

# Torres Strait Strategic Marine Research Plan

2005-2010

Prepared by the Torres Strait Scientific  
Advisory Committee  
(TSSAC)

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## **Executive Summary**

This Torres Strait Strategic Marine Research Plan 2006-2010 has been prepared by the Torres Strait Scientific Advisory Committee of the CRC Torres Strait. The purpose of the Plan is to set out the strategic

direction for integrated and collaborative research in Torres Strait for the next 5 years after the current life of the CRC Torres Strait ends in 2006. The Plan is set in the cultural, social and economic context of Torres Strait. The primary legal context is set by obligations on the Australian, PNG and Queensland Governments under the Torres Strait Treaty and by other legislative provisions that govern the management of fisheries and environmental matters in Torres Strait.

The primary aim and objectives of the research are:

**Aim:** The establishment of a coordinated and integrated research program that:

1. Supports the sustainable development of marine resources and minimize impacts of resource use in Torres Strait on the resources and on the Torres Strait people;
2. Enhances the conservation of the marine environment and its biodiversity
3. Enhances the social, cultural and economic well being of all stakeholders, in particular the Torres Strait peoples; and
4. Contributes to effective policy formulation and management decision making.

**Research Objectives:**

1. To provide information relevant to end-users,
  - a. on key ecological processes in Torres Strait that will improve understanding of the sustainability of the Torres Strait marine ecosystem and conservation of threatened marine species.
  - b. on status and trends of fisheries and other economically and culturally important natural resources of Torres Strait necessary for effective coordinated and integrated natural resource management.
  - c. to assess the impacts of resource exploitation on the Torres Strait marine environment
  - d. to identify candidate species for new aquaculture from the natural resources of Torres Strait that are compatible with the aspirations and life-styles of Torres Strait peoples,
  - e. to develop the technology and knowledge base to support sustainable production in new Torres Strait based aquaculture industries; and
  - f. to assess the impacts of shipping (shipping accidents and introduced pests) on the Torres Strait marine environment
2. To provide tools for the evaluation of the consequences of alternative management strategies on Torres Strait stakeholders, marine resources, communities and cultural values.
3. To create innovative systems to make available to Torres Strait peoples and other end users data and information, either existing or generated by the program.
4. To assist in the development and implementation of marine management and development strategies for Torres Strait.
5. To support the development of education and extension programs to enhance the involvement of Torres Strait peoples in research and development opportunities in Torres Strait.
6. To improve the capacity of
  - a. Torres Strait communities to understand and utilise research results for enhanced economic and social development.
  - b. researchers to engage with Torres Strait communities in the design and conduct of research and in the transfer of research results.

The Plan comprises a detailed analysis and description of the Key Information Needs and specific research priorities that might be undertaken in the period 2006-2010 arranged according to the main themes derived from the Torres Strait Treaty:

Theme 1 – Ecologically Sustainable Fisheries

Theme 2 – Understanding and Protection of Environmental Systems

Theme 3 – Needs and Aspirations of Torres Strait Peoples

Theme 4 – Collaboration with Papua New Guinea

## The Torres Strait Context

Torres Strait is an area of ecological, cultural, strategic and economic significance for Australia and internationally. Torres Strait links Australia to Papua New Guinea (PNG), and has been the home of the traditional peoples of Torres Strait for many centuries. It contains significant tropical marine ecosystems and populations of important marine species. The region contains valuable commercial and traditional fisheries and species of high conservation and cultural value. It supports the way of life and livelihood of many Torres Strait peoples and those of the Western Province of PNG. It is a major international shipping lane for transit to Australia and between the Indian and Pacific Oceans. At its southern boundary, Torres Strait joins the Great Barrier Reef World Heritage Area and contains the northern extension of the Great Barrier Reef Province beyond the Great Barrier Reef World Heritage Area and Marine Park.

### Geography and People

The Torres Strait marine environment is a complex shallow system of extensive shoals, banks, reefs and seagrass beds. It is a mixing zone between two large water masses – the Coral and Arafura Seas - with extremely strong currents and tides. The shallow nature of the island and reef environment makes Torres Strait potentially vulnerable to the effects of climate change, including coastal erosion. Torres Strait consists of over a hundred islands and reefs that have evolved from four major origins: volcanic, alluvial, coral cays and flooded land bridges that were once part of Australia's Great Dividing Range. Geographically, the islands form five groups: eastern, central, western, top-western and inner islands groups. Communities live on eighteen islands and in the northern part of Cape York Peninsula. There are important cultural and language differences between these communities.

The people of both the Australian and PNG sectors of Torres Strait are predominantly of Melanesian origin. These people and those of Aboriginal origins have strong seafaring traditions and customs that link them to their maritime environment. The peoples of Torres Strait also include people of Asian, Caucasian or other origins. The cultural identity of Torres Strait traditional inhabitants is expressed and maintained through *Ailan Kastom* that covers a range of customs, languages, traditions, observances and beliefs in their social organisation.

The indigenous people of the area have relatively higher levels of poor health and unemployment than urban Australians. There is a strong desire of Torres Strait peoples to become more self-sufficient and autonomous and to develop a strong, sustainable local economy. The limited opportunities for development on the islands of Torres Strait, together with abundant marine resources and a long history of indigenous association with the sea, mean that much of the future economic development of the region will be based on marine resources.

### Legislation and Governance

The *Torres Strait Treaty* entered into by Australia and PNG in 1985 is concerned with sovereignty and maritime boundaries in the area, the maintenance of the way-of-life and livelihood of traditional inhabitants and the protection of the marine environment. The Treaty also established the Torres Strait Protected Zone (the Protected Zone), within which each country exercises sovereign jurisdiction for swimming fish and sedentary species on the respective sides of the agreed Fisheries Jurisdiction Line and the Seabed Jurisdiction Line (Figure 1).

The *Torres Strait Fisheries Act 1984 (Cwlth)* provides for the Australian Government to meet its obligations for the management of commercial and traditional fisheries under the Treaty. The Queensland Government shares the responsibility for fisheries management within the Protected Zone and adjacent areas and is responsible for recreational and charter fishing, aquaculture and fisheries marketing. The *Torres Strait Fisheries Act 1984 (Qld)* provides the legislative basis for the Queensland Government obligations under the Treaty. Administration of the Protected Zone is coordinated between the Australian and Queensland Governments and the Torres Strait people by the Protected Zone Joint Authority (PZJA), comprising the Australian and Queensland Ministers for Primary Industries and the Chair of the Torres Strait Regional Authority (TSRA). The

TSRA was established in 1994 as an Australian Government statutory authority in recognition of the need for greater autonomy of the Torres Strait peoples in managing their affairs. During 1996-97, the House of Representatives Standing Committee on Aboriginal and Torres Strait Islander Affairs carried out an inquiry into greater autonomy for Torres Strait Islanders, and produced a report “Torres Strait Islanders: A New Deal”. The shape and content of possible autonomy remains undecided and continues to be discussed by Islanders today.

The Island Coordinating Council (ICC) , comprising the Chairpersons of all island communities, has for many years been an important body in coordinating the affairs of Torres Strait peoples.

The Queensland Government carries out many functions within the Torres Strait relevant to the jurisdictional responsibilities of the State. These include health, education, commercial and recreational fisheries management, environment protection, land management, infrastructure development, mining and agriculture. The Torres Shire Council is the authority responsible for administering Local Government matters relating to the populated Port Kennedy group of Thursday, Horn, Prince of Wales and Friday Islands. It is also responsible for the remainder of the Torres Strait and the Northern Peninsula Area that does not come under the control of Community Councils under the Queensland Community Services Act.

The Treaty specifies certain management objectives and provides a framework and philosophy for management of fisheries in Torres Strait. These are given legislative effect in the *Torres Strait Fisheries Act 1984 (the Act)*.

Australian Fisheries Management Authority (AFMA) is the Australian Government agency which, jointly with the Queensland Department of Primary Industries and Fisheries (QDPI&F), coordinates and delivers fisheries programs in the Protected Zone on behalf of the PZJA. In administration of this Act, the PZJA must have regard to the rights and obligations conferred on Australia by the Torres Strait Treaty and in particular to the traditional way of life and livelihood of traditional inhabitants, including their rights in relation to traditional fishing. The key fisheries objectives under the Torres Strait Treaty are to:

- protect and preserve the traditional way of life and livelihood of Australian traditional inhabitants;
- promote economic development in the Torres Strait area and employment opportunities for the traditional inhabitants; and
- allow for the sharing of the allowable catch of certain Protected Zone commercial fisheries.

A regional Native Title sea claim was lodged in 2001 on behalf of all Torres Strait communities over Torres Strait waters under Australian jurisdiction. The outcome of this sea claim may have a significant effect on the future management of the marine resources of Torres Strait. Coastal PNG residents from communities affiliated with the Paskatuma/Gizra Region have recently lodged a sea claim with the Australian High Court.

## Policy Context

The key policy drivers for this strategic research plan are derived from the legislative obligations and policy commitments of the Australian and Queensland governments, the TSRA, ICC and the commercial fishing industry. The main drivers for the development of the plan are:

- 1) **Obligations under the *Torres Strait Treaty*.** Both the Australian and Queensland Governments have obligations under the Treaty to provide for sustainable fisheries, protection of the marine environment, regulation of the exploration and exploitation of seabed mineral resources and the continuation of the traditional way-of-life of the Torres Strait peoples and their economic, social and cultural development.
- 2) **Torres Strait Development Plan 2005-2009.** The TSRA has recently released this plan with the planned outcome being “to achieve a better quality of life and to develop an economic base for Torres Strait Islander and Aboriginal people living in the Torres Strait region”. The TSRA embraces the partnership arrangement with the Cooperative Research Centre for Torres Strait (CRC Torres Strait). The key outcomes expected from the Torres Strait Development Plan relevant to the development of this strategic research plan are:

- (a) Business Enterprise and Economic Development – *“businesses are locally owned and operated by Torres Strait Islander and Aboriginal residents and sustainable primary industries exist throughout the Region”*
- (b) Environment – *“land and sea country is sustainably managed”*
- (c) Native Title – *“That all levels of government and other parties who wish to access Torres Strait Islander land recognize and give effect to native title, traditional laws and customs.”*
- (d) Marine and Fisheries –
  - (i) *“Fisheries in Torres Strait form the basis of a real economy for the region that improves the well being of traditional inhabitants.”*
  - (ii) *“Traditional Inhabitants control Torres Strait fisheries”.*
  - (iii) *“Torres Strait fisheries are managed in a sustainable manner”*

3) **National Research Priorities and their associated goals.** The four national research priorities are:

- (a) An Environmentally Sustainable Australia
- (b) Promoting and Maintaining Good Health
- (c) Frontier Technologies for Building and Transforming Australian Industries
- (d) Safeguarding Australia

The proposed strategic plan will contribute to each of these priority areas.

4) **Queensland Government Fisheries and Aquaculture Research and Development Programs**

- a) Fisheries resource sustainability
- b) Stock assessment
- c) Breeding and grow out technologies for aquacultured species (both marine and freshwater)
- d) Fish stocking

The proposed strategic plan addresses needs in each of these research areas

- 5) **Government Regional Planning Processes** - particularly in relation to
  - (a) Natural Resource Management process funded through the National Heritage Trust
  - (b) regional marine planning process under Australia’s Oceans Policy.
  - (c) Queensland Government marine and coastal planning strategies
- 6) **Other government policies and statutory arrangements** including National Policy on Fisheries By-catch, the Turtle Recovery Plan and relevant Australian Government and State Environmental Legislation (e.g. The Department of Environment and Heritage’s Sustainability Criteria for Fisheries).
- 7) **Obligations for the conservation of marine biodiversity and threatened species**, including those arising from the Torres Strait Treaty, State and Australian Government legislation and international treaties;
- 8) **Fishing industry’s objective** to continue to develop profitable and sustainable fisheries using world’s best fishing practices; and
- 9) **Meeting international obligations for shipping** arising from conventions and other arrangements under the Law of the Sea and the International Maritime Organisation.

## Drivers for Scientific Research in Torres Strait

### 1. Fisheries

The Torres Strait contains a complex set of inter-related multi-species fisheries. Biologically, its commercial fisheries are either over-exploited (bêche-de-mer or sand fish) or fully exploited (the prawn trawl fishery in Australian waters). The fisheries for Spanish mackerel and coral trout have not been classified as there is

uncertainty about their status.

The multi-species nature of Torres Strait fisheries makes management in the Torres Strait challenging, although not unique in Australia. However, Torres Strait fisheries are unique in the Australian fisheries context because of their socio-economic diversity, from fully commercial and semi-commercial to subsistence fisheries. Torres Strait fisheries are also unique because of the cross-border, trans-national nature of management arrangements with PNG.

Commercial fisheries in Torres Strait are sometimes exploited by both traditional and non-traditional inhabitants. For the most part these two sectors are clearly separated by the licences each uses to access the fisheries. All commercial fishing operations are required to have fishing boats licences. Non-traditional inhabitants have licences that are generally fully transferable, while traditional inhabitants may use a Traditional Inhabitant Boat (TIB) licence which is a special licence only available to those who are a bone fide Australian traditional inhabitant or, by administrative policy, a person who is treated as an Australian traditional inhabitant for licensing purposes<sup>1</sup>. Despite these arrangements traditional inhabitants generally don't see a clear demarcation between traditional and community fishing and their activities during a fishing trip often include fishing (or hunting turtles or dugong) for home consumption and fishing for commercial purposes.

Some fisheries are community fisheries only, including the trochus, crab and net fisheries and there is a just single non-community fishing licence in the bêche-de-mer fishery. In the fisheries that are exploited by both sectors (tropical rock lobster and finfish) their relative shares of the catch are unequal. In the tropical rock lobster fishery traditional inhabitants have directly harvested between 30 to 40 percent of the annual catch while in the reef line component of the finfish fishery their share has been less than that, but grew to about 30% in 2004.

Commercial fishing (including community fishing) is not evenly spread across the region and the communities. The benefits from commercial fishing are therefore not evenly spread and some communities benefit very little if at all from the activity while others benefit a great deal. Areas that benefit least are in the "top western" group of islands including Boigu, Dauan, and Saibai. In contrast Badu and the inner islands (including Thursday Island) reap many of the benefits from the tropical rock lobster fishery.

Responsibilities and obligations of the Australian and Queensland Governments under the Torres Strait Treaty, require particular emphasis to be given to social and economic considerations when developing fisheries management policies. These include fisheries interaction issues relating to the impacts of commercial fishing on traditional lifestyles, in addition to broader economic issues relating to promoting economic development in the Torres Strait region and increased employment opportunities for Islanders.

Illegal fishing in Torres Strait waters by foreign vessels, primarily from Indonesia and PNG, is of increasing concern to Torres Strait peoples and governments.

Fisheries currently managed under the PZJA are trawling for prawns, commercial line fishing for Spanish mackerel and reef fish, crabbing, barramundi netting, commercial diving for pearl shell, tropical rock lobster, bêche-de-mer and trochus, and indigenous harvest of turtles and dugong.

Commercial fishing is the most economically important private sector activity in the Protected Zone. The gross value of production in 2003 was estimated at around \$35million. The value of the tropical rock lobster fishery has increased since 2002 as the catches have soared while the value of the prawn fishery which was once by far the most valuable has declined because of lower prawn prices and lower effort and catches. Annual figures will vary in response to production and values of particular products.

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<sup>1</sup> The latter are people who were or still are PNG traditional inhabitants and who are long term residents of the Torres Strait communities and qualified for an immigration amnesty conducted in the late 1970s. Commercial fishing by traditional inhabitants is termed community fishing, and is distinct from traditional fishing in terms of legislation.

The sustainability of current or projected harvest rates is not clear for most fisheries. Future development of fisheries in Torres Strait requires urgent resolution of the status of natural populations of harvested species and ecological sustainability of alternative development and management options. Because of catch sharing arrangements with the peoples of the Western Province of PNG, satisfactory resolution of these issues also impacts on Australia's treaty with PNG.

Annual combined harvest in the Torres Strait of dugong and green turtles, by Australian traditional inhabitants, coastal villagers of PNG and communities from northern Cape York Peninsular, is thought to be as high as 1000 and 3000 animals respectively. These animals are central to the maintenance of the traditional lifestyle of Torres Strait peoples, and Torres Strait populations of dugong and turtles are important for the maintenance of healthy populations of these species in Australian waters. There is strong evidence that the traditional fishery for dugong is over harvesting the resource, while the traditional fishery for marine turtles (principally green and hawksbill turtles) may also be exploited at levels that are not sustainable. Consequently, prudent future management requirements and arrangements need to be developed as a matter of urgency.

The Torres Strait is central to the culture and lifestyle of Torres Strait peoples and coastal people of the Western Province of PNG. It provides much of their food and supports boating as the main means for transport between islands and along the coastline of the Western Province of PNG. Cross-border transactions have been conducted for hundreds of years between traditional communities. Such transactions now also involve government agencies concerned with customs, quarantine and defence activities.

Table 1 Quantity and approximate gross value (where applicable) of production for the principal Torres Strait fisheries (Australian waters) - 2004

<b>Fishery</b>	<b>Quantity (mean annual production)</b>	<b>Value (\$ millions)</b>
Prawn	1336 t	approx \$16 M
Rock Lobster	691 t <sup>1</sup>	approx \$12M
Spanish Mackerel	282 t	approx \$1.4M
Reef Fish	177 t	approx 2.2 M
Dugong	619 – 1250/yr <sup>2</sup>	Traditional
Turtles	1100-2600/yr <sup>2</sup>	Traditional

Note: <sup>1</sup> whole weight converted 2004; <sup>2</sup> estimated catch p.a. for period 1991-2001

### ***Fishery Management Arrangements***

Joint management of the fishery stocks in the Protected Zone by PNG and Australia provides complex and unique challenges for fisheries management not found elsewhere in Australia.

PNG is responsible for managing stocks of non-sedentary species north of the Fisheries Jurisdiction Line while Australia manages them south of the line. PNG is responsible for stocks of sedentary species such as pearl shell north of the Sea Bed Jurisdiction Line (Figure 1) and Australia manages them south of that line. Australia is responsible for management of islands that form part of Australia, but are located within the PNG area of jurisdiction. This includes management of the resources within 3 nautical miles of those islands i.e. the territorial seas.

The stocks of most fished species also extend outside the Protected Zone into PNG and Queensland waters. This is recognised in the Treaty arrangements by including provisions for the parties to declare “outside but near” areas for specific fisheries in the management arrangements between PNG and Australia. This has been done for each jointly managed fishery.

Cross-border fishing arrangements defined by the Torres Strait Treaty add to this complexity. Fishing for traditional purposes by traditional inhabitants of one country can occur in the jurisdiction of the other country. Commercial fishing can be undertaken in the other country's area of jurisdiction if the licence issued by the

first country has been endorsed by the other country. Cross-border fishing has so far taken place in the prawn, rock lobster and pearl shell fisheries.

As a general rule there is an understanding under the Treaty that management arrangements in one country will be complemented by the other. An example of this is the ban on trawlers taking lobsters in both jurisdictions. Both countries have an agreement to share information and data on the catch of species nominated under the Treaty. Bilateral fisheries meetings between PNG and Australia are convened annually in August.

### ***Mechanisms to control fishing effort***

In 1985 an Australian Government policy was implemented reserving future growth in Torres Strait fisheries for Australian traditional inhabitants. Consequently, the number of licences was capped in most Torres Strait fisheries between 1985 and 1987. This policy gave effect to the Torres Strait Treaty, Article 26(3) (*in issuing licences for Torres Strait fisheries the responsible authorities shall have regard to the desirability of promoting economic development in the Torres Strait area and employment opportunities for the traditional inhabitants*). In contrast, the Islander component of the fleet enjoys virtually open entry to all fisheries except prawn. However, in 2004 a ceiling was set on the numbers of endorsements for Islanders in the tropical rock lobster fishery for 12 months. Most other regulations on commercial fishing (eg closures, gear controls) apply to islanders and non-islanders alike.

With the inevitable effort creep of existing operators, and increased participation from the Islander sector in response to growing population levels and intensifying development aspirations, the pressure on the various Torres Strait fisheries will continue to grow. Several fisheries are now fully or over-exploited and require strengthened management arrangements.

To effectively respond to the inevitably increasing fishing pressure, management policies in the Torres Strait must become more rigorous. More effective management measures, such as seasonal and/or spatial closures, more effective input controls, and possibly output controls, will need to be assessed. A move to quota management in the tropical rock lobster fishery has been agreed by the PZJA for implementation in 2007.

### ***Management Arrangements for take of Dugong and Turtle***

Only Traditional Inhabitants are allowed to take dugongs or turtles. They are taken for subsistence food or for special occasions such as weddings, funerals and tombstone openings. The sale of dugong and turtle meat and products is prohibited. Regulations currently implemented in the Torres Strait Dugong and Turtle Fisheries include:

- Dugongs and turtles may only be taken by Traditional Inhabitants.
- Dugongs may only be taken using the traditional spear (wap).
- Dugong hunting is banned in a large area of western Torres Strait which has been set aside as a dugong sanctuary

### ***AFMA/DPI&F Fisheries Data Collection***

Conventional catch and effort logbooks are used to collect data in the rock lobster, finfish, and prawn fisheries. However, the nature of Torres Strait fisheries poses additional challenges for collection of complete fisheries data from all sectors. Data are particularly lacking from the islander sector, where traditional logbook reporting systems are not feasible given the semi-commercial dinghy-based nature of islander involvement. In 2004, AFMA implemented a new catch reporting system based on point of sale collection of data. The new system is addressing many of the historical issues of data collection from this sector.

Robust assessments of the current harvest of dugongs is difficult because of the lack of current information about the size of the harvest, especially from the Inner Islands, the NPA and PNG and the confounding effect of the movement of dugongs in and out of Torres Strait. Similarly, the status of turtle stocks in Torres Strait is

difficult to assess because there is no information on the species composition, geographic distribution or size of the turtle egg harvest. However, there is anecdotal information of declining abundance of dugong in Torres Strait and of green turtles on some reefs.

## **2. Marine Environment**

The Torres Strait marine environment is a complex shallow system of extensive shoals, banks, reefs and seagrass beds. It is a mixing zone between two large water masses – the Coral and Arafura Seas. Water depths in the Torres Strait rarely exceed 50 m and the region experiences strong tidal currents as a result of this oceanographic ‘barrier’. The waters are highly productive, support a rich biological diversity and provide internationally significant habitats and food for many species of high conservation value, including dugong, marine turtles and sea birds.

The tidal currents exert a force on the seabed that redistributes sediments and appears to influence biotic assemblages. Seabed sediments vary considerably across the Torres Strait. Silt dominates to the west and north-east of the Warrior Reef complex, rubble in the north-west and sand in the east and south. Sediments in some areas are also locally highly dynamic affecting the biotic assemblages as well as impacting on coastal processes.

The biotic assemblages are not only important in their own right but many also support the region’s commercial and traditional fisheries. Surveys of inter-reefal benthic assemblages during 2004 and 2005 found marked differences in the assemblages across the Torres Strait, with large catches of sponges taken in the north and west. On the other hand, echinoderms were present throughout the Torres Strait.

The Torres Strait marine environment is renowned for its significant seagrass meadows in the central and western parts and extensive coral reefs forming the northern limit of the Great Barrier Reef in the east. The structure and composition of biotic assemblages such as seagrasses are controlled by the region’s physical conditions including tides, currents, turbidity and small-scale topographic variations.

Information to aid in the understanding and management of the impacts, both natural and human-induced, on these assemblages and the species that they support is vital for the long term health of the Torres Strait marine environment and, subsequently its marine-based industries and people.

### *Environmental Management*

The Australian and PNG Governments recognise the importance of protecting the marine environment and, under the Torres Strait Treaty, are committed to co-operating with each other to ensure its conservation. To assist this cooperation, an Environment Management Committee (EMC) has been established to provide advice on environment issues to the Joint Advisory Council (the peak governance body under the Treaty). The EMC is jointly chaired by a representative of the Australian Government from the Department of Environment and Heritage and a representative of the PNG Government from the Department of Environment and Conservation.

Responsibility for environment management within the area under Australian jurisdiction in the Torres Strait is spread over multiple Australian and Queensland Government agencies, as well as the Torres Shire Council and the Torres Strait Regional Authority (TSRA). The lead Queensland government agencies with legislation and policies affecting the management of the environment in the Torres Strait are the Environment Protection Agency (EPA), the Department of Natural Resources and Mines (DNR&M) and the Department of Primary Industries and Fisheries (DPI&F) (protection and management of marine plants, fisheries habitats and resources). At the community level, on the outer islands, Island Councils and native title Prescribed Bodies Corporate are the key entities with local authority and community service functions, and rights and responsibilities as landholders, respectively.

Natural resource management in the Torres Strait is currently being supported through regional natural resource management (NRM) planning process funded by the Natural Heritage Trust (NHT). This is a collaborative approach between the Australian and Queensland Governments intended to identify and address strategic

natural resource and environmental management needs in Torres Strait. The Australian Government's regional marine planning process is also addressing strategic marine planning and conservation needs in the Torres Strait as part of its planning in the Northern Planning Area, which stretches from the Torres Strait to the eastern Arafura Sea. The NRM and regional marine planning processes seek to ensure integrated and coordinated delivery of environmental planning and management across the Torres Strait that also addresses the goals of the Torres Strait Treaty. Continued close links between these planning processes, the Treaty arrangements and the strategic research direction for the Torres Strait is required in order to meet Australian and PNG obligations for the conservation of the marine environment under the Treaty.

The NRM program is a possible catalyst for broader land and sea management-related initiatives in Torres Strait under the auspices of the TSRA. The TSRA is already involved in a cross-regional NHT funded project to support sustainable community-based management of dugongs and marine turtles. The approach being pioneered in this project is through partnerships between communities, managers and researchers.

Inherent in such partnerships is the sharing of information. The disparate nature of environmental and research agencies in the Torres Strait calls for the strategic management of environmental information to ensure that research results and other information held by agencies is used effectively by management agencies in making decisions about Torres Strait marine resources. The sharing of information is also required to enable the effective co-operation between Australia and PNG as envisaged under the Treaty.

#### *Impacts on the environment*

Impacts on the Torres Strait marine environment are numerous and varied. Research into the impacts of fishing on target and bycatch species and the ecosystem is covered in Theme 1. Research into, and effective management of, the marine environment can assist in sustainable fisheries management. Other current and potential impacts on the Torres Strait marine environment include the effects of climate change, shipping accidents, the introduction of marine pests, mine waste discharges and seabed mining and drilling.

#### Environmental change

The shallow nature of the island and reef environment makes Torres Strait potentially vulnerable to the effects of climate change, including loss of land through sea level rise, coastal erosion, increased risk of shipping accidents, changes to species compositions and abundance and possible coral bleaching through increased sea surface temperature.

The threat of increased coastal erosion is of particular significance to the Torres Strait because several of the inhabited islands are already experiencing the effects of erosion and climate change might accelerate the process. An understanding of sand-island stability within the complex wave and current regime of the Torres Strait is needed to manage this threat.

#### Shipping

Torres Strait is a major shipping route for transit to east coast ports of Australia. Shipping movements averaged between 1500 and 2000 per annum in recent years, including oil tankers of up to 100 000 tonnes dwt. In March 1970, the oil tanker *Oceanic Grandeur* ran aground in the Torres Strait and between 1400 and 4000 tonnes of crude oil was discharged. This is believed by some to have destroyed the productive pearl shell beds of Torres Strait, although no data exist to support this claim. Environmental impacts from shipping are major issues of concern. These concerns were expressed by the Australian and PNG Governments in the application to the International Maritime Organisation to list the Torres Strait as a Particularly Sensitive Sea Area (PSSA). This listing will require additional measures to ensure shipping safety in the Torres Strait including a two-way shipping route. Research to support shipping safety in the Torres Strait, including the support of outcomes from the PSSA application and understanding and monitoring the impacts from climate change on shipping channels is important to minimise one of the greatest risks to the Torres Strait marine environment.

In addition to risks of shipping accidents are risks of introduction of exotic species on the hulls and in the ballast water and piping of ships and of recreational vessels undertaking international passages. Exotic species such as northern pacific sea stars, black striped mussel and Asian green mussels have the potential to impact on native commercial species and cause significant and irrevocable damage to local ecosystems. The potential expansion of port facilities in Daru (PNG) could add further shipping traffic within the Region.

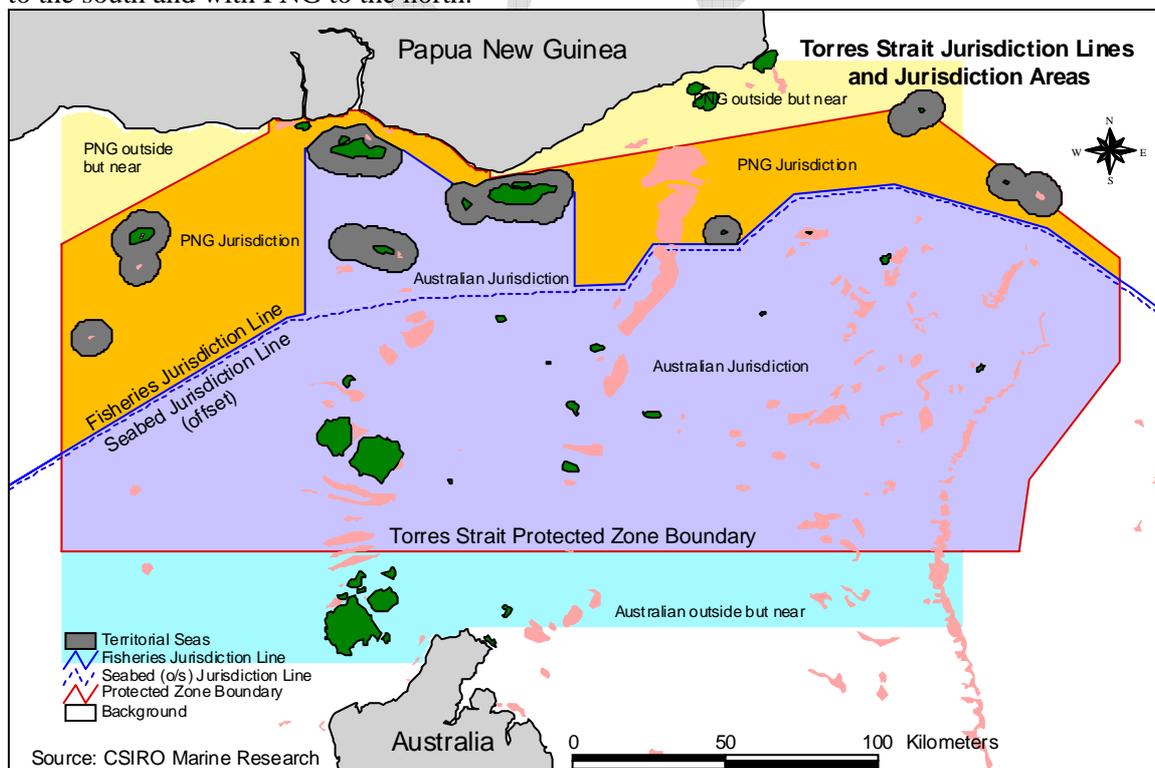
Other

The Torres Strait community and governments are concerned about the potential effects of pollution of the sea from land-based discharge, shipping and other development activity. Mine waste discharges into the Fly River in PNG are of particular concern. There is also community concern, but no evidence, about the possible impacts of riverine discharges of sediments from PNG into the western Torres Strait. The possibility of mine waste discharges affecting the marine environment needs to be evaluated in the context of natural events (e.g. die-back of seagrass beds) that pre-date mining operations.

Other possible developments over the next 5 years include the gas pipeline from Kutubu in PNG to coastal cities of Queensland which will traverse the seabed of the Torres Strait. A moratorium on seabed mining and drilling in the Torres Strait is also in place until February 2008. If lifted, there will probably need to be targeted research on areas of the Torres Strait with resource potential prior to any formal exploratory activities being undertaken.

**Proposed Research Area – Torres Strait Protected Zone**

The boundary of the proposed study area for this plan will be the current boundaries for joint fisheries management under the *Torres Strait Treaty*. This area incorporates the Protected Zone, and includes all the islands and waters of Torres Strait under Australian jurisdiction plus outside but near the Protected Zone. The southern boundary of the study area is contiguous with the northern boundary of the Great Barrier Reef World Heritage Area (Figure 1). The choice of these boundaries will continue to facilitate cross-boundary research and other activities between Torres Strait and the Great Barrier Reef World Heritage Area and Gulf of Carpentaria to the south and with PNG to the north.



**Figure 1 Torres Strait Protected Zone, Fisheries and Seabed Jurisdiction Lines, areas under Australian and Papua New Guinea jurisdiction and outside but near areas.**

DRAFT

# Torres Strait Strategic Marine Research Plan 2005-2010

This Strategic Research Plan builds on and expands the current CRC Torres Strait Research Plan 2003-2006, and is intended to provide a basis for the development of a research program for Torres Strait beyond mid 2006.

When this document was prepared (September 2005), the future funding arrangements for Torres Strait research were being developed. However, it was suggested that future Torres Strait research may be funded through the proposed Marine and Tropical Science Research Facility (MTSRF). The proposed MTSRF may well involve the current partners in the Torres Strait CRC, who would continue to be primary users of research information for management of the Torres Strait environment and peoples. It is anticipated that the MTSRF would continue the practices and policies that characterise the current CRC Torres Strait, particularly user-driven information needs that are addressed by a collaborative and accountable strategic research program.

Regardless of the eventual funding arrangements, this document will provide a useful basis for guiding strategic marine research in the Torres Strait beyond 2006.

## Scope

The geographic and environmental scope for this plan is the Torres Strait ecosystem, including marine and island environments and adjacent land masses (Northern Australia and PNG) in so far as they influence directly the waters, islands and communities in the Torres Strait. (Figure 1) The economic, social and cultural scope of the plan is the peoples of the Torres Strait. This plan is intended to provide information to meet the obligations under the Torres Strait Treaty. It will also provide a major source of information to be used in public extension and school-based education programs.

## Aim, Objectives and Outcomes

**Aim:** The establishment of a coordinated and integrated research program that:

5. Supports the sustainable development of marine resources and minimize impacts of resource use in Torres Strait on the resources and on the Torres Strait people;
6. Enhances the conservation of the marine environment and its biodiversity
7. Enhances the social, cultural and economic well being of all stakeholders, in particular the Torres Strait peoples; and
8. Contributes to effective policy formulation and management decision making.

**Research Objectives:**

7. To provide information relevant to end-users,
  - a. on key ecological processes in Torres Strait that will improve understanding of the sustainability of the Torres Strait marine ecosystem and conservation of threatened marine species.
  - b. on status and trends of fisheries and other economically and culturally important natural resources of Torres Strait necessary for effective coordinated and integrated natural resource management.
  - c. to assess the impacts of resource exploitation on the Torres Strait marine environment
  - d. to identify candidate species for new aquaculture from the natural resources of Torres Strait that are compatible with the aspirations and life-styles of Torres Strait peoples,
  - e. to develop the technology and knowledge base to support sustainable production in new Torres Strait based aquaculture industries; and
  - f. to assess the impacts of shipping (shipping accidents and introduced pests) on the Torres Strait marine environment
8. To provide tools for the evaluation of the consequences of alternative management strategies on Torres Strait stakeholders, marine resources, communities and cultural values.

9. To create innovative systems to make available to Torres Strait peoples and other end users data and information, either existing or generated by the program.
10. To assist in the development and implementation of marine management and development strategies for Torres Strait.
11. To support the development of education and extension programs to enhance the involvement of Torres Strait peoples in research and development opportunities in Torres Strait.
12. To improve the capacity of
  - a. Torres Strait communities to understand and utilise research results for enhanced economic and social development.
  - b. researchers to engage with Torres Strait communities in the design and conduct of research and in the transfer of research results.

### **Proposed Outcomes of the Plan**

The outcomes from the proposed research will provide support for:

1. Increased opportunities for Torres Strait peoples to develop culturally appropriate, environmentally sustainable and economically viable marine based industries utilising wild and cultured resources in Torres Strait;
2. Active collaboration between research providers, management agencies, industry, Torres Strait communities and the TSRA;
3. Cross-sectoral, multi-use ecosystem based management, particularly to support regional marine planning for Torres Strait and northern Australia
4. Improved decision making for the sustainable use of marine resources in Torres Strait;
5. Improved marine management and development strategies for Torres Strait;
6. Improved management of shipping and boating, marine engineering risks and boating safety and minimization of risks of introducing marine pests;
7. The effective involvement of stakeholders, especially Torres Strait communities, in the development, conduct and delivery of research results is essential to the delivery of effective outcomes from research in Torres Strait.
8. The evaluation of marine conservation strategies in Torres Strait, relevant to the traditional way-of-life of Torres Strait peoples.
9. The development of innovative tools and techniques for resource management and risk assessment, and for evaluating alternative management strategies for ecologically sustainable harvesting of marine resources in Torres Strait.
10. Sustainable management of culturally important threatened species, (particularly dugong and turtles);
11. Improved understanding
  - a. of marine environmental processes in Torres Strait and adjacent areas;
  - b. of threats to water quality and ecosystems in Torres Strait;
  - c. by researchers of users' information needs and policy or cultural imperatives;
12. Improved management and research coordination with PNG government agencies.

## **Key Information Needs for Management and Development**

The Key Information Needs of end-users for management and development were compiled in a series of workshops of the TSSAC, comprising representatives of research providers and research information users. Research responses to end-user information needs were considered under four themes derived from the Torres Strait Treaty. A brief description of the Aim, Key Research Areas, and a summary of Key Information Needs for each theme is set out below. The Key Information Needs have been developed for each of the Key Research Areas within each theme. These have been summarised from a detailed analysis of research needs for each component of each theme (e.g. individual fisheries) and then rated as High, Medium or Low Priority or Not Applicable (H/M/L/X). Detailed descriptions of the issues and specific research needed to address each Key Research Area within each theme are found in Appendixes 2-4.

### **Theme 1 Ecologically Sustainable Fisheries**

#### **Aim**

The aim is to acquire data, knowledge and improved understanding of the complex and dynamic systems that support ecologically, socially, culturally and economically sustainable fisheries. The fishery systems are driven by several processes, including human activities, markets, management, and complex environmental processes. Improved understanding will be gained through a coordinated program of multidisciplinary research and monitoring to provide the information base and the tools to reveal the many linkages between these processes.

#### **Key Research Area**

- Status of wild and cultured stocks, including depleted stocks
- Social, cultural and economic importance of fisheries to fishers
- Ecological impacts of fishing
- Fisheries interactions
- External impacts on fisheries (e.g. introduced species, SARS, illegal fishing - Indonesia)
- New fisheries and technology
- Management Effectiveness (including compliance and MSE)
- Catch sharing with PNG and among Torres Strait groups

#### **Summary of Key Information Needs**

The following high priority Key Information Needs were common to many of the fisheries, in particular the heavily exploited fisheries (lobster, prawn, reef line, turtles and dugong);

- Long-term collection of commercial harvest data (catch and effort), supplemented with fishery independent data, to support regular assessment of fishery stocks using appropriate assessment models.
- Many fisheries require an integrated assessment as they harvest a straddling stock (eg. lobster, pearl, prawn and mackerel). In addition these fisheries are subject to catch sharing arrangements between Australian and PNG.
- An understanding of the social, cultural and economic importance of fisheries to fishers and fisheries interactions to assist with the development of community-based management (eg. dugong and turtles) and with the participation of Torres Strait Islanders in commercial fisheries.

Such information should assist management agencies to develop clear management objectives, targets, performance measures and decision rules for each fishery.

## Theme 2 Understanding and Protection of Environmental Systems

### Aim

The aim of this theme is to acquire data, knowledge and improved understanding of the Torres Strait marine environmental system including descriptions of the environment, its biodiversity, dynamics, natural variability and the interconnections and interactions between components of the system. A subsequent aim is the use of integrated numerical or conceptual models to make predictions about natural variations and the effects of external influences to generate recommendations for actions to protect the environment from the effects of human activities.

### Key Research Areas

- Knowledge of biodiversity and interactions
- Impacts of environmental change
- Human threats to environment
- Land/ sea interactions, including runoff from PNG rivers
- Species and ecological communities at risk
- Diseases and introduced pests
- Conservation management effectiveness

### Summary of Key Information Needs

1. *Knowledge of ecosystem structure and processes* – Research into ecosystem structure and function is needed to develop sufficient understanding to deal with current uses and possible future uses – e.g. minerals exploration. This requires completion of the inter-reef characterisation, comparable characterisation of the reef areas, and targeted studies of biophysical, biogeochemical and ecological processes.
2. *Indicators of ecosystem health*. Monitoring of Torres Strait ecosystem health will require cost-effective and relevant marine indicator species or processes that can act as proxies for the health of the ecosystem as a whole. There is no current program to identify and monitor indicators of ecosystem health
3. *Shipping risks*. The location of the Torres Strait as a major international shipping route and as a marine highway for transit by Torres Strait peoples and people from PNG makes it a high risk area for the introduction of exotic marine pests. The shallow nature of the area and the high tidal flows makes the Torres Strait an area of high shipping accident risk
4. *Mechanisms for integrated conservation measures across region*. The ecological linkages between Torres Strait, PNG and West Irian waters are not supported by competent and comprehensive programs of research and management across the whole region.
5. *Impacts of coastal erosion*. Many islands in the Torres Strait region have coastal erosion problems, that requires urgent remedial action. Research into understanding the dynamics of coastal erosion and developing cost-effective and environmentally sensitive solutions to this erosion is needed to successfully manage ~~this issue~~ these impacts.
6. *Changes to sea-grass beds*. Healthy seagrass beds are fundamental to support fisheries and species conservation, particularly of dugong and turtles. Loss of large areas of seagrass occurs at times and the causes and ecological ramifications of this is poorly understood.

While environmental management arrangements in Torres Strait are complex, information needs are shared across all the different jurisdictional arrangements. Information is needed on:

- The distribution and condition of habitats
- The distribution and condition of populations and communities of species
- Ecological processes that influence distribution and abundance of species and condition of habitats
- The complex ecological interactions between biological and non-biological components of the Torres Strait system; and

- Tools to make use of data and knowledge. These tools include predictive models and analytical methods to support decision-making

### **Theme 3 Needs and Aspirations of Torres Strait Peoples.**

#### **Aim**

The aim of this theme is to acquire data and knowledge about and improved understanding of the participation of traditional inhabitants in the region's economy and opportunities to enhance this participation. The opportunities identified have to be relevant to both traditional and contemporary way of life. The research will explore the structural changes that might influence the take up of these opportunities.

#### **Key Research Areas**

- Access and ownership of marine resources
- Development of economically viable new industries
- Participation at all levels, including research
- Maintenance of the traditional way of life.
- Education and training needs (capacity building)
- Demography of TS islanders

#### **Summary of Key Information Needs**

1. *Better understanding of Torres Strait peoples and PNG Western Province peoples traditions and values.* Better definition and acceptance of what is traditional is needed, including recognition of differences in traditional peoples aspirations and perspectives particularly those that relate to clan and language group differences.
2. *Methods for improved input by Torres Strait peoples to decision making processes.* Effective Islander input into decision-making requires research into methods that are culturally sensitive and likely to be effective. Capacity building is needed for those people who could contribute. Improved capacity of researchers and others to involve Torres Strait peoples in decision-making is also needed
3. *Understanding the relationship between the development of new industries and maintaining the traditional way of life of Torres Strait peoples.*
4. *Different ways of understanding knowledge.* The development of understanding of marine ecosystems and fisheries has largely proceeded from a Western scientific ethic. Western science is often not well understood by Torres Strait peoples. Conversely, traditional knowledge is not well understood by management decision-makers nor used effectively in management decision making. Better understanding of the ways in which traditional and western scientific knowledge can be understood and better integrated.
5. *Development of sustainable aquaculture industries.* Research is needed to examine the feasibility of establishing specific aquaculture projects with Torres Strait peoples e.g. sponge aquaculture, ornamental pearl shell industry.
6. *Methods for improved ownership of commercial fisheries by Torres Strait peoples.* Research is needed into the economic costs and benefits of buying out non-traditional inhabitant commercial fishing licenses

### **Theme 4 Collaboration with PNG**

#### **Aim**

The aim of this theme is to acquire data, knowledge and better understanding for more successful fulfilment of the joint responsibilities of Australia and PNG under the Torres Strait Treaty. The Treaty established a framework for the management of activities in and around the Protected Zone including fisheries, and the protection of the environment. Research is needed that addresses both Australian and PNG issues relevant to fisheries, the environment and the peoples of the Torres Strait and adjacent coastal regions. For example, food security is an important Torres Strait issue for PNG nationals.

## Key Research Areas

- Bilateral regulatory arrangements and catch sharing
- Access and ownership by PNG nationals in Torres Strait
- Impact on marine resources of additional Treaty Villages in PNG
- Overfishing of PNG resources and impacts on TS
- Coastal stability of PNG Western Province (erosion)
- Holistic study of PNG and Australian components of the Torres Strait environment
- Marine debris and pollution from PNG
- Traditional harvest (other than for subsistence or artisanal markets) being used for commercial purposes

## Summary of Key Information Needs

1. *Trans-national, cross-boundary stock assessment.* An important Treaty provision is for the sharing of catches of Torres Strait fisheries. For this to occur it is necessary understand the dynamics of the stocks, particularly as they relate to processes that connect the stock across the fisheries jurisdiction line. One key question is how to determine each countries share of a catch that is determined in each country's area by the harvest in the other country's area of jurisdiction?
2. *Engagement of the PNG coastal community* –Research into sustainable uses of the Torres Strait must understand and recognise the disparate cultural, economic, social and political realities of the people from the Western Province of PNG.
3. *Access to Torres Strait resources by Western Province people*
4. *Monitoring of illegal fishing in Torres Strait by PNG fishers and others as an aid to enforcement*
5. *Development of improved capacity for natural resources management by Torres Strait people including at the Government and community level.*

## Research Funding

The main source for the funding of Torres Strait fisheries management research has been the Torres Strait Research Fund. This fund contributed up to \$500,000 annually from AFMA's+ government funding for the purposes of research in, or relevant to, the Protected Zone.

The CRC Torres Strait was established in 2003 for three years. Funding contributions for Torres Strait marine research increased substantially from this time. Existing research funds from AFMA , National Oceans Office and TSRA formed the basis of the research program, supplemented by additional funding contributed by the partners in the new CRC. This funding has been further supplemented through the Commonwealth Government CRC program arrangements. The CRC Torres Strait has a nominal life of 3 years and will fund projects to June 2006.

When this document was prepared (September 2005), the Government had committed funding to the establishment of a new research facility (tentatively named the Marine and Tropical Science Research Facility) from 2006, as part of a new Commonwealth Environment Facility. The new facility will have four main research areas - Great Barrier Reef, Torres Strait, Reef catchments and Wet Tropics rainforests. A total of \$40 million has been committed for this facility over 4 years. The allocation of funds between main research areas is yet to be determined.

Other potential sources of funding for this program include industry (e.g. oil and gas companies, shipping and ports) and defence agencies.