



Australian Government

Department of the Environment and Heritage

**Assessment of the
Torres Strait Trochus Fishery**

November 2005

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This document is an assessment carried out by the Department of the Environment and Heritage of a commercial fishery against the Australian Government Guidelines for the Ecologically Sustainable Management of Fisheries. It forms part of the advice provided to the Minister for the Environment and Heritage on the fishery in relation to decisions under Parts 10, 13 and 13A of the Environment Protection and Biodiversity Conservation Act 1999. The views expressed do not necessarily reflect those of the Minister for the Environment and Heritage or the Australian Government.

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Assessment of the ecological sustainability of management arrangements for the Torres Strait Trochus Fishery

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EXECUTIVE SUMMARY

Background

The Australian Fisheries Management Authority (AFMA), on behalf of the Torres Strait Protected Zone Joint Authority (PZJA) has submitted documents for assessment of the Torres Strait Trochus Fishery (TSTF) under Parts 10, 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

On 7 December 2004 the Minister for the Environment and Heritage (the Minister) signed an Agreement with AFMA to initiate the strategic assessment of the fishery. Following public consultation, Terms of Reference for the Environmental Assessment of the TSTF were adopted. The draft submission, *Draft Assessment Report: Torres Strait Trochus Fishery* (the submission), was received by the Department of the Environment and Heritage (DEH) in August 2005. The submission was released for a public comment period that expired on 17 November 2005. One public comment was received. AFMA provided a response to the issues raised although no changes were made to the submission as a result of public comment. A final submission for assessment was received from the PZJA in November 2005. The Torres Strait Trochus Fishery Statement of Management Arrangements was received from AFMA in November 2005.

The submission reports on the TSTF against the Terms of Reference, including the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. The DEH assessment considers the submission, associated documents and public comments.

In 1985 Australia and Papua New Guinea (PNG) entered into the Torres Strait Treaty (the Treaty). The Treaty is concerned with sovereignty and maritime boundaries in the area between the two countries and the protection of the traditional way of life and livelihood of traditional inhabitants and the marine environment. The Torres Strait Protected Zone (TSPZ) was established by the Treaty. Australia and PNG exercise sovereign jurisdiction for swimming fish and sedentary species on the respective sides of agreed jurisdiction lines within the TSPZ. The *Torres Strait Fisheries Act 1984* (TSF Act) gives effect in Australian law to the fisheries elements of the Treaty and established the PZJA.

Table 1: Summary of the TSTF

Area	Area of the TSPZ under Australian jurisdiction and the 'outside but near area' ¹ to the south of Prince of Wales Island to the west, and to due east of Cape York Peninsula. The majority of fishing occurs within the central and eastern Islands of the Torres Strait.
Fishery status	Uncertain.
Target Species	<i>Trochus niloticus</i>
By-product Species	No byproduct species are taken in the TSTF.
Gear	Hand collection or hand held non-mechanical implements. Reef top collection is also possible at low tide.
Season	Unlimited, however fishing effort is seasonal due to weather conditions, market demand and participation in other commercial and traditional fisheries.
Commercial harvest	2004 – approximately 3.767 tonnes (of trochus shell) 2005 - approximately 13.67 tonnes (of trochus shell – January and February 2005 only).
Value of commercial harvest	Approximately AUD\$100,000 in 1997 (17 tonnes).
Recreational harvest	Unknown.

¹ The TSF Act applies in the area of Australian jurisdiction in the TSPZ, and in areas 'outside but near' that zone that have been proclaimed in respect of particular fisheries which Australia and Papua New Guinea have agreed to manage jointly under the Treaty or which are referred to in the Treaty.

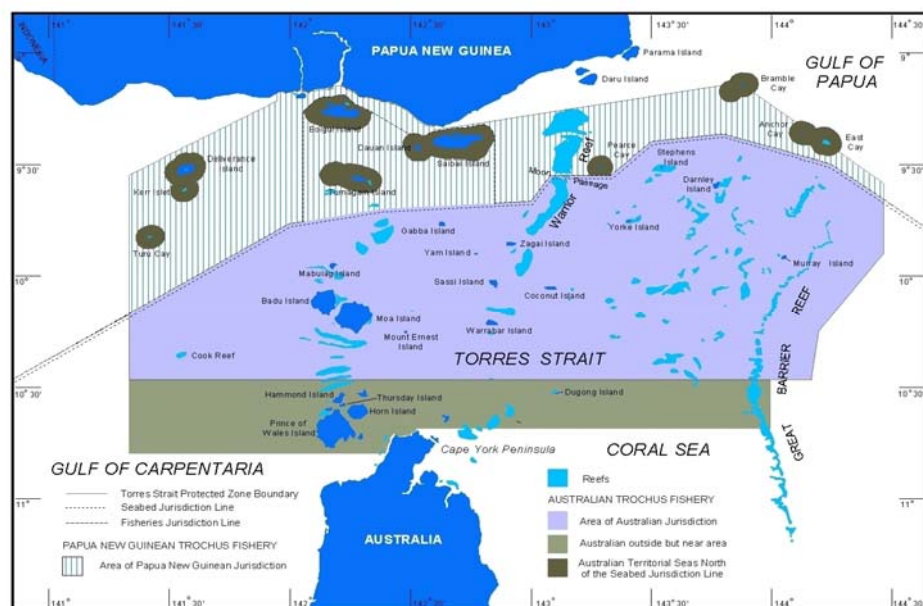
Commercial licences issued	122 entitlements (traditional inhabitants).
Commercial Management arrangements	<ul style="list-style-type: none"> • boat and gear restrictions; • size limits (minimum 80 mm and maximum 125 mm – at widest part of the base of the shell); • a competitive Total Allowable Catch (TAC) – 150 tonnes, with animal in shell; and • prohibited use of hookah or Self Containing Underwater Breathing Apparatus (SCUBA) gear for trochus shell collection.
Recreational Management arrangements	<ul style="list-style-type: none"> • size limits (minimum 80 mm and maximum 125 m) • bag limit: 50 individuals.
Export	Yes, the majority of catch is exported.
Bycatch	Considered nil.
Interaction with Threatened Species	Considered low.

The TSTF comprises tidal waters within the TSPZ and the area declared under the TSF Act to be ‘*outside but near*’ the TSPZ for commercial fishing of trochus (Figure 1). For the TSTF, the outside but near area extends to waters just south of Prince of Wales Island to the west and to due east of Cape York Peninsula.

Trochus are collected for commercial purposes mostly from the central and eastern islands of Torres Strait. Fishing has currently been concentrated on the central zone of Torres Strait, around Coconut Island and the Yorke Islands. Additional harvesting is occurring around the eastern islands, including Darnley Island.

The TSPZ was established to protect the traditional way of life and livelihood of the traditional inhabitants of the area, including traditional fishing and free movement rights between the two countries, and to enable the orderly development of commercial fishing. The Treaty also requires Australia and PNG to protect and preserve the marine environment and indigenous flora and fauna of the area.

Figure 1. Area of TSTF, including areas of PNG jurisdiction but excluding PNG areas outside but near the TSPZ.



The TSTF targets trochus (*Trochus niloticus*), a tropical marine gastropod of the order Archeogastropoda. No byproduct species are taken in the TSTF and it does not harvest any species listed on the Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES).

Trochus occur naturally in the intertropical belt from Sri Lanka in the eastern Indian Ocean to the islands of Fiji and Wallis in the western Pacific Ocean. They inhabit reef flats made of coral rubble, and as juveniles are generally found low on the intertidal reef flat. Juveniles are extremely cryptic because of their small size and similar colour to their habitat and have a tendency to bury themselves just under the surface of the reef. As they grow, trochus move out towards the reef slope. Most are found at depths to 10 metres but can be found at 24 metres.

In Queensland (QLD), growth rates of trochus average between 2.3 and 2.6 mm shell width per month and under favourable conditions, can reach marketable size in 2 -3 years. They are known to live to at least 12 years of age and maturity is reached at around 2 years of age, with shell widths between 50 and 90 mm. The maximum size of adults is about 160 mm shell width.

As mentioned above, the size at maturity may vary between 50 and 90 mm shell width (e.g. Sant 1995). Given that the minimum size limit used in the fishery is 80 mm, some trochus caught in the TSTF may not have reached maturity and therefore may not have contributed to recruitment of the population. However, it is important to note that '50% maturity' is a common rule in the setting of minimum size limits throughout the world and the sizes implemented in the TSTF are highly likely to meet that criteria. When more information is available, DEH encourages the PZJA to develop measures to confirm the size at maturity for shells in the region in order to determine whether current size limits are the most appropriate.

Trochus are synchronous spawners; males initiate spawning a day or two following the full moon, reportedly during the months of March to July, although other records suggest that spawning occurs during the months of October to May. The lecithotrophic larvae spend 2 days in the plankton before settling on the reef matrix. Due to their short larval period, it is thought that dispersal to other reefs is limited, and populations of trochus may therefore exhibit a degree of reproductive isolation from neighbouring populations. This aspect of trochus biology may make it susceptible to localised and serial depletion of stocks.

Trochus are herbivorous, grazing on the surface of dead corals to consume microalgae, diatoms and Foraminifera. They are preyed upon by predatory gastropods, brachyuran crabs, hermit crabs, teleost fish, rays, octopus and turtles.

The commercial fishery is largely based on the trochus' nacreous (mother of pearl) shell, which is used for making buttons and jewellery and can be ground down for use in floor tiles and metallic paints. Trochus meat (sourced from the muscular foot) is edible and the shell has been collected for subsistence purposes by traditional occupants of the Torres Strait for centuries.

In 2004, 3.767 tonnes of trochus shell were estimated to be harvested in the TSTF. In 2005 (from January to February) harvest was estimated at 13.67 tonnes of trochus shell. The value of the fishery is currently unknown because of its small-scale, the recent introduction of the docket book system and because of details on the domestic market being difficult to obtain. However, the value of the fishery and demand for trochus specimens is currently considered low (although demand for trochus has increased as indicated by the harvest level from two months in 2005, most likely as a result of the recent order from China for 100 tonnes of trochus shell).

Trochus have been fished for its meat in the Torres Strait for subsistence purposes for centuries, but it was not until the early 1900's that commercial harvest commenced for trochus shell as a material to manufacture buttons and jewellery (D'Silva 2001). Trochus quickly became popular as an alternative source of mother-of-pearl, and was commonly used in the production of cheaper pearl buttons. In the three years following 1912, catch in the fishery rose to almost 970 tonnes per annum.

Within five years trochus stocks were heavily depleted on many of the northern reefs (Haysom 2001).

The fishery continued to expand geographically for some years, stretching further down the QLD coast as far south as the Tropic of Capricorn. A slump in the price of pearl shell soon after saw many operators switch to trochus fishing. In 1931 the pearl shell and beche-de-mer Fisheries Acts were amended and a minimum legal size limit on trochus shell was implemented (Haysom 2001).

Following a brief upsurge in fishing for trochus following World War II, the fishery eventually collapsed in the mid-1950's when plastics replaced shell to produce cheap buttons. Interest in trochus shell from QLD and Torres Strait began to increase again during the late-1970's (Nash, 1985), but in the Torres Strait, participation in the fishery has remained very small until recently. The stock status of the fishery is uncertain, as stocks have not been assessed.

Australia and PNG entered into the Torres Strait Treaty (the Treaty) on 15 February 1985. The Commonwealth parliament passed the TSF Act to give effect to the fisheries provisions of the Treaty. The TSF Act established the PZJA. The PZJA comprises both the Commonwealth and State (QLD) Ministers responsible for fisheries and since October 2001, has included the Chair of the Torres Strait Regional Authority (TSRA). The PZJA has regard to the rights and obligations conferred on Australia by the Treaty, in particular the protection of the traditional way of life and livelihood of the traditional inhabitants, including their traditional fishing.

Trochus is hand collected or collected by hand held non-mechanical implements. The trochus is usually taken by free-diving, although SCUBA and hookah may also be used. However, another Fisheries Management Notice (FMN) – number 76 – is currently in process, which when implemented, will revoke the current FMN 52 and remove the permissible use of SCUBA and hookah gear in the TSTF. Fishers operate from dories/dinghies (less than 20 m length) crewed by 2-3 Islanders. Reef top collection of trochus is also possible at low tide. Recreational fishers are not permitted to use SCUBA or hookah gear while collecting trochus.

Due to the highly selective nature of harvest, bycatch in the fishery is limited to epifaunal and/or epifloral (commensal) organisms living on or within trochus species, such as bivalves, boring sponges and snails. The impact of the TSTF on bycatch species is likely to be minimal due to the small scale of harvest and management measures in place. At this stage, there has been no interaction between this fishery and any known endangered, threatened or protected species, except for the permissible taking of turtles or dugongs by traditional fishing. This is further discussed under Principle Two of this report.

An unknown quantity of trochus meat is also taken by Islanders for subsistence purposes. Generally about 10 kg of shell is required to collect enough meat for a meal for a family and therefore trochus is probably not collected regularly for subsistence purposes. Any non-Indigenous recreational removals for food or shell collection are small and are likely to be from areas surrounding Thursday Island where commercial fishing activity is low. Recreational fishing in the TSTF is managed by the Queensland Department of Primary Industries and Fisheries (QDPI&F) via bag and size limits. Size limits for trochus collected for recreational purposes are identical to those for the commercial fishery, being minimum 80 mm and maximum 125 mm. The bag limit for recreational take of trochus is 50. Harvests are usually limited to a depth of about 10 metres as recreational fishers are not permitted to use hookah or scuba apparatus for collection. Catch rates and fishing effort for recreational fishers are unknown, although considered low.

It is unlikely there is a discard of trochus in the commercial fishery as it is a highly targeted hand collection fishery. Any discards that do occur would be likely to occur immediately after picking up and examining the shell, and hence specimens are extremely likely to survive on replacement.

Illegal removals from the domestic sector are possible, but the use of the docket book in recording the boat license of fishers may assist in identifying any illegal take, however this is very difficult to

police given the remote localities where trochus are collected. Illegal foreign fishing for trochus shell is possible, and in particular by Indonesian fishing boats (Caddy, 1995). Although illegal fishing for trochus has not been reported in the TSPZ to date, AFMA compliance records indicate that between 1988 to October 2005, there have been 93 vessels apprehended in Australian waters targeting trochus. All apprehensions occurred off the Western Australian Coast or islands adjacent to Western Australia. This is further discussed in Parts I and II.

The fishery has been managed in accordance with the provisions of the Torres Strait Treaty and the TSF Act. Until 1 April 1999 the fishery was managed under the *Queensland Fisheries Act 1994* and the *Queensland Fisheries Regulations 1995* by the Queensland Fisheries Management Authority (QFMA). In April 1999, responsibility for management of the fishery was transferred from QFMA to the PZJA, with day to day management by AFMA and QDPI&F staff. The fishery has no formal management plan, however is currently managed through the TSTF Statement of Management Arrangements 2005 and FMN's made under the TSF Act. Regulations for the TSTF are currently detailed in FMN No. 52, however FMN No. 76 will revoke this Notice once implemented. This new FMN has been signed off and will be gazetted during mid to late December 2005.

Overall assessment

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

While the fishery has the basis upon which good management arrangements can be implemented, DEH has identified a number of risks that must be managed to ensure that their impacts are minimised:

- uncertain stock status;
- no performance indicators, performance measures, triggers or timelines;
- possible localised depletion;
- TAC is set arbitrarily;
- docket book system is voluntary (unverified data); and
- unknown take from recreational sector / unknown levels of waste / unknown take for subsistence purposes.

Recommendations to address these issues have been developed to ensure that the risk of impact is minimised in the longer term. Through the implementation of the recommendations, the continuation of a responsible attitude to the management of the fishery and implementation of other management commitments made by AFMA and the PZJA, management arrangements are likely to be sufficiently precautionary and capable of controlling, monitoring and enforcing the level of take from the fishery while ensuring the stocks are fished sustainably.

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

The operation of the fishery is consistent with the objects of Part 13A of the EPBC Act. Given the management arrangements specified in the submission, DEH considers that the fishery will not be detrimental to the survival or conservation status of the taxon to which it relates in the short term. Similarly, it is not likely to threaten any relevant ecosystem in the short term. DEH therefore recommends that the fishery be declared an approved Wildlife Trade Operation (WTO) with the actions specified in the recommendations to be undertaken by the PZJA to contain the environmental risks in the long term. DEH considers that the fishery, as managed in accordance

with the management arrangements is not likely to cause serious or irreversible ecological damage over the period of the export decision. Specifically, the WTO declaration would allow the export of product from the fishery for a period of three years. The WTO declaration will require annual reporting on the progress of implementing the recommendations and other managerial commitments. The implementation of the recommendations will be monitored and reviewed as part of the next DEH review for the fishery in 3 years time.

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

Protected species occurring in the fishery area include cetaceans, marine turtles, syngnathids, dugongs, sea snakes and seabirds. The taking of turtles or dugong is only allowed in the course of traditional fishing which is distinct from the commercial fishery for trochus. The actual and potential impact on Part 13 species under the management arrangements is considered low and adequate protection is provided. There are no listed threatened ecological communities in the fishery area.

DEH considers that the fishery to which the management arrangements relates does not, or is not likely to, adversely affect the survival in nature of a listed threatened species or a population of that species, or the conservation status of a listed migratory species, cetacean species or listed marine species or a population of any of those species. DEH also considers that the arrangements require that all reasonable steps are taken to avoid the killing or injuring of protected species, and the level of interaction under current fishing operations is low. On this basis, DEH considers that an action taken by an individual fisher, acting in accordance with the management arrangements, would not be expected to have a significant impact on a listed threatened species or listed migratory species protected by the EPBC Act.

Part 10 of the EPBC Act requires that Commonwealth managed fisheries undergo strategic assessment to determine whether actions taken in the fishery have a significant impact on the environment in Commonwealth Marine Areas. Under this Part, the Minister may accredit a management plan to exempt actions taken in accordance with the management plan from further impact assessment approval.

DEH considers, *inter alia*, that there has been adequate assessment of the impacts that actions approved in accordance with the management arrangements, as prescribed under the TSTF Statement of Management Arrangements, have, will have or are likely to have on the marine environment. DEH also considers that actions approved or taken in accordance with the management arrangements will not have unacceptable or unsustainable impacts on the marine environment in a Commonwealth area. DEH therefore recommends that, in accordance with Part 10, the TSTF Statement of Management Arrangements be accredited under section 33 of the EPBC Act for the matter of national environmental significance "the marine environment".

The implementation of the following recommendations and other commitments made by the PZJA in the submission will be monitored and reviewed as part of the next DEH review of the fishery in three years time.

Recommendations

Recommendation 1: DEH to be informed of any proposed amendment to the management regime for the TSTF to enable DEH to evaluate any impact on the ecological sustainability of the fishery.

Recommendation 2: PZJA, within 2 years, to develop fishery specific objectives linked to performance indicators and performance measures for the target species. The performance of the fishery to be reviewed annually against these measures and the outcomes published.

Recommendation 3: PZJA, within 2 years, to review stock assessment process and existing TAC levels to ensure that methods used to estimate potential yield and TACs are sufficiently precautionary, and recognise the level of risk

Recommendation 4: PZJA to continue to work with Torres Strait communities, fishers and processors to ensure that adequate and reliable data, appropriate to the scale of the fishery, are collected from all sectors to ensure sustainable management of the Torres Strait Trochus resource. Initial priority should be given to the docket book system for commercial sectors of the fishery. Options for the collection of non-commercial and illegal take will be evaluated, taking account of outcomes of recent research and compliance programs, and appropriate options progressively developed and implemented to improve estimates of all removals used in stock assessments and management controls.

Recommendation 5: PZJA to continue to cooperate with other management agencies, research institutions, Torres Strait communities and the industry in efforts to identify and undertake research and monitoring projects to address future sustainability of the Torres Strait trochus fishery.

Recommendation 6: PZJA to investigate and, if necessary, progressively implement measures to minimise potential localised depletion in the fishery.

PART I - MANAGEMENT ARRANGEMENTS

The TSTF is managed by the Torres Strait PZJA, which consists of the Australian Government (represented by the Minister for Fisheries, Forestry and Conservation), the Queensland Government (represented by the Minister for Primary Industries and Fisheries) and the Chair of the TSRA. The PZJA is responsible for monitoring the condition of Australian fisheries in the Torres Strait and for the formulation of policies and plans for their management. AFMA, in cooperation with the QDPI&F, coordinates and delivers fisheries management and surveillance/enforcement programs in the TSTF on behalf of the PZJA and in accordance with the provisions of the TSF Act and the *Torres Strait Fisheries Regulations 1985*. Recreational fishing, including charter fishing, is managed under Queensland law.

Since 1999, when management of the fishery was transferred from the QLD Government to the PZJA, the fishery has been managed under the TSF Act. The management regime is legislated through FMN's under the TSF Act and conditions on fishing permits. FMN's are publicly available. AFMA is preparing Statements of Management Arrangements for all fisheries that do not have a statutory management plans, and as such, a Statement of Management Arrangements has been prepared for the TSTF. While not a statutory instrument, a Statement of Management Arrangements describes the arrangements in place for the fishery, including relevant FMN's, permit/licence conditions and arrangements that have been agreed to at a policy level.

Details of the management regime are described in the following documents, all of which are publicly available:

- the TSF Act;
- the PZJA website: <http://www.pzja.gov.au>;
- The Torres Strait Fisheries Five-year Strategic Research Plan; and
- FMN's issued under the TSF Act.

There are a number of other documents, including research reports, scientific literature and discussion papers, which are integral to the management of the fishery.

DEH considers it important that management arrangements remain flexible to ensure timely and appropriate managerial decisions. Due to the importance of the documents identified above to DEH's assessment of the fishery, an amendment to the existing management regime could change the outcomes of our assessment and decisions stemming from it.

Recommendation 1: *DEH to be informed of any proposed amendment to the management regime for the TSTF to enable DEH to evaluate any impact on the ecological sustainability of the fishery.*

In November 2002, the PZJA established a new consultative structure of advisory bodies, which allows for greater participation from Islander representatives at all levels of the consultative process. Islander representatives, together with industry and government representatives, actively participate in the development of management arrangements. The PZJA receives management advice from the Torres Strait Fisheries Management Advisory Committee (TSFMAC) comprised of Islander, industry and government representatives. Other committees are established by the PZJA from time to time as required to deal with specific issues.

The development of management arrangements was previously the responsibility of the Torres Strait Trochus and Pearl shell Working Group. With the abolition of the working group the TSFMAC is now responsible for formulating recommendations and putting these forward to the PZJA for final approval. TSFMAC meet once or twice each year, and as it is a small fishery with previously extremely low effort, the TSTF has not received much attention during recent meetings. Management agencies proposed to the PZJA that a Hand Collectibles Working Group be established to discuss management arrangements for trochus. The proposal was put forward at the last PZJA

meeting (July 2005) and is currently being considered by the PZJA. DEH believes that the establishment of the Hand Collectibles Working Group would greatly benefit the TSTF.

The TSTF is managed in accordance with the Torres Strait Treaty and TSF Act. The PZJA has adopted the following broad objectives for the TSTF:

- i) to manage the resource so as to achieve optimum utilisation;
- ii) to maximise opportunities for Traditional Inhabitants of Australia; and
- iii) to encourage Traditional Inhabitants of the Torres Strait to participate in the Trochus Fishery.

Appropriate management arrangements are important elements for the TSTF as numerous studies (Heslinga *et al.* 1984; Nash 1993) have indicated that a pattern of rapid decline shortly after commencement of commercial fisheries suggests that *T. niloticus* is highly susceptible to overfishing.

The management arrangements including species TACs and size limits provide a sound basis to the management of the TSTF. However, they require refinement and the development of more explicit species-based management objectives and risk-based target and limit reference points are required to ensure long-term ecological sustainability.

The uncertain status of trochus stocks, the lack of a cap on trochus endorsements and the gaps in knowledge of the basic biology and ecology of trochus continue to be such that a precautionary and strategic approach to harvests in the fishery is essential (especially with the recent order from China for 100 tonnes of trochus shell). DEH recommends that AFMA refine the fishery specific management objectives, and develop performance indicators and performance measures. In addition, in order to ensure transparency in the evaluation of the performance of the fishery, DEH recommends that AFMA annually review the fishery against these measures once developed and publish the outcomes.

Recommendation 2: *PZJA, within 2 years, to develop fishery specific objectives linked to performance indicators and performance measures for the target species. The performance of the fishery to be reviewed annually against these measures and the outcomes published.*

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

- limiting the method of taking trochus to hand collection or by hand held non-mechanical implements;
- boats cannot exceed 20 metres in length;
- minimum (80mm) and maximum (125mm) size limits (at widest part of the base of the shell) – does not apply to non-commercial fishing by traditional inhabitants for subsistence purposes; and
- a competitive TAC of 150 tonnes (with animal in shell).

An assessment of the effectiveness of these measures is included in Part II of the report.

Compliance in the TSTF is difficult as much of the fishing occurs in remote areas, from a large number of small boats, over an extensive area. The current compliance program is restricted by the costs of implementing a program under these circumstances.

In 2004 a formal compliance risk assessment was undertaken for all Torres Strait fisheries. The risk assessment involved examining each of the fisheries under the jurisdiction of the PZJA and identifying the potential compliance risks within each of those fisheries. From this a compliance plan was developed outlining strategies to minimise the significant risks utilising the compliance tools available. The TSTF was one of the fisheries assessed as part of the compliance risk assessment process. At the time the risk assessment was undertaken there was very little activity in

the Trochus Fishery and therefore the identified risks were seen as having a very low probability of occurring. Since the assessment was undertaken fishing activity has increased in the fishery. At the time of writing this report, a further assessment of this fishery had not taken place, but with increasing fishing activity taking place, it is possible that the status of each risk could change. The compliance risk assessment recommended that fisheries risk assessments be undertaken on an annual basis until the compliance program achieves a low risk of non-compliance in all Torres Strait fisheries. The report recommended that at the least, risk assessments for Torres Strait should be undertaken every two years. DEH supports this action and considers that effective enforcement and compliance are essential to ensure that management measures are not undermined.

Surveillance activities in relation to foreign fishing in the TSPZ are co-coordinated by Coastwatch, an agency of the Australian Customs Service. Aerial surveillance in the area is carried out by both fixed wing and rotary aircraft. A minimum of two flights each day are carried out in the TSPZ. Surface surveillance is carried out predominantly by the Bay Class patrol vessels, Australian Customs Service. Royal Australian Navy patrol boats also provide some support in the region. Bay Class patrol vessels carry out regular patrols of the region and maintain a response/apprehension capability throughout the region. Although there have been an increasing number of incursions by Indonesian fishermen in the TSPZ over the last 3-4 years, there have been no apprehensions or reports of taking trochus by Indonesian fishers in the TSPZ. This is further discussed in Part II.

Compliance and enforcement tools utilised in the TSTF are based on the new voluntary docket book system (*Torres Strait Seafood Buyers and Processors Docket Book - TDB01*), which was recently introduced to Torres Strait fisheries by AFMA. This new scheme of creating a generic fisheries-invoicing system allows all buyer/processors to record catch and effort information (including those from the traditional inhabitant sector) in a way that doesn't duplicate their financial record keeping. The roll out of this new system for obtaining fishery-dependent data commenced in December 2003, and all buyers/processors currently operating in the fishery have been provided with copies. This system offers a significant advantage over other logbook schemes in that spatial information is recorded in a form that inputs directly into the Commonwealth Scientific and Industrial Research Organisations' (CSIRO) spatial stock assessment model.

The review of management arrangements is the responsibility of the TSFMAC. The TSFMAC is responsible for formulating recommendations and putting these forward to the PZJA for final approval. As mentioned before, management agencies proposed to the PZJA that a Hand Collectibles Working Group be established to discuss and review management arrangements for trochus. The proposal was put forward at the last PZJA meeting and is currently being considered by the PZJA.

A condition on the declaration of the TSTF as an approved WTO requires the PZJA to report annually to DEH on the extent to which the performance indicators and measures of the TSTF management arrangements, once developed, were met in the year and the progress of the PZJA in implementing the recommendations made in the *Assessment of the Torres Strait Trochus Fishery 2005*. This should assist in the periodic review of the performance of the fishery's management arrangements.

Fishery-dependent data relating to target species are collected on a regular basis in the fishery. Discussion of the information collection system can be found in Part Two of this report, as can an analysis of the fishery's capacity for assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem in which the target species live and the fishery operates.

The joint management arrangement for the fishery between Australia and PNG facilitate the development of consistent management arrangements in the two jurisdictions.

The TSTF is adjacent to the QLD East Coast Trochus Fishery (ECTF), which is managed by the QDPI&F. The genetic distribution of the species is poorly understood, however Larcombe (1993)

suggested that stock distribution is dependent on the degree of larval connection between separate reef habitats of trochus as adults are not capable of moving between reefs to spawn (unless transplanted). Due to the limited dispersal capacity of trochus larvae it is unlikely that Torres Strait trochus stocks are shared with QLD.

The size limits and TAC in the TSTF were developed based on other jurisdictions such as the ECTF and international jurisdictions such as the Cook Islands, where more studies have been conducted. The TSTF uses the same size limits as the ECTF and other jurisdictions. The TAC in the TSTF was set by splitting the previously combined Torres Strait and ECTF TAC from the late 1980's to early 1990's. DEH believes it would be beneficial, particularly for the PZJA governance, for the PZJA to continue to be involved in cross-jurisdictional actions to address concerns and management issues.

DEH considers that the current management arrangements comply with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies developed under that policy. DEH expects that AFMA will also ensure compliance with any future plans or policies as they are developed.

The Treaty is the primary regional instrument underlying management of the TSTF. The relationship between the Treaty and management of the TSTF has been outlined above. The prime international regime affecting the fishery is the United Nations Convention on the Law of the Sea. The management regime essentially complies with this. Other international regimes are applicable to fisheries management but do not explicitly involve this fishery. For example, the 1992 Convention on Biological Diversity and in particular the 1995 Jakarta Mandate require that, in relation to the sustainable use of marine and coastal biological diversity, the precautionary principle should apply in efforts to address threats to biodiversity. While these agreements are not specifically addressed in the Submission, the fishery's compliance with their requirements can be assessed by examination of Part II of this report. The application of the International Convention for the Prevention of Pollution from Ships (MARPOL) to vessels operating in the fishery is explicitly discussed under Principle 2, Objective 3.

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

Conclusion

The TSTF, while important in the community and regional economy, is relatively small by comparison to some other commercial fisheries in the region. As a result, resources available for management, compliance and research are limited.

The key elements of the TSTF management regime are documented, publicly available and transparent. Management provisions are developed through a consultative process established under the procedures of the PZJA and the requirements of the TSF Act. The management arrangements are adaptable and underpinned by objectives consistent with the requirements of the Torres Strait Treaty relating to sustainability and ensuring a flow of benefits to the traditional inhabitants of the Torres Strait. The management regime would benefit from the development of performance criteria by which the effectiveness of the management arrangements can be measured, enforced and reviewed.

The management arrangements provide a framework for control of the harvest through a combination of input and output controls appropriate to the size of the fishery. Annual review and reporting on the fishery is required under the standard processes of the PZJA. There are limited means of enforcing critical aspects of the management arrangements, although a risk assessment has been undertaken and compliance risks identified.

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

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

PART II – GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES

Stock Status and Recovery

Principle 1: *‘A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover’*

Maintain ecologically viable stocks

Objective 1: *‘The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability’*

Information requirements

The QFMA and QDPI&F have historically been responsible for data collection for Torres Strait fisheries, although no data was collected for the TSTF. As the fishery is predominantly reserved for the benefit of traditional inhabitants, there is no legal requirement for traditional inhabitants fishing under the Torres Strait community fishing system (i.e. *Traditional Inhabitant Boat* licensed fishers) to record logbook data.

A new docket book system administered by AFMA has been rolled out to commercial and community freezers to collect data on islander catch being sold. The primary objectives are to capture catch and effort data from all sectors in the Torres Strait, most particularly the indigenous commercial sector, and to facilitate the PZJA in pursuit of its legislative objectives in managing Torres Strait Fisheries. Data from the docket book system is submitted monthly by processors. AFMA collates this data within 2-3 weeks of receipt.

Key elements of the docket book system include:

- capture of all catch and some effort data (from the indigenous sector) at the point of sale in the Torres Strait;
- coverage of fish receivers in Torres Strait and those receivers in Cairns who purchase seafood direct from fishers of the Torres Strait;
- education and increased awareness of fishers and fish receivers of the need to provide catch and effort data for the sustainable management of marine stocks in the Torres Strait;
- a docket book management system to distribute docket books, receive completed returns and follow up on non-returns or poor data; and
- a database and data entry system for capturing and managing the Docket book data.

The *Torres Strait Seafood Buyers and Processors Docket Book* – TDB01 requests buyers and processors to provide true and correct information to AFMA on catch, effort and catch disposal data from each transaction, submitted monthly. Data include: sellers name, Australian Business Number, licence number, address and date of purchase.

For Traditional Inhabitant Boat (TIB) licence holders

- boat symbol;
- days fishing;
- number of divers / fishers;
- area fished; and
- methods used.

Details of catch being sold include:

- species being sold;
- processing code;
- grade;
- weight (kg);
- dollars paid per kilo or total price paid (two columns are provided for this purpose and the person completing the docket chooses whether or not to allow AFMA to see the financial data); and
- processing codes include: salted, salted and chilled, chilled, frozen and boiled, salted and frozen, boiled and salted, frozen and green, and boiled and chilled.

As previously mentioned, a new docket book system administered by AFMA has been rolled out to collect data on islander catch being sold. It should be noted, however, that the docket book system is voluntary and that seafood buyers and processors are under no legal requirement to fill them in. However, they do remain the main basis for assessing catch levels through the fishery, and information derived from them is used to provide estimates of change in catch rates and effort in the fishery. The catch rates and effort for recreational fishers is also unknown. Although take from this sector is considered low and recreational removals probably occurs mainly in areas where commercial activity is low, DEH recommends that AFMA take this into account when conducting stock assessments for the TSTF, to reduce uncertainty. The level of risk associated with illegal fishing of trochus is also evident with the recent plundering of trochus shell in the north of Western Australia (as advertised in the Western Australian, 27/10/2005). Similarly, there is considerable uncertainty with the level of subsistence fishing and how this impacts on trochus stocks. DEH notes that the Torres Strait Cooperative Research Centre (CRC) research program includes research projects on potential community monitoring programs and that the outcomes of these projects should be incorporated, as appropriate, to provide more robust ongoing estimates of removals of trochus from subsistence fishing.

As an initial step, to increase the robustness of fishery dependent data collected in the fishery, the amount of docket book returns should be increased. DEH agrees with, and commends AFMA for making education a priority and continuing to advocate the use and importance of the docket book system in the region. DEH recommends that AFMA continue to work with Torres Strait communities, fishers and processors to ensure that the data being obtained from the docket book system and from other sources across all sectors of the fishery is robust and comprehensive.

Recommendation 3: *PZJA to continue to work with Torres Strait communities, fishers and processors to ensure that adequate and reliable data, appropriate to the scale of the fishery, are collected from all sectors to ensure sustainable management of the Torres Strait Trochus resource. Initial priority should be given to the docket book system for commercial sectors of the fishery. Options for the collection of non-commercial and illegal take will be evaluated, taking account of outcomes of recent research and compliance programs, and appropriate options progressively developed and implemented to improve estimates of all removals used in stock assessments and management controls.*

Targeted fishery independent information is not currently being collected in the TSTF due to the small size of the fishery and the marginal returns, meaning little funding is available for independent stock assessments.

AFMA has committed \$450,000 per year to the Torres Strait CRC for research into the marine environment, major commercial fisheries and traditional fishing in Torres Strait. This arrangement will apply until the end of the 2005/06 financial year. The Torres Strait CRC has been established to work with local communities on fisheries management and research. Research has concentrated on the most valuable fisheries, with environmental impacts and traditional fishing also being studied. It

should also be noted that the Torres Strait research program is complemented by an education and extension program. DEH encourages AFMA to look at expanding the research and data collection to include trochus in the Torres Strait in order to promote and ensure sustainability of the TSTF.

DEH recommends that the PZJA continue to cooperate with other management agencies, research institutions, Torres Strait communities and the industry to identify and undertake research projects to address future sustainability of the TSTF.

Recommendation 4: *PZJA to continue to cooperate with other management agencies, research institutions, Torres Strait communities and the industry in efforts to identify and undertake research and monitoring projects to address future sustainability of the Torres Strait trochus fishery.*

Assessment

Currently there is no robust assessment of the dynamics and status of the TSTF. Little research has been carried out on trochus stocks in Australia, and none in the Torres Strait. The Bureau of Rural Sciences (BRS) Fishery Status Reports of 2003/2004 (2004) classified the Torres Strait trochus stock as 'uncertain'. Data obtained from the docket book is currently collected and analysed by AFMA. As the program is voluntary, has only been running for two years, and a renewed commercial market for trochus has only recently emerged, there has been little data collected through the program. No data is currently available to establish distribution and spatial structure of trochus stocks. However, it is hoped that docket book records may at least point to where most trochus is being taken and assist in determining locations of aggregations of trochus.

The TAC for the TSTF appears to have been set arbitrarily, based on splitting the previously combined Torres Strait and ECTF's TAC during the period prior to single jurisdiction in the fishery.

The lack of a precautionary TAC level is clearly a deficiency in the TSTF. The uncertain status of trochus stocks in the Torres Strait, the historical lack of data and the voluntary docket book system increases the chances of potential risks arising from an arbitrarily-set TAC. DEH agrees with AFMA's statement in the submission that data on trochus stocks is required before an informed and precautionary TAC level can be set, ensuring the sustainable harvest of trochus stocks. There is also a possible need for further biological information on *T. niloticus* in order to determine a precautionary TAC level. DEH therefore recommends that PZJA review stock assessment processes to ensure that methods used to estimate potential yield and TACs are sufficiently precautionary, and recognise the level of risk. Once this review has been finalised, DEH recommends PZJA review the current TAC level for the target species to ensure they are set in a sufficiently precautionary manner.

Recommendation 5: *PZJA, within 2 years, to review stock assessment process and existing TAC levels to ensure that methods used to estimate potential yield and TACs are sufficiently precautionary, and recognise the level of risk.*

Due to the nature of the TSTF management arrangements, fishing behaviour and the biological characteristics of trochus, localised depletion is possible in the fishery. Localised depletion to levels at which breeding success may be impaired is a risk unless effort can be distributed and measures are in place that provide effective protection for a proportion of the breeding stock.

Trochus have a short larval period and it is believed that dispersal to other reefs is limited, and populations of trochus are therefore isolated. Because trochus are a relatively sedentary species with low dispersal, and because of the nature of the TSTF (being a hand collection fishery), there is a risk of localised depletion of trochus stocks. There are no zones or area closures in place for the TSTF and therefore fishers potentially have access to any area in the TSPZ. It should also be noted that as size limits do not apply to traditional fishing for subsistence purposes, immature specimens yet to spawn may be collected by this sector. DEH, however, commends AFMA and the PZJA in ensuring that traditional inhabitants are fully aware of current knowledge and management

arrangements in the fishery, the principles of sustainable exploitation and trochus susceptibility to overharvesting, and possible management strategies.

DEH recommends that AFMA investigate and, if necessary, progressively implement measures to mitigate the potential risk of localised depletion and that monitoring of the spatial characteristics of fishing be undertaken. Measures that may be considered include, but should not be limited to, closed areas, local stop catch and move on rules, and rotational zoning. DEH realises that these measures will require close co-operation with the community sector.

Recommendation 6: *PZJA to investigate and, if necessary, progressively implement measures to minimise potential localised depletion in the fishery.*

AFMA and CSIRO are currently undertaking a project entitled *Ecological Risk Assessment for Commonwealth Fisheries* (ERA). The objectives of this project include consolidating/developing ERA methods that will meet the requirements of strategic assessment for Commonwealth fisheries and determining the relative sustainability risks in Commonwealth managed fisheries, considering target, byproduct, bycatch and broader ecological impacts where possible.

The following approach is being adopted for the project:

1. Qualitative risk assessment to identify broad categories of risk;
2. Semi-quantitative risk assessment to assist with risk categorisation, and to start to identify risk management responses. High-risk components after this stage will then proceed to the next level; and
3. A full quantitative risk assessment including formal treatment of risk and uncertainty and development of models to evaluate risk management strategies.

AFMA anticipates that the ERA for the TSTF will be completed by mid-2006. As more information is gathered, it will be incorporated into future reviews of the ERA project. Due to the limited gear allowed, small scale and low value of the fishery, it is likely that the ERA for the TSTF will be less complicated than those for bigger fisheries.

DEH strongly endorses the ERA project as a significant tool to assist AFMA and the PZJA in achieving ecosystem based fisheries management, tailoring management measures to ensure those species identified as being at risk are given appropriate protection. DEH considers that the implementation of measures to mitigate high risks identified through the ERA must be a priority for management of the fishery.

It is unlikely there is discarding of trochus in the commercial fishery as it is a highly targeted hand collection fishery. Discards that do occur would be immediately returned after picking up and examining the shell, and hence specimens are extremely likely to survive on replacement. AFMA management considered the issue of discards in the TSTF to be low risk.

An unknown quantity of trochus meat is also taken by Islanders for subsistence purposes, however anecdotal evidence suggests that trochus collected for subsistence purposes is low. Any non-Indigenous recreational removals for food or shell collection are small and are likely to be from areas surrounding Thursday Island where commercial fishing activity is minimal. Recreational fishing in the TSPZ is managed by QDPI&F via bag and size limits. Size limits for trochus collected for recreational purposes are identical to those for the commercial fishery, being minimum 80 mm and maximum 125 mm. The bag limit for recreational take of trochus is 50. Harvests are usually limited to a depth of about 10 m as recreational fishers are not permitted to use hookah or scuba apparatus for collection. Catch rates and fishing effort for recreational fishers are unknown

(Young & Challen, 2004), however the implementation of **Recommendation 3** should assist in providing reliable estimates of all removals.

Illegal removals from the domestic sector are possible, but the use of the docket book in recording boat license of fishers may assist in identifying any illegal take. AFMA compliance records indicate that between 1988 through to October 2005, there have been 93 vessels apprehended in Australian waters targeting trochus. However, none of these apprehensions were in Torres Strait fisheries. All apprehensions occurred off the Western Australian Coast or islands adjacent to Western Australia.

The potential for illegal fishing has recently been highlighted by the most recent report (p6, West Australian, 6 October 2005), that an Indonesian foreign fishing vessel carrying 25 men was apprehended by Customs in the Australian Fishing Zone off the Western Australian northern coast. Reports suggest the apprehended fishermen were looking to poach trochus shell. As of October 2005, there are no reports of poached trochus shell in Torres Strait by Queensland Boating and Fisheries Patrol (QB&FP) and no reports of any trochus shell seized on-board apprehended vessels in Torres Strait waters as part of the foreign fishing initiatives by the Australian Government to address foreign fishing activity.

It should be noted that trochus are of comparably low value compared to other products taken by illegal fishers. It is therefore unlikely, unless market prices increase substantially, that trochus would be illegally taken by foreign fishing boats in the Torres Strait.

Foreign fishing by people from PNG is possible for subsistence purposes. The scale at which this occurs is unknown.

No information on potential productivity of fished stocks and proportion that could be harvested is currently available.

Management response

The current TSTF management regime aims to maintain ecologically viable stock levels through a range of input and output controls as outlined in Table 1 and Part I of this report. Through the implementation of recommendations these management arrangements should lead to desired management outcomes for the fishery and ensure the future sustainability and minimise localised depletion of trochus shell populations throughout the Torres Strait.

There are no reference points currently in place for target species to trigger management actions in the TSTF. DEH agrees with AFMA in that the most important management measures that need to be established for the TSTF are trigger mechanisms, performance measures and decision rules (see **Recommendation 2**). This is an area that requires significant attention as management arrangements are developed with the traditional inhabitants who participate in the fishery.

At present the TAC for the TSTF is set at 150 tonnes, but appears to have been set arbitrarily. However, once this TAC has been reached, AFMA have indicated that there would be changes to licence conditions and fishers would be required to immediately cease harvesting the particular species.

No byproduct species are taken in the TSTF as it is a hand collection fishery.

Conclusion

DEH considers that the trochus stock is not currently overfished, and that should that occur in the future, the fishery is conducted such that there is a high degree of probability the stock would recover. However, the absence of stock assessments and reference points for the target species prevents a robust determination of whether these stocks are overfished. Lack of historical catch data for trochus, together with uncertainties surrounding sustainable catch limits and the need to further

limit both actual and potential effort across the fishery, indicates that improvements in several areas are required to ensure that management minimises the risk of over-fishing.

DEH considers that there is a need to further refine some of the existing information collection processes, assessment and management responses and has provided a number of recommendations for improvements over the next three year period.

Promote recovery to ecologically viable stock levels

Objective 2: *'Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes'*

While there is no evidence that the TSTF is overfished, the status of stocks is uncertain and there are no defined reference points. The submission indicates that catches and/or catch rates in the fishery have been relatively stable over recent years, however there is not sufficient information provided in the submission to demonstrate with any high probability that the stock is not being overfished.

The TSTF has not received research funding in the past due to its low commercial value, however should information on stocks become available which indicates overfishing is occurring, DEH is confident appropriate management measures to promote stock recovery will be developed and implemented by the relevant advisory groups in a timely manner.

DEH notes the commitment of the PZJA to reducing effort in order to ensure that overfishing does not occur.

Conclusion

DEH notes the uncertainty surrounding the status of trochus species in the Torres Strait and expects that the suite of recommendations made in this report will assist the PZJA in managing these stocks at a more precautionary level.

Ecosystem impacts

Principle 2: *'Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem'*

Bycatch protection

Objective 1: *'The fishery is conducted in a manner that does not threaten bycatch species'*

Due to the highly selective nature of the harvesting in the fishery, no bycatch is taken in the TSTF apart from commensal organisms (such as boring sponges, worms, snails and bivalves) that may inhabit trochus. The trochus fishery is unlikely to have a significant impact on the survival of such bycatch species as trochus with boring commensal organisms are rarely collected as they have no commercial value.

Conclusion

DEH considers that, given the mode of operation and small scale of the fishery, there is a high likelihood the fishery is conducted in a manner that does not threaten bycatch species. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that the PZJA would implement appropriate actions to ensure that bycatch species are not threatened by this fishery.

Protected species and threatened ecological community protection

Objective 2: *‘The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities’*

No interactions with endangered, threatened or protected species have been reported to date in the TSTF. The taking of turtles or dugong is only allowed in the course of traditional fishing for traditional purposes, which is distinct from the commercial fishing for trochus. Other protected species that may occur in the TSTF area, either temporally or permanently, include sharks, cetaceans, syngnathids and sea snakes. There appears to be no requirement to report interactions with protected species in the docket book or any other logbook system. DEH encourages the PZJA to educate, through the implementation of **Recommendation 3**, fishers in the TSTF to be conscious of protected species interactions and possibly develop a mechanism to allow for the reporting of such interactions.

Turtles are known to eat trochus (Nash 1985), but it is not known in what quantities or how heavily turtles rely on trochus as a food source. DEH encourages monitoring of this relationship between turtles and trochus and the possible effects of the fishery on this relationship. No other protected species are known to interact with trochus.

Given the low impact and highly specific fishing method (hand collection) used in the fishery, the most likely negative impact on protected species would be boat strikes. However, boat strikes are unlikely due to the limited entry and number of vessels. No boat strikes have been reported in the past in the TSTF.

Conclusion

DEH notes that due to the small scale of the fishery and the fishing methods used there are likely to be minimal interactions with protected species in this fishery, DEH therefore considers that the fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities. Should this situation change, or a risk assessment process indicate otherwise, DEH suggests that appropriate actions be undertaken to ensure the fishery avoids mortality or injury to these species and avoids or minimises impacts on threatened ecological communities.

Minimising ecological impacts of fishing operations

Objective 3: *‘The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally’*

Information requirements

Research regarding ecosystem impacts of the TSTF has not been conducted to date, as limited funds are available for research, due to the small size and limited number of participants in the fishery.

Assessment

Impacts of the fishery on the ecosystem are believed to be low due to the relatively benign method of fishing. While it is recognised that some damage to the benthos may occur when trochus are collected by fishers walking on the reef, their level of contact and impact is considered minimal.

Trochus consume plant material by grazing on coral rubble, which may assist in keeping algae levels down on reef flats; they are preyed upon by various crustaceans, finfish and molluscs, but are

not known to be the sole food source of any organism. Turtles also feed on trochus, but it is not thought removal of the small number of trochus collected in the TSTF would have deleterious effects on turtle populations. As such Trochus are not believed to play a pivotal role in the dynamics of their ecosystem, intertidal reef flats.

The impact of vessel discharge on the ecosystem is considered to be low and there have been no issues with vessel discharge reported by the fishery to date. The use of chemicals and explosives are not permitted in the management arrangements for this fishery. The application of MARPOL is also relevant to vessels operating in the fishery. This Convention deals with most forms of waste disposal from ships and assists in preventing pollution. DEH encourages PZJA and AFMA continue to ensure compliance with this Convention.

Fishing gear is not regarded as posing a significant risk to the physical environment in the fishery as harvesters are limited to hand collection only.

Management response

No specific management responses have been developed in the fishery for the effects of harvesting trochus species on the wider marine ecosystem. If fishing in the TSTF is identified by the ERA process as high risk of damaging the ecosystem, then management should be directed at these high risk areas to ensure that fishing operations are undertaken in a manner that minimises any impacts on the physical environment, ecological communities or on food chains within the area of the TSTF.

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

Conclusion

DEH considers that the fishery is conducted in a sufficiently precautionary manner to minimise the impact of fishing operations on the ecosystem generally. DEH notes that should circumstances alter significantly in the fishery, appropriate assessments and additional actions should be promptly identified and implemented.

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List of acronyms

AFMA	Australian Fisheries Management Authority
BRS	Bureau of Rural Sciences
CITES	Convention on International Trade of Endangered Species of Wild Flora and Fauna
CRC	Cooperative Research Centre for Torres Strait
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEH	Department of the Environment and Heritage
ECTF	East Coast Trochus Fishery
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERA	Ecological Risk Assessment
FMN	Fisheries Management Notice
MARPOL	International Convention for the Prevention of Pollution from Ships
PNG	Papua New Guinea
PZJA	Torres Strait Protected Zone Joint Authority
QB&FP	Queensland Boating and Fisheries Patrol
QDPI&F	Queensland Department of Primary Industries and Fisheries
QFMA	Queensland Fisheries Management Authority
QLD	Queensland
SCUBA	Self Containing Underwater Breathing Apparatus
TAC	Total Allowable Catch
TDB01	Torres Strait Seafood Buyers and Processors Docket Book
TIB	Traditional Inhabitant Boat licence
TSF Act	<i>Torres Strait Fisheries Act 1984</i>
TSFMAC	Torres Strait Fisheries Management Advisory Committee
TSTF	Torres Strait Trochus Fishery
TSPZ	Torres Strait Protected Zone
TSRA	Torres Strait Regional Authority
WTO	Wildlife Trade Operation