species.

Following settlement the juveniles grow rapidly and are one of the fastest growing lobster species known. The minimum size limit (115mm tail length or 90mm carapace length) effectively protect the juveniles until they are about 2 years old. In their third year they are harvested in the Torres Strait TRL fishery. Shortly after their second year of benthic life, in Autumn, all lobsters undergo an extensive breeding emigration. A very small proportion of males and a few females spend an extra year in the Torres Strait before migrating. Well known breeding migrations pass through the Great North East Channel and into the Gulf of Papua. These migrations were extensively trawled in the 1970s and early 1990s until trawling for lobsters was banned. Some of the breeding lobsters migrated as far east as Yule Island in the eastern part of the Gulf of Papua where they were taken during a short fishing season by Islanders. Studies in the 1980's demonstrated that few if any lobsters survived after the breeding season on reefs in the vicinity of Yule Island.

Many other breeding lobsters must migrate elsewhere to breed and some have been found in the eastern reefs of Torres Strait and outside of the Great Barrier Reef to depths in excess of 100 metres. There is no return migration to Torres Strait from breeding grounds in the Gulf of Papua. This is consistent with the catastrophic mortality documented among lobsters that migrated as far as Yule Island. There may be some return from the breeding grounds in the eastern reefs of the Torres Strait, but the number is insignificant given that the commercial catch is comprised almost entirely of one cohort.

Prohibited Species

As the fishery is a highly selective single species fishery, no bycatch is taken. However, fishers with other endorsements are able to harvest under those authorities while targeting rock lobster.



1.2. Management Arrangements Employed in the Fishery

The fishery is managed under the *Torres Strait Fisheries Act 1984* by management arrangements put in place through fisheries management notices as well as a range of policies as agreed by the Protected Zone Joint Authority (PZJA).

In exercising its management functions, the PZJA adheres to objectives agreed to by Australia and Papua New Guinea. The following three objectives have been agreed to for the management of the Torres Strait TRL fishery:

1. to conserve the stock of tropical rock lobster;
2. to maximise the opportunities for traditional inhabitants of both Australia and Papua New Guinea to participate by implementing policies that include managing the fishery for tropical rock lobster as a dive fishery;
3. to promote the dive fisheries for tropical rock lobster in the Torres Strait and in the waters near Yule Island, Papua New Guinea.

In August 2002, the TRL Working Group reviewed the above management objectives for the fishery and the PZJA agreed to the following revised objectives:

1. to avoid any adverse impacts on the traditional way of life and livelihood of the traditional inhabitants;
2. to limit catch at a level that maintains the stocks at ecologically viable levels;
3. to minimise the impacts of fishing operations on the ecosystem generally;
4. to maximise economic efficiency in the fishery; and
5. to encourage Islander participation in the fishery, promote economic development in the Torres Strait area and employment opportunities for the traditional inhabitants.

Expansion in participation in the Torres Strait TRL fishery is limited to Traditional Inhabitants in order to maximise their opportunities.

The PZJA has imposed licensing provisions to prevent the growth of the non-Traditional Inhabitant sector, both in terms of fishing capacity (boat replacement policy) and licence numbers. There is also a ban on trawlers taking lobster to prevent pressure on the lobster resource from the prawn trawling fleet.

The following policy is in place which limits the length of primary boats (ie those boats from which tenders operate):

- boats up to six metres may be replaced by another up to six metres;
- boats greater than six metres and less than or equal to ten metres may be replaced by a boat up to and including ten metres;
- boats greater than ten metres and less than or equal to 14 metres may be replaced by a boat up to and including 14 metres; and
- boats greater than 14 metres may be replaced by another of equal length. The maximum size for fishing boats is 20 metres.

Many of the primary boats have been in the fishery for many years. Unlike many fisheries where the size, horsepower and other characteristics of the primary boats may play a significant role in the fishing powers of the operation, this is not so much the case in the Torres Strait TRL fishery because the fishing is done entirely from the tender. Divers



operating from the tenders are not required to hold a Torres Strait Master Fisherman's Licence, but the boat from which the tender is working must be operated by someone who holds such a licence.

Many, but not all, boats licensed for the Torres Strait TRL fishery have endorsements for other fisheries. In practice, the other endorsements are used to a very limited extent. Additionally, it is not feasible for the primary boat to undertake other fishing activities while its tenders are used for lobster fishing and while divers are in the water.

A 30% tender reduction from the 2002 level in the non-Islander sector has been in place in the fishery since 2003 to try to prevent effort growing substantially in response to higher lobster abundance and until the new quota management system is implemented.

Regulations currently employed in the Torres Strait TRL fishery include:

- limiting the method of taking of lobster to either hand or with the use of a hand held implement, such as a spear or scoop net, with an October-November (inclusive) ban on commercial fishing;
- a further ban on the use of hookah gear during December and January (inclusive);
- a minimum tail size of 115mm or minimum carapace length of 90mm for all commercially caught lobsters;
- a bag limit of 3 lobsters per person or 6 lobsters per dinghy applies to traditional fishing (Islander or visiting PNG Traditional Inhabitants) (the same limit applies to recreational fishing under Queensland State law); and
- the prohibition of the processing or carrying of tropical rock lobster meat that has been removed from any part of a tropical rock lobster on any boat.

1.3. Fishing Methods (gear types)

Tropical Rock Lobster is largely taken by divers working from four to six metre tenders, using a short hand spear or snare either with the use of surface supplied air (hookah) or free diving. Only one diver works from each tender. Divers work to about 20 metres in depth and dive mainly during daylight hours. Some traditional inhabitants fish at night with a light.

1.4. Fishing Area

Most commercial fishing for the ornate rock lobster occurs in the Torres Strait with less activity along the far north-east coast of Queensland. From a population dynamics perspective, the stock probably comprises all lobsters north of around 14° South along the Queensland coast, in the Torres Strait and the south eastern coast of Papua New Guinea because any breeding within this region could potentially supply recruits to all areas within the region due to the clockwise gyre in the north-west Coral Sea (see Figure 1 below). Assessments are based on surveys of juvenile (1.5 year old) and sub-adult (2.5 year old) lobsters in the central and western Torres Strait where most of the fishing occurs (Figure 1 – cross hatched area within the Torres Strait).



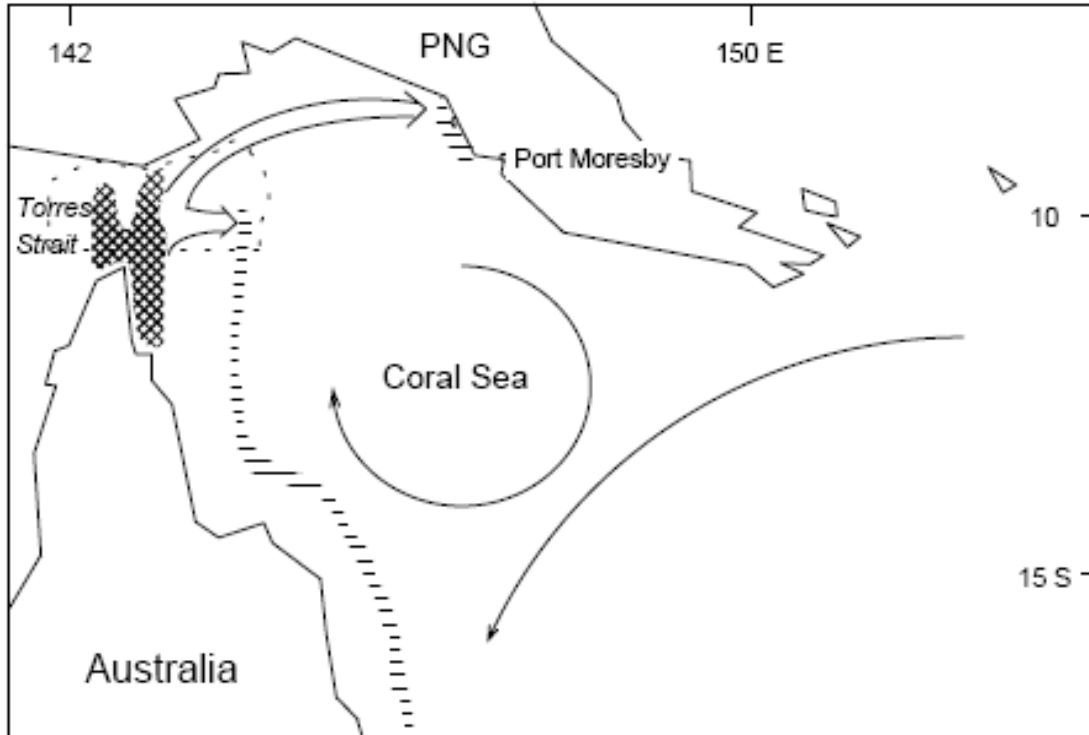


Figure 1 – Map of the Torres Strait and Gulf of Papua showing the main fishing grounds around the central and western reefs and islands (- - -), the migration pathways (==>), breeding grounds (—_), current patterns (—>) in the Coral Sea, and the boundary of the Protected Zone (----).

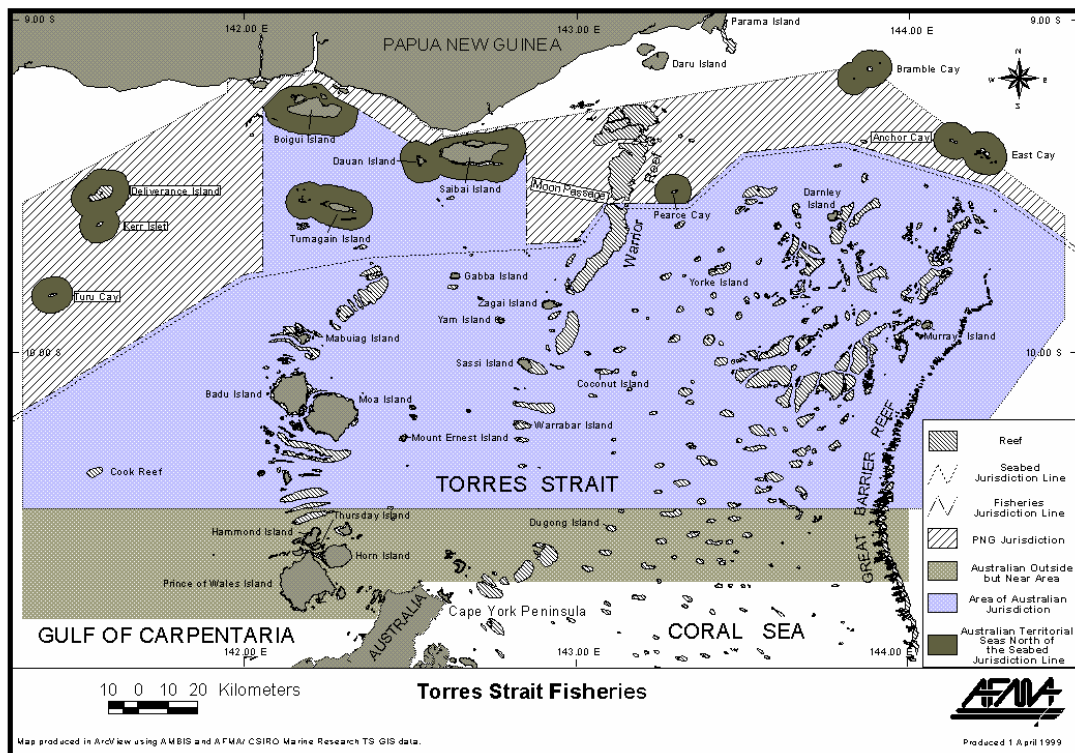


Figure 2: Area of the Torres Strait Tropical Rock Lobster Fishery, including areas of PNG jurisdiction but excluding PNG areas outside but near the Torres Strait Protected Zone.



1.5. Allocation between sectors

Torres Strait Islanders fish on both local and more distant reefs, while a small fleet of predominantly non-Islander freezer boats travel to the fishing grounds on trips lasting from a few days to several weeks. The Treaty specifies catch sharing arrangements between Australia and Papua New Guinea (PNG) boats to operate in the Australian area of jurisdiction. The current catch sharing arrangement allows for seven PNG licensed fishing boats, each with up to seven tenders to access the Protected Zone to take rock lobster. Australia has forgone access to its share of the catch in the PNG area of jurisdiction. This was taken into account when calculating the effort to be allocated to PNG to fish in the Australian area of jurisdiction.

Officials from Australia and PNG meet annually to discuss fisheries matters of mutual importance.

The Protected Zone Joint Authority (PZJA) made a decision at its 18th meeting in July 2005 to reallocate access to the Tropical Rock Lobster fishery between the Community and non-Community commercial fishing sectors. The PZJA also decided at the same meeting that it would offer payments for non-community commercial licences through a voluntary tender process to acquire access needed to meet Australia's obligations under the catch sharing provisions of the Torres Strait Treaty. The voluntary tender process is part of a program of reforms which will see the introduction of a under a formal Plan of Management for the lobster fishery from 2008.

1.6. Governing legislation/fishing authority

The Torres Strait Treaty between Australia and Papua New Guinea was ratified in 1985. It requires that the two countries conserve and achieve optimal utilisation of the Torres Strait fisheries and maximise the opportunities for the traditional inhabitants of both countries to participate in them.

The enacting legislation for the Treaty in the area under Australian jurisdiction is the *Torres Strait Fisheries Management Act 1984*, which establishes the PZJA. Membership of the PZJA comprises the Australian Government Minister for Fisheries, Forestry and Conservation, the Queensland Minister for Primary Industries and Fisheries, and the chair of the Torres Strait Regional Authority.

The PZJA is advised by the Torres Strait Fisheries Management Advisory Committee (TSFMAC) and the Torres Strait Prawn Management Advisory Committee (TSPMAC). The TSFMAC consists of representatives of traditional inhabitants and commercial fishers, fisheries managers from the PZJA Agencies and the Chairman of the Torres Strait Scientific Advisory Committee (TSSAC). The TSSAC, which has recently been reinstated and comprises representatives from research organisations, fisheries managers, Traditional Inhabitants and industry, advises the TSFMAC on scientific issues associated with TSPZ fisheries. Recreational fishing is still managed under Queensland law.

PZJA agencies include the Australian Fisheries Management Authority (AFMA), the Queensland Department of Primary Industries and Fisheries (QDPI&F), the Torres Strait Regional Authority (TSRA) and the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF).



1.7. Status of export approval/accreditation under the *Environment Protection and Biodiversity Conservation Act 1999*

The Torres Strait Tropical Rock Lobster (TRL) fishery was granted export approval/accreditation under the EPBC Act on 16 November 2004 for a period of 3 years and is valid until 24 November 2007. This accreditation was subject to a number of recommendations the outcomes of which are discussed in Attachment A. A copy of the letter of accreditation and recommendations and conditions can be found at

<http://www.environment.gov.au/coasts/fisheries/commonwealth/torres-strait-rock-lobster/decision.html>

2. Management

2.1. Changes to management arrangements

Since accreditation of the Torres Strait TRL fishery in 2004, the following amendments have been made to management arrangements:

- In 2004 the PZJA imposed:
 - licensing provisions to prevent the growth of the non-Traditional Inhabitant sector, both in terms of fishing capacity (boat replacement policy) and licence numbers. A ban on trawlers taking lobster to prevent pressure on the lobster resource from the prawn trawling fleet was also introduced; and
 - a 30% tender reduction and moon/tide hookah closures to manage effort in the fishery until the new is implemented for the fishery. A stock assessment demonstrated that the fishery was made more resilient to high fishing pressure by increasing the minimum size of the lobsters and the closure in October and November and banning hookah in December and January. However the same study showed that overfishing occurs at fishing mortality rates above 0.5. Therefore fishing should be controlled to keep fishing mortality less than this figure.
- In 2005 the PZJA noted that the implementation of long term management arrangements based on an outputs control system could take some time and agreed to extend the interim arrangements for the 2006 season including:
 - Carry over of the 30% reduction in the TVH sector as it was implemented in 2005;
 - Maintaining a cap on Traditional Inhabitant Boat (TIB) licences greater than six metres with a CR endorsement, that is, to not grant new licences for TIB licensed lobster boats of greater than six metres in length; and
 - Prohibiting the use of hookah to take rock lobster for a period of approximately seven days each month corresponding with the strongest spring tides from February to September, inclusive.
- At its October 2006 meeting, the PZJA noted that:



- In the absence of a TRL management plan in 2007, which would give effect to a new output management system, interim arrangements needed to be put into place to manage effort in the fishery in 2007;
- Past interim management arrangements had not been entirely successful in controlling fishing effort but had played an important role; and
- While past interim arrangements had restricted effort in all sectors, there had been some problems of equity within the non-community sector that were yet to be fully resolved.

The PZJA agreed to extend the 2006 arrangements to 2007 and similarly for 2008 to:

- reduce by 30% the number of tenders each non-community licence holder could use, by applying the same conditions on licences that had been applied during 2006;
- reintroduce “moon/tide hookah closures” three days before, on, and three days after, either the full or new moon each month during the months of February to September inclusive by applying appropriate conditions on each TVH and TIB licence.

2.2. Performance of the fishery

The performance of the TRL fishery against its reference points has been relatively good. The most recent stock assessment indicates that the stock has been fished to below the spawning stock levels associated with maximum sustainable yield (MSY) in 4 years. However, the stock recovered following these years.

Catches in the fishery have varied considerably over time (see figure 4). As the fishery is based largely on a single year class of 2+ lobsters, variations in recruitment strongly influence catches in the fishery. Fishing effort also influences catch.

Figure 4 - Catches from PNG and Australian jurisdictions and the Queensland east coast. All catches are converted to tonnes live weight using the conversion ration of 1kg tails = 2.562kg live weight. Source: Dr. Yimin Ye – CSIRO (Ye *et al*, 2007)

Year	Australia	PNG	TS total	QLD East Coast	Total
1989	623	202	825	13	838
1990	469	151	620	5	625
1991	425	161	586	8	594
1992	405	128	533	15	548
1993	484	159	643	5	648
1994	553	236	789	10	799
1995	533	246	779	25	804
1996	559	218	777	52	829
1997	625	231	856	48	904
1998	633	192	825	73	898
1999	392	156	548	135	683
2000	400	225	625	144	769
2001	122	161	283	191	474
2002	209	272	481	109	590
2003	468	197	665	93	758
2004	722	174	896	180	1076
2005	893	218	1111	136	1247
2006	326	136	462	180	642



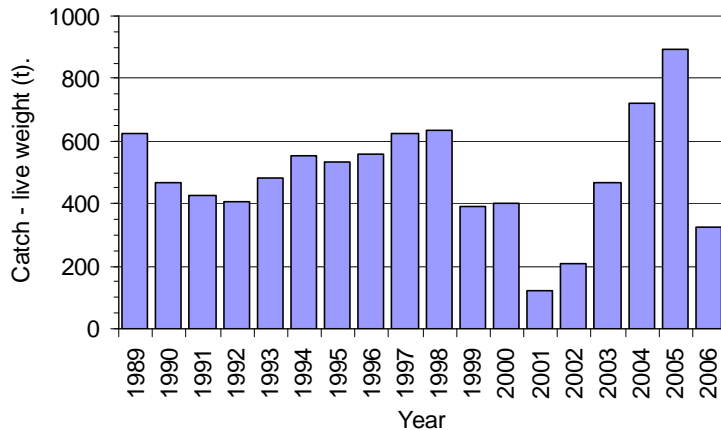


Figure 5 - Catch history in the Australian fishery. The Australian catch includes both community and non-community commercial fisheries. Source: Dr. Yimin Ye – CSIRO, Ye *et al* (2007).

In recent years there have been low catches over the period 1999-2002 and then very high catches over the period 2004-2005 inclusive with the catch dropping again in 2006. There is a belief amongst many licence holders that these fluctuations in catch are brought about through natural cyclical variations in lobster abundance.

Assessment of the Torres Strait Rock Lobster Fishery has come a long way. There have been some improvements in catch data but also the loss of some population size structure data. Most importantly, the number of years of data on the fishery continues to increase thus providing more information about the stock and the way it responds to fishing pressure and varies naturally from year to year. New stock assessment models can capture this information and allow the estimation of population parameters to determine the performance of the fishery.

The TRL Resource Assessment Group (RAG) reviewed the 2006 stock assessment for the TRL fishery at its August 2006 meeting, which indicated that, with the exception of 1999, 2001, 2002 and 2006, the fishery is fully but not over-fished. The RAG also agreed on the following new management objective for the fishery which the PZJA agreed to in October 2006:

Objective 1: To maintain the spawning stock at levels that meet or exceed the level required to produce the maximum sustainable yield.

PZJA agreed in October 2006 that two fishery independent surveys (pre-season and mid-season) should be conducted each year for at least the next two years while the possibility of reducing the program to a single survey is evaluated. A pre-season population survey (November) is considered essential to accurately estimate the size of the fished population and to set a sustainable total allowable catch (TAC), as lobster recruitment and the stock recruitment relationship are highly variable, depending on environmental conditions.

An issue of concern is the provision of TAC advice to TRL fishers as ideally fishers would like to have final advice about the TAC for the following year in plenty of time to make business decisions. The fact that the fishery exploits a single cohort for about 85% of its total catch and that the abundance of that cohort is most accurately estimated at the point when it recruits to the fishery, effectively prevents this.

The RAG has proposed an approach to address this issue which would commence with the forecast of a TAC based on spawning stock abundance measured at mid-season two and a



half years before the commencement of the season. This advice would use the stock recruitment relationship to produce an estimate of relatively low precision since it is widely accepted that recruitment is strongly affected by the success or otherwise of the larval phase of most exploited marine species.

A further prediction of the TAC would be made from the mid-year survey undertaken about 6 months prior to the commencement of the season. This estimate would be based on the population estimate of the 1+ lobsters. The estimate is refined by the pre-season survey which measures the abundance of the same cohort more reliably just prior to its recruitment to the fishery.

With quota management expected to commence in the TRL Fishery in 2008, the RAG, at its May 2007 meeting, considered it important to develop a harvest control rule and determine the management actions necessary to achieve the defined biological and economic objectives of the fishery. The RAG defined the four fishery specific parameters - B_{LIM} (limit biomass reference point), B_{TARG} (target biomass), F_{LIM} (limit fishing mortality rate) and F_{TARG} (target fishing mortality rate) and agreed that the harvest control rule consist of a constant exploitation rate ($F_{TARG}=0.35 \text{ year}^{-1}$) while the stock size is above $B_{TARG}(=S_{MSY})$ and reduces to zero linearly as the stock reduces to $B_{LIM}(=0.2S_0)$. The limit fishing mortality was set at $F_{LIM}=F_{MSY}$. In addition, a cap on the TAC was included as a precautionary measure to prevent extremely high fishing pressure.

2.3. Compliance risks present in the fishery and actions taken to reduce these risks

Two separate programs administer the compliance regime in the Torres Strait. Coastwatch manages and coordinates the civil maritime surveillance program that identifies incursions into Australia's Exclusive Economic Zone (EEZ). Civil aircraft under contract to Coastwatch conduct surveillance of the Torres Strait region. Following a report from Coastwatch of a foreign fishing vessel sighting, AFMA initiates a response. Coastwatch coordinates the response, using the at-sea platforms available to it, namely Royal Australian Navy patrol craft and larger vessels of the National Marine Unit (NMU) of the Australian Customs Service. QB&FP officers on board the vessels action the request.

Queensland Boating and Fisheries Patrol (QB&FP) carries out the domestic compliance programs for the Torres Strait under an agreement between the Commonwealth of Australia and the State of Queensland relating to the cost of management of fisheries in the area of Australian jurisdiction.

The Australian Fisheries Management Authority (AFMA) undertook a compliance risk assessment for the Torres Strait in 2004 in response to the PZJA's concerns that the compliance programs for the fisheries under its authority were being compromised for a number of reasons. The executive summary of the risk assessment and compliance plan was tabled at the Torres Strait Fisheries Management Advisory Committee (TSFMAC) meeting in July 2004 with the full risk assessment endorsed at PZJA 17.

Using this process, the following risks were identified as being significant for the Torres Strait Rock Lobster Fishery, based on controls that were in place at the time:

- The risk of unlicensed domestic operators (non-traditional) and unlicensed PNG nationals was identified as high.
- Unlicensed domestic operators (traditional) were considered of moderate risk.



- Breach of gear restrictions, in particular the use of hookah breathing apparatus and seasonal closures, were identified as being moderate.
- Breach of possession limits, size limits and fishing during seasonal closures were rated as moderate risks.

The risk assessment acknowledged the understanding that QB&FP was responsible for the enforcement of statutory prohibitions including patrolling and surveillance, and the preparation of evidence for use in legal proceedings.

The risk assessment process pointed to some shortcomings that existed within compliance arrangements in the Torres Strait fisheries. While compliance in the protected zone was managed by QB&FP:

- QB&FP staff were increasingly diverted from Torres Strait compliance functions to activities of national importance, ie. post-apprehension administration of Indonesian vessels and crew;
- relief officers did not have time to gain a full understanding of the issues involved in (a) dealing with Indonesian fishing crews, or (b) Torres Strait fisheries management issues;
- the ability of QB&FP staff to carry out compliance activities on the more distant island and reef groups and along the border with PNG was compromised. Officers relied on the availability of Customs and Police vessels and fisheries patrols were a low priority for the agencies who own these boats. Even when Custom vessels were employed, they were limited in their usefulness in that vessels could not proceed into uncharted waters.

The risk assessment suggested some options that PZJA could consider for enhancing the compliance program, including:

- a letter from the PZJA to the Commonwealth Minister for Fisheries, Forestry and Conservation identifying the severity of the foreign fishing vessel issue and its impact on the ability of the PZJA to manage Torres Strait fisheries;
- minimum training standards (Certificate IV in Government Fraud Control - Investigations) for all fisheries officers;
- AFMA and the Queensland Department of Primary Industries and Fisheries (QDPI&F) to continue to cooperatively identify arrangements that;
 - (1) minimise the effect of the foreign fishing program on the PZJA compliance program; and
 - (2) create less reliance on external agencies for vessels capable of patrolling the whole of the fishery.

At its 17th meeting, the PZJA requested a report on options for enhancing the compliance program in the Torres Strait.

A workshop involving AFMA and QDPI&F officers was convened on 4 May 2005 to discuss the full range of potential options. As a result of the outcomes of that workshop and the recommendations contained in the report "Options for Enhancing the Domestic Compliance Program in the Torres Strait" (the Report), the PZJA agreed to undertake the following:

- a trial using private charter vessels for 100 days per year for fisheries compliance purposes at an additional approximate cost of \$210,000 per year with the program to be reviewed after a period of time to determine its effectiveness;



- a review of those legislative provisions which were hindering compliance efforts in the Torres Strait as part of a broader review of the *Torres Strait Fisheries Act 1984*, including the feasibility of introducing penalty infringement notices;
- consideration of options for improving the process for determining a person's eligibility for a commercial fishing licence;
- introduction of a customized registration sticker system which would improve compliance by allowing easy identification of TIB vessels; and
- submission by the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) to the Royal Australian Navy seeking the urgent charting of various Torres Strait waters as part of the RAN 'HydroScheme' ((Hydrographic and Oceanographic Scheme) program.

Customized Registration Sticker System

As a result of the workshop outcomes outlined above, the PZJA, at its 20th meeting on 26 October 2006, agreed to implement the specific guidelines developed for the proposed customized Torres Strait Fishing Boat Registration Sticker System. The system will require licence holders to display registration stickers on Traditional Inhabitant Boat (TIB) and Transferable Vessel Holder (TVH) licensed boats to provide enforcement officers and others with a means of visually identifying whether the boat is the one authorised to be used under the licence. Under the proposed system the Queensland Water Police will also be able to easily determine whether boats are registered; currently they must seek a list of TIB licence holders from Queensland Boating and Fisheries Patrol (QB&FP) to verify current boat registrations.

Drafting of new provisions under the *Torres Strait Fisheries Regulations 1985* is currently under way by the Attorney General's Office of Legislative Drafting and Publishing to give effect to the system. The sticker system will apply to all boats licensed to fish in the TSPZ with the exception of prawn endorsed boats. Prawn endorsed vessels are not considered to have a high risk from unlicensed fishing and are monitored via VMS. Cross endorsed PNG vessels will also be required to display a sticker under the system.

The implementation date for the system will be dependant on the timeframe for amending the Regulations. It is expected that the system will be implemented early next year.

Penalty Infringement Notices

The provision of power for the Minister to implement alternatives to prosecution for breaches of offences under the *Torres Strait Fisheries Act* by way of infringement notices and a demerit points system were included as part of the PZJA's broader review of the *Torres Strait Fisheries Act 1984* and development of proposed amendments under the *Torres Strait Fisheries Legislation Amendments Bill 2007*. The Bill received Royal Assent on 28 June 2007 and the two mechanisms under the Act now provide enforcement agencies with effective and efficient tools to deter and handle offences committed under the Act.

The amendment to Section 54B of the Act allows an infringement notice scheme to be implemented by regulation. This will provide a more efficient mechanism for deterring breaches of licence conditions and arrangements under the new output control system than previously available. The issuance of infringement notices avoids the need for time consuming prosecution of offences in the court system. This provides benefits both for compliance officers and operators.



Demerit Points System

Similarly, the Bill also provided for the introduction of a demerit point system by regulation. This system would provide additional deterrence for habitual offenders in lieu of higher penalties per prosecuted offence. Section 54C of the *Torres Strait Fisheries Act 1984* allows the establishment of a demerit points system under regulations under which a licence granted under section 19 may be suspended or revoked if the licensee accrues a prescribed number of demerit points.

With the decision to change management of the Tropical Rock Lobster Fishery from an input restricted to an output (TAC) in 2008 and due to the diverse nature of fishing activities and limited compliance resources in the TSPZ, it is important that compliance matters are addressed in a holistic rather than individual fishery fashion. With a suite of new management arrangements being drafted for the major fisheries in the TSPZ, the PZJA recognizes the need for a compliance risk assessment for all the fisheries and this is expected to be undertaken prior to implementation of the individual plans of management.

2.4. Consultation Processes

The PZJA is responsible for monitoring the condition of the designated fisheries and for the formulation of policies and plans for their management. The PZJA has regard to the rights and obligations conferred on Australia by the Torres Strait Treaty, in particular the protection of the traditional way of life and livelihood of the traditional inhabitants, including their traditional fishing.

The Torres Strait Fisheries Management Advisory Committee (TSFMAC) and Torres Strait Prawn Fishery Management Advisory Committee (TSPMAC) are advised on scientific and research matters by the Torres Strait Scientific Advisory Committee (TSSAC) which has been reinstated this year following the conclusion of its role of advising the Board of the Co-operative Research Centre (CRC); and on management issues of individual Torres Strait fisheries by Working Groups for the fisheries.

The consultative structure for Torres Strait fisheries incorporates Australian Traditional Inhabitant commercial and traditional fishers, non-Traditional Inhabitant commercial fishers, Australian Government and Queensland officials, and technical experts (Figure 6) and was updated to include Torres Strait Tropical Rock Lobster Resource Assessment Groups (TRL RAG) following the decision of the PZJA 18 in July 2005.

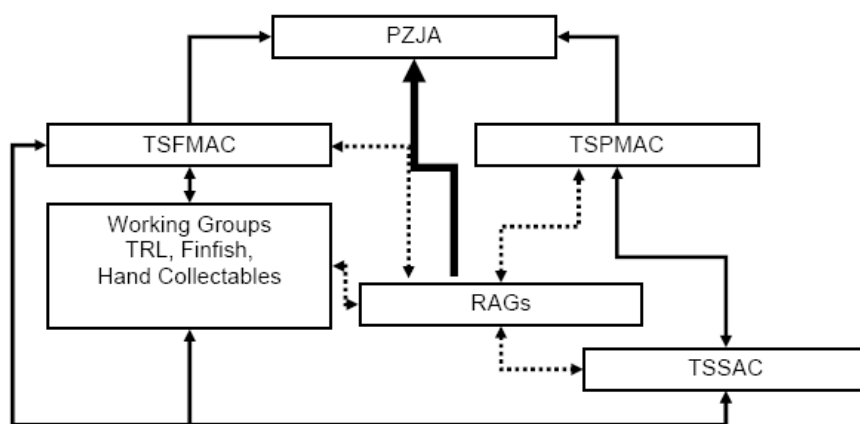


Figure 6 - The consultative structure of the TS PZJA and relevant Advisory Committees and Working Groups. Solid lines and dashed lines indicate primary and secondary lines of communication respectively.



Consultation and communication can be difficult across the scattered islands of Torres Strait, but are important elements in the effective management of the region's fisheries. The consultative committees are therefore complemented by meetings between fisheries officers and fishermen in communities around the Torres Strait. These meetings are occasionally supplemented by fisheries programs broadcast on Radio Torres Strait and articles/advertisements in the *Torres News*.

While the TSFMAC and TSPMAC are the main means for the PZJA to obtain advice and information, the PZJA may seek advice and views from others with relevant expertise or interest. This includes PZJA Agencies, other government agencies, independent consultants, operators in other fisheries and representatives of the broader community.

2.5. Description of cross-jurisdictional management arrangements

The Torres Strait Treaty recognises the right of Australia and Papua New Guinea (PNG) to share the commercial fisheries of the Torres Strait Protected Zone. The shares to which each country is entitled are specified in Article 23 of the Treaty. These shares are specified as percentages of Allowable Catches that, in contemporary fisheries terminology, are referred to as Total Allowable Catches. For a multitude of reasons Total allowable Catches have never been set in the Torres Strait fisheries, and Australia and PNG have agreed to an arrangement to share the catch – each country estimates and then nominates the number of boats to fish in the other country's waters estimated to be needed to catch that country's share.

In October 2006 the Queensland Department of Primary Industries and Fisheries announced implementation of a quota system in the East Coast Fishery to complement the Torres Strait Fishery. PNG has a management plan in place for their fishery that includes complementary management arrangements such as the same size limits and a 4 month prohibition on the use of hookah and limits the number of hookahs in the fishery to 49.

2.6. Outcomes of review processes

Over the past two years the PZJA has made a number of decisions that will introduce significant changes to the future operating environment in the Torres Strait TRL fishery. In particular, it was agreed that commercial fishing rights will be allocated in the fishery under a Plan of Management and that the fishery will be managed under a quota system. A resource allocation between the traditional inhabitant (TIB) and the non-traditional inhabitant (TVH) commercial sectors is currently under way through a voluntary licence buy-back program via a voluntary tender process. Substantial progress has been made on the proposed details of the Management Plan and for the TRL Fishery with implementation expected to occur next year. AFMA expects to undertake a strategic assessment of the new management arrangements as part of the drafting process for the Management Plan.

2.7. Demonstration of compliance with Threat Abatement Plans (TAPs), recovery plans, etc and also relevant domestic and international agreements

As the fishery is a highly selective single species fishery and no bycatch is taken, there are no threat abatement plans, recovery plans or bycatch reduction strategies applicable to the fishery.



3. Catch data

3.1. Total catch of target species and species taken in other fisheries

Information collection for the Torres Strait TRL fishery is based on a mix of fishery dependent and fishery independent research and is reviewed periodically by the Torres Strait TRL Resource Assessment Group (TRL RAG).

The level of effort within sectors in the fishery has been difficult to quantify, particularly the traditional sector. As such data collection has focused on estimating output from the fishery. Logbook data collected from commercial operators provide a reliable estimate of commercial removals from the fishery.

Fishery dependent research and monitoring

There are four sources of fishery dependent research and monitoring for the commercial fishery:

- The TS Daily Tropical Rock Lobster Log (TRL03 which has been replaced with the TRL04)
- Monthly Data Returns (replaced with the Docket Book System)
- The commercial catch taken by traditional divers which was monitored in the middle of each year during 1988-2001 to provide catch and effort information from this sector and the size frequency distribution of the catch. The size grade data from lobster tails was also collected opportunistically. This monitoring now occurs through the Docket Book System. The mid-year sampling has been conducted since 1988 and is conducted on a number of the Islands within the Torres Strait where the processors are based. The samples are considered to be representative of the catch in the area and at that time of the year.
- Data on commercial landings of lobsters collected from the shipping records from shipping companies and several airlines that service the Torres Strait.

Fishery independent research and monitoring

From 1980, CSIRO and PNG Department of Primary Industries undertook a research program in the Torres Strait which collected size frequency information and released tagged lobsters from most of the fished areas. The information was also collected during the breeding migrations. This research has provided data on population structure, growth, reproductive biology and migration patterns. Research was also undertaken on the reproductive biology, physiology and mortality at Yule Island. Other studies of fine scale movement and den occupancy patterns have been carried out in the Torres Strait, to identify likely interactions between the free and hookah diving sectors of the fishery.

An important fishery independent research and monitoring program is conducted annually by the CSIRO. The abundance of lobsters in Torres Strait was first estimated by a large scale diver survey in 1989. During that survey 572 sites were surveyed by two divers swimming a 500 metre transect and counting all lobsters within a two metre strip on each side of the line (ie a survey area of 0.2 hectare at each site or 114 hectare in total). In addition to counting the lobsters the relative abundance of 1.5 and 2.5 year old lobsters was also established. Each



year since the first survey in 1989, smaller fishery independent surveys have sampled 82 sites for most of this time. The surveys do not cover the complete geographic extent of the fishery but they do cover the areas from which a very large percentage of the catch is taken.

A pre-season survey has also been conducted since November 2005 to provide managers with information on the abundance and biomass of fishery recruits and the likely stock biomass available to be fished in the 2006 season. This information was subsequently used by the TRL RAG, in March and August 2006, to help formulate a method to set a sustainable TAC for the 2006 fishing season.

As is the case for the annual (mid-year) population surveys (1989 – 2006) the pre-season surveys provide the only fishery-independent indices of lobster abundance throughout the Torres Strait fishery.

The commercial catch does not reflect the estimated abundance from the surveys well, indicating the importance of the surveys for reliable population abundance information. The existence of such a long term data set of fishery independent derived indices of abundance is extremely valuable for this fishery and sets it apart from many other fisheries.

3.2. Catch of byproduct/bycatch species

Because of the hand collection methods used, there are no non-retained species or bycatch species in the fishery, however, fishers with other endorsements are able to harvest under those authorities while targeting rock lobster.

3.3. Harvest by each sector (commercial, recreational, traditional and illegal)

The Torres Strait TRL fishery consists of two major sectors- a freezer vessel sector (TVH) and an island-based (TIB) sector. The former relies on larger primary vessels and predominantly employs hookah diving to collect lobsters. In contrast, the latter uses smaller vessels and free diving is the more commonly employed fishing method. It is believed that the TVH sector contributed up to 80% of the total catch before 2001. However, its contribution decreased over the last six years (Figure 7).

A regulation has been in place to control the fishing effort of the TVH sector since 2003, and a cap on the number of licenses allowed to fish lobsters in the TIB sector was implemented in 2005. These regulatory measures were intended to reduce the catch share of the TVH sector, and conversely to increase that of the TIB sector.

The docket book system introduced in late 2003/early 2004 is a voluntary system that depends on the cooperation of the buyer and seller to record the catches sold and ancillary information about the fishing operation. While this system has allowed the collection of more detailed catch data from the TIB sector and provided an approximate estimate of the share of the lobster catch between the two sectors, it should be recognized that the data may be unreliable. The main reason for this is that the docket books are used to record the purchases of catch from two groups of people – those who use a logbook to report their catches and those who do not – and double counting may have occurred where catch recorded in a logbook has not been identified as such on the docket book resulting in inaccurate data.



Figure 7 - Catch statistics (whole weight in tonnes) of the two sectors of the TS Rock Lobster (TRL) fishery from 2001 to 2006. Source: Dr. Yimin Ye – CSIRO (Ye *et al*, 2007)

Year	TVH	TIB	Total	TIB (%)
2001	70	53	123	43
2002	144	65	209	31
2003	350	118	468	25
2004	465	257	722	36
2005	523	370	893	41
2006	130	196	326	60

The Torres Strait TRL fishery shares the same stock as the TS PNG TRL fishery (managed by the PNG NFA) and the Queensland lobster fishery (managed by QDPI&F, see Figure 8). Most of the non-indigenous commercial fishers hold dual-endorsed licences for the Torres Strait and Queensland lobster fisheries. Some fishers have endorsements to fish for pearl shell and/or mackerel. There is a small but insignificant recreational fishery for lobsters in the Torres Strait regulated by QDPI&F. The commercial catch taken within the TSPZ is shared between Australia and PNG under a catch sharing arrangement as outlined under section 2.5.

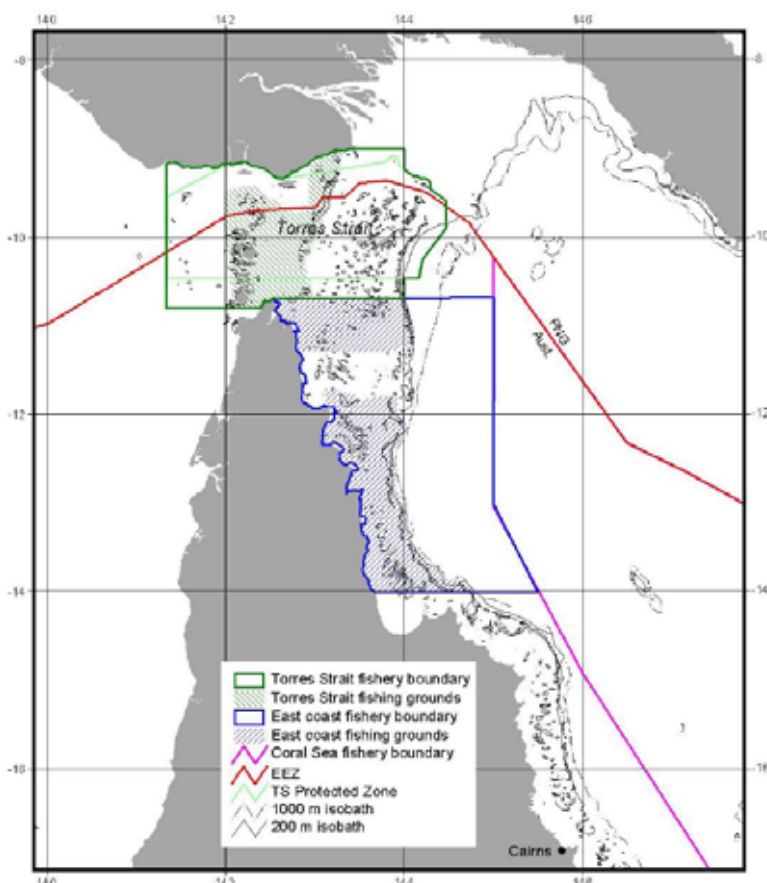


Figure 8 - Map of northern Queensland and southern Papua New Guinea showing the EEZ boundaries of the lobster fisheries in both countries, the Torres Strait Protected Zone and the 200 m and 1000 m isobaths.



3.4. Effort data including information on any trends

Fishing effort data for the whole Torres Strait TRL fishery has not been available, even though comprehensive catch and effort data has been available for the TVH sector since 1997 when the logbook system became compulsory. The logbook data has become available recently following considerable effort by AFMA in checking and cleaning the records it holds. In the past, stock assessment of this fishery has relied solely on catch statistics and relative abundance indices estimated from the mid-year fishery independent surveys since 1989. The results outlined in the 2006 Assessment of the Torres Strait TRL fishery undertaken by the CSIRO Marine and Atmospheric Research suggest that the standardized CPUEs of the TVH sector provide another reliable source of stock abundance and that the additional information should be incorporated into future stock assessment.

Dr Ye points out in his report that the abundance index from the GLM-standardized CPUE is unlikely to replace the survey index because the logbook catch and effort data covers only one age group – age 2+. He adds that fishing effort is essential data for stock assessment but that as only the TVH sector has implemented a compulsory logbook system and the practical operation of the docket-book system in place for the TIB sector has not achieved what was planned, effort data for the whole lobster fishery will still be unavailable in the foreseeable future.

3.5. Spatial issues/trends

The abundance and biomass of the Torres Strait lobster population was first estimated using a fishery-independent diver survey in 1989, after a small scale pilot study in 1988. Annual population surveys have been conducted in all years since 1989. However, only two surveys had full spatial coverage over the period, one in 1989 and the other in 2002. The 1989 survey was not well stratified because there was no seabed habitat and little lobster distribution information available at the time. In addition, the age composition of the population was estimated using the size-frequency distribution of lobsters speared by a professional fisherman. Although the two benchmark surveys could be used to estimate the lobster population size, the monitoring surveys can only provide relative abundance indices.

The sample design of the population surveys had to be modified over time to accommodate financial constraints, new dive regulations introduced in 2002, and the need to increase spatial coverage of the surveys. During 1990-1995 50 locations, each with two sites, were surveyed but the survey was further scaled down to 42 locations during 1996-2001 because of financial constraints and logistical difficulties. During 1990-2001 two sites were sampled at each location (as was done in the original 1989 survey), but this was changed to one transect per location in 2004 to increase the spatial coverage of the survey.

Surveys of the PNG Torres Strait TRL population were conducted mid-year in 1989, 1998, 2002, 2003 and 2004 to give fishery-independent indices of the relative abundance of the recruiting (1+) and fished (2+) year classes and size distribution data. The surveys were conducted as part of more extensive surveys of the Torres Strait lobster population and provided essential data for stock assessments and interpretation of the impacts of the fishery, especially given that commercial catches are not directly related to actual stock abundance. The surveys provided the only information available on levels of recruitment.

The previous population surveys provide information on both spatial and temporal differences in abundance of lobsters that can be assessed and reasons for these differences (eg habitat changes, local depletions, recruitment failures) can be interpreted and separated from other causes such as overfishing. The surveys provide the only fishery-independent indices of



lobster abundance throughout the Torres Strait fishery. This information is essential for the conservation, management and optimum utilisation of the Torres Strait TRL fishery, as required under the Torres Strait Protected Zone Treaty.

As directed by the PZJA, management of the Australian Torres Strait TRL fishery is moving to a (QMS) from the current input managed system in 2008. Under the QMS the fishery sectors will be allocated catches based on the biological sustainability of the stock. Hence, information on the abundance of fishery recruits is essential in calculating quota for the following year's fishery. Hence, it was important that complementary population surveys were conducted in PNG waters of the Torres Strait to allow an assessment of the current status of the PNG stock and to provide up-to-date data for recommendations on the sustainable level of catch in the PNG lobster fishery.

4. Status of target stock

4.1. Resource Concerns

The Torres Strait Tropical Rock Lobster Fishery was assessed by the Bureau of Rural Sciences (BRS) in the *Fishery Status Reports 2006* as **not overfished** and overfishing status **uncertain**.

While landings in the 2006 season were low, BRS considered catch rates to be still within the normal range. BRS reported that the 2006 assessment estimated that the high catches recorded in 2004 and 2005 resulted from spawning stocks in both years that were above the level estimated to produce maximum sustainable yield (MSY). BRS reported, however, that the likelihood that overfishing is occurring in the fishery is uncertain given the levels of uncertainty in the stock assessment models, the poorer than expected season and the two previous seasons of intensive fishing.

In assessing the reliability of the assessment, BRS reported that the new assessment, introduced in 2005 and revised in 2006, used new models, fishery-independent survey data collected since 1989, and catch data up to mid-2005. BRS consider that while the new models are considered significantly better, the relatively poor model fit over the last 3 years deserves further investigation.

BRS also considered that estimation of spawning stock size at the conclusion of the 2006 season would assist evaluation of the effectiveness of measures to manage effort carried over from the previous season. BRS reported that the voluntary movement of effort to the Queensland fishery in 2006 should have contributed towards the maintenance of an adequate number of spawners in Torres Strait but that the shift in effort would have reduced the spawning stock on the Queensland east coast.

A copy of the full report can be found at:
<http://www.affashop.gov.au/product.asp?prodid=13736>

Review of the 2006 TAC estimation

CSIRO's most recent assessment (Ye *et al*, 2007), which is expected to be released shortly, has tested the reliability of the models by simply comparing the actual 2006 catch with the forecasted TAC estimated for 2006 in Ye *et al*, 2006.



The assessment outlines that the two models which provided TAC estimates for 2006 were proven close to the real landings and that this success suggests significant progress in science and technical development in the estimation of a TAC for short-lived species and paves the way for the implementation of TAC management in the lobster fishery as decided by the PZJA.

Measures to manage the effort of the freezer boat sector were carried over from the previous seasons to maintain a 30% reduction in the number of dinghies (tenders) each non-community licence holder may use. A 7-day spring-tide hookah closure for February-September was introduced in 2006.

4.2. Stock Assessments

Since the 1989 baseline survey, annual surveys of abundance and age composition have been used to make fishery-independent estimates of the fishable stock, the relative abundance of recruits that would comprise target stocks in the following year, and the potential yield. The annual surveys have shown that the growth of Torres Strait tropical rock lobsters varies over time and by area, and that the natural mortality rate varies from year to year.

The 2005 annual survey found that the abundance of 2+ year old lobsters was the highest recorded since 1992, suggesting improvement since the record low in 2001, and resulting in above-average catches in 2005. The high abundance of 2+ age class lobsters in 2005 resulted from a high survival rate of 1+ age class lobsters in 2004. However, the 2005 survey also found that the trend of increasing 1+ age-class lobster abundance since 2001 had ended, the abundance in 2005 being the second lowest on record.

The Torres Strait Rock Lobster Fishery Resource Assessment Group (RAG) was established in 2005 to provide technical support and scientific advice for the new quota management system, and replaced a largely ad hoc assessment group. Its inaugural meeting was held in March 2006 with a second meeting in August 2006. The RAG reviewed previous stock assessments, developed an updated stock assessment and evaluated the Total Allowable Catch (TAC) estimation process.

Pre-season and mid-season surveys were conducted in November and June/July of 2005 and 2006. A catch-at-age stock assessment model was developed and fitted to the commercial catch and fishery-independent survey index data. The model outputs were used to construct a stock-recruitment relationship and to estimate the maximum productivity of the fishery (and its corresponding fishing effort). A number of models were developed to estimate a TAC for the fishery. Some used outputs from stock assessment models, while others relied solely on pre-season survey data. The forecasting utility of the models was evaluated using various methods, including cross-validation.

The quality of data collected through logbooks was improved by a catch validation programme that gave fishers an opportunity to cross-check their daily catch records with records held by AFMA. In addition, records were also checked for gross errors, and special attention was paid to checking for spatial errors that had previously excluded some catch data from the fishery.

CSIRO's latest assessment (Ye *et al*, 2007) estimated the abundance of recruiting (1+) lobsters in 2006 was the highest recorded since the surveys started in 1989, indicating a strong recruitment to the fishery in 2007 and a promising commercial catch for the 2007 season. In contrast to the record high abundance of recruiting (1+) lobsters, the abundance of fished (2+) lobsters was near the lowest recorded. This low stock abundance was



corroborated by feedback from fishermen during the season and confirmed by the low annual lobster catch recorded in 2006.

In the latest assessment, the age-structured population dynamics model developed in Ye *et al*, 2006 was fitted to the commercial lobster catch series and the lobster abundance index series derived from the annual fishery-independent surveys conducted since 1989. CSIRO reports that a significant improvement was achieved in model fitting in this study by dropping the weighting factors in the integration of likelihood components. Diagnostics of the model fit also proved more satisfactory than the previous model fit reported in Ye *et al*, 2006 due to improved data quality and the addition of length frequency and catch data for the last three years.

The basic parameters of the stock assessment model remained similar to those in the previous assessment (Ye *et al*, 2006). The natural mortality rate was estimated at 0.81 year⁻¹ and the maximum sustainable yield of the Torres Strait TRL fishery was estimated at 700 tonnes whole weight, 10% higher than the estimate of Ye *et al*, 2006. These changes reflect the impact of the use of a new conversion rate from tail weight to whole weight, the catch data updates and additions, e.g. the 2005 catch was the highest recorded since 1989, but it was set at the 2004 level in Ye *et al*, 2006 due to the unavailability of the catch data at the time.

The latest assessment showed that 1.14 million spawners are required to produce 9.2 million recruits at maximum sustainable yield. Since 1989, the fishery has fished the stock to below the spawning stock level associated with the maximum sustainable yield (MSY) in four years. Although this is evidence of over-exploitation, the latest assessment considers it was not a serious threat to the long-term sustainability of the fishery as the current fishing mortality is well below the level associated with MSY and the stock had recovered strongly in the subsequent years without the introduction of additional controls on fishing. These stock recoveries are considered to be generally the result of strong recruitments, which are partially environment driven. However, the assessment considers that if a low stock is followed by a poor recruitment the fishery could be seriously over-fished and highlights the need for the establishment of a well-designed harvest control rule to ensure the stock remains above the level that is required to produce MSY

5. Interactions with protected species

5.1. Frequency and nature of interactions

The Torres Strait TRL fishery has little known interaction with protected species. Legislation prevents the taking of turtles or dugong in the course of any fishing other than traditional fishing so, while these species are frequently seen in the area of the fishery, they are protected from non-traditional hunting.

6. Impacts of the fishery on the ecosystem in which it operates

6.1. Results of any Ecological Risk Assessments

An “Ecological Risk Assessment for Effects of Fishing on the Torres Strait TRL fishery (ERAEF)” has been developed jointly by CSIRO Marine and Atmospheric Research and the Australian Fisheries Management Authority but is yet to be considered by the TRL RAG. ERAEF provides a hierarchical framework for a comprehensive assessment of the ecological



risks arising from fishing, with impacts assessed against five ecological components – target species; by-product and by-catch species; threatened, endangered and protected (TEP) species; habitats; and (ecological) communities.

ERAEF proceeds through four stages of analysis: scoping; an expert judgement based Level 1 analysis (SICA – Scale Intensity Consequence Analysis); an empirically based Level 2 analysis (PSA – Productivity Susceptibility Analysis); and a model based Level 3 analysis. This hierarchical approach provides a cost-efficient way of screening hazards, with increasing time and attention paid only to those hazards that are not eliminated at lower levels in the analysis. Risk management responses may be identified at any level in the analysis.

Level 1 Results

Two ecological components were eliminated at Level 1. The Bycatch-Byproduct component was eliminated – there is no bycatch in the Torres Strait TRL fishery. The Communities component was also eliminated – no community hazards were assessed as greater than minor risk (risk score 2).

There was at least one risk score of 3 – moderate – for each of the Target, TEP and Habitat components.

Most hazards (fishing activities) were eliminated at Level 1 (risk scores 1 or 2). One internal fishing activity hazard remained:

- fishing capture (impact on Target component)

Significant external hazards included:

- other fisheries in the region (impact on TEP and Habitat components), and
- other anthropogenic activities (impact on TEP and Habitat components).

No risks were rated as major or above (risk scores 4 or 5).

For the Torres Strait TRL fishery, impacts from fishing on all species and habitat components were NOT assessed in more detail at Level 2.

Level 2 Results

Species

No Torres Strait Rock Lobster species were assessed at Level 2 using the PSA analysis.

Habitats

No Torres Strait Rock Lobster habitats were assessed at Level 2 using the habitat PSA analysis.

Summary

A conservative and precautionary approach is taken to management of the Torres Strait TRL fishery to ensure conservation of the stock for traditional inhabitants. The fishing method (spearing by divers) has little or no impact on the inshore demersal communities, particularly due to the selective nature of fishing and the absence of bycatch or byproduct.

One internal fishery issue emerged from the Level 1 analysis of the Torres Strait TRL fishery

- capture fishing was identified as a hazard related to the single target species.



Capture fishing is addressed through current input controls and managers are moving to a in 2007. The impacts of the adjacent PNG and Queensland lobster fisheries are currently difficult to quantify, particularly due to uncertainty about PNG lobster catch, but both fisheries plan to adopt quota management in the near future.

Two external issues emerged as hazards to the TEP and Habitat components;

- other fisheries; and
- other anthropogenic activities.

Key Uncertainties / Recommendations for Research and Monitoring

It is difficult to assess the absolute risk to the Torres Strait Rock Lobster target species population as a result of external fisheries impacts without an integrated stock assessment to determine status of the whole lobster stock. Comprehensive commercial catch monitoring is required before such an assessment is possible. This may be achieved once all fisheries move to quota management in the near future (planned enforcement in 2007).

6.2. Nature of impacts on the ecosystem

Lobsters in the fishery are harvested by hand. Although divers may have some contact with benthos and some fishers walk on reefs while collecting lobsters, the potential impacts of these actions are thought to be low and no information has been collected regarding these actions. The Department of the Environment and Water Resources (DEW) has expressed concerns at the lack of information collection and research covering the fisheries impact on the ecosystem and environment generally. However, DEW 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. DEW have indicated that they strongly support research in this area.

6.3. Management action taken to reduce impacts and results of such action

No specific management responses have been developed as the marine environment is not considered to be significantly impacted by the fishery. Should the need arise, appropriate management measures will be considered by the relevant advisory group. The Department of the Environment and Water Resources considers that as there are no specialist predator or prey relationships in the fishery area, there will not be significant damage to the ecosystem due to the operation of the fishery while the stocks are maintained at sustainable levels (i.e. above the limit reference point).

7. Progress in implementing recommendations and conditions resulting from the DEWR assessment of the fishery

7.1. Description of progress in implementing each recommendation and condition

The table at Attachment A outlines the progress made against the recommendations and conditions of the assessment as at 30 June 2007.



8. Research and monitoring

In July 2005 the PZJA made the decision to change management of the TRL fishery from effort restricted to a quota management system. The new management system includes moving to a 50:50 or 70:30 share of Australian commercial entitlements between Torres Strait Islanders and non-islanders. This decision brought about an urgent need to develop a method to set a sustainable total allowable catch (TAC) in 2006 and to prioritise research needed to obtain the necessary lobster stock and fishery data to estimate the TAC. The new quota system was subsequently delayed to 2008.

The main research priority identified, to support the new TAC, was the pre-season population survey of recruiting (1+) lobster abundance. The first pre-season survey was conducted in November 2005 to provide managers with information on the abundance and biomass of fishery recruits and the likely stock biomass available to be fished in the 2006 season. This information was subsequently used by the TRL RAG, in March and August 2006, to help formulate a method to set a sustainable TAC for the 2006 fishing season.

As is the case for the annual (mid-year) population surveys (1989 – 2006) the pre-season surveys provide the only fishery-independent indices of lobster abundance throughout the Torres Strait fishery. The combination of the long term stock assessment, based on the age-structured fishery model and current estimates of stock abundance is critical in ensuring the annual TACs are set at sustainable levels. This information is essential for the conservation, management and optimum use of the Torres Strait TRL fishery, as required under the Treaty.

TAC estimation is most difficult for fisheries targeting species with highly variable recruitment and targeting a single cohort (Pope, 1984). The Torres Strait TRL fishery is a clear example of such a case, particularly given that the combination of a minimum size limit and spawning emigration results in greater than 90% of the commercial catch comprising one (2+) cohort. Nevertheless, several catch forecast methods including spawning stock-based, population based and empirical models have been trialled to test their reliability for TAC estimation. The models that used pre-season survey abundance rather than mid-year survey abundance were preferred given the greater likelihood that the stock forecast from these models would be more precise.



ATTACHMENT A

Recommendations to the Australian Fisheries Management Authority (AFMA) on the ecologically sustainable management of the Torres Strait Tropical Rock Lobster Fishery

Wildlife Trade Operation – 11 November 2004 to 10 November 2007

Performance Criteria	Level of Achievement as at 30 June 2007	Deadline
<p>1: Operation of the fishery will be carried out in accordance with the <i>Torres Strait Fisheries Act 1984</i> and the <i>Torres Strait Rock Lobster Statement of Management Arrangements</i>. AFMA will inform DEH of any changes to the Act or the Statement.</p>	<p>The fishery continued to operate as per statement of management arrangements.</p>	<p>Ongoing.</p>
<p>2: AFMA to continue to ensure that consultative processes are conducted in a manner that ensures the timely implementation of management responses essential for the sustainability of the fishery.</p>	<p>Consultative (Working Group) meetings were held in February and May 2007.</p> <p>The third TRL RAG meeting, including PNG and QLD, was convened during May 2007.</p> <p>The next scheduled meetings of the Working Group is September 2007 and the 4th RAG in October 2007.</p>	<p>Ongoing.</p>
<p>3: AFMA to develop clear objectives and performance measures for the fishery relating to target species and ecosystem impacts within 1 year. The performance of the fishery to be reviewed annually against these measures and the outcomes published. A biological reference point to be developed and implemented for rock lobster stocks.</p>	<p>New management objectives for the fishery were agreed by the PZJA in April 2006. The RAG revised Objective 1 as follows:</p> <p><u>Objective 1:</u> To maintain the spawning stock at levels that meet or exceed the level required to produce the maximum sustainable yield.</p> <p>The target reference point was reviewed by the RAG in May and recommended that it be S_{msy} rather than $1.5S_{msy}$. F_{MSY} is the other target reference point recommended. A new limit reference point recommended was $.2B_0$. These changes bring the Torres Strait TRL fishery into line (or close to it) with the Commonwealth's Harvest</p>	<p>10 November 2005.</p>



Performance Criteria	Level of Achievement as at 30 June 2007	Deadline
	<p>Strategy.</p> <p>The PZJA will consider these recommendations when it meets in August 2007.</p> <p>Recommended Total Allowable Catch (TAC) (next provisional TAC recommendation due out in October 2007) for the fishery will reflect the strategy adopted by the PZJA.</p>	
<p>4: AFMA to develop a clear process and timeframe for determining the reason for a performance criteria breach and implementing appropriate management measures within specified timeframes.</p>	<p>The response is implicit in the RAG's proposed harvest strategy. The TAC will be set by the PZJA on an annual basis. If it is exceeded it is a compliance issue. If the TAC turns out to be set too high or too low that experience will continue to help refine the TAC setting process, however the annual assessment and TACs will prevent any persistent breaches.</p>	<p>10 November 2007.</p>
<p>5: AFMA to conduct a formal compliance risk assessment of the TSRLF within 1 year and develop a strategy to implement any resultant recommendations.</p>	<p>No change: AFMA with QDPI&F (Boating Patrol) completed a risk assessment for the fishery in July 2004. This assessment has been put into operation and guides compliance activities in the fishery. QDPI&F will update the risk assessment when the new management plan is drafted.</p>	<p>10 November 2005</p>
<p>6: Annual catch and effort statistics to be published and publicly available by the end of 2004.</p>	<p>Annual catch statistics including 2006 were released in April/May 2007. There are still some systemic problems with the data collection that are not going to be resolved until mid 2008 because of the delay in implementing the TSF Act legislative amendments (fish receivers licences) for 12 months.</p>	<p>December 2004</p>
<p>7: AFMA to ensure that mechanisms are in place to ensure that adequate and reliable data on catch and effort, appropriate to the scale of the fishery, are collected from all sectors to ensure sustainable management of the TSTRL</p>	<p>The data collection program continues to use compulsory logbooks to collect catch and effort data from boats > 7m and the docket book (TDB01) to collect the data from the community fishing sector. This system will be strengthened in</p>	<p>10 November 2007.</p>



Performance Criteria	Level of Achievement as at 30 June 2007	Deadline
resource.	the future with the docket book being made compulsory in mid 2008.	
8: AFMA to continue to pursue complementary management arrangements with other jurisdictions responsible for managing shared rock lobster stocks to ensure that all removals and other relevant impacts on the stock are properly accounted for in stock assessments.	AFMA has continued to promote complementary management arrangements. The TRL RAG meetings, involving all three jurisdictions, are examples of this effort. PNG has observer status at the Working Group and TSFMAC both of which promote complementarity. Queensland announced implementation of a quota system in the EC fishery to complement the TS fishery in October 2006.	Ongoing.
9: AFMA to control fishing mortality, through effort controls or other mechanisms across all sectors, to maintain stocks at ecologically sustainable levels.	The fishery has operated with a 30% reduction of tenders in the non-community sector and continuation of 7 day moon/tide closures in the fishery during 2007.	Ongoing.
10: AFMA will provide a report annually to the DEH on the progress in implementing the recommendations.	This report achieves this reporting requirement.	10 November 2006

Summary: The Torres Strait Tropical Rock Lobster fishery has continued to go through a period of transition from a fishery loosely controlled by inputs to an output system. The rate of transition has increased and a process to remove significant capacity from the non-community sector has commenced with a tender process that will complete the first round of tenders by the end of August 2007. Consultation on the new output management arrangements continues with one further meeting scheduled with the TRL working group before the drafting instruction for the management plan will be completed. Amendments of the Torres Strait Fisheries Act to provide the legislative basis for modern output controls have been made which is a significant step towards the management objectives for the fishery. The management of the fishery should be viewed in the context of these continuing complex and difficult changes.

