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Strategic Assessment Report

Torres Strait Tropical Rock Lobster Fishery

July 2016

Prepared by the Australian Fisheries
Management Authority on behalf of
the Torres Strait Protected Zone
Joint Authority



Australian Government

Australian Fisheries Management Authority

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Executive summary

The Torres Strait Tropical Rock Lobster (TRL) Fishery was strategically assessed in May 2014 under Parts 10, 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Export approval was granted through declaring the TRL Fishery a Wildlife Trade Operation (WTO) for a period of three years, valid until 4 May 2017.

A formal management plan for the TRL Fishery is being developed by the Australian Fisheries Management Authority (AFMA) on behalf of the Protected Zone Joint Authority. This submission has been produced to allow the Department of the Environment to assess the management arrangements under the EPBC Act prior to the expiry of the current WTO.

The TRL Fishery Management Plan will introduce a quota management system. The system is comprised of a total allowable catch (TAC) for TRL, quota (in the form of transferrable quota units) and mechanisms for trading (selling and leasing) quota, representing a major change to the management of the fishery.

This report describes: the current status and nature of the Torres Strait Tropical Rock Lobster fishery; the proposed management arrangements of the fishery under the management plan, the research and monitoring regime of the fishery and trends of catch and effort, including spatial and temporal information.

This document has been developed in accordance with AFMA's obligations under the EPBC Act to produce a submission for full strategic assessment before determining a plan of management.

Torres Strait Tropical Rock Lobster Fishery Strategic Assessment Report – July 2016

Introduction

This draft assessment report for the Torres Strait Tropical Rock Lobster (TRL) Fishery has been prepared in accordance with the *Terms of Reference – Environmental Assessment of the Torres Strait Tropical Rock Lobster Fishery (Attachment A)*. The report provides the basis for the strategic assessment of the Torres Strait Tropical Rock Lobster Fishery consistent with the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Consultation

The Protected Zone Joint Authority (PZJA) is responsible for making management decisions for PZJA fisheries, including the TRL Fishery. The PZJA membership is comprised of the Commonwealth Assistant Minister for Agriculture, the Queensland Government Minister for Agriculture and Fisheries and the Chair of the Torres Strait Regional Authority. Further information regarding the PZJA is provided in **Section 2.2**.

The PZJA is advised by several forums on issues associated with the Tropical Rock Lobster Fishery. The Torres Strait Tropical Rock Lobster Fishery Working Group (TRLWG) was consulted for the development of the strategic assessment.

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1. Description of the fishery

At a glance	
Principle species	Tropical rock lobster (<i>Panulirus ornatus</i>)
Fishery sectors	Transferrable Vessel Holder (TVH) Traditional Inhabitant Boat (TIB) Papua New Guinea (PNG) cross-endorsed
No. concessions 2015	TVH: 12 licences, 33 tenders, limited entry TIB: 291 (on 7 April 2015) PNG: 0 (cross-endorsed) (ABARES Fishery Status Reports 2015)
Fishing methods	Hookah – diving assisted by surface supply breathing apparatus Free diving – diving with breath hold only Lamp fishing – fishing at night with a light and collecting lobster by a handheld spear or by net while remaining on the boat
Estimated catch and value or 2013/14	Australia TRL catch 401 t (~\$A20.9) PNG TRL catch 255 t (value uncertain) (ABARES Fishery Status Reports 2015)
Primary markets	Live lobsters and frozen tails – domestic Frozen tails – United States Live lobsters – Hong Kong and China (ABARES Fishery Status Reports 2015)
Stock status	2013/14 not overfished 2013/14 not subject to overfishing (ABARES Fishery Status Reports 2015)
Management plan	None In preparation to move from the current effort based management system to one based on quota a TRL Fishery Management Plan is being developed.
Management method	Under the current management system input controls are the primary management tool with restrictions on fishing gear and seasonal closures. These controls are complemented with a minimum size limit (115 mm tail length or 90 mm carapace length) and traditional landing and recreational bag limits.
Consultative mechanism	The PZJA is responsible for making management decisions for the TRL Fishery. The PZJA has established two consultative forums for the TRL Fishery: the Tropical Rock Lobster Resource Assessment Group (TRLRAG) and the Tropical Rock Lobster Working Group (TRLWG) who provide recommendations to the PZJA.

1.1 Target/permitted/prohibited species

The Torres Strait Tropical Rock Lobster Fishery is based on a single species, the tropical rock lobster (*Panulirus ornatus*). Other species of rock lobster (*P. versicolour*, *P. penicillatus* and *P. femoristriga* and *P. polyphagus*) have been recorded in the Torres Strait; however catches of these species are negligible.

Bycatch or by-product species are not taken due to the selective nature of the fishery. Other species may be targeted opportunistically by TRL fishers who hold other fishery endorsements.

1.2 Fishing method employed

The TRL Fishery is primarily a dive-based, hand-collection fishery using hookah or by free-diving, a small quantity of lobster is also taken by lamp fishing. The hookah dive method typically has one diver working from each fishing vessel (called tenders); tenders are generally four to six metres in length. Hookah divers work to about 20 metres in depth during daylight hours. Lamp fishing involves collecting lobsters at night by drifting over shallow reefs using handheld spears or scoops.

The TVH sector generally uses primary boats in conjunction with smaller fishing tenders and fish for lobster using hookah. The TVH sector normally undertakes trips to fishing grounds that last from a few days to several weeks.

The TIB sector typically uses smaller fishing tenders only with trips lasting for one or two days. However, recently an increasing number of TIB sector operators have started using larger primary boats in conjunction with fishing tenders and hookah dive equipment. Some TIB operators lamp fish the shallow reefs at night.

1.3 Fishery area

See the map detailing the area of the fishery (**Attachment B**), available from: http://pzja.gov.au/wp-content/uploads/2011/05/lobster_map.gif.

Majority of the tropical rock lobster is taken from the western and central zones of the fishery (**Section 3.9**).

1.4 Stock status

Since 2007 the TRL Fishery has been classified as not overfished and not subject to overfishing (ABARES Fishery Status Reports 2015). The most recent assessment of the TRL Fishery indicated that the spawning stock biomass is above the target and current catches are unlikely to result in substantial biomass declines.

1.5 Allocation between sectors

Catch sharing arrangements between Australia and PNG are defined under the under the *Treaty between Australia and the Independent State of Papua New Guinea concerning Sovereignty and Maritime Boundaries in the area between the two Countries, including the area known as the Torres Strait, and Related Matters* (the Torres Strait Treaty), for further information on the Torres Strait Treaty see **Section 2.1**.

Under the treaty PNG cross-endorsed vessels are entitled to take 25 per cent of the TAC within the Australian area of jurisdiction and Australia is entitled to take 75 per cent of the TAC. Under the proposed Plan the Australian share of the TAC will be allocated between the TIB and TVH sectors.

1.6 Status of export approval /accreditation under *Environment Protection and Biodiversity Conservation Act 1999*

The TRL Fishery was granted export approval/accreditation under the EPBC Act on 7 May 2014 for a period of three years and is valid until 4 May 2017. The declaration of the harvest operations of the Torres Strait Tropical Rock Lobster Fishery as an approved wildlife trade operation (WTO) stipulates three additional provisions (**Attachment C**).

2. Management arrangements

2.1 Governing legislation

The Torres Strait Treaty establishes the Torres Strait Protected Zone (TSPZ) and aims to protect the traditional way of life and livelihood of the traditional inhabitants of the Torres Strait and adjacent coastal areas of the two countries. Australia and Papua New Guinea are obligated to cooperate in the conservation, management and utilisation of the Protected Zone fisheries and both countries have sovereign rights within the Protected Zone.

Management of Protected Zone fisheries in the Australian area of jurisdiction is subject to the *Torres Strait Fisheries Act 1984*. The purpose of the Act is to give effect, in Australian law, to the fisheries elements of the Torres Strait Treaty.

The Act also establishes the PZJA (**Section 2.2**) and a PZJA policy decision outlines which agencies are able to administer the day to day functions of the PZJA (**Section 2.3**).

In addition to the above Act, Protected Zone fisheries are subject to assessment under three parts of the EPBC Act for fisheries where:

- a formal management plan or regime is to be determined (part 10)
- there are interactions with listed threatened species and ecological communities (part 13)
- fisheries product is to be exported (part 13A).

2.2 Protected Zone Joint Authority (PZJA)

The PZJA members comprise the Commonwealth and Queensland ministers responsible for fisheries, and the Chair of the Torres Strait Regional Authority. The Australian Government Minister is the Chair of the PZJA.

To assist in the management of the PZJA fisheries, the PZJA has established advisory bodies comprising a wide range of stakeholders and fishery experts, including:

- industry (TIB and TVH sectors);
- Australian and Queensland government officials; and
- other technical experts.

The PZJA is advised by several forums on issues associated with the TRL Fishery; these are the PZJA Standing Committee (**Section 2.3**), the Torres Strait Scientific Advisory Committee (TSSAC), Tropical Rock Lobster Fishery Working Group (TRLWG), and the Tropical Rock Lobster Fishery Resource Assessment Group (TRLRAG).

The PZJA Standing Committee

The PZJA Standing Committee consists of senior representatives from the PZJA member agencies. Its function is to provide strategic and operational recommendations to the PZJA on the management of the fisheries in accordance with the PZJA's statutory obligations and to oversee the implementation of the PZJA's agreed policy commitments.

The Torres Strait Scientific Advisory Committee

The TSSACs main role is to advise on the strategic direction, priorities and funding for research undertaken by AFMA across all PZJA fisheries in the Protected Zone. This advice gives consideration to meeting research gaps in line with the objectives of the *Torres Strait Fisheries Act 1984*.

Tropical Rock Lobster Working Group

The TRLWG provides recommendations to PZJA forums on fishery specific issues, including input to research gaps, operational issues and compliance issues. The TRLWG is comprised of members and observers from industry, AFMA, QDAF, TSRA, fishery scientists. Observers to the TRLWG are Malu Lamar registered native title body corporate (RNTBC), PNG National Fisheries Authority (NFA) and industry members (TIB, TVH and PNG). The TRLWG enables greater participation from industry members (indigenous and non-indigenous) in the consultative process.

The Tropical Rock Lobster Resource Assessment Group

The TRLRAG provides advice on stock assessment related matters that address biological, economic and social/cultural factors affecting the fishery. These matters include; the status of fish stocks, sub-stocks, species (target and non-target species) and the impact of fishing on the marine environment. Members of the TRLRAG include research members, industry members, AFMA, QDAF and TSRA. Observers to the TRLRAG are Malu Lamar RNTBC, industry members, PNG NFA and industry members (TIB, TVH and PNG).

2.3 Agencies roles and responsibilities

The PZJA Standing Committee is comprised of the Australian Fisheries Management Authority (AFMA), Queensland Department of Agriculture and Fisheries (QDAF), Torres Strait Regional Authority (TSRA) and the Australian Government Department of Agriculture and Water Resources.

Australian Fisheries Management Authority

AFMA undertakes fisheries management and licencing functions in consultation with the other agencies and maintains an office on Thursday Island. AFMA is responsible for developing fisheries management arrangements such as management plans and provides support and secretariat services for the PZJA, TSSAC, the TRLRAG and the TRLWG. AFMA is also responsible for foreign compliance in Commonwealth waters.

Queensland Department of Agriculture and Fisheries

Fisheries Queensland is the delegate for Torres Strait domestic compliance. They also provide fisheries management and licencing advice on day-to-day operational issues at an officer level and through the Standing Committee.

The Torres Strait Regional Authority

The TSRA provide input to fisheries management decisions and represent the interests of Traditional Inhabitants in fisheries management.

The TSRA have also taken the lead on the development of community management plans for turtle and dugong. Additionally, turtle and dugong are detailed as a fishery under the *Torres Strait Fisheries Act 1984* meaning that current legislation regarding sustainability is administered by AFMA.

The Commonwealth Department of Agriculture and Water Resources

The Commonwealth Department of Agriculture continues to work closely with AFMA in assisting with legislative reform and policy advice.

2.4 Proposed management arrangements for the fishery

Under the proposed TRL Fishery Management Plan the fishery will be managed by output controls through the allocation of TRL quota units to the TIB and TVH sectors. Output controls regulate the fishing activity by restricting the amount of fish that can be landed. The Plan pursuant to section 15A of the *Torres Strait Fisheries Act 1984* will:

- determine a total allowable catch (TAC) (a measure of fishing capacity (s15A(4)) each fishing season for tropical rock lobster (*Panulirus spp.*);
- allocate units (division and allocation of fishing capacity (s15A(6)) to eligible persons and/or entities. Each unit (known as quota units) will entitle the holder to an equal share of the TAC; and
- allow for the trading (selling and leasing) of quota units (s15A(6)).

The total allowable catch (TAC) will be determined by the PZJA in line with requirements of the TRL Harvest Strategy and following advice from the TRLRAG and TRLWG. The current TRL Harvest Strategy is inherently precautionary with a conservative target fishing mortality level of 0.15 and a conservative target biomass of 80 per cent of pre-fished levels, which is significantly higher than the default 48 per cent target set out in the *Commonwealth Harvest Strategy Policy and Guidelines, September 2007*. Some management measures such as size limits and fishing gear restrictions will remain in the form of management notices and licence conditions (**Table 1**).

Table 1. Torres Strait Tropical Rock Lobster Fishery management measures.

Management measures	Traditional Inhabitant Sector (TIB)	Non-traditional inhabitant Sector (TVH)	What instrument is used to impose the measure	Will the arrangement continue immediately after the Management Plan (MP) ¹	Will the arrangement be in the MP ²
Requirement to hold a licence	Yes	Yes	<i>Torres Strait Fisheries Act 1984 and Community Fishing Notice 1.</i>	Yes	MP
Tender/dinghy number restrictions	No ³	Yes (maximum 7)	TVH sector: result of limited entry policy.	Yes	No, other instrument.
Catch reporting	No	Yes	Licence conditions	Yes	No, other instrument.
Moon-tide hookah closures	Yes	Yes	Licence conditions	Yes	No, other instrument.
Fishery closure (1 Oct – 30 Nov)	Yes	Yes	<i>Torres Strait Fisheries Management Instrument No.9</i>	Yes, to be reviewed.	No, other instrument.
Hookah closure (1 Dec – 31 Jan)	Yes	Yes	<i>Torres Strait Fisheries Management Instrument No.9</i>	Yes, to be reviewed.	No, other instrument.
Size restrictions, minimum tail size of 115 mm or minimum carapace length of 90 mm.	Yes	Yes	<i>Torres Strait Fisheries Management Instrument No.9</i>	Yes	No, other instrument.
Prohibition on using SCUBA or any kind of equipment used for breathing underwater other than hookah gear.	Yes	Yes	<i>Torres Strait Fisheries Management Instrument No.9</i>	Yes	No, other instrument.

¹ All management arrangements are subject to periodic review

² Details will be set out in other instruments or licence conditions.

³ Policy removed in 2014. Tender numbers are now constrained by vessel survey standards

Management measures	Traditional Inhabitant Sector (TIB)	Non-Indigenous Sector (TVH)	What instrument is used to impose the measure	Will the arrangement continue immediately after the Management Plan (MP)	Will the arrangement be in the MP or operational detail be in the actual MP
Collection by hand, spear and scoop net only.	Yes	Yes	<i>Torres Strait Fisheries Management Instrument No.9</i>	Yes	No, other instrument.
Prohibition on carrying meat removed from lobster.	Yes	Yes	<i>Torres Strait Fisheries Management Instrument No.9</i>	Yes	No, other instrument.
Prohibition on carrying diving equipment at night.	Yes	Yes	<i>Torres Strait Fisheries Management Instrument No.9</i>	Yes	No, other instrument.
A Master Fisherman's licence must be held by person in charge of the boat.	Yes	Yes	Policy	Yes	MP
A processor/carrier licence is required to carry or process TRL at sea.	Yes	Yes	<i>Torres Strait Fisheries Management Instrument No.9</i>	Yes	MP
A bag limit of three lobsters per person or six lobsters per boat applies to traditional fishing (Islander or visiting PNG Traditional Inhabitants) and recreational fishing.	Yes	Yes	<i>Torres Strait Fisheries Management Instrument No.9</i>	Yes	No, other instrument
Boat length restrictions and boat replacement policy ⁴	Yes (maximum 20m)	Yes (maximum 18m)	Licence conditions and <i>Fisheries Management Notice No.47</i> (maximum 20m)	Yes	No, other instrument

- ⁴
- boats up to six metres may be replaced by another boat 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 10 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 boat of equal length. The maximum size for fishing boats is 20 metres.

2.5 Statement of the performance of the fishery against objectives, performance indicators and performance measures

A statement of the performance of the TRL Fishery against its objectives, performance indicators and performance measures is made annually in PZJA's annual report. A copy of the current statement can be found on the PZJA website.

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

Queensland Boating and Fisheries Patrol (QBFP) 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 Australian area of jurisdiction.

AFMA is responsible for the foreign compliance program for the Torres Strait and it liaises closely with PNG National Fisheries Authority (NFA) and Australian Border Force - Maritime Border Command.

QBFP compliance regime

During 2014/15 QBFP had four matters involving the Torres Strait Tropical Rock Lobster Fishery referred to the Commonwealth Director of Public Prosecutions. Decisions on these matters are still pending; they involve offences including: unlicensed fishing, breaches of licence conditions and commercial sale of no take species.

AFMA compliance regime

AFMA and QBFP undertake an annual compliance risk assessment process for the Torres Strait. The 2015 compliance risk assessment process identified six moderate to high level risks within the area of the Torres Strait. Three identified risks are of direct relevance to the Torres Strait Tropical Rock Lobster Fishery.

The breaching of trip, gear, size and jurisdictional limits:

- breach of gear restrictions, in particular the use of surface supply breathing apparatus (hookah) and seasonal closures.
- breach of possession limits, size limits and fishing during seasonal closures.

The occurrence unauthorized fishing:

- unlicensed domestic (non-traditional and traditional) operators and unlicensed PNG nationals.

The occurrence of logbook misreporting:

- failure to accurately complete logbooks (TVH sector only).
- failure to submit logbooks within the required timeframe (TVH sector only).

At the 2014 and 2015 bilateral meetings between AFMA and PNG, officials discussed the options currently in place for enhancing the foreign compliance regime in the Torres Strait, including:

PNG Treaty Awareness Program and Treaty Village Identification Scheme

Australian and PNG government agencies conduct visits to the 13 PNG Torres Strait Treaty Villages, situated along the Southern Coastline of Western Province, PNG, as a part of the Department of Foreign Affairs (DFAT) led Treaty Awareness Program.

The Treaty Awareness Program is designed to educate and advise members of the Treaty villages on their rights and responsibilities under the Torres Strait Treaty between Australia and Papua New Guinea. The visits involve agencies responsible for fisheries, immigration, biosecurity, maritime safety and health. AFMA officers discuss traditional fishing rights under the Torres Strait Treaty, Australian fisheries law and the ramifications of not adhering to fisheries legislation. AFMA has also implemented the Traditional Vessel Identification Scheme as part of these treaty awareness visits. Identified treaty village vessels are marked with unique identification labels which assist the Australian Border Force and AFMA in monitoring the movements of fishing vessels under the Treaty arrangements. Approximately 90 per cent of all vessels (152 boats) in the area have treaty village identification labels. Only one labelled treaty village boat has been apprehended for illegal fishing since implementation of this scheme in 2012.

Joint Patrols and activities

During the 2014/2015 year AFMA and PNG National Fisheries Authority (PNG NFA) coordinated respective patrol boat movements on both sides of the TSPZ during two operations. Suspected illegal fishing activity decreased noticeably during these periods. One PNG NFA officer also joined AFMA and Royal Australian Navy (RAN) officers for a targeted operation against illegal TRL fishing on Warrior Reef.

PNG NFA and police officers based in Daru have conducted a series of at sea transfers of apprehended PNG nationals from Australian patrol boats this year. These transfers provide for repatriation and subsequent processing and prosecution of the offenders under PNG legislation and in keeping with the spirit of the Torres Strait Treaty.

Monitoring, Control and Surveillance

The foreign compliance regime in the Torres Strait is conducted by Australian Border Force – Maritime Border Command working closely with the AFMA Foreign Compliance Operations sector and fishery stakeholders to detect, intercept and disrupt illegal maritime activity.

From October 2013 – January 2016 a total of 27 foreign fishing vessels with PNG origin have been apprehended or otherwise subject to enforcement action within the TSPZ. Of these apprehended vessels 15 resulted in forfeiture of vessels and related fishing gear, including a total number of 247kgs of whole TRL and 50kgs of tailed TRL.

Maritime Border Command has a dedicated Operations Centre which coordinates the civil maritime surveillance program, identifying incursions into Australia's Exclusive Economic Zone (EEZ) and the TSPZ. The intelligence-led, risk-based intervention approach is drawn upon to plan, prioritise and coordinate operations to counter maritime security threats.

AFMA carries out a role as an ongoing patrol presence in response to compliance risks associated with the region. Periods of identified heightened risk through ongoing methods of surveillance may lead to the request of additional assets and patrols for certain areas.

Border Force assets include Bay Class and Cape Class patrol vessels, contracted fixed wing and rotary aircraft including; Dash-8 and Rheims surveillance aircraft, AS350 Squirrel and Bell 412 rotary aircraft. Defence-assigned assets include Royal Australian Air Force AP-3 Orion maritime patrol aircraft and Royal Australian Navy patrol boats. Maritime Border Command also utilises commercial satellite imagery to conduct surveillance of remote areas of our ocean.

The goal is to maintain a secure and safe maritime operating environment for industry participants to be able to conduct their business. The AFMA Foreign Compliance Operations Section in the Torres Strait engages with industry to improve on water awareness, prevention, preparedness and response to potential incidents.

2.7 Description of cross-jurisdictional management arrangements

Australia and PNG entered into the Torres Strait Treaty on 15 February 1985. The Treaty requires Australia and PNG to cooperate in the conservation, management and optimum utilisation of all Article 23 commercial fisheries in the TSPZ. It also allows for catch sharing arrangements between the two countries which are negotiated annually at the fisheries bilateral meeting (**Section 1.4**).

2.8 Demonstration of compliance with Threat Abatement Plans, recovery plans etc

As the fishery is a highly selective single species fishery (**Section 1.1**) and no bycatch is taken, there are no threat abatement plans, recovery plans or bycatch reduction strategies applicable to the fishery.

3. Research and monitoring

3.1 Research priorities and funding

Research proposals are considered by a number of consultative forums; these forums evaluate the research proposals and advise AFMA on research priorities and funding. The consultative process for research proposals is described below:

AFMA sends a targeted call for fisheries research in the Torres Strait region. The call for research details priority projects (identified by the TSSAC). Applicants are required to submit pre-proposals detailing their proposed research work and costs, applicants may also submit pre-proposals for projects not identified as priority work.

All pre-proposals are considered by the TRLRAG and TRLWG, these forums will advise on the preferred research projects based the fishery priorities. The TRLRAG and TRLWG meeting records, including any recommendations, will be provided to the TSSAC for consideration.

The TSSAC evaluates pre-proposals based on specific criteria. A strong emphasis is placed on the ability of research proposals and principal investigators to engage Torres Strait Islanders in the research process in meaningful and culturally appropriate ways. The TSSAC will also consider recommendations from the TRLRAG and TRLWG.

Researchers are notified of the TSSACs evaluation of proposals. Individual applicants are then invited to prepare a full (detailed) proposal based on evaluation of the pre-proposals. Full proposals are considered and if accepted endorsed by the TRLRAG, TRLWG and TSSAC.

3.2 Fishery independent surveys

Annual fishery-independent monitoring of the Torres Strait TRL population has been carried out since 1989. Dive surveys are conducted mid-year (June) and additionally pre-season (November) for the years 2005-2008 and 2015, provide information on the relative abundance of recruiting and fished lobsters. Information on the monitoring program and the TRL Fishery stock assessment is provided annually in the Torres Strait rock lobster (TRL) fishery surveys and stock assessment report' produced by CSIRO. The most recent milestone report was completed in June 2015 and it is provided at **Attachment D**.

There have been several changes to the sampling method since 1989, however abundance data has been standardised for the duration of the monitoring program. A total of 140 (full-scale) or 74 (reduced-scale) sites are allocated to the established sampling strata. Measured belt transects (500 m by 4 m) comprise the primary sampling unit. At the completion of each transect a diver records; the number of lobsters caught (and measured), the number and age-class of those observed but not caught, depth, visibility, distance swum, numbers of pearl shell (*Pinctada maxima*) and holothurian species observed, percent covers of standard substratum and biota (including seagrass and algae species) categories.

Pre-season population surveys inform the abundance recruiting lobster; these surveys were identified by the TRLRAG as critical to support the move of the TRL Fishery to quota management, first proposed by the PZJA in 2005. As a result pre-season surveys were conducted in 2005-2008 and 2015, in addition to mid-year surveys, to provide managers with information on the abundance and biomass of fishery recruits and the likely stock biomass available to be fished each year. This information underpins the outputs of the stock assessment model which has been developed to assess the fishery status and to forecast the recommended biological catch of TRL for each fishing season

The stock assessment model is also informed by historic catch per unit effort (CPUE) information for the TIB sector (years 2004-2015) and for the TVH sector (years 1994-2015). The CPUE information provides data on the abundance of fished lobsters and informs model predictions of the spawning biomass; this is a fundamental parameter to forecast the recommended biological catch.

3.3 Catch and effort reporting

Mandatory catch and effort reporting requirements are in place for the TVH sector. Catch and effort data for the TVH sector is recorded in the Tropical Rock Lobster Logbook (TRL04), an example of the TRL04 logbook page is provided at **Attachment E**. For each vessel day there can be multiple shots (up to four) with each shot consisting of up to eight tenders. Each tender has a catch record by dive method (hookah, freedive or unknown) and by processed form (whole, tailed or unknown). Currently reporting of catch and effort data is not compulsory for the TIB sector due to legislative limitations.

In January 2004, AFMA introduced the Torres Strait Seafood Buyers and Processors docket-book (TDB01) to commercial and community freezer operators to collect data on Torres Strait Islander catch. Unlike the TRL04 logbook, which requires catch and effort data to be recorded for individual fishing operations related to each vessel tender, the docket-book requires only aggregate catch and effort data to be recorded at the end of each trip. The use of the TDB01 docket-book is currently voluntary, and has been considered successful in monitoring the harvest of TRL by TIB fishers to date. An example of the TDB01 docket book page is available at **Attachment F**. Currently there is no observer program for the Torres Strait Tropical Rock Lobster Fishery.

3.4 Total catch of target species

The total reported global catches (Australia and PNG) of TRL and the global total allowable catch for the years 2012 to 2015 is provided in **Table 2**.

Table 2. Global reported catch and total allowable catch of TRL (tonnes in live weight) from 2012-2015.

Year	Australia catch (tonnes)	PNG catch (tonnes)	Notional TAC (tonnes)
2012	521	174	964
2013	489	108	871
2014	405	261	616
2015	303	192	894

3.5 Total catch of target species taken by other fisheries

The Torres Strait Prawn Fishery (TSPF) has historically interacted with TRL. Licensing conditions limit TSPF operators to retain 20 kg of TRL per trip if caught in trawl nets and all TRL catches must be reported. PNG have reported catches of TRL in demersal trawl fisheries targeting prawns. The quantity of TRL taken in these fisheries is unknown.

An AFMA independent fishery observer was on-board two TSPF vessel trips during 2015, observing a total of 54 fishing days and a total of 203 shots. The number of tropical rock lobster observed during this period is provided in **Table 3**.

Table 3. Number of TRL caught and discarded on TSPF observer voyage OB15/043.

Species	Common name	Number caught	Discarded alive	Discarded dead	Per cent discarded dead
<i>Panulirus ornatus</i>	Tropical Rock Lobster	628	613	15	2.5

3.6 Bycatch and byproduct species

The fishery is a highly selective single species fishery as a result of the hand collection fishing method (**Section 1.2**). There is no bycatch or byproduct species reported in the fishery. However, operators with other fishery endorsements may harvest those species opportunistically while targeting TRL.

3.7 Harvest by each sector

The total catch of tropical rock lobster (tonnes in live weight) for the Australian sectors (TIB and TVH) and PNG for the years 2004-2015 is provided at **Table 4**.

Table 4. Australia (TIB and TVH) and PNG annual catch (tonnes live weight) of tropical rock lobster and Total Allowable Catch for the years 2004 to 2015.

Year	TIB	TVH	PNG	Total Catch	Notional TAC	Catch as % of TAC
2004	211	481	192	874	*	*
2005	345	545	228	1118	*	*
2006	143	135	142	420	471	89
2007	267	269	228	764	842	91
2008	207	100	221	528	751	70
2009	135	91	161	387	450	86
2010	182	279	293	754	853	88
2011	201	503	165	869	803	108
2012	151	370	174	695	964	72
2013	127	362	108	597	871	69
2014	132	173	261	666	616	108
2015	151	152	192	495	894	55

*Information not available

3.8 Effort data including information on trends

Effort in the TVH sector is recorded as hours fished by a tender during each set. The hours fished for the majority of tender sets (92.8 per cent) are between 0.5 and 12 hours, while the hours fished is not recorded for 6.2 per cent of tender sets. The annual total number of tender sets and the number of tender sets where effort is between 0.5 and 12 hours and the associated hours fished is provided in **Table 5**. There were 20 records where the recorded hours fished was greater than 12 hours, two records where effort was less than 0.5 hours and 315 records where effort was recorded as 24 hours (1.2 per cent of records). Effort in the TVH sector declined between 2006 and 2009 as a result of the removal of licences in the fishery through the voluntary buyback process. Effort increased in 2010, and has been relatively constant from 2010 to 2015.

Table 5. Annual total number of tender-sets, annual number of tender-sets where effort is between 0.5 and 12 hours and total number of hours fished.

Year	N-sets	Sets fishing 0.5-12 hours	
		N-sets	Hours
2004	5 200	4 880	30 627
2005	4 302	3 761	22 829
2006	2 428	2 329	13 775
2007	2 869	2 731	17 403
2008	1 211	1 159	7 996
2009	1 308	1 240	8 484
2010	2 368	1 933	13 547
2011	2 670	2 465	15 216
2012	2 311	2 131	14 721
2013	3 008	2 920	19 994
2014	2 901	2 772	18 253
2015	2 659	2 600	16 351

Between 2004 and 2015 there are a total of 66,644 TDB01 docket-book records for the TIB sector. The total number of days fished by year for these records is given at **Table 6**. The number of TIB sector docket-book records decreased after 2012 due to aggregate catch records submitted by two lobster buyers/processors.

Table 6. Total number of days fished for the TIB sector identified in docket-book information.

Year	04	05	06	07	08	09	10	11	12	13	14	15
Total Days	5186	7596	4619	6492	5340	4546	2698	3364	2209	481	1743	1935

The nominal catch per unit effort (CPUE) for the TVH and TIB sectors is provided in **Table 7**. The nominal CPUE for TIB and TVH sectors is variable; this is consistent with the high natural variability of the Torres Strait tropical rock lobster and may also be attributed to changes to management arrangements and changes to the fishing fleet through time.

Table 7. Nominal catch per unit effort for TIB and TVH sectors for the years 2004-2015.

Year	CPUE (Kg per day) TIB sector	CPUE (Kg per tender-set) TVH sector
2004	34.4	92.5
2005	42.4	126.7
2006	27.6	55.8
2007	32.6	93.6
2008	27.2	82.9
2009	17.6	69.6
2010	25.4	119.3
2011	33.2	188.6
2012	35.5	160.3
2013	40.9	120.2
2014	15.3	94.0
2015	14.1	57.0

*Data not available

3.9 Spatial and temporal issues/trends

The spatial distribution of TRL is reported by the TIB sector using the 21 zones identified in the TDB01 docket-book (**Attachment G**). Since 2004, the western zones of the TSPZ (Thursday Island, Mabuiag and Badu strata) have accounted for approximately 65 per cent of the TIB sectors catch. The eastern zones (Warrior and Warraber strata) have accounted for approximately nine and eight per cent of the TIB sectors catch respectively.

The spatial distribution of TRL is reported by the TVH sector using modified docket book zones. Since 1994, the central zones (Kircaldie and Warraber strata) have accounted for

approximately 65 per cent of the TVH sectors catch. The northern zones (Buru and Numar strata) have accounted for approximately 20 per cent of the TVH sectors catch.

Stock assessment surveys conducted by CSIRO reported that there were no significant trends or correlation between spatial information and lobster density. Lobster density was reported to be 'loosely' correlated with seagrass habitat. However, seagrass coverage is highest in the Thursday Island Bridge and Mabuiag strata and the correlations between seagrass coverage and lobster density were poor.

Tagging studies of Torres Strait tropical rock lobster has shown that during the months of August to October each year most lobsters that are at least two years old emigrate from the western and central Torres Strait and move north-east into the Gulf of Papua, undergoing reproductive development at the same time. Lobsters arriving in Papuan waters are in very poor condition and almost all lobsters die after breeding. Annual variability observed in tropical rock lobster distribution is influenced by environmental conditions such as strong trade winds, food availability and high turbidity. These factors may also result in spatial and temporal changes to fishing operations.

3.10 Benthic communities

The benthic habitat of the Torres Strait was surveyed in May-June 1989, using almost 600 transects randomly dispersed over an area of approximately 25 000 km² (Pitcher et al. 1992). The distribution and relative abundance of seagrasses tended to increase from almost zero abundance in the southern and eastern areas of the survey to moderately dense in north-western Torres Strait. The substratum type also varied greatly, with the greatest diversity and abundance of biota associated with the harder substrata. The ongoing TRL monitoring program (**Section 3.1**) has shown that seagrass coverage may change overtime, while substrate (sand, rubble, hard cover) has been consistent through the monitoring period (CSIRO unpublished data).