

TORRES STRAIT SCIENTIFIC ADVISORY COMMITTEE

STRATEGIC RESEARCH PLAN FOR TORRES STRAIT FISHERIES

2012-2014



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PART 1: BACKGROUND

This Strategic Research Plan has been developed by the Torres Strait Scientific Advisory Committee (TSSAC), to describe how the TSSAC will use research opportunities to assist the Protected Zone Joint Authority (PZJA) in managing fisheries resources of the Torres Strait.

This background section of the Plan identifies the principles, administration and funding aspects of the Torres Strait fisheries research programme. Part 2 of this Plan identifies the key factors influencing Torres Strait research needs. Key policy and research issues in the eleven fisheries managed by the PZJA are described in Part 3, while Part 4 identifies the six research themes that will guide Torres Strait fisheries research during the life of this Plan. An Operational Plan¹ for Torres Strait Fisheries has also been developed in conjunction with this Strategic Plan.

The intent of the TSSAC is that this Plan and the Operational Plan be living documents, capable of responding to the changing nature of the Torres Strait fisheries and institutional environments. In line with this intent, the TSSAC will undertake annual reviews of the Operational Plan, a mid-term review of this Plan after 2-3 years, and a full review of this Plan in 2014. In line with this commitment, this document was reviewed in March 2012

Review	Timeframe
Operational Plan	Annually
Mid-term Review of Strategic Research Plan	2011-2012
Full review of Strategic Research Plan	2014

¹ TSSAC (2011) Operational Plan for Torres Strait Fisheries.

1.1: Research management and administration

The PZJA neither directly funds nor manages any Torres Strait fisheries research². Instead, Torres Strait fisheries research is funded – and administered – by a number of separate research programmes managed by various agencies/departments/institutions.

- Each of the four PZJA agencies – the Australian Fisheries Management Authority (AFMA), the Department of Agriculture, Fisheries and Forestry (DAFF), the Torres Strait Regional Authority (TSRA) and Fisheries Queensland, a service of the Department of Education, Economic Development and Innovation (DEEDI) – currently administer separate Torres Strait fisheries research activities³.
- Aside from the PZJA agencies, other government agencies/departments – such as the Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) - fund Torres Strait fisheries research projects.
- SEWPaC also funds the Marine and Tropical Sciences Research Facility (MTSRF), part of which is devoted to Torres Strait fisheries research.

These funding sources are in addition to research funds provided by:

- i) research providers – CSIRO for example has a long history of contributing funding support for CSIRO-led Torres Strait research;
- ii) other bodies with a direct interest in fisheries research - such as the Fisheries Research and Development Corporation (FRDC); and
- iii) bodies focused on promoting indigenous economic development – such as Indigenous Business Australia (IBA), an independent statutory authority designed to advance the commercial and economic interests of Indigenous Australians.

Though there are informal links between the staff from many of these funding bodies and the researchers involved, each of these research programmes is managed and

² Unlike other Torres Strait fisheries management costs, research is intentionally excluded from the Torres Strait fisheries cost sharing arrangement between the Australian and Queensland Governments.

³ AFMA reserves a portion of the annual appropriation it receives from the Australian Government to manage Torres Strait fisheries for research purposes. DAFF, the TSRA and the Queensland Government provide occasional funding support to Torres Strait fisheries projects based on the merits of the project relative to competing projects and their respective overall research needs/funding.

administered separately and each agency maintains sole control over its respective research programme.

1.2: The role of the TSSAC

In general, the TSSAC does not directly commission research. The TSSAC has an advisory role in identifying strategic directions, priorities and potential funding opportunities for Torres Strait fisheries research and ensuring research is conducted in a coordinated manner with other research bodies. However, where identified tactical research priorities are not being addressed by researchers, the TSSAC may actively seek research proposals on these areas.

- The TSSAC reports directly to the AFMA Executive in regard to AFMA's Torres Strait research programme, such that the research needs identified by the TSSAC have a direct influence on the research that AFMA funds.
- Research needs identified by the TSSAC are intended to influence research addressed by other funding agencies, though such influence is more implicit than explicit.
- The TSSAC also provides advice to the Protected Zone Joint Authority (PZJA).

Unlike other Australian fisheries where respective Commonwealth and State Government fisheries research advisory boards (FRABs) coordinate fisheries research, there is at present no central advisory body for Torres Strait fisheries research. The TSSAC views the lack of a central advisory body for Torres Strait fisheries research as a weakness and believes that greater coordination amongst the separate Torres Strait fisheries research funding agencies would improve the overall effectiveness of their collective research investment.

The TSSAC - being singularly focused on Torres Strait fisheries and having independent scientific expertise and stakeholder involvement - is to establish itself as a central Torres Strait fisheries research advisory body. The Committee will review and provide advice on all Torres Strait fisheries research proposals irrespective of their funding source, similar to the role played by the fisheries research advisory bodies in all other Australian states and at the Commonwealth level⁴.

⁴ The TSSAC currently provides these services to the PZJA in evaluating proposals submitted for funding under the AFMA Torres Strait research programme and providing advice to the PZJA on the suitability of these proposals. A future Torres Strait fisheries research advisory body would provide similar advisory services to all Torres Strait research programmes.

In the short-term the TSSAC will:

- i) strengthen its links with other agencies/departments managing existing Torres Strait fisheries research programmes and keep abreast of the Torres Strait fisheries-related projects that they support;
- ii) establish links with potential new research donors;
- iii) continue its existing role of being the primary advisory body to AFMA's Torres Strait fisheries research programme; and
- iv) encourage prospective Torres Strait fisheries research providers to submit their research proposals to the TSSAC for consideration. The TSSAC will provide prospective researchers with comments on the perceived merits of the proposed research and advise on potential funding opportunities where appropriate.

1.3: Principles underpinning the role of the TSSAC in Torres Strait research

The TSSAC undertakes its research functions according to the following principles.

1. Research priorities will be driven by the needs of Torres Strait fisheries.

- Considering that the mandate of the PZJA is broader than just resource sustainability, the research programme needs to give regard to the aspirations of development of Traditional Inhabitant fishers in terms of socio-economic development.

2. Research will be most effective when there is effective engagement with fishery stakeholders, particularly Traditional Inhabitants of the Torres Strait, and where the research has widespread stakeholder support. To this end, the TSSAC will require each proposal to explicitly explain:

- how stakeholders – especially Traditional Inhabitants - are to be engaged in the research process;
- how the results are to be communicated to stakeholders, particularly Traditional Inhabitants;
- the level of stakeholder support – particularly from Traditional Inhabitants – for the proposed work;

- how researchers will show respect for Traditional Inhabitant culture at all times⁵; and
 - how the research outcomes will benefit Traditional Inhabitants.
3. The processes used to identify research priorities, invite research proposals and then evaluate these proposals are to be transparent and accountable.
- Recognising that the PZJA does not in itself commission research, the TSSAC will act as an intermediary, linking prospective research providers with potential research funding agencies.
 - Research proposals are to be evaluated and prioritised in accordance with the need, risk, cost and expected benefits of the research to the fishery, the ecosystem and the Torres Strait region.
4. Consistent with the legislative responsibilities of the PZJA, the TSSAC will not deal with aquaculture research except for where there would be potential aquaculture/wild-stock interactions.

⁵ The TSSAC has developed cultural protocols that researchers should follow when engaged on Torres Strait fisheries research.

PART 2: KEY FACTORS INFLUENCING TORRES STRAIT FISHERIES RESEARCH NEEDS

2.1: The Torres Strait Fisheries Act

The Protected Zone Joint Authority (PZJA) is created under the Torres Strait Fisheries Act 1984 (the Act); the legislation used by the Australian Government when managing Torres Strait fisheries.

The Act makes the PZJA responsible for monitoring the condition of the fisheries under its control and formulating policies and plans for their good management. In performing these functions, the Act requires the PZJA to ‘give regard’ to the ‘rights and obligations conferred on Australia by the Torres Strait Treaty’. Among these Treaty obligations, the Australian Government is:

- i) ‘to protect and preserve the Torres Strait marine environment and indigenous fauna and flora’ (Article 10.4);
- ii) ‘to identify and protect species of indigenous fauna that are or may become threatened with extinction’ (Article 14.1(a)) and, in so doing, ‘to minimise any restrictive effects on the traditional activities of the traditional inhabitants’ (Article 14.4);
- iii) ‘to acknowledge and protect the traditional way of life and livelihood of the traditional inhabitants including their traditional fishing and free movement’ (Article 10.3);
- iv) in issuing licences to permit commercial fishing, to ‘have regard to the desirability of promoting economic development in the Torres Strait area and employment opportunities for the traditional inhabitants’ (Article 26.3);
- v) to cooperate with PNG ‘in the conservation management and optimum utilisation of Protected Zone commercial fisheries’ (Article 21);
- vi) desirous of cooperating with the Papua New Guinean Government in the conservation, management and sharing of the Torres Strait fisheries resources (as stated in the Treaty preamble).

Accordingly, in developing research priorities and evaluating/recommending research proposals, the TSSAC is required to have regard to:

- i) protecting the Torres Strait marine environment;

- ii) protecting traditional fishing;
- iii) promoting economic development in the Torres Strait and employment opportunities for Traditional Inhabitants; and
- iv) achieving optimum utilization of commercial fishing; and
- v) encouraging effective cooperation with Papua New Guinea.

2.2. Increased community expectations

The Australian community is becoming more environmentally aware and demanding higher standards of marine management from Commonwealth and state governments.

Fisheries managers and governments are responding to these enhanced community expectations. In recent years, fisheries management in Australia has embraced concepts such as ecosystem-based management and the development of harvest strategies, while Governments have demonstrated increased commitment to rebuild overfished stocks and prevent overfishing of other species. The Torres Strait and the PZJA are not immune to these pressures.

- A harvest strategy has been developed for the Torres Strait Prawn Fishery. It is anticipated that harvest strategies will be developed for other Torres Strait fisheries over the medium term.
- Sandfish is the only Torres Strait stock considered to be overfished.⁶ The fishery for this species has been closed since 1998 but the most recent scientific survey conducted in 20010/11 found signs of recovery of this species. The fishery remains closed with an experimental fishing research project in progress in 2011/12. Previously overfished species (Black Teatfish and Surf Redfish) have increased in numbers and these fisheries are now open with conservative Total Allowable Catches. Given the significance of some of these species to Traditional Inhabitants, the PZJA can expect increased pressure in coming years to further expedite stock recoveries⁷.
- The PZJA has acknowledged concern over the sustainability of current dugong and turtle catches, the inadequacy of the current management controls over

⁶ Wilson DT, Curtotti R, & Begg GA (eds) 2010, Fishery status reports 2009: status of fish stocks and fisheries managed by the Australian Government, Australian Bureau of Agricultural and Resource Economics – Bureau of Rural Sciences, Canberra.

⁷ The Torres Strait pearl shell stock is also likely to be in an overfished state, though its status has not been assessed for many years and fishing pressure is low

turtle and dugong harvesting and the need to limit catches to sustainable levels. Though it has long supported increased community-based management of these species, the PZJA remains ultimately responsible for ensuring that dugong and turtle stocks are fished at sustainable levels. The PZJA is likely to face increasing pressure in the years ahead to ensure that appropriate management arrangements are implemented in these two iconic fisheries.

- A voluntary buy-out of non-Traditional Inhabitant fishing concessions was announced by the PZJA on 21 December 2011. This signifies not only a commitment by the PZJA to increase the Traditional Inhabitant share of the fishery, but the process will also include formalising management arrangements that will provide certainty of access for both Traditional Inhabitant and non-Traditional Inhabitant fishers. Research for Tropical Rock Lobster stock assessments and related areas will have increasing importance over the coming years.

2.3 Increased scrutiny of fisheries management performance

The effectiveness of the management arrangements in all Torres Strait fisheries are subject to periodic review by the Australian Government in accordance with the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. Under the EPBC Act, the Australian Government Environment Minister has the power to stop the exporting of product taken from a fishery should management arrangements in that fishery be deemed inadequate. Such action would have a major impact in the export-orientated prawn, Tropical Rock Lobster and Finfish fisheries in the Torres Strait.

Management arrangements in most Torres Strait fisheries have been reviewed at least once and all such fisheries have had their export approval reaffirmed. However, in several fisheries, the reviews identified areas of the management arrangements that need strengthening, and future export approval is likely to be subject to the PZJA making suitable progress to address these specific weaknesses. Specific research may be needed to help the PZJA address these identified management shortcomings.

2.4 Changed management arrangements

The PZJA is moving towards the introduction of quota-based fisheries management in the Torres Strait to replace former limited-entry management regimes. Quotas are to

be introduced in the Tropical Rock Lobster fishery and in both the Spanish mackerel and reef line sectors of the Finfish fishery.

These changes in strategy create new management demands. With managers now tasked with explicitly setting total allowable catch (TAC) levels, scientists may need to alter their assessment methods to provide more timely (and specific) management advice. Different compliance strategies will be required, shifting the focus from visual inspection of fishing gear to a more audit-based assessment of catch landings, while research may be required to identify cost-effective new management approaches.

2.5 Need to promote Traditional Inhabitant economic development

Consistent with both the Treaty obligations and the TSRA development aspirations, in July 2005, following several years of consideration and review, the PZJA decided to reallocate fisheries access in the Tropical Rock Lobster and Finfish fisheries from non-Traditional Inhabitants to Traditional Inhabitant interests. This reallocation was achieved by the Australian Government's purchasing of non-islander licences using a publicly-funded voluntary tender.

The intent of the buyout was to encourage increased Traditional Inhabitant participation in these two fisheries and thereby promote economic development and employment opportunities for Traditional Inhabitants. The Australian Government has invested considerable funds in the pursuit of this goal: it stands to reason that additional economic and/or social research will be required to monitor the effectiveness of this policy and identify/address any further impediments to increased economic involvement of Traditional Inhabitants in Torres Strait commercial fisheries.

2.6 Need to improve the commercial viability of Torres Strait fisheries

Aside from promoting the economic development of Traditional Inhabitant interests, the PZJA has a further goal of seeking the optimum utilization of the Torres Strait's commercial fisheries.

The Torres Strait prawn fishery, for example, is healthy biologically but in poor shape economically. The gross value of production in this formerly dominant (from a commercial Torres Strait perspective) fishery has fallen continually since 1998/99 and

the most recent ABARE survey indicate negative returns in the fishery for both 2004-05 and 2005-06. The fishery's economic situation is likely to have further deteriorated in the years since the ABARE survey.

The seriousness of the situation in the prawn fishery is reflected in the outcomes from the December 2007 meeting of the Torres Strait Prawn Fishery Management Advisory Committee which '*recognised that the TSPF was operating in very difficult economic circumstances....and that urgent attention was required to identify solutions to support industry viability in the 2008 season and beyond.*'

Though the situation in other fisheries is less severe than in the prawn fishery, profitability in the Tropical Rock Lobster and Finfish fisheries is also strongly subject to changes in fuel prices, movements in exchange rates, and more recently, volatile export demand in response to adverse global economic conditions.

The TSSAC needs to be mindful of the various economic pressures facing each fishery when considering the overall the Torres Strait fishery research programme,

2.7 Need to more fully involve fishery stakeholders in the research process

The PZJA is committed to managing the fisheries resources of the Torres Strait in partnership with fishery stakeholders. Consistent with this commitment, the TSSAC believes that fishery stakeholders need to be actively included throughout the research process if the potential benefits of completed research are to be realised.

The TSSAC seeks to ensure that stakeholders – both Traditional Inhabitants and non-Traditional Inhabitants – are involved in all facets of the research programme, from the setting of research priorities, the development and implementation of the research activities, and finally the dissemination and understanding of the results.

Traditional Inhabitant stakeholders are acknowledged as having particular significance. It is essential that when developing proposals, prospective researchers work with the interests of Traditional Inhabitants to identify opportunities for engaging them in the proposed research in meaningful and appropriate ways, at both an individual and community level.

The TSSAC commissioned a review of current processes and procedures for fisheries research in the Torres Strait and a report was published in 2011⁸. In addition to the final report, a short guide to fisheries researchers working in the Torres Strait, based on the full report, was developed by the TSSAC to provide researchers with a quick reference to the protocols to be followed when conducting research in the Torres Strait.

There are two broad principles which underlie the increased involvement of Traditional Inhabitants in research:

1. Wherever practical and possible, research being undertaken in particular Torres Strait sea country will engage with Traditional Inhabitant co-researchers from that sea country. Such involvement relies on a sufficient number of skilled Traditional Inhabitants in each Island Nation where research is carried out to enable meaningful engagement of Traditional Inhabitants in research.
2. A plan to adopt strategies to overcome impediments in engaging Traditional Inhabitants in research in the Torres Strait. Work is currently underway to address this issue.

2.8 Non-Fisheries Issues

The core business of the PZJA is fisheries management and the research activities undertaken by the TSSAC on behalf of the PZJA are to focus on fisheries management issues.

The direct environmental impacts of fishing are included in fisheries management research. However, research examining the Torres Strait-wide impact of non-fishing activities – such as the potential impact of shipping accidents, the management of marine pests, climate change and the impacts of seabed mining – are beyond the jurisdiction of the PZJA. While the PZJA may contribute to the fisheries-specific component of such research, the PZJA should only play a supporting role and the coordination of such broad-scale research is best left to the appropriate Australian and Queensland Government environmental agencies.

Alternatively, the PZJA may be involved in contributing to the Torres Strait component of any broader Australia-wide fisheries research such as the likely impacts

⁸ Nakata & Nakata 2011. The full report, as well as the shorter guide, can be found on the PZJA website www.pzja.gov.au.

of climate change on the fisheries sector. As stated above, the PZJA would be playing only a supporting role, with management of the overall project residing elsewhere. The TSSAC is being exposed to more research on climate change impacts on fisheries and is interested in extending this to include potential impacts of climate change on fisheries in the Torres Strait.

In both cases, the principle remains the same – the PZJA is a fisheries management agency, not an environmental management agency, and the limited research activities of the PZJA need to remain focused on Torres Strait fisheries management research.

PART 3: INDIVIDUAL TORRES STRAIT FISHERIES

Torres Strait fisheries comprise of or are managed under five broad groups as follows:

- i) the Prawn fishery;
- ii) the Tropical Rock Lobster fishery;
- iii) the Finfish fisheries (reef line and Spanish mackerel); and Barramundi
- iv) the Traditional Dugong and Turtle fisheries; and
- v) the Hand Collectables including Bêche-de-mer, Trochus, Pearl Shell and Crab fisheries

Background information on these fisheries is available from numerous other sources and not reproduced here⁹. Instead, this section identifies key research and research related issues in these fisheries.

3.1: The Prawn fishery

From a research perspective, the three key issues in the prawn fishery are:

- i) how to improve industry profitability/viability;
- ii) how to improve resource utilisation; and
- iii) how to manage the ecosystem impacts of the fishery.

The fishery is managed using input controls, the most significant of which is a cap on the total allowable fishing effort (fishing nights). Individual operators have a share of the cap, ie an individual effort limit. Substantial amounts of available effort remain unused¹⁰.

A new management plan was implemented in 2009 which will enable the short-term leasing of unused nights between licensed operators within a fishing season (prior to this, nights could only be permanently traded¹¹). The PZJA expects that short-term leasing will improve the utilisation of nights, though sectors of industry are concerned that leasing may reduce demand for the permanent purchase of nights and hence erode operators' asset values.

⁹ Information on the PZJA fisheries is available from the annual fisheries status reports produced by the Australian Bureau of Agricultural and Resource Economics and Sciences, the PZJA annual reports and the PZJA website.

¹⁰ In 2010, only 1,663 of a possible 9,200 nights were fished.

¹¹ At the TSPMAC meeting in June 2007, Fisheries Queensland staff advised that some prawn operators were using creative ways to effect the short-term transfer nights under pseudo leasing arrangements, though the extent of such 'leasing' was not stated.

A long-term harvest strategy, designed to establish clear, transparent rules for possible adjustments to the level of fishing effort – up or down - throughout the fishing season based on a set of pre-agreed decision rules, is under development.

3.2: The Tropical Rock Lobster Fishery

With 90% of the Tropical Rock Lobster catch coming from a single age group of a single species, recruitment is prone to high levels of natural variability. Accordingly, catches are also highly variable.

The Australian Torres Strait fishery is currently managed using input controls – limited entry (for non-Traditional Inhabitants), a minimum size limit, closed seasons, and gear/vessel controls. A new quota management system is to be introduced – featuring individual transferable catch allocations - though a definite starting date is not yet set¹².

Annual fishery-independent surveys of the stock have been carried out in Australian waters of the Torres Strait annually since 1989¹³. A second survey closer to the start of each fishing season (pre-season), provides the information to formulate an annual Total Allowable Catch (TAC) for the fishery.

The Torres Strait Tropical Rock Lobster Resource Assessment Group (TRLRAG) considers the fishery to be in good condition biologically but notes that the fishery was moderately overfished in four of the last ten years – in 1999, 2001, 2002 and 2006 – which were also years of low abundance and low Australian catch.

Following the PZJA's 2005 reallocation decision, in 2007 the Australian Government funded a partial buy-back of non-Traditional Inhabitant licences. Thirteen such licences (and an associated 29 tenders) were removed from the fishery – around half the former non-islander fleet. The past Torres Strait Islander Community Fisher Group subsequently expressed disappointment with this outcome, on the basis that the reallocation failed to meet aspirations of Traditional Inhabitants and left no room for future Traditional Inhabitant growth.

While Papua New Guinea's share of total catch is usually lower than Australia's, fishing pressure in Papua New Guinean waters is far greater than in Australian waters.

¹² Queensland has introduced quota management arrangements into the east coast fishery.

¹³ These surveys have at times included Papua New Guinean waters.

There is considerable Traditional Inhabitant participation in the Tropical Rock Lobster harvesting and, to a lesser extent, processing sectors. From a Traditional Inhabitant perspective, the Tropical Rock Lobster fishery is the most economically important fishery in the Torres Strait. The institutional arrangements that Traditional Inhabitants establish to manage their quota allocations may have important implications for both the level and distribution of benefits from Traditional Inhabitant participation in the fishery. Monitoring the level of economic benefits that Traditional Inhabitants generate from the fishery and developing strategies to increase these benefits are key future issues.

3.3: The Finfish (Reef line and Spanish mackerel) Fisheries

No formal stock assessments have been undertaken for coral trout or any other reef species taken in the reef line fishery.

In regard to Spanish mackerel, Begg et al (2006) estimated that the Spanish mackerel fishery is most likely being harvested near or in excess of the level needed to produce maximum sustainable yield. Begg cautioned that the stock was susceptible to overfishing given its predictable seasonal spawning aggregations and suggested that management strategies may need to be implemented to ensure total catches decline from current levels.

The PZJA is currently developing a management plan for the Finfish (Spanish mackerel and Reef Line) fishery, including a quota management system, although date of implementation as yet is unknown.

Discussions in late 2007 between non-Traditional Inhabitant fishers and the Australian Government resulted in the voluntary buyout of all non-Traditional Inhabitant licences from the Finfish fisheries. All licences in the reef line and Spanish mackerel fisheries are now held by Traditional Inhabitants.

In order to maintain continuity of supply to shore-based processors, and to facilitate skills transfer between the former commercial non-Traditional Inhabitant Finfish fishers and prospective Traditional Inhabitant Finfish fishers, the PZJA has agreed to allow the TSRA to lease Reef Line and Spanish Mackerel quota short-term to non-Traditional Inhabitant operators.

The level of economic benefits generated by Traditional Inhabitants from the reef line fisheries, opportunities for increasing this level of benefit, and the extent to which the

leasing policy maintains continuity of product supply and enables skills transfer to Traditional Inhabitant fishers, warrants regular review and assessment.

3.4: The Traditional Fisheries

Traditional fishing means Traditional Inhabitant subsistence (that is, non-commercial) fishing. There are two main traditional fisheries – for dugong and for turtle.

3.4.1: Dugong

The Torres Strait is home to the largest population of dugong in the world, with the most recent estimate of Torres Strait dugong abundance – based on the results from a 2006 aerial survey – at between 12,500-17,000 animals, slightly higher than the previous survey estimate from 2001.

Abundance – and hence hunting effort and catch - is concentrated in the seagrass beds of western Torres Strait. There is considerable variability in the annual catch, consistent with evidence suggesting periodic large-scale movements of dugong into and out of the Torres Strait in response to changing seagrass conditions.

There is no current catch data. The most recent catch estimate for communities in the Australian sector of the TSPZ - excluding the Papua New Guinea coastal communities, the inner islands and the Northern Peninsula communities – dates back to 2000/01 and indicates catch to be above the current model-based estimates of sustainable catch rates.

Concern that catch rates in the Torres Strait may be unsustainable are long-standing, but the time series of aerial survey results dating back to 1985 have not detected any declining trend in dugong abundance. Marsh et al (2007) identifies four possible reasons for this apparent contradiction:

- i) the aerial surveys are underestimating absolute dugong population size;
- ii) dugongs are moving into the Torres Strait from the west, from areas outside the survey area;
- iii) the estimated annual catch used in the model significantly overstates the true level of catch; and
- iv) dugongs are breeding faster – at a younger age and more frequently - than assumed in the model.

Marsh et al concludes that the development of culturally acceptable and scientifically robust mechanisms to manage Indigenous hunting is the major priority for dugong management in the Torres Strait.

3.4.2: Turtle

There are two aspects to the Torres Strait turtle fishery – the harvesting of animals for meat and the harvesting of eggs. Three species are involved – green turtles, by far the most abundant species and harvested both for meat and eggs, and hawksbill and flatback turtles, harvested mostly for eggs. The Torres Strait populations of green, hawksbill and flatback turtles represent a substantial portion of the global population of each respective species.

The PZJA actively supports the development of a community-based approach to dugong and turtle management. The TSRA – one of the PZJA agencies – is overseeing implementation of the Torres Strait component of a National Heritage Trust funded programme (the Northern Australian Indigenous Land and Sea Management Alliance (NAILSMA) programme) part of which is designed to assist indigenous communities develop sustainable management arrangements for their dugong and turtle fisheries. The Torres Strait component - the Regional Activity Plan for Torres Strait - of the NAILSMA dugong and turtle project has four themes:

- i) development and implementation of community-based dugong and turtle management plans in eight Torres Strait communities¹⁴;
- ii) monitoring programmes;
- iii) education and training about turtle and dugong management; and
- iv) agreed approach to turtle and dugong catch sharing between PNG and Australia.

The PZJA, at its meeting in May 2008, commended the Traditional Inhabitant communities on their progress in developing community management plans, urged communities to stay engaged in the process, and agreed to investigate options to help communities implement the plans and extend the programme to other communities.

¹⁴ Eight community management plans have been implemented with a further seven in the process of being implemented.

3.5: Bêche-de-mer and Trochus

3.5.1 Bêche-de-mer

There has been a growing interest in the Bêche-de-mer with approximately 25 tonnes of catch recorded for the 2011 fishing season. Current key commercial species within the fishery are the high value white teatfish and medium value prickly redfish. These recent catches are still relatively small when compared to catches throughout the 1990's, when other high value species, namely black teatfish and sandfish were open to fishing.

The most recent scientific survey of Torres Strait Bêche-de-mer stocks in 2009 indicated recovery of black teatfish and subsequently CSIRO have recommended a 25t TAC for this species. Sandfish stocks at Warrior Reef however continued to be at very low levels and CSIRO have recommended that the closure for this species remains in place. Surf redfish are now believed to be naturally occurring in low abundance and it is considered most likely early catch records misidentified deepwater redfish for surf redfish (Skewes et al. 2010).

Compliance is a key issue in the fishery, particularly the illegal fishing of sandfish on Warrior Reef. The Australia-Papua New Guinea border crosses Warrior Reef. The Papua New Guinean section of the reef is currently closed to fishing, given the depleted state of the sandfish stock.

Conceptually, the recovery of the sandfish stock on Warrior Reef could be assisted through re-seeding hatchery reared juveniles. However, SEWPaC considers that priority should be given to enhancing the natural regeneration of sandfish stocks rather than reseeded (DEH 2005).

3.5.2 Trochus¹⁵

There were no reports of trochus harvested throughout 2011 on the back of very low effort for 2010. There is anecdotal evidence to suggest the falling price of mother of pearl has made the fishery uneconomical at this point in time.

The Trochus fishery is managed by a competitive TAC, though the current TAC has no scientific basis. There has been no stock assessment and the present status of the Torres Strait Trochus stock is uncertain. Localised depletion of Trochus shells is an

¹⁵ Activity in the Trochus fishery is highly variable and a case could be made for including Trochus with the small scale fisheries discussed under Section 3.6.

area of potential concern. The fishery is also managed using size limits, though the current limits are based on research from other *Trochus* fisheries rather than any Torres Strait specific analysis. Until information specific to the Torres Strait *Trochus* population(s) is gathered, it is difficult to assess whether current size limits are the most appropriate.

Pascoe (2007) identified alternative management strategies as an area of potential research. For example, Pascoe noted that pulse fishing – exploiting areas of the fishery when prices are high and stocks abundant, and either moving to a different area and/or stopping fishing when stocks and/or prices are low - may under certain conditions be a superior management strategy to that of maintaining stable catches.

In 2008 the Torres Strait Scientific Advisory Committee gave in-principle support to a one-year research project designed to provide a robust stock assessment and user-friendly information on spatial abundance of the Torres Strait *Bêche-de-mer* and *Trochus* stocks.

In addition, limited funding has been made available through the Marine and Tropical Sciences Research Facility (MTSRF) to support a project investigating the feasibility of community-driven harvest strategies - including regional TACs - for *Bêche-de-mer* (and other) fisheries. Such strategies will, among other things, examine the prospects for incorporating traditional fishing practices/knowledge into management arrangements, the eventual goal being to develop community-supported fishery management plans.

3.6: Remaining (small-scale) fisheries

Fishing effort in the remaining Torres Strait fisheries - pearl shell, barramundi and crab - is very low¹⁶.

None of these three fisheries have ongoing data collection programmes, estimates of sustainable catch levels, reliable historical catch data or recent scientific research.

Some Torres Strait fishery stakeholders have suggested there may be opportunities to revitalize the pearl shell fishery, given the high quality and marketable brand name

¹⁶ The pearl shell fishery was once the commercial mainstay of the Torres Strait, featuring hundreds of vessels and having catches in the hundreds of thousands of shells. That was a long time ago: demand for live pearl shell is now restricted for broodstock purposes only and there is negligible targeted pearl shell fishing. The catch - estimated at less than 400 shells/year – is taken opportunistically by Tropical Rock Lobster divers. Participation in the crab and barramundi fisheries is reserved for Torres Strait Islanders.

of Torres Strait pearls. It has also been suggested that stock recovery could be promoted by relocating pearl shell closer together to help boost recruitment. The effectiveness of the current maximum size limits in the fishery is also uncertain.

Prior to any research being undertaken in the crab and barramundi fisheries, fishery managers and traditional inhabitants must first get together to:

- i) share knowledge about the nature and status of the two fisheries;
- ii) identify issues in the two fisheries; and to
- iii) agree on future management needs – such as a cost-effective method of catch monitoring (such discussions should also unearth potential research needs – biological and economic).

The challenge for the PZJA with these small-scale fisheries is how to best fulfil its fisheries management responsibilities given that the cost-effectiveness of virtually any management and/or research activity is open to question.

PART 4: RESEARCH THEMES

All research activities considered by the TSSAC, on behalf of the PZJA, must be consistent with the PZJA's legislative obligation - as stated in the Act - to 'give regard' to the 'rights and obligations conferred on Australia by the Torres Strait Treaty'. As was previously stated in Section 2, this means that in developing research priorities and evaluating/recommending research proposals, the TSSAC is required to have regard to (without hierarchy):

- protecting the Torres Strait marine environment;
- protecting traditional fishing;
- promoting economic development in the Torres Strait and employment opportunities for traditional inhabitants;
- achieving optimum utilization of commercial fishing;
- encouraging effective cooperation with Papua New Guinea; and
- cost-effective management.

Complementing these broadly-defined overall goals, the PZJA has developed more specific objectives at an individual fishery level. Objectives for the prawn, Tropical Rock Lobster and Finfish fisheries have recently been reviewed – and enhanced – as part of the process of developing management plans for those fisheries. The objectives for other PZJA fisheries can be expected to be similarly improved in future years as management processes in these other fisheries evolve¹⁷.

While the details of the individual fishery objectives vary from fishery to fishery, at a general level they reinforce the aforementioned five Treaty objectives. They also introduce a new objective - the desirability of cost-effective management.

In accordance with the broad thrust of these legislative and fishery-specific objectives, the PZJA encourages research in 6 thematic areas.

Theme 1: Protecting traditional fishing

The Treaty states that the principal purpose in the Australian and Papua New Guinean Governments establishing the Torres Strait Protected Zone is to acknowledge and

¹⁷ The PZJA's objectives for individual Torres Strait fisheries are provided in the Annual Operational Plan for Torres Strait Fisheries.

protect the traditional way of life and livelihood of the Traditional Inhabitants including their traditional fishing and free movement.

Consistent with the primacy of this goal, the PZJA encourages research proposals that are designed to protect/enhance traditional fishing opportunities.

Possible research activities under this theme include:

- i) evaluating alternative methods of estimating the traditional catch; and
- ii) identifying opportunities for Traditional Inhabitant-based community management of the turtle and dugong fisheries (both at the community and regional level).

Theme 2: Protecting the Torres Strait marine environment

Contemporary fisheries management embraces managing the ecosystem impacts of fishing activity. On this issue, the PZJA was ahead of other Australian fisheries authorities – the need to protect the Torres Strait marine environment having been one of the PZJA’s founding objectives when it was established in 1984.

It is stressed that the PZJA is a fisheries management agency, not an environmental management agency, and PZJA research activities aimed at protecting the Torres Strait marine environment are to focus on the direct environmental impacts of fishing.

Possible research activities under this theme include:

- i) Protecting and preserving the Torres Strait marine environment and indigenous fauna and flora;
- ii) the effectiveness of fishery bycatch reduction devices; and
- iii) wild stock/aquaculture interactions.

Theme 3: Optimum utilization of commercial fishing opportunities

The PZJA is responsible for implementing policies that promote a sustainable, profitable commercial fisheries sector in the Torres Strait.

Possible research activities under this theme include:

- i) physical surveys of the abundance and spatial distribution of fish stocks;
- ii) provision of stock assessment and TAC advice;
- iii) developing fishery harvest strategies;
- iii) assessing the feasibility of spatial management arrangements;

- iv) marketing studies for underutilized Torres Strait species; and
- v) identifying opportunities for increased profitability in established Torres Strait fisheries.

Theme 4: Promoting economic development in the Torres Strait and employment opportunities for Traditional Inhabitants

In managing the Torres Strait fisheries sector, the PZJA needs to have regard for fisheries-based economic development opportunities in the Torres Strait and for Traditional Inhabitants.

It is expected that the TSRA – being a PZJA agency and committed to developing the fisheries sector as the basis for a real economy for Traditional Inhabitants living in the region – and Traditional Inhabitant fisher groups would be actively involved (or at least fully supportive) of all projects undertaken under this theme.

Possible research areas under this theme include:

- i) alternative models for the management of Traditional Inhabitant quota allocations;
- ii) the determinants of Traditional Inhabitant fishing behaviour; and
- iii) opportunities/impediments facing Traditional Inhabitant corporate fisheries bodies.

Theme 5: Effective engagement with Papua New Guinea

Most fisheries stocks in the Torres Strait are shared stocks between Australia and Papua New Guinea such that neither country can effectively manage their fisheries independently from the other. Under the terms of the Treaty, both Governments have recognised their duty to cooperate and various formal and informal arrangements are in place to facilitate cooperation. There is a continual need to consider innovative ways by which the two countries can work together to achieve their common management goals.

Possible activities under this theme include:

- i) a review of current management arrangements in the Australian and Papua New Guinean waters of the Torres Strait to identify opportunities for more compatible management measures;

- ii) identifying opportunities for increased collaboration between Australian and Papua New Guinean research and management agencies regarding Torres Strait fisheries.

Theme 6: Cost-effective management

Objectives recently developed by the PZJA for the prawn and Tropical Rock Lobster fisheries explicitly include cost-effective management. Notwithstanding the small-scale of several Torres Strait fisheries, the PZJA is committed to continual improvement in the cost-effectiveness of the management arrangements in all Torres Strait fisheries.

Potential research areas under this theme include:

- i) evaluating the merits of alternative fisheries compliance strategies; and
- ii) reviewing the effectiveness of current fisheries consultative/decision-making arrangements.

Meaningful stakeholder engagement

As stated in Part 2 of this Plan, the TSSAC considers it essential that when developing proposals, prospective researchers work with Traditional Inhabitant interests to identify opportunities for engaging Traditional Inhabitants in the proposed research in meaningful and appropriate ways, at both an individual and community-level.

Consistent with this, all research proposals submitted under these 6 research themes will be required to demonstrate how fishery stakeholders - particularly Traditional Inhabitants - are to be involved in the research and the level of stakeholder support for the proposed work.

Individual fishery research needs

The specific research needs in each individual Torres Strait fishery, based on advice received from the respective PZJA advisory bodies, is provided in the Annual Operational Plan for Torres Strait Fisheries. These lists are intended to be indicative rather than exhaustive and may not identify all research needs for any particular fishery.

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