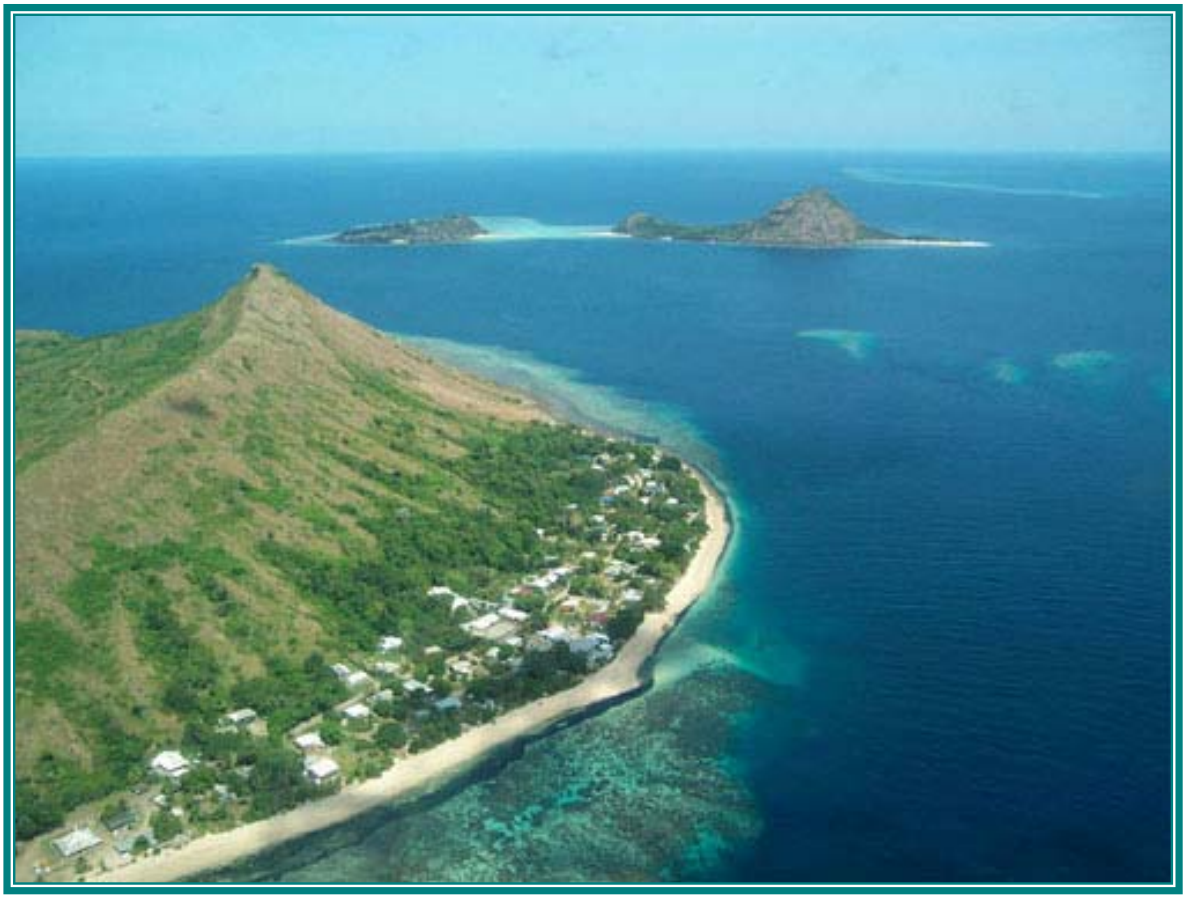
# LAND & SEA MANAGEMENT STRATEGY

for

# TORRES STRAIT



**Funded under the Natural Heritage Trust**

Natural Heritage Trust

Helping Communities Helping Australia

An Australian Government Initiative

Australian Government

Torres Strait Regional Authority

Queensland Government

# LAND & SEA MANAGEMENT STRATEGY

for

# TORRES STRAIT


*Torres Strait NRM Reference Group*

*with the assistance of*

*Miya Isherwood, Michelle Pollock,*

*Kate Eden and Steve Jackson*


*November 2005*


*An initiative funded under the Natural Heritage Trust program*

*of the Australian Government*

*with support from:*

*the Queensland Department of Natural Resources & Mines*

*the Australian Government Department of*

*the Environment and Heritage*

*and the Torres Strait Regional Authority.*



Prepared by: Bessen Consulting Services

# FOREWORD

The Torres Strait region is of enormous significance from a land and sea management perspective. It is a geographically and ecologically unique region, which is home to a culturally distinct society, comprised of over 20 different communities, extending from the south-western coast of Papua New Guinea (PNG) to the northern tip of Cape York Peninsula. The Torres Strait is also a very politically complex area, with an international border and a Treaty governance regime that poses unique challenges for coordinating land and sea management initiatives.

Torres Strait Islander and Aboriginal people, both within and outside of the region, have strong and abiding connections with their land and sea country. While formal recognition of this relationship has been achieved through native title and other legal processes, peoples' aspirations to sustainably manage their land and sea country have been more difficult to realise.

The implementation of this Strategy, with funding from the Australian Government's Natural Heritage Trust initiative, presents us with an opportunity to progress community-based management in our unique region, through identifying the important land and sea assets, issues, information, and potential mechanisms for supporting Torres Strait communities to sustainably manage their natural resources.

The efforts of members of the Natural Resource Management Reference Group for Torres Strait should be acknowledged in terms of their contributions towards prioritisation of land and sea issues and aspirations reflected in the Strategy.

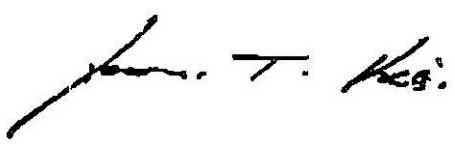
The Strategy is the culmination of a long process of consultation, research and decision-making about and for Torres Strait land and sea management. As a reference group, we feel privileged to have taken part in consolidating this information and incorporating it into a Strategy to guide the next steps towards sustainable natural resource management in our region.

We wish to thank the Torres Strait Regional Authority for agreeing to implement this Strategy on behalf of the people of the Torres Strait region, to better enable communities themselves to pursue their diverse land and sea management aspirations.

While resourcing to enable this to occur has been a long time coming, and is not going to be sufficient to address all environmental issues or concerns in the region, it will go a long way towards establishing the basic structures and processes we now need to take care of our land and sea country.

It will, we hope, catalyse the development of a strong and functional, strategic and regional approach to on-ground capacity-building and environmental management by Torres Strait Islander and Aboriginal people living in the Torres Strait.

***Josephine David-Petero***
*Chairperson,*
*Torres Strait Natural Resource Management Reference Group*



***John Toshie Kris***
*Chairperson,*
*Torres Strait Regional Authority*

# EXECUTIVE SUMMARY

The Australian Government and Queensland State Government Ministers reconsidered the delivery of the Natural Heritage Trust Extension (the Trust) in the Torres Strait in light of the region's late start compared to other regions in Queensland. The Ministers decided to defer the development of a full regional natural resource management (NRM) plan as required for other regions under the Natural Heritage Trust Bilateral Agreement between the Australian and Queensland Governments, and instead focus on the identification of a package of strategic priorities and activities, including on-ground works and key information needs.

Former Board members of Torres Strait Natural Resource Management Ltd (TSNRM) were asked to participate in the development of the strategic directions package as part of a Torres Strait NRM Reference Group, which also included representatives from key Commonwealth and State agencies.

The NRM Reference Group, at a workshop held on Thursday Island on 2–3 November 2005, developed the framework for this Land & Sea Management Strategy for Torres Strait, which covers:

- desired outcomes of the Strategy;
- natural resource assets to be protected and enhanced;
- issues and threats affecting these assets;
- suggested management actions to address these issues and threats;
- linkages to existing and planned activities in Torres Strait;
- implementation planning;
- criteria for the assessment of project proposals.

This Strategy is consistent with previous work undertaken in Torres Strait. It reaffirms the vision of the Marine Strategy for Torres Strait, developed in 1994, and complements information compiled from previous consultations and reports made available by the Island Coordinating Council and the Torres Strait Regional Authority.

Further technical input was provided by agency staff and the scientific community, including officers from the Department of the Environment and Heritage (including the National Oceans Office), Australian Fisheries Management Authority, Australian Quarantine and Inspection Service, Department of Foreign Affairs and Trade, Torres Strait Regional Authority, Queensland Department of Natural Resources and Mines, Queensland Department of Primary Industries and Fisheries, Queensland Environmental Protection Agency, Queensland Parks and Wildlife Service, the Cooperative Research Centre for Torres Strait, and James Cook University.

The Strategy articulates with the NOO Northern Regional Marine Plan, the NAILSMA Dugong and Marine Turtle Management Project, the cross-regional Ghost Nets Project, and Treaty NRM governance arrangements with PNG. It is also cognisant of the fisheries management regime, and is intended to dovetail with this regime, rather than duplicating efforts.

Queensland and Australian Government Ministers have requested the assistance of the TSRA to implement the Strategy on behalf of the Joint Australian-Queensland Government NRM Steering Committee (JSC). The Strategy is to be presented to the TSRA for use as a tool to assess and

develop project proposals that are consistent with the TSRA development plan and the overarching objectives of the organisation. The TSRA will then recommend a list of projects for implementation to the Ministers through the JSC.

The Land & Sea Management Strategy is intended to provide the framework for guiding the investment of Trust funds in the Torres Strait region, but will also usefully serve as a prospectus for attracting and leveraging additional funds for land and sea management initiatives. The funding available for implementing this Strategy under the Trust will not be sufficient to address all environmental issues in the region, nor support all community aspirations for land and sea management. Many of these issues and initiatives will require long-term, coordinated efforts on the part of Torres Strait communities, organisations, researchers and government agencies. The Strategy is intended to form a framework to assist in directing these efforts, such that agency and research agendas are aligned with local and regional priorities, to the greatest extent possible.

# THE DESIRED OUTCOMES

The desired outcomes of the Land & Sea Management Strategy for Torres Strait are:

- provision of a framework for the development of a coordinated, comprehensive, adaptive and integrated approach to environmental management in the region, that identifies risks, gaps in knowledge, and addresses issues at a bioregional, ecosystem, island and species level.

- improved approaches to Torres Strait Islander and Aboriginal consultation, input and decision-making across all levels of government, in all areas of environmental management.

- facilitation of improved coordination and administration by all three levels of government and the multiple agencies responsible for supporting Torres Strait Islander and Aboriginal people in sustainably managing the region.

- promotion of improved communication and cooperation between Torres Strait Islander, Aboriginal and Papua New Guinean peoples in the sustainable management of their shared resources.

- support for Torres Strait Islander and Aboriginal people to develop and implement community-based plans for managing their sea country and resources, including involvement in monitoring and enforcement.

- opportunities for Torres Strait Islander and Aboriginal people to develop and implement community-based environmental plans at the island or local level, consistent with Community Development Plans.

- provision of sustainable employment in land and sea management fields, and ecologically and culturally appropriate economic development opportunities for Torres Strait Islander and Aboriginal people.

- introduction and strengthening of community education and awareness programs to ensure that traditional and local knowledge continues to complement and enhance regional environmental initiatives.

- support and encouragement of capacity-building and community-based programs, such as ranger programs, to facilitate traditional and local management skills and approaches to land management, marine and coastal conservation, surveillance and monitoring.

- maintenance, revitalisation and incorporation of traditional and local ecological and cultural knowledge of Torres Strait Islanders and Aboriginal people in environmental initiatives, including through community consultation and education strategies on the part of the scientific community.

# Contents


***Page #***

**1.0 INTRODUCTION** ..... **1**

**1.1 NRM Reference Group** ..... **1**

**1.2 List of Abbreviations** ..... **3**

**1.3 How to use this Strategy** ..... **5**

**1.4 Regional Delivery of the Natural Heritage Trust** ..... **7**

**2.0. ASSETS** ..... **11**

**2.1. The Torres Strait Region** ..... **11**

**2.2 Assets of the Torres Strait Region** ..... **11**

2.2.1 Islands ..... 15

2.2.2 Sea ..... 16

2.2.3 People ..... 16

**3.0 ASSETS AND ISSUES** ..... **18**

**3.1 Islands** ..... **18**

3.1.1 Land Resources (Human Settlements) ..... 18

3.1.1.1 Coast ..... 18

3.1.1.2 Landscapes ..... 19

3.1.1.3 Infrastructure ..... 22

3.1.2 Water ..... 23

3.1.2.1 Surface water ..... 23

3.1.2.2 Groundwater ..... 24

3.1.3 Biodiversity ..... 25

3.1.3.1 Ecosystems ..... 25

3.1.3.2 Species ..... 26

**3.2 Sea** ..... **30**

3.2.1 Sea Resources ..... 30

3.2.1.1 Social, Cultural and Heritage ..... 30

3.2.1.2 Shipping ..... 30

3.2.1.3 Water Quality ..... 31

3.2.2 Sea Biodiversity ..... 32

3.2.2.1 Ecosystem Health ..... 32

3.2.2.2 Marine Species ..... 33

3.2.2.3 Marine Habitats ..... 34

**3.3 People** ..... **36**
3.3.1 Ailan Kastom ..... 36
3.3.1.1 Cultural Heritage ..... 36
3.3.1.2 Traditional Knowledge ..... 37
3.3.1.3 Community ..... 38
3.3.2 Capacity ..... 40
3.3.2.1 Regional Capacity ..... 41
3.3.2.2 Local Capacity ..... 41
3.3.3 Institutional Environment ..... 43
3.3.3.1 Governance ..... 43
3.3.3.2 Education ..... 47
3.3.3.3 Science and Research ..... 47

**4.0 MANAGEMENT OBJECTIVES AND POSSIBLE INITIATIVES** ..... **49**

**4.1 Islands** ..... **50**
4.1.1 Land Resources (Human Settlements) ..... 50
4.1.2 Water ..... 54
4.1.3 Biodiversity ..... 55
**4.2 Sea** ..... **59**
4.2.1 Sea Resources ..... 59
4.2.2 Sea Biodiversity ..... 62
**4.3 People** ..... **68**
4.3.1 Ailan Kastom ..... 68
4.3.2 Capacity ..... 72
4.3.3 Institutional Environment ..... 75

**5.0 IMPLEMENTATION** ..... **80**

**5.1 Land and Sea Management Unit** ..... **80**
**5.2 Risks to Delivery** ..... **82**
**5.3 Criteria for Assessing Projects** ..... **83**

**APPENDIX 1 – LIST OF REFERENCES** ..... **85**

# 1.0 INTRODUCTION

## 1.1 NRM Reference Group

### Torres Strait Natural Resource Management Reference Group members

Members of the Torres Strait NRM Reference Group were originally members of Torres Strait NRM Ltd who were nominated to represent particular community interests and subregions in the Torres Strait. The following members of TSNRM participated in the workshop on 2-3 November 2005.

| | |
|---|---|
| Josephine David-Petero | Chairperson (Women) |
| Toshio Nakata | (Fishing) |
| John Toshie Kris | (TSRA Chair and Member for St Pauls) |
| Pedro Stephen | (Local Government) |
| Terry Waia | (TSRA Member for Saibai) |
| Ned David | (Education) |
| Alan Keeling | (Conservation) |

### Technical members of the reference group

Technical members of the reference group present at the workshop included Australian and Queensland Government agency staff from departments with legislative responsibilities and policy interests in the Torres Strait.

| | |
|---|---|
| Chris Buckingham | Environment Officer<br>Environmental Protection Agency |
| Kate Eden | Regional Liaison Officer<br>Department of Natural Resources and Mines |
| Regina Holden | Extension Officer<br>Department of Natural Resources and Mines |
| Miya Isherwood | Regional Facilitator<br>Torres Strait Regional Authority |
| Steve Jackson | Assistant Director, National Oceans Office<br>Department of the Environment and Heritage |
| Michelle Pollock | Regional Liaison Officer<br>Department of the Environment and Heritage |
| Jim Prescott | Manager<br>Australian Fisheries Management Authority |
| Sel Sultmann | Environment Officer<br>Environmental Protection Agency |
| Bruce Wannan | Principal Biodiversity Planning Officer<br>Queensland Parks and Wildlife Service |
| Suzy Wilson | Treaty Liaison Officer<br>Department of Foreign Affairs and Trade |

## Contributors

The following people provided further technical and agency input into the development of the Strategy:

| | |
|---|---|
| Shayne Ahboo | Operations Manager Torres Strait and NPA<br>Australian Quarantine and Inspection Service |
| Bill Arthur | Research Fellow<br>ANU - Centre for Aboriginal Economic Policy Research |
| Mich Bazin | Manager Field Operations Section<br>Torres Strait Regional Authority |
| Shannon Burns | Policy Officer<br>Department of Natural Resources & Mines |
| Stuart Duncan | Manager<br>Infrastructure Support Unit – Island Coordinating Council |
| John Field | Senior Lecturer<br>James Cook University |
| Warren Geeves | Assistant Director, Marine Strategies and Programs Section<br>Department of the Environment and Heritage |
| Garrick Hitchcock | Consultant Anthropologist<br>Torres Strait Regional Authority |
| Rod Kennett | Dugong and Marine Turtle Project Coordinator<br>North Australian Indigenous Land & Sea Management Alliance |
| Tim Kerlin | NAQS Senior Scientific Officer<br>Australian Quarantine and Inspection Service |
| Isle Kiessling | Oceans Liaison Officer, National Oceans Office<br>Department of the Environment and Heritage |
| Donna Kwan | Policy Officer, Marine and Migratory Species Section<br>Department of the Environment and Heritage |
| Peter Latch | Team Leader Threatened Species<br>Queensland Parks and Wildlife Service |
| Meg Lethbridge | Anthropologist<br>Torres Strait Regional Authority |
| Helene Marsh | School of Tropical Environment Studies and Geography<br>James Cook University |
| Vic McGrath | Manager, Gab Titui Cultural Centre<br>Torres Strait Regional Authority |
| Wez Norris | Fisheries Officer<br>Queensland Department of Primary Industries and Fisheries |
| Debbie Prescott | Teacher Education Coordinator<br>James Cook University |
| Shaun Seymour | Land Protection Officer<br>Department of Natural Resources and Mines |
| Tim Sheppard | Assistant Manager<br>Infrastructure Support Unit – Island Coordinating Council |
| Barbara Waterhouse | Botanist<br>Australian Quarantine and Inspection Service |
| Adam West | Fisheries Officer<br>Queensland Department of Primary Industries and Fisheries |

## 1.2 List of Abbreviations

ACC ..... Area Consultative Committee
AFMA ..... Australian Fisheries Management Authority (AG)
AG ..... Australian Government
AMSA ..... Australian Maritime Safety Authority (AG)
ANU – CAEPR..... Australian National University – Centre for Aboriginal Economic Policy Research
AQIS..... Australian Quarantine and Inspection Service (AG)
BoM..... Bureau of Meteorology (AG)
CDEP..... Community Development Employment Projects
CFG ..... Community Fisher Group
CPM Act..... *Coastal Protection and Management Act 1995* (Qld)
CRC..... Cooperative Research Centre
CSIRO ..... Commonwealth Scientific and Industrial Research Organisation (AG)
CS(TS)Act ..... *Community Services (Torres Strait) Act 1984 (Qld)*
DAFF..... Department of Agriculture, Fisheries and Forestry Australia (AG)
DATSIP ..... Department of Aboriginal and Torres Strait Islander Policy (QG)
DES ..... Department of Emergency Services (QG)
DET ..... Department of Employment and Training (QG)
DEST ..... Department of Education, Science and Training (AG)
DFAT..... Department of Foreign Affairs and Trade (AG)
DITR..... Department of Industry, Tourism and Resources (AG)
DLGP..... Department of Environment, Local Government, Planning and Women (QG)
DoTARS ..... Department of Transport and Regional Services (AG)
DOT..... Department of Transport (QG)
DP&C ..... Department of the Premier and Cabinet (QG)
DPI&F ..... Department of Primary Industries and Fisheries (QG)
DEH..... Department of the Environment and Heritage (AG)
DSD..... Department of State Development (QG)
EMC ..... Environment Management Committee
EMS..... Environmental Management System
EP Act..... *Environmental Protection Act 1994* (Qld)
EPA ..... Environmental Protection Authority
EPBC Act ..... *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ERIN..... Environmental Resources Information Network
ESD ..... Ecologically Sustainable Development
FFV..... Foreign Fishing Vessel
GBRMPA ..... Great Barrier Reef Marine Park Authority (AG)
ICC ..... Island Coordinating Council (QG)
IDC ..... Interdepartmental Committee
IFA..... Interim Funding Agreement
ILUA ..... Indigenous Land Use Agreement
IMO ..... International Maritime Organisation
IPA..... Indigenous Protected Area
IPA..... *Integrated Planning Act 1997* (Qld)
JSC..... Joint Queensland-Australian Government NRM Steering Committee
MACC ..... Marine and Coastal Committee

MARPOL ..... The International Convention for the Prevention of Pollution from Ships
MaSTERS..... Marine Strategy for Torres Strait
MPA ..... Marine Protected Area
MTSRF..... Marine and Tropical Science Research Facility
NAEA..... Northern Australian Environment Alliance
NAILSMA..... North Australian Indigenous Land and Sea Management Alliance
NAQS ..... Northern Australia Quarantine Strategy
NHT..... Natural Heritage Trust
NLP ..... National Landcare Program
NOO ..... National Oceans Office (AG)
NPA..... Northern Peninsula Area
NRCG..... Northern Regional Coordination Group
NR&M..... Department of Natural Resources and Mines (QG)
NRM..... Natural Resource Management
PBCs..... Prescribed Bodies Corporate
PCQ ..... Ports Corporation of Queensland (QG)
PNG NFA ..... Papua New Guinea – National Fisheries Authority
PNG DEC ..... Papua New Guinea – Department of Environment and Conservation
PZJA..... Protected Zone Joint Authority
RAPTS..... Regional Activity Plan for Torres Strait – Dugong and Marine Turtle Management Project
RIS..... Regional Investment Strategy
RPA ..... Regional Partnership Agreement
QB&FP..... Queensland Boating and Fisheries Patrol
QED..... Queensland Education Department
QG ..... Queensland Government
SPREP ..... South Pacific Regional Environment Programme
TSBS ..... Torres Strait Baseline Study
TSC..... Torres Shire Council
TS CRC ..... Torres Strait Cooperative Research Centre
TSFMAC..... Torres Strait Fisheries Management Advisory Committee
TSNRM ..... Torres Strait Natural Resource Management Ltd
TSPZ..... Torres Strait Protected Zone
TSRA..... Torres Strait Regional Authority
TS SAC..... Torres Strait Scientific Advisory Committee
TS SMRP..... Torres Strait Strategic Marine Research Plan 2005-2010
WWF ..... World Wide Fund for Nature

## 1.3 How to use this Strategy

The Strategy can be used for:

- information (mainly through the reference material)
- developing projects for funding through the Trust
- assessing projects for funding through the Trust
- identifying local and regional priority issues
- directing government and research activities in the region.

### Information

The Strategy is not designed to be a regional NRM plan and should not be considered a comprehensive technical document. It summarises information from a variety of sources and as such, leads the reader to refer to other documents for detail and context.

Because the Strategy relies heavily on other sources for information, some sections are more comprehensive than others. For example, extensive material is available on the marine environment whilst information about some aspects of the terrestrial environments is virtually unknown. The document will be periodically updated as further information comes to light.

The text contains valuable information on linkages to existing programs; however, the onus is on the reader to follow up with the relevant organisations or people on particular areas of interest. A list of key references can be found at Appendix I.

### Developing projects

To use the Strategy as a guide for developing projects for funding through the Trust:

- check Section 1.4 to determine if your project fits the overarching objectives of the Trust;
- scan Section 4 to identify management objectives that your project could achieve;
- consider the possible initiatives in Section 4 to find those appropriate to address the relevant issues and management objectives;
- check the linkages to existing processes and programs in Section 4 to determine whether your project would duplicate, complement, or fall within the scope of another process or program;
- you can then develop the detail of your project to match the issues, objectives and actions in the Strategy.

### Assessing projects

Suggested criteria for assessing project proposals are contained in Section 5.3. These are intended to be used as a guide to assist TSRA in decision-making about the projects suitable for implementation in light of available funding, staffing capacity and other assessments of feasibility in accordance with TSRA's existing systems and processes.

## Identifying priority issues

In the body of the Strategy, under Section 3, the issues relating to particular assets and their subclasses are identified and listed. These issues correlate to the management objectives and possible initiatives found in the tables in Section 4.

## Directing other activities

Many of the management objectives and possible initiatives contained in Section 4 will not be capable of being funded under the Trust initiative, nor delivered through the TSRA alone. Other government agencies, research organisations, philanthropic and private sector organisations undertaking or investing in land and sea management activities in the Torres Strait region are encouraged to align their efforts with priorities and possible initiatives identified in this Strategy.

## 1.4 Regional Delivery of the Natural Heritage Trust

### Overarching objectives of the Natural Heritage Trust

The Natural Heritage Trust (the Trust) is the Australian Government's largest investment in environmental management initiatives to date. The three overarching objectives of the Trust are:

1. **biodiversity conservation** – the conservation of Australia's biodiversity through the protection and restoration of terrestrial, freshwater, estuarine and marine ecosystems and habitat for native plants and animals

2. **sustainable use of natural resources** – the sustainable use and management of Australia's land, water and marine resources to maintain and improve the productivity and profitability of resource based industries

3. **community capacity building and institutional change** – support for individuals, landholders, communities, industry and organisations with skills, knowledge, information and institutional frameworks to increase capacity to implement biodiversity conservation, and sustainable resource use and management.

### The Bilateral Agreement

The Bilateral Agreement between the Australian and Queensland Governments for the delivery of the Trust and other Commonwealth and State NRM programs provides the framework for the delivery of funding for NRM and planning in Queensland. Trust funds are primarily delivered through investments at the regional level, in accordance with accredited regional NRM plans and investment strategies. The Queensland Government has committed to providing financial or in-kind contributions to match the Australian Government investment in all regions.

The Bilateral Agreement provides for the establishment of regional NRM bodies for 15 NRM regions in Queensland, which are roughly based on river catchment area boundaries. It is the responsibility of the regional bodies to coordinate the development and implementation of regional NRM plans and investment strategies.

The JSC is responsible for overseeing the management of the State and Australian Governments' interests in the implementation of the Bilateral Agreement under the *Natural Heritage Trust of Australia Act 1997* (Cth) and the *Natural Resources Management (Financial Assistance) Act 1992* (Cth). The JSC advises the Ministerial Board and State Ministers regarding the delivery of the Trust in Queensland.

There is specific reference to the delivery arrangements for the Torres Strait in the Bilateral Agreement:

> *72. The Parties agree to*
>
> *(a) acknowledge the particular circumstances pertaining to the Torres Strait as recognised in the Torres Strait Treaty, especially the unique marine assets of the region, and the social, cultural, environmental and economic importance of these assets, and that international cooperation is necessary for the effective management of natural resources in the region;*

*(b) avoid duplication and integrate the institutional arrangements for the Trust with those existing in the region, especially the Torres Strait Regional Authority, Island Coordinating Council, the Protected Zone Joint Authority and the Torres Strait Environmental Management Committee; and*

*(c) recognise that through these existing structures, cooperation already exists between the community and governments to plan and manage for natural resource management outcomes.*

The National Oceans Office (NOO) is also in the process of developing a regional marine plan across northern Australia, including the Torres Strait, to implement Australia's Oceans Policy. Marine-based aspects of the Torres Strait Land & Sea Management Strategy will be linked to the Northern Regional Marine Plan. The NOO is undertaking a number of discrete projects relevant to the sustainable use of marine resources in the Torres Strait, and will continue to work closely with TSRA and other agencies to support the delivery of marine-based elements of natural resource management in the Torres Strait.

## Background to the development of the Strategy

The Queensland and Australian Government Ministers reconsidered the delivery of the Trust in the Torres Strait in light of the region's late start in comparison to other regions in Queensland. The JSC in July 2005 approved the development of a document that was to set strategic directions to meet NRM objectives, in lieu of a fully accredited NRM plan for the Torres Strait region. It was agreed that the Queensland Department of Natural Resources and Mines (NR&M) would be the key service provider throughout this process, and that the Strategy would be developed with the support of a NRM Reference Group, consisting of key government and Torres Strait Islander stakeholders, including former TSNRM Ltd directors (including TSRA Board Members), scientific and technical representatives. The NRM Reference Group met on 2–3 November 2005 to participate in a facilitated workshop to develop the framework of, and set overarching objectives for, the Strategy.

The NRM Strategy, now referred to as the Land and Sea Management Strategy for Torres Strait, identifies a package of strategic projects and activities, including on-ground projects, key information needs, and institutional resource needs to protect and enhance the natural assets of Torres Strait.

The Strategy takes existing agency initiatives and programs into consideration and also integrates and articulates with:

- the Torres Strait component of the NOO Northern Regional Marine Plan
- the cross-regional Dugong and Turtle Management Project being coordinated through NAILSMA (North Australian Indigenous Land and Sea Management Alliance)
- the cross-regional Carpentaria Ghost Net Programme coordinated by the Northern Gulf Resource Management Group
- Treaty natural resource management governance arrangements and mechanisms for engagement of Papua New Guinea National and Provincial Governments and Western Province coastal communities regarding bilateral aspects of the Strategy.

## Implementation of the Strategy and Other Land and Sea Management Projects

Queensland and Australian Government Ministers have requested the assistance of the TSRA to implement the Strategy on behalf of the JSC. The Strategy is to be used by the TSRA as a framework against which to assess and develop project proposals that are consistent with the TSRA Development Plan and the overarching objectives of the organisation, as well as community needs and priorities identified in Community Development Plans. The TSRA will then recommend a list of projects for implementation to the Ministers through the JSC, for approval.

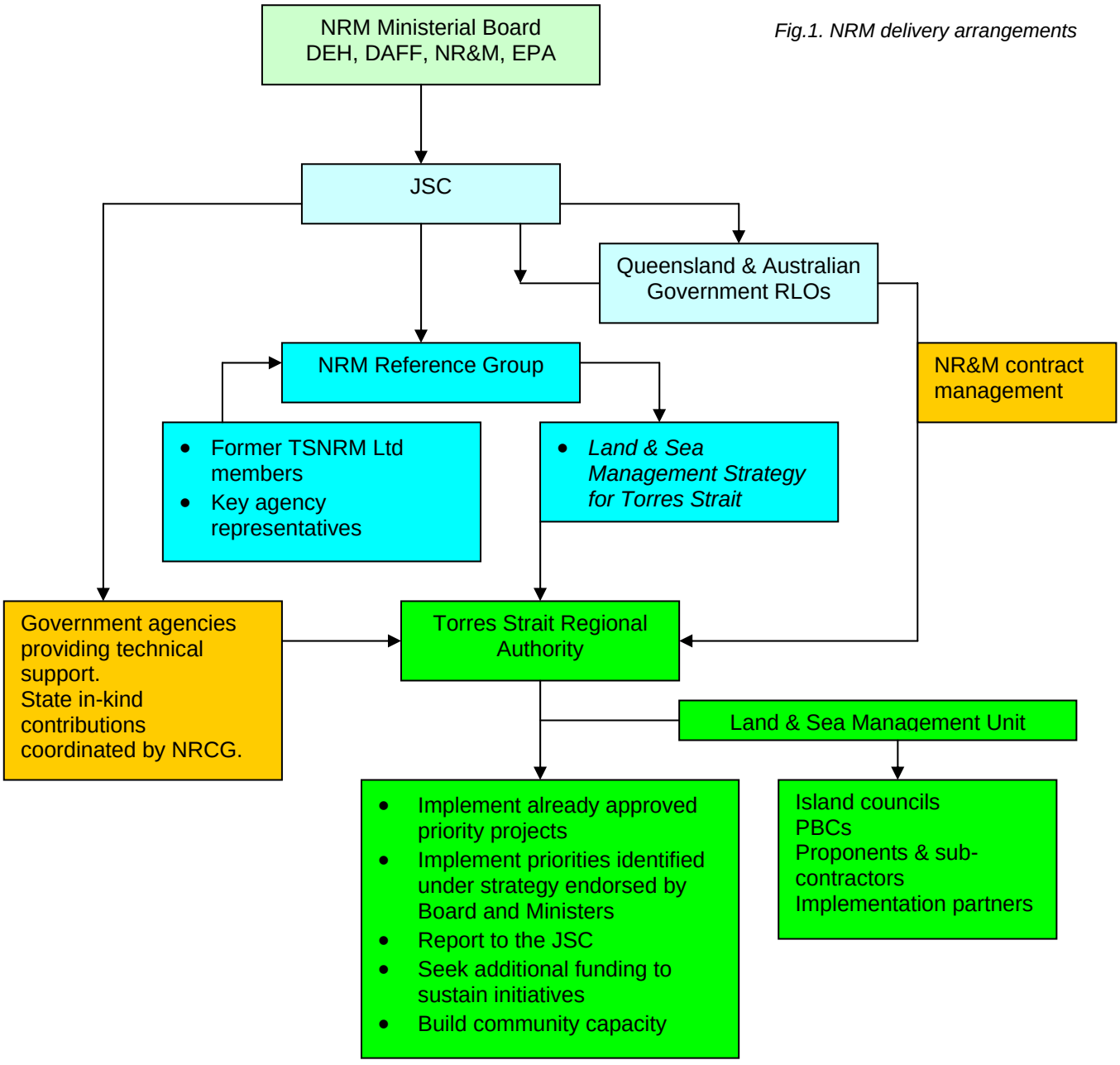



*Fig.1. NRM delivery arrangements*

The TSRA will also assist with the delivery of already approved priority Trust projects for the region, including the:

- Badu Island Land and Sea Management Program
- Ugar Water Quality / Hydrological Survey.

Other priority projects for which funding has been approved include the:

- Regional Coastal Erosion Project – to be delivered through CRC TS
- PNG Engagement Project – to be managed by DEH's International Unit and the Joint NRM Team to ensure appropriate intergovernmental coordination with PNG DEC and the Western Provincial Government, and to contribute funding towards engagement of PNG in regional catch sharing arrangements for dugongs and turtles under the RAPTS.

It is intended that a Land and Sea Management Unit will be established within TSRA to enable the delivery of projects under the Strategy. Core operational and project facilitation funding for TSRA will be provided to allow for the establishment of the Land and Sea Management Unit, and to cover essential administration, project management, coordination and capacity-building costs associated with delivery of the program in the region.

Other project and program funds relating to environmental management may also be devolved through this Unit to enable unfunded aspects of the Strategy to be addressed over time. These funds may include government funds, for example under the Envirofund, Waterfund, or National Landcare Program, as well as non-government and philanthropic investments.

# 2.0 ASSETS

## 2.1 The Torres Strait Region

The Torres Strait region covers an area of more than 35 000 square kilometres, of which 2.6% is terrestrial land, 6.2% tidally inundated reef flats, and 91.2% open seas, most of which are relatively shallow. There are more than 100 islands and a multitude of cays, sandbanks and coral reefs scattered throughout the region, which stretches 200 kilometres from the tip of Cape York Peninsula to the south-west coast of PNG.

Located on one of the world's most extensive continental shelves, the Torres Strait has long been recognised for its ecological complexity and biodiversity. The region provides a multitude of habitats and niches for the highly diverse Indo-Pacific marine fauna.

The clearer waters and coral reefs to the east, above the most northerly section of the Great Barrier Reef, constitute rich fishing grounds, and turtles are found throughout the entire region. Extensive seagrass beds occur in the western and northern areas, forming critical habitat for resident dugong populations.

Torres Strait Islanders have a unique and holistic relationship with their environment. There are strong cultural, social, economic and spiritual links between Torres Strait Island people and their sea country, which are governed by their distinct *Ailan Kastom* (Island Custom). Marine resources traditionally have been, and continue to be, vital to Torres Strait Islanders from a subsistence and cultural viewpoint.

It is recognised that if the unique environment and way of life of Torres Strait Islander people is to be preserved, there is a need for a comprehensive conservation and sustainable development strategy to be designed and implemented in the region.

Impacts and influences from external sources are contributing to the pressures already being placed on the regional environment by the traditional harvest of marine resources, and the impacts of a growing population and ever-increasing community development.

The jurisdictional and administrative arrangements over the Torres Strait environment are complex, involving two nations, all three levels of government and multiple agencies.

## 2.2 Assets of the Torres Strait region

The assets of Torres Strait are the islands, the sea and the people. The assets classes have sub-classes as shown in Figure 2.

*Fig. 2. Assets of Torres Strait*

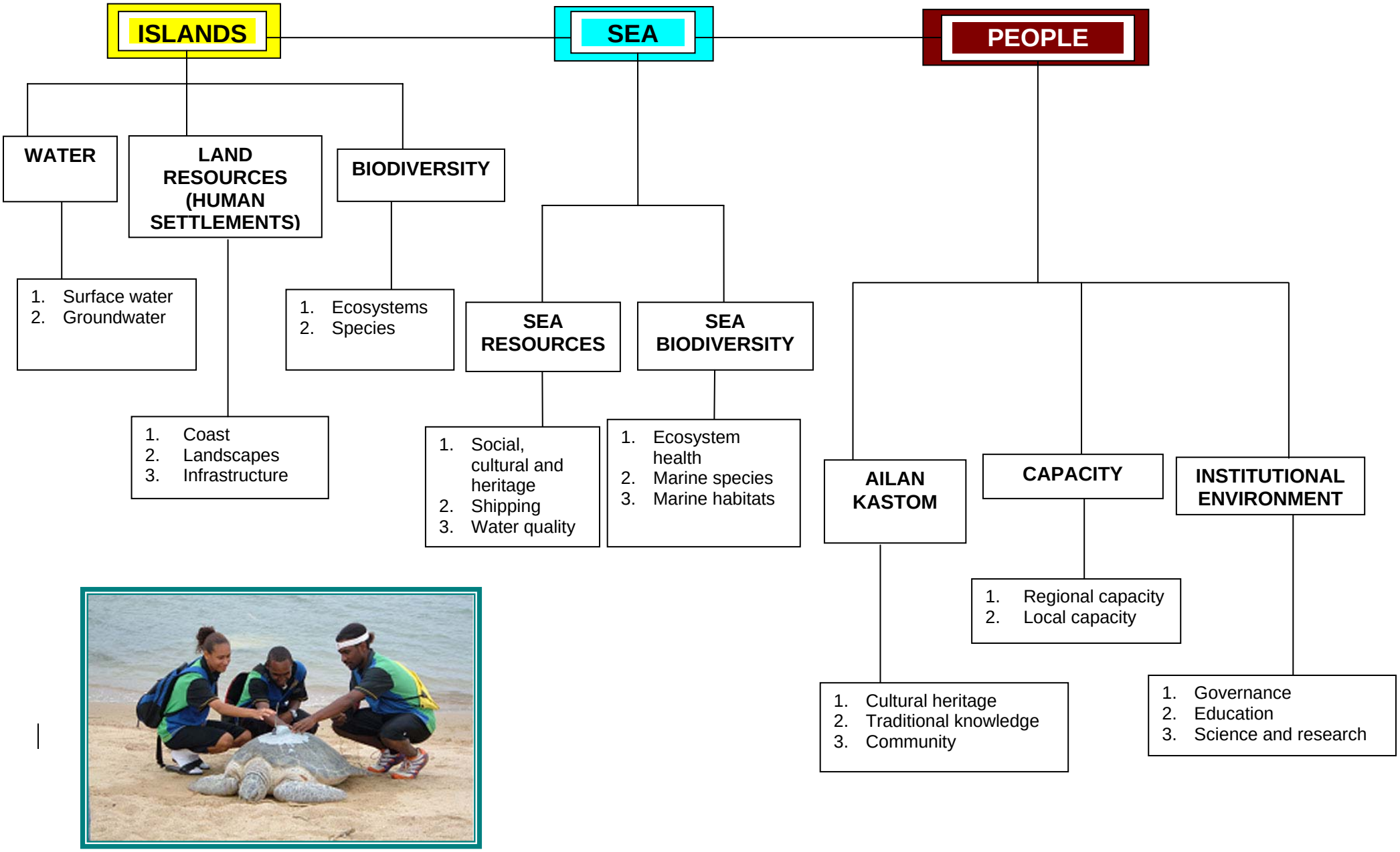


*Fig. 3 Map of the Torres Strait NRM region*

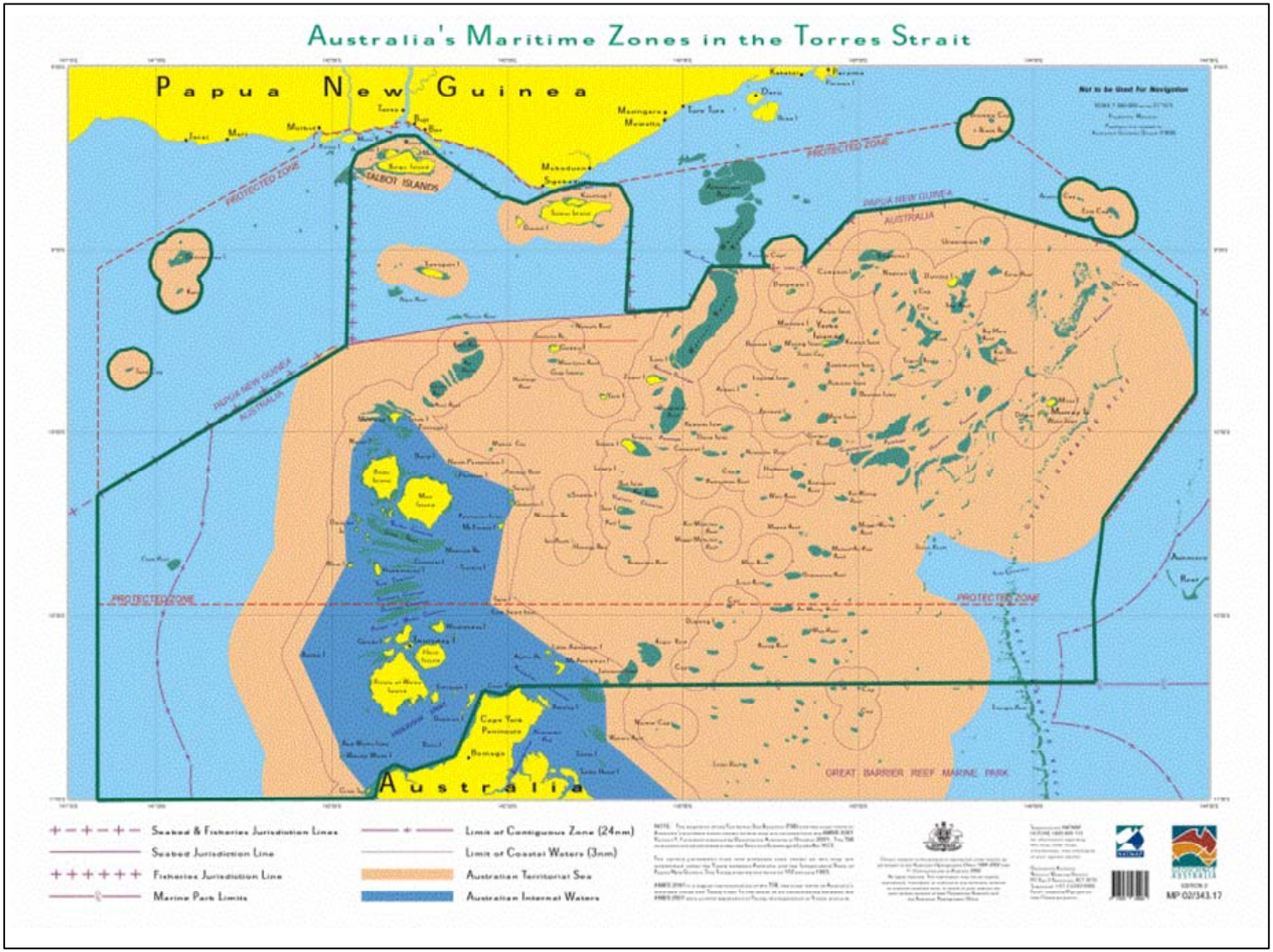
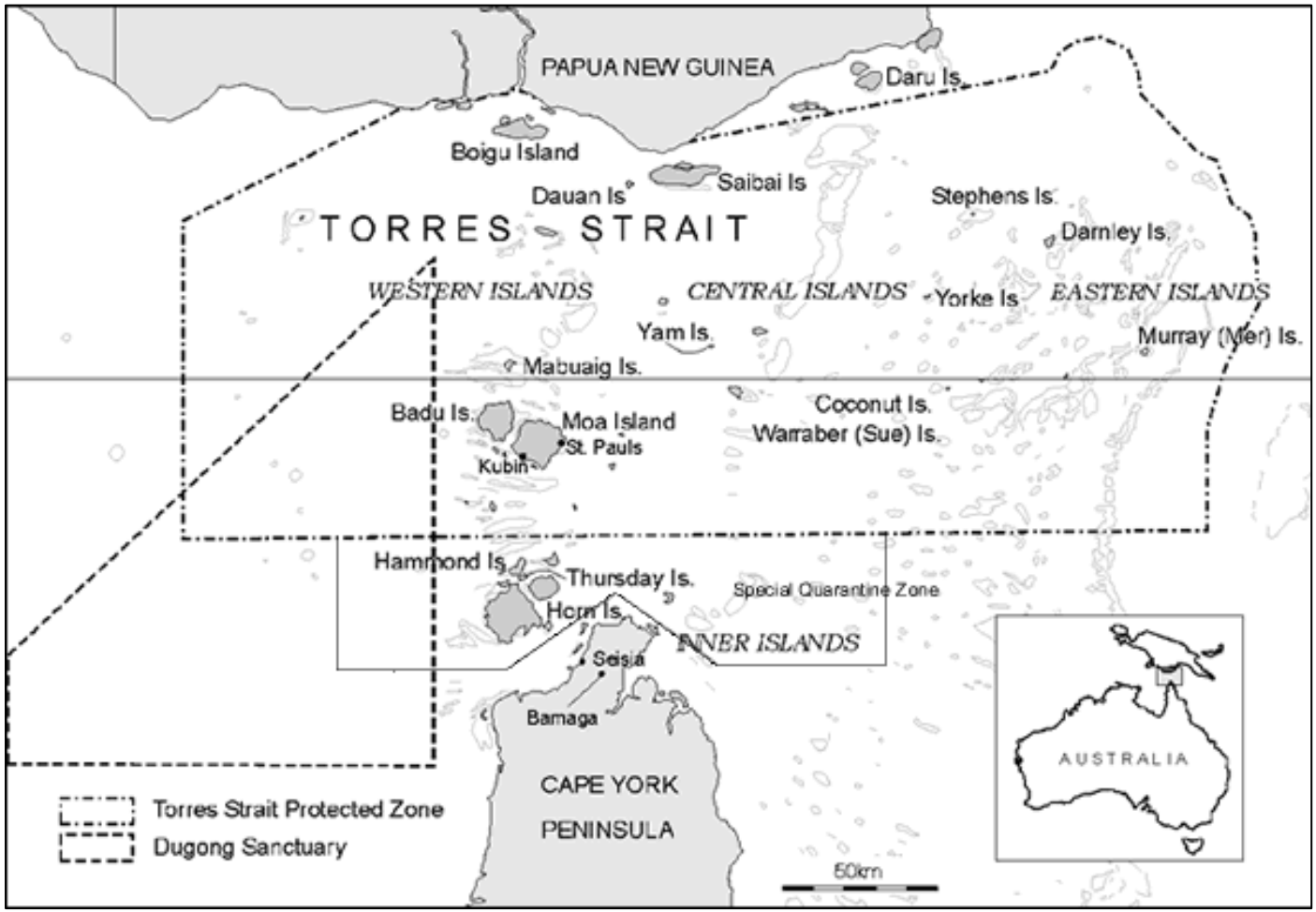


*Fig. 4 Map of the Torres Strait Protected Zone*



### 2.2.1 Islands

The Torres Strait consists of an archipelago of small and geographically isolated islands. The islands of the Torres Strait suffer from certain resource constraints and environmental issues similar to those experienced in small island environments worldwide.

The islands of the Torres Strait fall into four main groups, or clusters:

- central coral islands;
- eastern volcanic islands;
- western and southern continental islands;
- northern mud islands.

Most of the central islands of the Torres Strait are comprised of sand and coral, and are of low relief with extensive fringing reefs. This cluster includes Warraber (Sue) Island, Poruma (Coconut) Island, Masig (Yorke) Island, and Iama (Yam) Island.

The eastern volcanic islands comprise the inhabited islands of Erub (Darnley) Island, Ugar (Stephen) Island, Mer (Murray) Island, along with Dauar and Waier Islands off Mer. These are smaller islands, and are derived from Pleistocene basalt.

The western and southern continental islands include the Inner Island group, namely Waibene (Thursday Island), Ngurupai (Horn Island), Keriri (Hammond Island), Gealug (Friday Island), Mawai (Wednesday Island), Muralug (Prince of Wales Island), and Palilug (Goods Island). Badu, Mua and Mabuiag Islands are in the centre of the region, and Dauan Island is near the PNG mainland.

The northern mud islands are formed from sedimentary deposits from the large southern rivers of PNG, including the Fly River. These are extremely low-lying islands comprised of mud on coral, and contain large areas of wetland, mangrove and brackish swamps. The largest of these islands are Saibai and Boigu, both of which lie just a few kilometres south of PNG.

The Islands section consists of the following themes or sub-classes:

1. **Land resources (human settlements)**
    - Coast
    - Landscapes
    - Infrastructure
2. **Water**
    - Surface water
    - Groundwater
3. **Biodiversity**
    - Ecosystems
    - Species

### 2.2.2 Sea

The Torres Strait marine environment is of national and international significance. Being at the junction of the Arafura and Coral Seas, it is a major shipping route for transit between the Indian and Pacific Oceans and contains significant tropical marine ecosystems and populations of important and vulnerable marine species. The region contains valuable commercial and traditional fisheries and species of high conservation and cultural value such as dugongs and marine turtles. The southern boundary of the Torres Strait Protected Zone adjoins 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.

For detailed technical information on the Torres Strait marine environment refer to the *Marine Strategy for Torres Strait: Policy Directions* (Mulrennan and Hanssen 1994) and the *Torres Strait Strategic Marine Research Plan 2005-2010*.

The Sea program is subdivided into the following themes and sub-classes:

1. **Sea resources**
    - Social, cultural and heritage
    - Shipping
    - Water quality
2. **Sea biodiversity**
    - Ecosystem health
    - Marine species
    - Marine habitats

### 2.2.3 People

Torres Strait Islander and Aboriginal people have fundamental rights with respect to natural resources, which are recognised in legal, policy and institutional arrangements.

The population of Torres Strait is predominantly comprised of Torres Strait Islanders of Melanesian origin. The Kaurareg, an Aboriginal people, are the traditional owners of the Muralug archipelago, or inner islands, which includes Thursday Island, the administrative centre of the Torres Strait region. There are also large, mixed-descent Islander populations living on Thursday Island and Hammond Islands, as well as many non-Indigenous people, the majority of whom are public servants, business people or trades people, who are usually short-term residents on Thursday Island.

There are strong cultural, social, economic and spiritual links between the Indigenous people of the Torres Strait and their sea country. The cultural identity of Torres Strait's traditional inhabitants is expressed and maintained through *Ailan Kastom* (Island Custom) which covers a range of customary practices, languages, traditions, observances and beliefs that structure social organisation. There are 19 communities that live on 17 inhabited islands and the Northern Peninsula Area, each with their own distinct languages and customs, and different priorities, needs and aspirations for land and sea management.

The Indigenous people of the region experience relatively higher levels of poor health and unemployment than urban Australians. Population pressures on small island environments with limited ecological carrying capacities are also cause for concern. There is a strong desire on the

part of Torres Strait people to become more self-sufficient and autonomous, and to develop a strong, sustainable local economy. The limited opportunities for development on the islands, together with abundant marine resources and a long history of Indigenous association with the sea, mean Torres Strait Islanders look to sea country for the future economic development of their communities.

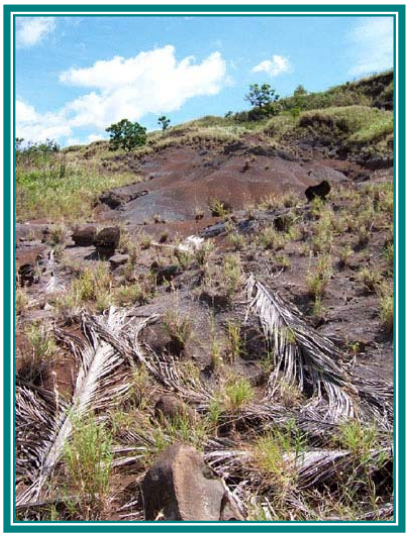
The People asset consists of three sub groups:

1. ***Ailan Kastom***
    - Cultural heritage
    - Traditional knowledge
    - Community
2. **Capacity**
    - Regional capacity
    - Local capacity
3. **Institutional environment**
    - Governance
    - Education
    - Science and research

# 3.0 ASSETS AND ISSUES

Each sub-class of the major assets of Islands, Sea and People is broken down into theme areas described in terms of:

- current status and significance
- issues affecting that asset.



The management objectives and possible initiatives to address these issues are found in the tables in Section 4 that correspond with the asset and theme areas.

## 3.1 Islands

### 3.1.1 Land Resources (Human Settlements)

#### *3.1.1.1 Coast*

***Current status and significance***

Torres Strait consists of a shallow shelf with dispersed archipelagos of islands, reefs and shoals. The seabed ranges from high energy sandy areas to low-energy muddy areas. Reefs form through the Strait, both fringing high islands and as large platforms and coral shoals. Strong tidal currents scour the seabed and affect the form of reef development. The area is also subject to wind-generated surges emanating locally, in the Indian Ocean and the Coral Sea. Strong south-easterly trade winds dominate through the dry-season, from May to November. During the remainder of the year, including the wet season, winds blow predominantly from the north-west and are generally weaker.

Onshore and alongshore sediment movement is associated with the prevailing south-easterly winds of the dry season, while beaches tend to erode during the wet season north-easterly winds, particularly on the central sand cay islands.

The top-western low-lying islands are formed from fine-grained sediments or mud. Beach rock, comprised of ferruginous outcrops of former reef, is found in places, along with limited areas of beach sand. The maximum height above sea level of these islands, along with the central sand cay islands, is approximately three metres, which makes the islands and infrastructure prone to tidal inundation.

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, coastal flooding, increased risk of shipping accidents and changes to habitat and species composition.

The issue of coastal erosion and tidal inundation is of enormous social, cultural and economic significance and concern to many Torres Strait Island communities, particularly the central sand cay islands of Warraber, Poruma and Masig, and the top-western mud islands of Boigu and Saibai. Areas of cultural significance, such as tombstones, vegetation, and particular landscape features, may be vulnerable to coastal erosion or flooding. Significant government investments in community infrastructure, including water reservoirs, on these islands are also threatened by coastal erosion and tidal surge.

Commencing in 2006, the School of Tropical Environment Studies and Geography at James Cook University, in conjunction with CRC Torres Strait, is to undertake a Trust-funded priority project to engage with affected communities in the central islands. The project will identify and prioritise erosion threats, identify the causes of erosion and develop long-term sustainable solutions that work with, rather than against, natural processes.

***Issues***

- **Coastal erosion –** strategies to address the effects of coastal erosion over the long-term that work with, rather than against, natural coastal processes, and are owned by communities themselves.
- **Tidal flooding –** appropriate remedial action and hazard mitigation to address tidal flooding and inundation on islands where community infrastructure and settlements are at risk.
- **Community understanding –** building community understanding of sand island stability, sediment movements and coastal processes with a view to appropriate future planning, infrastructure development and remedial activities.
- **Loss of mangroves –** preventing or reversing the loss of mangrove habitats due to reclamation and development, to maintain their important coastal functions, including stability against the effects of tidal surges and the complex wave and current regime of the Torres Strait.
- **Inappropriate works –** minimising and preventing risks posed by ineffective or inappropriate works or attempts to mitigate erosion that may treat the problem very locally but may make the problem worse or introduce new problems.
- **Habitat loss –** further investigation into the linkages between coastal erosion and loss of habitat for turtle nesting, migratory bird foraging and nesting activities, and effects on seagrasses, dugongs and other marine species.
- **Climate change –** investigation of possible linkages between intensifying coastal erosion and unusual weather patterns resulting in stronger winds and extremely high tides, possibly due to the effects of climate change.
- **Pollution –** minimising land-based point and diffuse source pollution and effects on coastal amenity and environmental health.

#### *3.1.1.2 Landscapes*

***Current status and significance***

The geomorphology of the Torres Strait islands varies widely across the region and its 150 or so islands. There are important cultural dimensions to the landscape and its features, and particular human uses and activities that are governed and affected by the geomorphology of particular islands, including their soil fertility and composition, availability of fresh water and ability to support different vegetation types. The complex mosaic of islands is often divided into four sub-regions according to their geographical position, topography and their physical make up.

*Top western cluster*

The north-western cluster consists of the low-lying mud islands of Boigu and Saibai. These islands are formed from alluvial mud deposited on decayed coral platforms by the adjacent large river systems in PNG. Both islands are extremely flat, with large interior swamps filled with brackish

water. Mangroves line the entire perimeter shores except in front of the communities. The key vegetation types are open woodlands and grasslands, and wetlands, including mangrove and saltpan communities.

Dauan, also in the top-western cluster, is a high granite outcrop that is of acid volcanic origin. The topography is very steep, with the highest peak at 242 metres above sea level. Together with the hill of Mabaduan on the adjoining PNG coast, Dauan forms the most northerly extension of the Great Dividing Range, which in the Torres Strait becomes a sunken chain of islands that once extended as a bridge to the northern landmass. Numerous small creeks drain the slopes into the valleys from which the current water supply is drawn. The soil is relatively fertile and supports local family gardens.

*Western islands*

Mabuiag Island is a granitic island, which is also a remnant of the chain of islands forming part of the Great Dividing Range. The terrain consists of steep hills, with the community located on a coastal flat on the south coast.

Badu and Mua Islands, in the western region of the Torres Strait, are both large continental islands, of which two thirds consist of granite hills. A granite ridge on Mua Island, Mt Augustus, is the highest point in the Torres Strait (399 metres above sea level). The geology of both islands is classified as Tertiary and Quaternary in the low sandy areas in the centre of the island and the mangrove areas on the coast. A quarry is in operation at Badu Island and St Paul's community on Mua manufactures concrete blocks and operates a quarry to produce road base and aggregate. Both islands are covered with scattered forest and scrub areas, with low-lying regions tending towards swamp and mangroves. Badu harvests local hardwood species for construction of community infrastructure.

*Eastern islands*

Mer, Erub and Ugar Islands are of volcanic origin and have distinctive geological features consistent with this history. The terrain over all three generally consists of basaltic slopes rising to central plateaus or peaks. The fertile basalt derived soils support dense vegetation types, with some clearings for banana, cassava, taro and sweet potato gardens. Numerous creeks and streams drain to the coast on Erub. Early clearing of trees for construction purposes and trepang processing has destroyed much of the previously dense vegetation on Erub. Uncontrolled hillside grassfires during the summer months contribute to sheet and gully erosion during the wet season.

*Central islands*

Iama Island in the central group of islands consists of a large steep mass of granite fringed with coral sand flats, the largest being at the north-western end of the island on which the village is located. Vegetation includes thick scrub and mangroves.

The central sand cay islands of Warraber, Poruma and Masig have a flat topography, with elevations generally less than 3 metres above sea level. Soils are medium to coarse grain overlying a cemented body of beach rock atop coral platforms.

*Inner islands*

The inner island group of Waibene (Thursday Island), Ngurupai (Horn Island), Keriri (Hammond Island), Gealug (Friday Island), Mawai (Wednesday Island), Muralug (Prince of Wales Island) and

Palilug (Goods Island) vary in their geomorphology and landscape features. The terrain ranges from steep granite hills to extensive intertidal wetlands. The larger islands support diverse vegetation types and have permanent or seasonally flowing creeks, streams and springs. Soil fertility is generally poor but some islands support tiny pockets of rainforest. Extensive burning in the summer months of grass and woodlands is prevalent in the inner island cluster.

***Issues***

- **Land erosion –** reverse or prevent the decline in native vegetation cover on hillslopes, catchments or in other environmentally sensitive or culturally significant areas.
- **Burning regimes –** minimise production of greenhouse gases and loss of and damage to native vegetation and animal species by implementing ecologically and culturally appropriate fire management regimes.
- **Access –** regulate access to ecologically and culturally sensitive areas to prevent damage to and destruction of sensitive habitats and places, and allow for regeneration of native species.

### *3.1.1.3 Infrastructure*

***Current status and significance***

Land use in Torres Strait is different from other regions in Queensland and on mainland Australia, where there may be a variety of land use activities, including agriculture, pastoralism and mining. The land base in the region is scarce and, on most inhabited islands, is largely taken up with human settlements and infrastructure. Land-based infrastructure development impacts upon, and is inextricably linked to, sustainable environmental management.

The communities in the Torres Strait outer islands vary in population size from 40 (Ugar Island) to 800 or so (Badu Island). The extent of infrastructure development generally corresponds to population size and the level of community economic activity.

All communities comprise residential areas with supporting facilities, including churches, council offices and infrastructure, some government agency outlets, IBIS stores, health centres, primary schools, sporting facilities and private or council operated enterprises. All of the outer islands have diesel power generators, telecommunications infrastructure and their own airstrips, or helicopter landing pads in the case of tiny Ugar and mountainous Dauan. Water supply infrastructure and reticulated water supply systems are in place on all of the outer islands, with permanent desalination units on some islands, and mobile desalination units on others to supplement reservoir supplies in the drier months. Many individual homes on the outer islands have water tanks installed. Boigu, Saibai, Iama, Mer and Badu have sewerage systems; the rest rely on septic tanks.

Government agencies and island councils are generally the key proponents of infrastructure developments, all of which require native title requirements to be satisfied. Indigenous land use agreements (ILUAs) have been negotiated to validate existing infrastructure works on the outer islands. Negotiations may be protracted and difficult and are often influenced by the relationship between the council and native title prescribed body corporate (PBC). Awareness of and compliance with environmental and cultural heritage legislation and approvals processes on the outer islands is generally limited and the entire region is rarely visited by EPA and NRM staff based in Cairns.

The region has only one engineered landfill, being the Horn Island Waste Disposal Facility, which currently accepts solid waste generated on Thursday Island and Horn Island. Waste disposal facilities on all of the outer islands are unlined sites with limited management. Recycling opportunities have not been fully explored on a regional basis. Transport of recycled materials and large waste items out of the region is complicated by quarantine regulations. To comply with quarantine legislation, goods for recycling or transport out of the region for disposal need to be free from plant, animal or soil contaminants. Transport costs for removal of large waste items are prohibitive and necessitate regionally negotiated arrangements with shipping companies to be economically viable.

Waste management is a critical issue in small island environments because the impact of poor management spills over into a large proportion of the environment and the tropical climate increases the health risks. The proximity of Asia and Papua New Guinea presents a high risk of the spread of biological pathogens and disease.

Geographic variations between the island clusters necessitate a customised approach to waste management for each island. A holistic approach to waste management is the preferred way to address some of these issues, however, island councils have limited resources and expertise to draw upon. Nevertheless, basic waste management (including managing human waste) has been

identified as a high priority issue by many outer island communities, whilst recycling and sustainable, improved methods of waste management are priorities for the inner island communities.

The Major Infrastructure Program continues to deliver significant improvements to the management of biosolid waste. Sewerage is replacing septic systems on the outer islands under a structured program.

Funding may be available from DEH for an integrated pilot waste management project to be conducted on Warraber Island, with technical and project management support to be delivered through the EPA. This initiative will be important in terms of pioneering management of the whole-of-waste stream in a small island environment, with lessons learned capable of being replicated throughout the region.

***Issues***

- **Native title –** need for additional support for native title legislative requirements to be satisfied in respect to future infrastructure developments and land management activities, including capacity-building support to enable PBCs to engage in negotiations and activities.
- **Environmental and cultural heritage approvals –** need for additional support for island councils to satisfy requirements under environmental and cultural heritage legislation in respect to clearing, diversion of watercourses, infrastructure development, and waste management and pollution controls.
- **Insufficient physical infrastructure –** there is a need for improved landfill design, installation of appropriate waste disposal equipment and means of compacting waste.
- **Inappropriate disposal of rubbish –** ensure disposal of waste is regulated to ensure appropriate locations of tip sites in relation to communities, beaches, wetlands, creeks and culturally sensitive areas, and minimise rubbish disposal elsewhere.
- **Removal of waste items and recyclables –** regional negotiation of arrangements with shipping companies to transport recyclables and large waste items (e.g. car bodies, white goods, construction waste) out of the region, in accordance with quarantine requirements.
- **Regional waste management services –** support for the establishment of systems for waste minimisation through appropriate purchasing, sorting, recycling and reuse of certain waste items.
- **Community education –** improved awareness and understanding of environmental and health hazards of poor waste management and alternative management strategies.

### 3.1.2 Water

#### *3.1.2.1 Surface Water*

***Current status and significance***

The Torres Strait region lies within a sub-humid savanna environment, with a dry season of five to seven-and-a-half months duration, and 95% of annual rainfall falling between December and April. Wet season rainfall averages 1600 mm at Thursday Island, but the monthly total for the wettest month, January (mean 430 mm) ranges between 167–863 mm. Relatively drier areas occur on the leeward side of the larger high islands but prolonged droughts are rare and usually coincide with the

El Niño–Southern Oscillation phenomenon every five to seven years. The impact of climate change on Torres Strait rainfall and weather patterns is yet to be investigated.

Prior to the development of major infrastructure in the Torres Strait, including water supply systems, the carrying capacity of island environments, and hence their human populations, was generally limited by the availability of permanent supplies of potable water. No communities have permanent streams from which to draw water, although Erub and Mabuiag have natural catchments, which divert surface water to artificial storages during the wet season.

Excavated and lined storage areas have been constructed at Boigu, Dauan, Erub, Kubin, Mabuiag, Masig, Mer, Poruma, Saibai, St Paul's, Ugar and Warraber. The storage areas, or dams, are generally surrounded by a lined catchment skirt and are supplemented where available by the above limited natural catchments (Erub and Mabuiag); or the above groundwater from shallow wells and infiltration galleries. While the excavated storage lagoons at Poruma, Saibai, and Ugar rely solely on rainwater caught at the lagoon itself, permanently fixed desalination plants supplement rainwater at Boigu and Mer. Iama, which lacks a suitable area for a dam, has a two megalitre concrete reservoir fed by a permanently fixed desalination plant.

Storage of fresh water supplies (as groundwater lenses or in constructed tanks) to last through the long dry season is a major problem on many islands. Occasionally, outer island communities have to rely on mobile desalination units or have water delivered by barge to supplement dwindling community water supplies.

***Issues***

- **Suitable water supplies** - Degradation, depletion and contamination of fresh water supplies, and need for upgrading of water supply infrastructure.
- **Catchment management** - Loss of riparian vegetation and degradation of catchment areas, resulting in loss of topsoil and siltation of creeks and streams.
- **Contamination of wells** - Appropriate measures are needed to mitigate the impacts of tidal flooding of wells on northern mud islands.
- **Water tanks** - Installation, maintenance and repair of household water tanks to ensure availability of rainwater for household purposes, with regular inspection and maintenance regimes to avert risks of dengue fever outbreaks.
- **Community education** - Improved community awareness and understanding of the need for water management, conservation and recycling, and education about appropriate ways to minimise consumption.

#### *3.1.2.2 Groundwater*

***Current status and significance***

Most aquifers and groundwater systems on small island environments, particularly coral cays, are fragile and, if over-extracted, are prone to saline intrusion. Bores are generally operated to feed into reservoirs when salinity levels are low and communities use reservoir water when salinity is elevated. It is important to monitor pumping rates and salinity to ensure that saline water is not introduced into the system.

The communities of Badu, Dauan, Erub, Keriri, Kubin, and St Paul's have shallow wells or infiltration galleries, which vary in effectiveness and sustainability. The communities of Warraber

and Masig are able to draw through bores from the limited freshwater 'lenses' beneath these sand/coral islands. The current bores are unable to sustain these communities' water consumption in years of less than average rainfall.

The Island Coordinating Council Infrastructure Support Unit (ICC-ISU) supports local councils to manage water supplies and provides technical assistance with water quality monitoring and maintenance procedures. The ICC-ISU assists with the implementation of a Trust-funded priority project to conduct a groundwater hydrological survey on Ugar. The water supply on remote Ugar Island is very fragile and, to protect the freshwater lens from depletion, placing the island's vegetation at risk, it is necessary to investigate the best mechanisms for the effective reinstatement of bores to provide the community with a robust and reliable source of potable water.

***Issues***

- **Contamination of groundwater –** concern about freshwater quality and supply accessed from freshwater lenses by bores for household purposes, including potential leachate pollution of groundwater from landfill trenches.
- **Hydrological surveys –** need for further information on the status, quality and extent of aquifers.

### 3.1.3 Biodiversity

#### *3.1.3.1 Ecosystems*

***Current status and significance***

The islands of the Torres Strait support a unique and diverse assemblage of plants, animals and ecosystems. Of great conservation, cultural and scientific interest, this biodiversity and its current distribution reflects the unique nature of the Torres Strait as an important area of interchange between mainland Australia and PNG, and their respective fauna and flora.

Knowledge of terrestrial biodiversity of the Torres Strait region is not well developed or documented, with systematic surveys of many islands never having been undertaken. What has been studied and recorded demonstrates a diversity of animals and plants that is reflective of the diversity of island geology, topography and vegetation, and the proximity of the region to mainland Australia and PNG.

Various regional ecosystems are found throughout the region, many of which are considered to be of concern. The ecological values of some of the islands studied, including Mer and Mua, range from national to site significance.

*Vegetation communities*

The vegetation communities of the Torres Strait are poorly known botanically, though of great significance and interest from an evolutionary and cross-border perspective. Vegetation mapping by the Queensland Herbarium has shown that there is a diverse range of plant communities on Torres Strait Islands, some of which are restricted to the area. Vegetation communities in the western and continental islands include vine forests, eucalypt and melaleuca woodlands, grasslands, sedgelands and mangroves. The top western islands include pandanus savanna, mangroves and swamp vegetation communities. The eastern volcanic islands are characterised by richer soils with

vine forests, woodlands and grasslands, some of which are degraded by lantana and other weeds. The central islands possess vine forest, woodland and grassland on coral sands.

Although regional vegetation communities have been mapped by the Queensland Herbarium at 1:100,000 scale, there has been little on-ground fieldwork conducted to support this large-scale mapping. The scale of mapping is in many cases too coarse for accurate delineation of communities on most islands. Consequently, the existing vegetation mapping for the region is often highly inaccurate, thereby compromising management approaches and outcomes.

*Wetlands*

There are large areas of intertidal wetlands around the northern mud islands of Saibai and Boigu. Smaller areas of intertidal wetlands exist around many of the continental islands. Most areas of freshwater wetlands are small and seasonal, although there are seasonal wetlands on some of the larger continental islands, such as Muralug, Badu, Mua and Mabuiag, but little is known about their extent or ecology.

There are no listed wetlands in Torres Strait largely due to the paucity of knowledge about this region. In spite of this, all wetland areas are of major ecological, social and economic importance within the region itself.

***Issues***

- **Lack of knowledge –** development of an accurate knowledge base on the occurrence and distribution of threatened vegetation types through further finer-scale terrestrial vegetation mapping is necessary to enable strategic planning, protection and management.
- **Loss of native vegetation –** inappropriate burning regimes, clearing associated with development of settlements and infrastructure, as well as the harvest of trees for construction and other purposes have impacted on native vegetation communities and resulted in the loss of habitats.
- **Degradation of riparian zones –** development activities and loss of native vegetation cover, invasion of weeds and feral animals, such as pigs, deer, horses and goats, have resulted in the degradation of catchment areas and riparian zones, which support key regional ecosystems.
- **Degradation and draining of wetlands –** development activities, including draining of wetlands, and the impacts of feral animals and weeds have resulted in the degradation or loss of wetland habitats.
- **Introduced species –** incursions of exotic weeds, feral animals and disease organisms potentially threaten the existence of native plant and animal populations.

### *3.1.3.2 Species*

***Current status and significance***

*Native Plants*

There are 78 species of plants listed as threatened in Torres Strait, comprising:

- Six endangered species
- Seventeen vulnerable species
- Fifty-five rare species.

The occurrence of these plant species throughout the region is variable and highly dependent on climatic conditions and the geology and topography of the various islands. Larger concentrations of all threatened plant species are generally found on the continental islands, whilst many are virtually absent from coral cays. Most of the threatened species of plants are found in vine forest communities.

*Native animals*

Many species of fauna found in the Torres Strait region are of conservation significance and include those listed as threatened or rare under Commonwealth or Queensland legislation.

There are several migratory bird species listed and protected under international agreements between Australia and Japan and China. A number of species are endemic to the Torres Strait, while some bird species found in PNG are only represented in Australia in the Torres Strait.

More than 50 species of reptiles have been recorded. Some species are widely distributed across the Pacific. Others are much more restricted, such as the pink snake (*Cryptophis incredibilis*), which has only been recorded once on Muralug (Prince of Wales Island) and has one of the most restricted distributions of any Queensland snake.

The native mammal fauna are poorly known but comprise several species of native rodents and at least 15 species of bats, including the rare Torresian tubenosed bat (*Nyctimene cephalotes*) known to exist only on Mua (Moa Island).

Of great conservation significance is the Bramble Cay melomys (*Melomys rubicola*), a small endangered rodent that only occurs on Bramble Cay in the far north eastern region of the Torres Strait Protected Zone. With a population of less than 100 individuals inhabiting a single small sand cay threatened by coastal erosion, the Bramble Cay melomys is one of the most endangered mammals in Australia. A draft recovery plan has been developed. The QPWS, in collaboration with the Erub community, is monitoring the population and assessing threats, such as erosion of the cay.

Torres Strait is one of the more important bird areas in Australia as it is the point where the Australian bird fauna contacts that of PNG. It also forms a passage between the Indian and Pacific Oceans and acts as a major migratory pathway. Upwards of 240 bird species have been recorded from the region, of which 87 are resident and breed on the islands. Major breeding colonies of sea birds occur on Booby Island and Bramble Cay.

Table 1: Numbers of rare and threatened species listed under the Queensland *Nature Conservation (Wildlife) Regulation 1994* and recorded on Torres Strait islands

| | **Endangered** | **Vulnerable** | **Rare** |
|---|---|---|---|
| **Animals** | | | |
| Mammals | 1 | 2 | 1 |
| Birds | 1 | 2 | 4 |
| Reptiles | | | 4 |
| Frogs | | | |
| **Plants** | 6 | 17 | 55 |

*Pest animals and weeds*

The proximity of Torres Strait to Asia and PNG makes it an important monitoring and surveillance zone by quarantine authorities for exotic pests, weeds and diseases. Many Torres Strait islands now have populations of a number of pest animal and weed species. Some of these species cause environmental damage and/or have a negative effect on residents' quality of life and health. Animals (including insects) that cause damage to a valued resource are termed pest animals. Similarly, weeds can reduce the sustainability of native flora or fauna populations or otherwise create a nuisance. Some weed species have the potential to modify the fire regimes on Torres Strait Islands, which have a higher proportion of fire prone sclerophyll vegetation.

High priority weeds found in the Torres Strait region include:

- leucaena
- pond apple
- sensitive weed
- caltrop
- para grass
- mossman river grass
- lantana
- mission grass
- molasses grass
- herbaceous weed such as *Praxelis clematidea* (listed as a DEH alert weed).

High priority pests include:

- feral mammals – dogs, cats, pigs, horses, goats, deer and rats
- Asian honey bee
- common myna bird
- feral pigeons
- sparrows
- mosquitoes.

***Issues***

- **Habitat loss, alteration and degradation –** Clearing of vegetation, inappropriate development activities, coastal erosion, pollution and inappropriate fire regimes threaten vulnerable populations of native species and the habitats they rely upon.
- **Introduced species –** Incursions of exotic weeds, feral animals and disease organisms potentially threaten the existence of native plant and animal populations. Small island populations of native species are particularly at risk from invasive species.
- **Lack of information –** Limited knowledge of Torres Strait biodiversity and ecology and those processes that threaten native species and their habitats, and the lack of even a basic inventory of what occurs on many of the islands, compromises the effectiveness of any management efforts.

- **Community understanding –** Need to increase community understanding of the relationship between disturbance and weed invasion, and of the impacts of stray and feral animals.

## 3.2 Sea

### 3.2.1 Sea Resources

The sea resources asset consists of the following sub groups:

1. Social, cultural and heritage
2. Shipping
3. Water quality

#### *3.2.1.1 Social, Cultural and Heritage*

***Current status and significance***

Sea resources have social (e.g. aesthetic, amenity), heritage and cultural value for the people of Torres Strait and, in some cases, the wider community. The clean and unspoilt waters of the Torres Strait have high recreational and aesthetic values.

Torres Strait Islanders have a rich maritime history and close cultural connections to the waters of the Torres Strait and features within and under them (e.g. reefs). These connections can relate to features of the seabed and ocean, which should be maintained to allow the strong cultural connections to continue.

The waters of the Torres Strait also contain numerous shipwrecks of local, regional and national heritage value. In some cases these have been accurately surveyed but the location of many others is either unknown or only approximately identified.

***Issues***

- **PNG pipeline and other infrastructure –** infrastructure should be developed with appropriate consideration of social, cultural and heritage values.
- **Pollution –** marine debris and other forms of pollution can be aesthetically displeasing as well as impacting directly on important cultural and heritage sites and social activities.

#### *3.2.1.2 Shipping*

***Current status and significance***

The waters of the Torres Strait provide a significant means of transport between islands, between the Torres Strait and major regional centres (e.g. Cairns) and a major international shipping route. Enabling safe shipping and boating within and through the Torres Strait is one of the most significant ongoing issues for the region.

A large amount of commercial shipping passes through the three major shipping lanes: the Prince of Wales Channel, Adolphus Channel and Great North East Channel. These shipping lanes are particularly difficult for navigation on account of many hazards, including shallow water, narrow channels, reefs, rocks and islands, strong currents and tidal streams. Commercial shipping accidents pose a significant threat to local communities and environments.

The inclusion of the Torres Strait with the Great Barrier Reef as a particularly sensitive sea area recognised by the International Maritime Organisation (and associated measures such as compulsory pilotage and two-way shipping route) recognises both the value of the assets that are threatened and the level of threat.

Increasing vessel sizes means that monitoring of channel depths, tides and sediment movements is vital in order to minimise the risk of groundings. Customs and Defence also undertake surveillance activities, and are often required to voyage into areas which are poorly surveyed. Some parts of the Torres Strait have never been hydrographically surveyed, making any shipping in these areas hazardous.

***Issues***

- **Impacts of shipping –** ensuring safe shipping in and through the Torres Strait to prevent shipping accidents and consequent social, cultural, economic and environmental impacts is a critical management issue for the Torres Strait.

#### *3.2.1.3 Water Quality*

***Current status and significance***

Little is known about marine pollution levels in the Torres Strait region, though compared to some other inshore areas around the coastline the waters of the Torres Strait are probably relatively clean overall. However, some localised areas off the inhabited islands may be subject to increased levels of pollution through localised oil or chemical spills or through runoff or outflows from the land.

The people of the Torres Strait value the Strait's clean water and the biodiversity that it sustains. Disturbances, both natural and human, to the quality of sea water can have health, environmental and economic consequences. Such concerns led to a major baseline study on Torres Strait seafood during the 1990s, which found naturally high levels of cadmium in some seafood. There have also been continuing concerns over, and calls for monitoring of, the impact of mine-derived heavy metals from the Fly River on the ecology of Torres Strait, particularly to the far north around the PNG coastline.

One of the forms of pollution that is having some impact on the coastlines of the Torres Strait is marine debris which may pose a threat to fishery resources, wildlife and habitat, as well as human health and safety. Marine debris is difficult to address because it comes from a wide variety of sources, both on and off the shore. One type of marine debris that requires special attention is derelict fishing gear, composed of both whole and large sections of nets, as well as discarded fishing line and plastic parts associated with traps and nets.

A number of marine debris surveys have been undertaken along northern Australia's coasts and the community-based cross-regional Carpentaria Ghost Net Program has recently been established in the Gulf of Carpentaria. Studies have indicated that a small proportion (10–20%) of the derelict nets found on shore in northern Australia are the same as those used by Australian fisheries but that

the majority of marine debris, particularly fishing debris, on northern Australian coasts is likely to originate from Asian (principally Taiwanese, Indonesian and Japanese) sources (Kiessling 2003). Asian nets washing ashore tend to be of larger mesh size and of much greater area and weight than Australian prawn trawl nets that wash ashore and are also causing some of the greatest harm to marine animals, especially turtles.

While it is uncertain what quantities of debris are affecting the Torres Strait and level of impact they are having, studies along other parts of the Australian coastline and anecdotal evidence suggests that the problem could be considerable. Through establishing links with the Carpentaria Ghost Net Program and other initiatives, there is an opportunity to improve information to guide measures to address marine debris, as well as to remove debris from coastlines to prevent it causing further damage.

***Issues***

- **Heavy metals –** the monitoring of heavy metals to detect levels that may be of health and other concern continues to be an issue in the Torres Strait.
- **Pollution –** pollution, in all of its forms, can have significant impacts on water quality and have subsequent impacts on the broader marine environment and the peoples of the Torres Strait.

### 3.2.2 Sea Biodiversity

The sea biodiversity asset consists of the following sub groups:

1. Ecosystem health
2. Marine species
3. Marine habitats

#### *3.2.2.1 Ecosystem health*

***Current status and significance***

Important components of marine ecosystems include biological assemblages, nutrient flows, trophic relations and oceanographic systems (e.g. currents and tides). Considerable work has recently been undertaken as part of the CRC Torres Strait program to gain a greater understanding of ecosystem processes in the Torres Strait marine environment and it is hoped that this work will continue when the current program finishes in mid-2006.

Historically, the Torres Strait region supported a number of large-scale fisheries, including the pearlshell fishery, which have had significant impacts on the present marine environment and ecosystem health.

Trophic relations can be disrupted through overfishing of key species or through the introduction of marine pests. Marine pests can quickly become established in favourable environments. Incursions of marine pests in other parts of tropical Australia (e.g. Black Striped Mussel in Darwin in 1999; Asian Green Mussel in Cairns in 2001) demonstrate this threat. Assets under threat include relatively pristine marine habitats; associated stocks of commercially fished species and their breeding grounds; pearl farms and other aquaculture enterprises.

The forthcoming (2005) consultancy report for the DEH National Oceans Office *A situation and gap analysis of IMS, vectors and management arrangements for the Northern Planning Area* outlines most of what is known about the status and significance of introduced marine species in the Torres Strait region.

According to current information, the Torres Strait region appears to be free of marine pests. A port baseline survey, conducted in the Torres Strait for IMS in 2004, found no marine pests, but samples are still being analysed and there are no systematic monitoring programs in place in the Torres Strait.

***Issues***

- **Lack of information –** information is lacking on ocean processes such as currents, tides and chemistry and on ecological and biological connectivity.
- **Introduced marine pests –** maintaining the current status of Torres Strait being marine pest-free by preventing their introduction and spread.

#### *3.2.2.2 Marine species*

***Current status and significance***

Marine species have been categorised for management actions according to the following criteria:

1. cultural significance to Torres Strait Islander and Aboriginal peoples, either spiritually or as sustenance
2. environmental significance (status under Australian and/or Queensland environmental legislation or under international instruments)
3. commercial significance.

Most species in the Torres Strait are significant for more than one of the above criteria. For instance, within the Torres Strait dugongs and marine turtles are highly significant species both culturally and environmentally. The importance of these species across northern Australia has led to the development of a Trust-funded cross-regional turtle and dugong project co-ordinated by the North Australian Indigenous Land and Sea Management Alliance (NAILSMA). The project includes the Torres Strait, where the TSRA will be working closely with Torres Strait communities, researchers and fisheries management authorities to support communities moving towards sustainable community-based approaches to dugong and marine turtle population management.

Providing key research information to support the sustainable management of turtles and dugong and commercially important species such as prawns, tropical rock lobster, finfish (barramundi, king salmon, blue salmon, black jewfish, queenfish, grunter, grouper, coral trout, snappers, emperors) and beche-de-mer has been an important focus of current (CRC Torres Strait) and past research in the Torres Strait and considerable efforts are being made to understand stock structures and species biology in order to set sustainable harvest limits. Commercial fishing is managed by the Torres Strait Protected Zone Joint Authority (PZJA) and extensive measures are in place for these species.

Other marine species of environmental or cultural importance in the Torres Strait include:

- crocodile
- cetaceans (whales, dolphins and porpoises)

- sharks, rays and sawfish
- molluscs (trochus, giant clams, pearl oysters, mud scallops, baler shells, Arcidae)
- marine snakes
- sea birds.

The ERIN database in the Department of the Environment and Heritage and Key Species Report for the Northern Planning Area contain further information on the above species, including their distribution and abundance across northern Australia and the threats which they currently or potentially face.

***Issues***

- **Traditional fishing and hunting –** ensuring the continuation of traditional fishing and hunting is paramount to maintaining Islander culture and identity. It is important to ensure that these harvests are sustainable and other impacts on the species targeted, especially dugong and turtle, are minimised.
- **Rare and endangered species –** non-hunting impacts on rare and endangered species, including turtle and dugong, such as those caused by marine debris, illegal fishing, loss or disturbance of nesting sites and critical habitats, need to be effectively managed.
- **Commercial fisheries –** environmental management efforts need to be coordinated and aligned with strategies already in place to manage commercially fished species in the region.

### *3.2.2.3 Marine habitats*

***Current status and significance***

Marine habitats consist of:

- coral reefs
- the garden bottom, containing sponges and other flora outside of reef areas
- marine plants, where seagrass beds and algae provide shelter and food for marine species
- the water column above the reefs, garden beds and seagrass beds.

Torres Strait is well known for its significant seagrass beds. Seagrass occurs in dense and extensive meadows in areas such as Thursday Island port and on some reef platforms. Surveys of the open waters of Torres Strait indicate the existence of 13 425 $km^2$ of seagrass habitat. Seagrasses are important as a food source for turtles and dugong and as a nursery area for commercially important species such as prawns and tropical rock lobster. They also play an important role in nutrient trapping and recycling.

Seagrass dieback and large-scale fluctuations in habitat quality are known to occur periodically in the Torres Strait. These dieback events influence commercial fisheries, such as the tropical rock lobster fishery, as well as the distribution and local abundance of dugong and other marine species.

Coral bleaching may also be occurring in parts of the Torres Strait. Further research into the possible causal linkages between seagrass dieback and moving sand waves, as well as climate change, are necessary.

Recent seabed mapping of the Torres Strait under the CRC Torres Strait program has shown areas of high habitat biodiversity, particularly in the area near Saibai and Boigu where significant areas of sponges occur.

The coral reefs of the Torres Strait have been extensively mapped and classified by the CSIRO. These reefs support many of the marine species of significance in the Torres Strait (e.g. beche-de-mer) as well as being highly diverse themselves. Reef gleaning is a significant part of Islander life for sustenance purposes. Impacts on reef habitats associated with climate change, including coral bleaching, require further investigation in the Torres Strait region.

The water column is also recognised as a marine habitat in this context as it supports pelagic (surface-swimming) species such as spanish mackerel, trevally and other similar species as well as the planktonic life stages of many species.

***Issues***

- **Disturbance of garden bottom and coral reefs –** garden bottoms and coral reefs are some of the most highly diverse marine habitats supporting a multitude of life and the Islander way of life.
- **Seagrass –** maintaining the health and extent of seagrass (within natural variability) is of vital importance to sustain turtle, dugong and important commercial fisheries in the Torres Strait.

## 3.3 People

The people asset consists of three sub classes:

- *Ailan Kastom*
- Capacity
- Institutional environment

### 3.3.1 *Ailan Kastom*

*Ailan Kastom* (Torres Strait Creole or broken English for 'Island Custom') refers to all aspects of the distinctive culture and way of life of the Torres Strait Islanders; it is also called *Ailan Pasin* ('Island Fashion') or *Ailan Wei* ('Island Way'). *Ailan Kastom* is a rich and vital way of life, which governs Torres Strait Islander relations between themselves and with outsiders, underpins their unique identity and reproduces the structures, beliefs and practices of Islander society.

State and Commonwealth laws now recognise Indigenous customary laws and traditions, including *Ailan Kastom*. Section 2.02 of the *Torres Strait Islander Land Act 1991* (Qld) defines *Ailan Kastom* as "the body of customs, traditions, observances and beliefs of Torres Strait Islanders generally or of a particular group of Torres Strait Islanders, and includes any such customs, traditions, observances and beliefs relating to particular persons, areas, objects or relationships".

*Ailan Kastom* guides Torres Strait Islander interactions with their lands and seas, providing a link between environment and culture. Relevant processes which are governed by *Ailan Kastom* in this context include: ownership and responsibility for particular areas, techniques by which natural resources are harvested, traditional strategies for the management of resources, such as only harvesting animals of a certain age, and restricting the harvest of certain species at particular stages of their reproductive cycles or on a seasonal basis.

*Ailan Kastom* should therefore be regarded as integral to any efforts to promote, maintain and strengthen the cultural heritage and environmental integrity of the region for future generations. It is also imperative that the traditional knowledge of Torres Strait Islanders is appropriately maintained, collated, protected and reflected in natural resource management initiatives that occur in the region.

#### *3.3.1.1 Cultural heritage*

***Current status and significance***

Torres Strait Islanders have a strong interest in recording and protecting sites and places of cultural heritage significance. These have cultural meaning in terms of the human history and heritage of the region and can include archaeological sites, as well as cultural sites without archaeological evidence, the most important of which are storyplaces (i.e. places associated with Torres Strait Islander myths, legends, and historical events). Many other cultural heritage sites and places exist in Torres Strait, such as shipwrecks, World War Two relics and the remains of pearlshelling stations, monuments and so on.

Torres Strait Islanders want sustainable development to proceed in the region so as to benefit their communities, but also wish their cultural heritage to be protected in the process. There is

consequently an urgent need for close integration of cultural heritage protection with local development.

Torres Strait Islanders are also engaged in several collaborative archaeological and cultural heritage research programs with universities (in particular, Monash University). Archaeological research has the capacity to inform contemporary resource management strategies by providing a deep-time overview of past Torres Strait Islander settlement and subsistence patterns, such as fishing and hunting of dugong and turtle, and evidence of local and regional environmental change.

***Issues***

- **Lack of recording of sites and places –** many sites in Torres Strait have not been recorded. For example, many storyplaces, especially those in the sea, have not been properly documented.
- **Damage to sites and places of cultural heritage significance –** accelerated infrastructure development on islands, including housing developments, airstrips, roads, dams, rubbish dumps etc. has resulted in the loss of many cultural heritage sites and places. Natural weathering, fire and erosion also have negative impacts on the cultural heritage of Torres Strait.
- **Lack of formal management –** there is a lack of formal culture site management programs within the region; at present, there are no government officers in Torres Strait with responsibilities for cultural heritage.
- **Failure to implement and enforce legislation –** State and Commonwealth laws which protect and manage cultural heritage are not known or poorly understood by local authorities and Islanders, with the result that there is next to no observance of relevant laws or best practice cultural heritage processes (e.g. surveys, assessments, and Cultural Heritage Management Plans).

#### *3.3.1.2 Traditional knowledge*

***Current status and significance***

Torres Strait Islanders possess a vast body of knowledge about their islands and marine environment, accumulated and passed on over many centuries. This ancestral legacy means that they often possess more knowledge about local resources and habitats than western scientists. Traditional ecological knowledge and resource management practices can therefore provide the basis for effective, sustainable environmental management and conservation initiatives, at the same time empowering communities by giving them a greater role in managing their traditional land and sea country.

Torres Strait people have expressed a strong interest in combining their traditional knowledge with western science, to achieve more holistic resource management objectives that meet the needs of all. For example, the community of Saibai, home to perennial wetlands, would like to work with an ornithologist to document the bird species of their island with a view to encouraging bird watching tours. The Hammond Island community have also stated their desire to record traditional hunting practices, to provide a culturally appropriate basis for future management practices that may also borrow from Western science. Several other communities have expressed interest in collaboratively working with anthropologists, biologists and other researchers, to document their knowledge of species and environments, the behaviours and life cycles of marine resources, and winds, currents and tides – all with a view to managing and conserving their lands and seas.

***Issues***

- **Divergent views about the environment –** challenges may arise when trying to reconcile the different perceptions, laws and values about the sea held by Torres Strait Islanders and non-Indigenous managers of fisheries and marine conservation agendas.
- **Loss of traditional knowledge –** the passing of Elders and emigration to the mainland has resulted in the loss of some traditional knowledge and skills.
- **Erosion of culture –** Western influences have caused disruption to traditional lifestyles, including attenuation of knowledge and the abandonment and/or replacement of past beliefs, value-systems and practices.
- **Displacement of indigenous languages –** increased use of English and Torres Strait Creole in communities has resulted in a decline in the number of speakers of Meriam Mir and Kala Lagaw Ya.
- **Lack of mapping and/or recording –**there is a need to document and analyse cultural landscapes and seascapes, geographical and zoological classification systems, traditional ecological knowledge and resource management practices.
- **Inappropriate school curricula –** schooling in the region does not incorporate sufficient traditional knowledge.
- **Traditional knowledge undervalued –** environmental scientists often pay little attention to, or dismiss completely, Indigenous people's knowledge about their resources and environments, in the belief that it is of little scientific worth.

#### *3.3.1.3 Community*

***Current status and significance***

Torres Strait is a remote archipelago of small islands lying between the tip of Cape York and the southern coast of PNG's Western Province. The Strait sits on three notional borders. One is the political and international border between PNG and Australia, a second is the cultural border between Melanesia and Aboriginal and European Australia, and a third is the economic border between the very poor villages of Western Province and the comparatively wealthy communities of Australia's Torres Strait.

The difference in wealth between Torres Strait and PNG's Western province is reflected in the different level of services on each side of the border. This difference encourages PNG residents to visit the islands of the Strait for store goods and health services. PNG has several agricultural pests and diseases that threaten the health of Islanders and other Australians, and the integrity of Australia's agriculture. Even if the border with PNG were a closed border, the proximity of PNG would still pose a threat to Australia. The provisions of the Treaty with PNG allow for 'traditional visits' making the border relatively open, and this increases the threat. To alleviate the situation the Torres Strait Protected Zone is managed as a 'buffer zone' between PNG and Australia.

All of the above features combine to increase the complexity of the region's land and sea management arrangements.

The population of the region presently classified as Torres Strait lives on 17 inhabited islands in the Strait. At the 2001 Census, the regional population was estimated at around 8000 people. Of this some 80% were Indigenous (predominantly Torres Strait Islanders). Compared to other regions in the country, the population of Torres Strait is predominantly Indigenous.

Torres Strait is composed of two administrative sub-regions; the inner islands and the outer islands and this division has some significance for resource management (see Governance below). The inner islands (those around Thursday Island) form the region's service centre and have services similar to those found in small country towns in Queensland. The inner islands have a mixed population of Islanders and non-Islanders. Many of the non-Islanders are temporary residents on short-term contracts in government positions. The inner islands population is around 30% of the regional population. The outer islands have very small populations averaging at some 280 people per community. These are largely Islander populations, though on some islands there are numbers of people from PNG. The outer island communities have much lower standards of services than the inner islands. Outer island retail stores are small, medical facilities are limited and there are no secondary schools. Two of the outer islands, Dauan and Ugar, are only accessible by boat or helicopter.

There is some population movement between the islands of the Strait and a considerable movement between the Strait and the mainland. Movement to and from the mainland is associated with several factors, which include affluence, secondary education, training, family visits and recreation.

Natural features of the region that add to its uniqueness are that it is composed of islands; the islands are small; many of the islands have no potable water; and the natural supply of water on those islands that do have it, is very limited.

The notion of Torres Strait as a region and identity is largely a post-contact phenomenon, the result of European colonisation and administration. Prior to that time, islands were reasonably separate entities. Many island communities were, however, closely connected through social networks, including trade and kinship ties. Although when confronting the outside world Islanders may demonstrate some unity, on other occasions each Island, dialect or language group may wish to retain a degree of autonomy regarding land and sea management.

Levels of Torres Strait Islander health are generally below that of other Australians. Many of the so-called 'lifestyle diseases', including diabetes and heart disease, are now prevalent in Torres Strait Islander and Aboriginal populations in the region. Torres Strait Islanders have also expressed concerns over possible heavy metal contamination of seafoods as a result of mining runoff from the Fly River delta in PNG entering the marine ecosystem. As noted above, contact with PNG risks the introduction of additional cross-border health problems. This is a fragile situation that requires careful management.

Opportunities for economic development in the region are limited. The principal productive industry is commercial fishing, which has importance locally and as a part of the overall Queensland fishing industry. Islanders are involved in some sectors of the commercial fishery and they also collect, fish and hunt marine resources for everyday consumption and for ceremonial occasions.

***Issues***

- **Lack of awareness –** need improved levels of awareness and understanding about what is needed and what can be realistically achieved within communities.
- **Planning –** need for land and sea management planning at the community level, as well as at the regional level.
- **Communication –** possible low levels of communication and co-operation between communities make coordinated land and sea management on a regional basis more difficult.

- **Conflict –** possible disagreement between island traditional owner groups regarding land and sea issues may hinder cohesive approaches to management.
- **Employment –** sustainable employment in land and sea management at the local and regional level needs to be provided to enable delivery of on-ground environmental outcomes, to build the socio-economic basis of communities and to enable many important services to be delivered in the region that government agencies and contractors are unable to deliver.
- **Inappropriate ecological and cultural tourism initiatives –** communities have expressed concern about the potentially negative impacts of inappropriate tourism on Torres Strait environments and cultures.
- **Science and research –** information presented at the community level is often not in a form that is accessible or easily understood. Community rangers could play a role in facilitating improved communication between scientists and communities.
- **Health –** community health is inextricably linked to land and sea management issues and meaningful employment opportunities.
- **Water supply –** the carrying capacity of small islands is highly contingent upon the availability of potable water.
- **Population change –** the introduction of permanent water supply infrastructure has enabled population expansion in small island environments over a relatively short time period. The potential of islands and the marine environment to absorb increasing populations is unknown.

### 3.3.2 Capacity

Torres Strait Islander people have repeatedly asserted their desire for greater self-sufficiency and autonomy, and for the opportunity to manage their own natural resources in such a way as to develop a strong, sustainable local economy.

With this in mind, the ideal structure for this Strategy would be at two levels: the regional level and the community level. To ensure a coordinated approach, the community-level activities will require some support regionally. This may be similar to the regional support provided under the Caring for Country program in the Northern Territory.

### *3.3.2.1 Regional Capacity*

***Current status and significance***

To enable the effective delivery of land and sea management initiatives in the Torres Strait requires coordination and support at the regional level, and it is intended that this occur through the TSRA. At the present time there is limited available surge capacity within TSRA to take on this role and to support the implementation of projects at the community level. As a result, a dedicated Land and Sea Management Unit would need to be established within the TSRA. The Unit would consist of, at least initially, a manager and a project officer. The Unit would play an important role in coordinating local and regional efforts and initiatives, attracting additional funding and ensuring that agency and research activities were aligned with community priorities to the greatest extent possible.

***Issues***

- **Institutional support and coordination –** core operational and project facilitation funding is required at the regional level to enable the implementation of initiatives in a coordinated way throughout the region.
- **Technical staff –** staff with appropriate technical skills in project management and community engagement need to be recruited to work at a regional level to support communities to undertake initiatives.

### *3.3.2.2 Local Capacity*

***Current status and significance***

Each community, with the support of the island councils, has in place a community development plan that sets out the intended activities, priorities and needs of the respective communities over a four-year period. These plans address, to varying degrees, local environmental considerations and issues. Ideally, the process of developing a strategic regional approach to land and sea management would encompass supporting each island community in developing its own local-level land and sea management strategies. There is currently limited capacity and opportunity at the regional or community level for this to occur in such a way as to meet the requirements of external funding bodies. However, management of natural resources by local communities has traditionally been integral to the life of island communities, as well as their interactions with outsiders.

There has never been any dedicated funding for the employment of land and sea rangers in the Torres Strait on a regional basis, in spite of repeated calls by island councils for such positions to be funded. It is envisaged that community-level strategies may be developed in the future by community rangers with the support of Land and Sea Management Unit staff, with technical and financial assistance to be provided by agencies where this aligns with their policy objectives. Community rangers could also assist with the implementation of projects and act as conduits between regional staff and their respective councils, PBCs and communities in respect to land and sea management issues and community aspirations.

It should be noted that in the past, some aspects of administration have been dealt with at the level of island clusters. These clusters have some traditional currency and may provide an alternative structure around which to develop and implement initiatives under the Strategy. For example,

rangers could operate at a cluster or sub-regional level to undertake marine and coastal surveillance activities, thereby sharing expensive resources such as boats and navigational equipment.

It is in the national interest that the Torres Strait, one of the most strategically important, yet remote, regions in Australia, is managed on a sustainable basis by its Indigenous people resident in the region, with the collaboration and support of those agencies and entities with policy interests in the area. Provision of meaningful and sustainable employment opportunities in land and sea management for Torres Strait Islander and Aboriginal people in the region has the dual benefits of building the socio-economic base of communities and ameliorating welfare dependency, as well as ensuring that the unique Torres Strait environment is managed and protected by those people with the strongest and most enduring association with that environment.

Sea country planning provides a useful model of a strategic mechanism to enable Indigenous communities to engage more holistically, proactively and effectively with government in relation to management of local marine areas. NOO has played a key role in coordinating and supporting the development of sea country plans in northern Australia on a pilot basis. The concept of engaging Indigenous people in planning at a culturally appropriate scale remains important in achieving government policy objectives, particularly in remote regions such as the Torres Strait where environmental monitoring and enforcement is expensive, hazardous and difficult.

***Issues***

- **Local planning –** local-level land and sea management plans should be developed with the support of regional staff and community rangers.
- **Implementation and coordination –** at the community level, on the outer islands, a dedicated community ranger position needs to be funded to coordinate the implementation of local land and sea management projects, articulate local land and sea management issues and aspirations, and act as a conduit to regional institutions and agencies.
- **Monitoring –** there are currently no formal environmental monitoring programs in the outer islands, and unclear processes and responsibilities for reporting incidents and outcomes of surveillance activities.
- **Sustainable employment –** communities and local institutions have limited abilities to work towards long-term sustainable outcomes when positions are funded on a short-term or project basis, or not at all.
- **Resourcing –** PBCs are key entities to be involved in land and sea management initiatives, yet have no staff or core operating funds to allow for their engagement in land and sea management activities.
- **Technical support –** communities require intensive and ongoing technical support and capacity-building from regional staff to ensure that projects are implemented effectively and within budget, and meet acquittal requirements.
- **Communication difficulties –** communication and cooperation between communities could be improved for enhanced coordination of land and sea management initiatives and sharing of resources.
- **Potential for disagreements –** land and sea management may lead to disputes among and between traditional owners and councils.
- **Tourism –** support for the establishment of appropriate and feasible ecological and cultural tourism initiatives is required at the community level.

- **Health issues –** many Torres Strait Islander communities suffer from low levels of health, which impact on local capacity.
- **Poor quality feedback –** information presented at the community level is often not in a form that is accessible or easily understood.
- **Technology uptake issues –** new technologies and concepts are sometimes not easily adopted at the local level.

### 3.3.3 Institutional Environment

#### *3.3.3.1 Governance*

***Current status and significance***

*Boundary of NRM region*

Under the Bilateral Agreement, the Torres Strait NRM regional boundary runs in a clockwise direction from the south-west corner of the Torres Strait Protected Zone (TSPZ), north to the western intersection of the TSPZ and the Australia–PNG border, along the border to the eastern intersection of the border, along the TSPZ boundary south to its south-eastern corner, south to the Great Barrier Reef Marine Park (GBRMP) boundary, west along the GBRMP northern boundary to the tip of Cape York, along the lowest astronomical tide on the west coast of Cape York Peninsula to 11 degrees south, then west to meet up with the western boundary of the TSPZ. Australian territorial sea and land beyond the Australian border but within the TSPZ is also included (e.g. Turu Cay, Deliverance Island, Bramble Cay, etc.) (see Fig. 3).

The region, for the purpose of this Strategy, is therefore inclusive of the islands within the Torres Strait, but excludes two Islander communities that are within the administrative purview of the TSRA (Seisia and Bamaga) and three other nearby Aboriginal communities. All of these communities have an interest in land and sea issues in the Torres Strait region and political friction between some of these and the communities of the TSRA is not uncommon.

*Regional institutions and coordination*

Establishing institutional and organisational frameworks that promote ecologically sustainable use and management of resources is critical to ensure that Torres Strait Islander and Aboriginal people are able to realise their aspirations for land and sea management, and to enable coordination and strategic efforts on the part of agencies. There are a number of key organisations and agencies that play a role in coordinating initiatives and fostering regional, external and international linkages. These organisations and their legislative requirements create a complex institutional environment that is probably unique within Australia. Any strategy for regional land and sea management in the Torres Strait must articulate with this environment.

More than 25 government agencies and departments exist in Torres Strait because of its unique political features and strategic location for defence, surveillance and monitoring purposes. These agencies are primarily based on Thursday Island, the administrative centre of the region, and include the Department of Foreign Affairs and Trade (DFAT), Department of Defence, the Australian Quarantine and Inspection Service (AQIS), Australian Customs Service and Department of Immigration, Multicultural and Indigenous Affairs (DIMIA). AQIS and DIMIA employ Indigenous officers on the inhabited outer islands.

Two Indigenous-specific regional bodies operate. The Torres Strait Regional Authority (TSRA) is a Commonwealth statutory authority that provides regional coordination of policies and programs to benefit Torres Strait Islander and Aboriginal people living in the region. This is the only such regional Indigenous body in Australia. The TSRA is comprised of an administrative and executive arm, with the executive arm made up of 20 Board members, including 18 elected Island Council Chairpersons and two representatives from Port Kennedy and Horn/Prince of Wales Islands.

The state-funded Island Coordinating Council (ICC) also operates at a regional level to coordinate the delivery of services and programs on behalf of the island councils, including those through its Infrastructure Support Unit for water supply and sewerage services on the outer islands.

*Local institutions and landholding entities*

Torres Shire Council operates under the *Local Government Act 1993* to deliver local government services to the inner islands, including the Muralug group and NPA. On the outer islands, Community Councils established under the *Community Services (Torres Strait) Act 1984* perform quasi-local government functions. The island councils are currently in the process of transitioning into a State local government regime.

Individual land trusts have been established under the *Torres Strait Islander Land Act 1991*. In addition, following the Mabo decision in 1992, there have been successful determinations of native title over every inhabited island in the outer islands. Accordingly, each outer island has established a prescribed body corporate (PBC) to hold and manage native title on behalf of the native title holders for that community. PBCs may have members who are based outside of the region itself. However, the administrative core, or governing committee, of each PBC is generally comprised of members who reside in the Torres Strait. There is no funding or other support provided for PBCs to employ staff to undertake activities or meet their extensive legal obligations as corporate landholding entities.

While island councils have greater financial capacity and administrative resources available for the purpose of local project implementation activities, the majority of activities on the islands will have native title implications. Accordingly, collaborative arrangements between island councils and PBCs will need to be negotiated and established in relation to any local initiatives, and there may also be a need to negotiate specific ILUAs where native title rights are directly affected by particular project activities (e.g. tree planting, fencing, construction of interpretive facilities).

*Regional sea claim*

The TSRA Native Title Office has supported Torres Strait Islander and Aboriginal groups in the region in commencing a regional sea claim, which was filed on 23 November 2001 and is currently in mediation. The sea claim may lead to clarification of people's connection to, and shared rights in relation to, their sea country with other users, though is unlikely to lead to a ruling that Torres Strait Islanders have exclusive rights to access sea resources in light of recent precedents.

*Treaty governance arrangements*

The *Treaty between Australia and the Independent State of Papua New Guinea concerning matters of sovereignty and maritime boundaries in the area known as the Torres Strait, and related matters*, or Torres Strait Treaty, was signed by Australia and PNG on 18 December 1978 and was ratified on 15 February 1985.

The Treaty is an agreement between Australia and PNG about the maritime boundary between the two countries, about which country has sovereignty over each island in the Torres Strait and about the fisheries jurisdiction of each country.

The Treaty establishes the seabed jurisdiction line, which serves as the boundary between the two countries as regards sovereignty, under international law. Australia has rights to all things on or below the seabed south of this line and PNG has rights to all things on or below the seabed north of this line, as long as they fall outside Australian territorial seas.

The Treaty recognises Australian sovereignty over 15 islands and cays which are north of the line. These are Boigu Island, Dauan Island, Saibai Island, Anchor Cay, Aubusi Island, Black Rocks, Bramble Cay, Deliverance Island, East Cay, Kaumag Island, Kerr Islet, Moimi Island, Pearce Cay, Turnagain Island and Turu Cay.

The Treaty also establishes the fisheries jurisdiction line, which designates the sovereign rights of the two countries as regards the exploration, exploitation, conservation and management of fisheries resources, except for species which are sedentary. Jurisdiction over sedentary species is determined by the seabed jurisdiction line. The fisheries jurisdiction line encompasses the area known as the 'top hat' area and it surrounds the inhabited Australian islands which are north of the seabed jurisdiction line

There is a long history of traditional movement, trade and subsistence fishing by both Torres Strait Islanders and PNG people in the areas of the Torres Strait which are close to PNG. In recognition of this history, the Australian and PNG governments agreed early on in their negotiations that the Torres Strait Treaty would seek to minimise interference to the lives and traditional practices of Torres Strait Islanders and PNG people in these areas and would seek to protect their traditional life and livelihood. The creation under the Treaty of the Torres Strait Protected Zone highlights this approach.

The Treaty designates the 'Torres Strait Protected Zone'. Within this zone, traditional inhabitants of the Torres Strait and of PNG are permitted to undertake free cross-border movement without passports or visas for the purpose of engaging in specific activities which are designated as 'traditional' activities under the Treaty within a stipulated area of the Torres Strait which is close to the PNG coastline (i.e. the Protected Zone).

A further purpose of the Protected Zone is to protect and preserve the marine environment and indigenous flora and fauna. For example, Australia and PNG agreed to take complementary measures to control damage to the marine environment and to protect species that may be threatened with extinction.

The Treaty sets out a fisheries regime in the Protected Zone. The regime has two key aspects, namely the sharing of the resources and the enforcement of conservation measures.

Regarding the sharing of resources, Article 23 of the Treaty sets out provisions for the sharing of the total allowable catch of a particular Protected Zone commercial fishery. The total allowable catch is determined jointly by the parties. Generally speaking, in areas under the jurisdiction of one country, that country is entitled to 75% of the catch and the other country is entitled to 25% of the catch. In specified areas, the allowable catch is shared on an equitable 50:50 split. This catch sharing arrangement is relevant in areas of territorial sea and of fisheries jurisdiction.

Article 15 of the Treaty implemented a moratorium on mining and drilling of the seabed in the Protected Zone for a period of 10 years from the date of entry into force of the Treaty. Since that 10

year period expired, the Australian and PNG governments have extended the moratorium three times. The most recent extension of the moratorium was in February 2003, when the moratorium was extended for a further five years until 2008.

The Protected Zone Joint Authority (PZJA) was established to manage the Protected Zone (and nearby areas). The PZJA is composed of the relevant State and Commonwealth Ministers and the chair of the TSRA. The operational structure of the PZJA includes working groups for the Torres Strait fisheries and these have representation from Islander and non-Islander fishers, fishing industry groups, the scientific community and the relevant government fisheries management bodies, such as AFMA.

DFAT has primary policy responsibility for the Treaty and has established a Treaty Liaison Office, located on Thursday Island. The role of the Torres Strait Treaty Liaison Office is to facilitate the implementation at the local level, of the provisions of the Treaty. In effect, this requires the Treaty Liaison Office to facilitate consultation and administration across all facets of the Treaty, in cooperation with line agencies and traditional inhabitants from Australia and PNG. In line with mutual obligations under the Treaty, Australia and PNG undertake a cycle of Treaty meetings which feeds into the annual Australia-PNG Ministerial Forum.

The annual Treaty cycle comprises four cross-jurisdictional meetings, and two interdepartmental committee meetings (IDCs). The Treaty cycle meetings are the Traditional Inhabitants' Meeting (TIM), where traditional inhabitant leaders from Australia and PNG meet to determine and discuss their agenda for the cycle; the Treaty Liaison Meeting (TLM), to advise the respective liaison officers at agency level, and to provide input to solving locally identified problems, at an administrative level; the Environment Management Committee (EMC), to explore environmental matters; and the Joint Advisory Council Meeting (JAC) comprising up to nine national, state/provincial and traditional inhabitant representatives from both states' parties. The Treaty cycle is hosted on an alternating basis.

For more information on the Treaty governance regime and possible mechanisms for improved bilateral coordination refer to the *Review of the Torres Strait Treaty Natural Resource Management Governance Arrangements* (M. Narracott and M. Edwards 2005, commissioned by the National Oceans Office).

There may be some scope within this Strategy to improve the coordination of NRM, regional marine planning and fisheries management within the Torres Strait Protected Zone and with PNG in line with existing Treaty mechanisms.

A priority Trust-funded project to improve cooperation and engagement with PNG in relation to shared natural resource management issues in the Torres Strait Protected Zone, especially dugong and turtle management, is being administered through DEH.

Under the Australian Youth Ambassadors for Development program, a position has been posted within the PNG Department of Environment and Conservation (PNG DEC) to facilitate improved coordination between the Australian Government DEH, the PNG National and Western Provincial Governments in relation to Torres Strait–PNG environmental matters.

In addition to contact with PNG, the Torres Strait, like some other parts of northern Australia, has contact with Indonesia through the activities of illegal fishers. The levels of management and regulation of the environment and of fisheries in PNG and Indonesia are below those experienced in Australia. Improved government coordination to address foreign fishing and compliance issues in northern Australian waters is being driven through AFMA.

***Issues***

- **Pan-Strait policy coordination –** there is a need for improved coordination of natural resource management policy information to facilitate informed decision-making across government agencies and Torres Strait communities.
- **Regional capacity limitations –** resources to employ the additional staff necessary to support greater coordination are severely limited.
- **Cape York –** to the south, issues arise with the demarcation of the NRM region and the related interaction with communities on the tip of Cape York; this will require careful management.
- **Cross-border and Treaty issues –** to the north, ongoing liaison with neighbouring PNG will be required via Treaty mechanisms and with the support of DEH's International Unit.
- **Foreign fishing vessels –** increasing levels of illegal foreign fishing activities are occurring within the Torres Strait Protected Zone, necessitating improved regional coordination and response mechanisms on the part of responsible government agencies.

#### *3.3.3.2 Education*

***Current status and significance***

Generally, Torres Strait Islanders have lower standards of education than other Australians. Outer islands only have primary schools. The only secondary school is on Thursday Island and this has a limited capacity to accept students from outer islands, in part because of limited accommodation. A proportion of secondary students attend boarding schools on the mainland. A TAFE college is located on Thursday Island, though students also move to the mainland for training.

Tertiary education is also provided through associations with other tertiary institutions, such as James Cook University, which offers transitional courses to enable students to enter tertiary studies.

***Issues***

- **Skills shortages –** low capacity to implement initiatives at the community level due to a small pool of available and skilled people.
- **Access –** limited local access to tertiary education and other training facilities, and need for transitional courses to be delivered within the region.

#### *3.3.3.3 Science and research*

***Current status and significance***

Research in the past has been commissioned by the ICC and the TSRA, through the work of PhD students and through the activities of the Torres Strait Scientific Advisory Committee (SAC). In recent years, the SAC has aligned with the CRC Reef out of Townsville to form the Torres Strait CRC (TSCRC) and this system has representation from the TSRA and communities. A future research initiative and consortium for research will be the Marine and Tropical Research Facility (MTSRF) out of James Cook University.

Earlier research tended to focus on commercial fisheries, though recently the general research brief has been expanded to include environmental and socio-economic issues.

Some previous studies took an environmental focus and these include the Marine Strategy for the Torres Strait, commissioned by the TSRA and the ICC, and the Torres Strait Baseline study. The latter focussed to some extent on the implications for Torres Strait of the run-off to the Fly River from the Ok Tedi mine and on levels of heavy metals in Torres Strait.

Other current work that has relevance for this Strategy includes the National Oceans Office Northern Regional Marine Plan and associated research projects, and the NAILSMA Dugong and Marine Turtle Management Project.

In the late 1990s, feasibility studies were carried out to run a natural gas pipeline through Torres Strait from PNG to the Australian mainland. There is renewed interest in this project and its potential environmental and cultural heritage impacts, and calls for independent research and provision of information to affected communities about such impacts.

A common complaint about research has been the lack of feedback to communities. The work of the TS CRC has included a communication strategy to explain the research to local people, to involve them in it and to disseminate the results to communities. The proposed MTSRF is likely to develop its own set of appropriate communication and research protocols for working with Torres Strait communities.

***Issues***

- **Negotiated research programs –** communities have expressed concerns about academic research with limited practical application and would prefer to be involved from the inception of the research process in negotiating research proposals, processes and outcomes.
- **Research feedback –** plain English summaries of Western scientific information and results for local communities are required, as well as discussion and negotiation with communities about research findings.
- **Lack of dissemination –** the outcomes of government-commissioned studies in relation to Torres Strait Islander issues and the Torres Strait environment need to be appropriately disseminated and communicated to communities.
- **Replication –** duplication of research programs over time is problematic due to the high turnover of regional staff and lack of continuity of programs.
- **Information management –** regionally, there is a critical need for coordinated data management and sharing in relation to Torres Strait information to support improved decision-making and management approaches. A locally based technical reference library, containing all relevant books, articles and reports, would be a good starting point.

# 4.0 MANAGEMENT OBJECTIVES AND POSSIBLE INITIATIVES

## Introduction

The following tables were generated with the assistance of participants at the NRM Reference Group workshop and other contributors. Issues, problems and threats identified are linked to broad management objectives and possible initiatives to address the issues. Issues identified as priorities by the NRM Reference Group are listed below and are marked in the tables by *PI (Priority Issue).

| **Asset** | **Priority issues** |
|---|---|
| Capacity (local capacity) | 1. Lack of community-level capacity for natural resource management |
| Land resources (human settlements) | 2. Coastal erosion and the impacts on infrastructure |
| Institutional environment (governance) *and* Capacity (regional capacity) | 3. Lack of coordination and capacity at the regional level |
| Island biodiversity (ecosystems) | 4. Lack of knowledge of terrestrial biodiversity and the impacts of feral animals on species and habitats |
| Sea biodiversity *and* Institutional environment (governance) | 5. Foreign fishing vessels and the impacts of exotic diseases, incursions of pests and weeds and illegal foreign fishing activities |
| Land resources (landscapes) | 6. Land degradation, especially hillside erosion and the effects of burning of vegetation |
| Island biodiversity (ecosystems) | 7. Weed infestations |
| Land resources (human settlements) | 8. Waste management |

Management objectives are the broad approaches that are consistent with Australian and State Government requirements under relevant legislation and policies. Reference is also made to possible linkages with complementary and related initiatives.

Possible initiatives are those activities deemed appropriate for consideration for implementation by the TSRA, subject to Ministerial approval, and within budget and capacity for TSRA to implement using Trust funds. Many initiatives will require cooperation, coordination and assistance from other agencies and organisations, including those based outside of the Torres Strait region, to implement.

## 4.1 Islands

### 4.1.1 Land resources (human settlements)

| **Coast** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Coastal erosion**<br>***PI**<br>**Tidal inundation**<br>**Community understanding**<br>**Loss of mangroves**<br>**Inappropriate works**<br>**Habitat loss**<br>**Climate change**<br>**Pollution** | ➢ High water tables<br>➢ Tidal surges<br>➢ Impacts on beaches | • Loss of infrastructure<br>• Contamination of water<br>• Loss of culturally significant coastal features<br>• Loss of amenity<br>• Loss of vegetation<br>• Loss of important turtle nesting habitats<br>• Exacerbation of problems | – Increase the community's understanding of the causes of coastal erosion and ensure community-endorsed options are identified for mitigating the impacts of coastal erosion.<br>– Develop and secure resources for a coordinated, sustainable response to coastal erosion. | – Immediate action to stop loss of infrastructure and important cultural sites such as trees and tombstones, using geo-textile bags or other interim measures.<br>– Whole-of-government workshop on coastal erosion to be coordinated by the Land and Sea Management Unit.<br>– Installation of properly designed barge ramps with culverts to allow the movement of sand.<br>– Support for the implementation of the recommendations of the coastal erosion study through JCU project team.<br>– Coastal revegetation programs to mitigate against coastal erosion, including mangrove replanting projects.<br>– Investigation of coastal processes and ways of mitigating tidal flooding impacts on mud islands.<br>– Storm surge hazard mapping and monitoring of tide levels and wave hazards.<br>– Monitoring of turtle migration patterns and the extent and intensiveness of erosion on nesting beaches.<br>– Clean Beach Days. |

**Linkages to other processes:**

– Coastal Erosion project
– NAILSMA Dugong & Marine Turtle Management project
– Ghost Net project
– Badu Island Land & Sea Management project
– *Coastal Protection & Management Act 1995* (Qld) & State Coastal Policy
– DoTARS Natural Disaster Mitigation Programme

| **Landscapes** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Land erosion**<br><br>***PI** | ➢ Clearing of vegetation<br>➢ Removal of top soil<br>➢ Inappropriate works<br>➢ Roads and drainage infrastructure not matched to catchment principles | • Loss of top soil and degradation of soil structure and quality<br>• Landslips on hillslopes<br>• Weed infestation<br>• Habitat degradation or loss<br>• Damage to infrastructure<br>• Impact on reefs and marine life | – Reverse the decline in the extent and quality of native vegetation | – Identify, map and prioritise areas for restoration and rehabilitation.<br>– Establish local native plant nurseries for revegetation programs.<br>– Implement revegetation programs, involving propagation and replanting of endemic and culturally significant species to reduce the impact of erosion and loss of native vegetation cover.<br>– Develop community education programs about the significance of restoration programs and the traditional and ecological values of plants used.<br>– Fencing of sensitive areas to allow for natural regeneration of vegetation communities and to protect against the impacts of feral animals.<br>– Establish monitoring programs to assess the effectiveness of revegetation projects.<br>– Build up an inventory of aerial photographs of the Torres Strait to enable interpretation of the vegetation history. |
| **Linkages to other processes:**<br>– Envirofund project on Erub Island to remove lantana and propagate and replant endemic species on erosion-prone hillsides<br>– Landcare project proposal to address lantana and revegetate Erub, Masig and Mer Islands<br>– *Vegetation Protection & Management Act 1999* (Qld)<br>– *Land Protection (Pest & Stock Route Management) Act 2002* (Qld)<br>– *Integrated Planning Act 1997* (Qld) | | | | |
| **Burning regimes** | ➢ Damage to saplings and undergrowth<br>➢ Generation of greenhouse gases<br>➢ Disruption of natural composting regime | • Loss of native plants, habitats and species<br>• Changes to local island ecology<br>• Erosion of hillsides<br>• Global climate change impacts | – Reverse the decline in the extent and quality of native vegetation by implementing ecologically appropriate and controlled fire management regimes | – Commission research into appropriate fire management regimes for the Torres Strait region and educate communities about the impacts of burning.<br>– Develop fire management plans for each island.<br>– Implement remote sensing techniques such as satellite monitoring of fire and fire scars to improve fire management.<br>– Establish on-ground monitoring of habitats to assess effectiveness of burn programs. |
| **Linkages to other processes:**<br>– NAILSMA Fire Management Project | | | | |

| | | | | |
|---|---|---|---|---|
| **Access** | ➢ Uncontrolled access to sensitive areas by visitors and contractors<br>➢ Uncontrolled camping<br>➢ Uncontrolled fires, shooting, harvesting and damage to turtle nesting grounds<br>➢ 4WD vehicles | • Ecological impacts<br>• Disrespect and damage to cultural or sacred sites<br>• Social disharmony<br><br>**Linkages to other processes:**<br>– *Native Title Act 1993* (Cth)<br>– *Torres Strait Cultural Heritage Protection Act 2003* (Qld)<br>– Indigenous Protected Areas Program<br>– Ecotourism Program | – Manage or restrict access to significant habitats and culturally significant places in accordance with community priorities and native title and cultural heritage requirements | – Support the establishment of community ranger programs to control camping, 4WD access and littering in visited areas.<br>– Support the development of appropriate signage and fencing for naturally and culturally significant and/or sensitive areas.<br>– Support the designation and management of indigenous protected areas by traditional owners.<br>– Support the establishment of community-owned and operated eco-cultural tourism ventures. |

| **Infrastructure** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Native title** | ➢ Need for approvals for all land management activities affecting native title | • Delays<br>• Insufficient resourcing or support for PBCs<br>• Limited PBC engagement in land management<br>• Community conflict | – Ensure native title legislative requirements are appropriately addressed in respect to any infrastructure developments and land management activities.<br>– Provide sufficient resourcing and capacity-building support to enable PBCs to engage in land management decision-making and activities. | – Support the employment of a Project Officer to support PBCs in engaging in land management activities and assist in ensuring native title requirements are satisfied in respect to land management initiatives.<br>– Ensure that all project proponents are aware of the need to meet native title requirements in respect to delivery of land management initiatives. |
| **Environmental and cultural heritage approvals** | ➢ Limited compliance with environmental and cultural heritage approvals and standards required under legislation<br>➢ Limited support and access to appropriate | • Breaches of legislative requirements<br>• Environmental and public health and safety risks<br>• Loss of or damage to culturally significant places and objects | – Ensure councils and local proponents are aware of and comply with requirements of environmental and cultural heritage legislation through provision of appropriate support and technical advice. | – Improve communication and education programs about environmental and cultural heritage legislation.<br>– Encourage more regular visits to outer island communities by environmental and cultural heritage officers based outside of the region, and support the employment of a Cultural |

| | | | | |
|---|---|---|---|---|
| | technical advice | | | Heritage Officer within TSRA with funding from NR&M. |
| **Insufficient physical infrastructure**<br><br>**Waste management**<br>***PI**<br>**Community education** | ➢ Inadequate infrastructure and systems for community waste management<br>➢ Inappropriate disposal of rubbish outside of designated tip sites<br>➢ Limited information and understanding about environmental and health hazards of poor waste management | • Contaminated land<br>• Contaminated water supplies<br>• Environmental and public health and safety risks<br>• Breaches of environmental legislation<br>• Threats to native animals | – Improve community understanding of waste management procedures for the whole-of-waste stream, including disposal of non-biodegradable, toxic and contaminated waste, recycling and composting of organic matter.<br>– Improve waste management systems, capabilities and activities, including through recycling programs. | – Participation in decision-making regarding the Major Infrastructure Program (MIP), especially in relation to land and sea management impacts and issues and progress in implementing the Regional Waste Management Strategy.<br>– Support the implementation of the integrated waste management pilot project on Warraber Island with funding from DEH and project management support from EPA.<br>– Support for the improvement of the Horn Island Waste Management Facility, construction of a wash down bay and implementation of recycling initiatives for the inner islands in conjunction with Torres Shire Council.<br>– Support waste management planning and design, in particular with regard to leaching of contaminants into fresh and salt water.<br>– Support the establishment of ranger programs to control camping, 4WD access and removal of rubbish from visitor areas.<br>– Provide education, incentives and equipment for composting of organic matter.<br>– Develop community education materials about the importance of reducing waste by appropriate purchasing, reuse, sorting, recycling, and composting.<br>– Support education and training initiatives for Council Officers on best practice waste treatment methods.<br>– Negotiate with Seaswift and IBIS for bulk purchasing of food and other essential items to reduce packaging, and the return of recyclables at no cost to the community.<br>– Negotiate with Seaswift for regional scale |

**Linkages to other processes:**

- Environmental Protection Agency
- Australian Quarantine & Inspection Service
- ICC Infrastructure Support Unit and Water Supply Initiatives
- Department of Environment and Heritage (Oil Recycling Section)
- Department of Local Government and Planning
- Integrated Waste Management Pilot Project at Warraber Island
- Regional Waste Management Strategy under the Major Infrastructure Program
- *Environmental Protection Act 1994* (Qld) and Regulations

| | | | | |
|---|---|---|---|---|
| | | | | removal of large waste items.<br>– Support the closure and rehabilitation of tip sites. |

### 4.1.2 Water

| *Issue* | *Problem* | *Threat* | *Management Objectives* | *Possible Initiatives* |
|---|---|---|---|---|
| **Suitable water supply**<br>**Catchment management**<br>**Contamination of wells**<br>**Water tanks**<br>**Community education**<br>**Contamination of groundwater**<br>**Hydrological surveys** | ➢ Polluted surface and ground water<br>➢ Flow-on health effects (e.g. boils, sores, diabetes)<br>➢ Communities having to barge water and seek water from other islands to cope with shortages | • Health concerns<br>• Conflict over resources<br>• Loss of riparian habitat values | – Improve the condition of freshwater quality and supply<br>– Provision of assistance to communities to improve understanding and protection of freshwater areas including groundwater and to access funds to coordinate projects<br>– Water conservation and recycling initiatives and promotion of greater community awareness of the need for appropriate water management | – Development of water conservation and recycling initiatives, especially in those islands dependent on desalination units for water supply (e.g. incentives, installation of water tanks and water conserving mechanisms, Waterwise programs).<br>– Hydrological surveys and monitoring of aquifers to assess the quality and quantity of water.<br>– Support upgrades to water supply infrastructure, including replacement of some water supply tanks with reservoir systems, and reopening and cleaning out of old wells.<br>– Support further investigations into the impact of tidal inundation on aquifers.<br>– Support the improved regulation of groundwater usage.<br>– Support the construction of sediment and rubbish traps.<br>– Establish community water quality monitoring programs for fresh water streams and wetlands.<br>– Implement riparian revegetation activities.<br>– Support the closure and rehabilitation of tip sites. |

**Linkages to Other Processes:**

– ICC Infrastructure Support Unit and water supply initiatives
– Community Water Grants Initiative
– Proposed hydrological study into sustainable water extraction on Ugar and other islands
– *Water Act 2000* (Qld)

### 4.1.3 Biodiversity

| **Ecosystems** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Lack of knowledge**<br><br>***PI** | ➢ Lack of information on terrestrial biodiversity<br>➢ Lack of information on ecological and biological processes<br>➢ Mapping of vegetation incomplete and not at an appropriate scale for use in land management and planning | • Land management activities are undertaken without an understanding of the likely impacts upon species and ecosystems | – Improve knowledge base of Torres Strait terrestrial biodiversity to better support and inform NRM decision making<br>– Information from biodiversity surveys, vegetation mapping and ecological research is made available in a form that is understandable, widely available and accessible to all communities and decision-makers | – Undertake systematic flora and fauna surveys across selected Torres Strait islands.<br>– Undertake vegetation surveys involving botanists working with communities to discuss traditional values and plants and record traditional/local names against scientific names.<br>– Assess threats to island biodiversity.<br>– Map vegetation communities at appropriate scales for use in land management planning.<br>– Prioritise species for management and protection, including through assessing the status of species within the Torres Strait, and developing management strategies.<br>– Establish monitoring programs for selected species and their habitats.<br>– Encourage collaborative research projects that support and enhance conservation management of Torres Strait species.<br>– Document and incorporate traditional ecological knowledge into conservation management planning.<br>– Establish, coordinate and maintain databases, GIS and other data layers to inform and support biodiversity management decisions. |
| **Species and ecological communities of conservation significance** | ➢ Lack of information about what species and ecosystems are threatened<br>➢ Loss and degradation of habitat and feral animal and weed invasion | • Declines in populations and loss of species leading to reduction in local biodiversity and potential extinction of species | – Protect threatened ecological communities and habitats of species of conservation and/or cultural significance<br>– Assist in the recovery of those species that are threatened | – Determine the regional status of national and state species listed under legislation and international agreements and instigate appropriate management responses as required.<br>– Support appropriate programs for monitoring and recovering threatened species and |

| | | | | |
|---|---|---|---|---|
| | ➢ Climate change and rising sea levels | | | communities such as national recovery and threat abatement programs.<br>– Identify and determine the status of culturally important species and instigate appropriate management actions as required.<br>– Build partnerships and enhance the capacity of local communities to monitor, manage and recover species and ecological communities of conservation and cultural importance. |
| **Introduced species**<br><br>***PI** | ➢ Impacts of feral animals<br>➢ Invasion of habitats by weeds<br>➢ Dumping of unwanted pets on islands<br>➢ Limited capacity to eradicate pest and weed species in the region | • Loss of native vegetation and sensitive terrestrial habitats due to incursions of weeds or pest species<br>• Loss of native wildlife due to competition and predation by feral animals | – Land managers are assisted to develop and implement pest and weed management plans<br>– Prevention of further incursions of pests and weeds into the region | – Support for weed and feral animal surveys and the development of regional and local-level pest management plans addressing weeds and feral animals, with assistance from NR&M.<br>– Support for implementation of pest management plans and weed control measures on all outer islands, with assistance from NR&M.<br>– Annual visits to the outer islands by a private vet to conduct desexing of unwanted dogs/cats and euthanasia of unwanted animals.<br>– Implementation of a baiting/culling program for feral animals and fines for dumping animals and removing local flora and fauna.<br>– Fencing of sensitive areas to allow natural regeneration of vegetation communities and to protect against the impacts of feral animals.<br>– Weed removal activities and ongoing actions to prevent weed seed dispersal, including the establishment of a regional wash down facility on Horn Island.<br>– Increasing community understanding of the impact of weeds and pests and ensuring commitment of key stakeholders to |

**Linkages to other processes:**

- Northern Australian Quarantine Strategy (AQIS)
- Defeating the Weeds Menace
- Torres Shire Council Pest Management Plan for the Muralug group of islands (around Thursday Island). Other Torres Strait island councils will be supported to develop pest management plans under the *Land Protection (Pest & Stock Route Management) Act 2002* (Qld) in the future
- *Integrated Planning Act 1997* (Qld)
- *Vegetation Protection & Management Act 1999* (Qld)
- *Nature Conservation Act 1992* (Qld)

| | | | | |
|---|---|---|---|---|
| | | | | implementing effective weed and pest management.<br>– Establishing systems to map, report and monitor pests that are compatible with traditional views and values.<br>– Preventing the introduction of new pests and weeds from the Australian mainland, across international borders and between islands, by maintaining close links with Torres Strait-based AQIS staff and scientists from the Northern Australia Quarantine Strategy.<br>– Providing resources, equipment and training for controlling critical pests and weeds.<br>– Encouraging responsible pet ownership. |
| **Species** | | | | |
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Habitat loss, alteration and degradation** | ➢ Clearing of vegetation<br>➢ Inappropriate development<br>➢ Coastal erosion<br>➢ Pollution | • Threats to the existence of vulnerable populations of native species<br>• Habitat loss | – Reverse the loss of habitat and the decline in habitat values<br>– Improve understanding and protection of important terrestrial habitats of threatened and/or commercially and culturally significant species and ecological communities, including migratory birds | – Commission ethnobotanical research into significant terrestrial habitats, including mangroves and wetlands.<br>– Support appropriate measures to enhance the protection of freshwater turtle habitats.<br>– Support ongoing research into migratory bird habitat of significance in the top western cluster, with links to potential eco-tourism opportunities<br>– Support the development and implementation of a management plan for Warul Kawa IPA (Deliverance Island) and support for the process of designating Pulu Islet as an IPA, with the assistance of DEH. |
| **Introduction of** | ➢ Foreign fishing | • Public health risks | – Effective controls and mechanisms | – Improved coordination and response |

**Linkages to other processes:**
- Northern Australian Quarantine Strategy (AQIS)
- Marine & Tropical Science Research Facility
- *EPBC Act 1999* (Cth)
- Recovery Plans for Threatened Species
- *Nature Conservation Act 1992* (Qld)
- Defeating the Weeds Menace
- Indigenous Protected Areas Program

| | | | | |
|---|---|---|---|---|
| **exotic diseases and pests** | vessels landing on islands<br>➢ Vessels carrying livestock and landing on islands<br>➢ Migratory birds<br>➢ Traditional movements and trade<br>➢ Non-compliance with AQIS regulations<br>➢ International yachts<br>➢ Windborne entry | • Bird flu<br>• Species health risks | for the prompt treatment of new introductions of pest species and weeds | procedures between Customs, Defence, island councils, and NAQS officers in relation to detection of foreign fishing vessels.<br>– Support for the establishment of outer island stations for Customs boats to enable a more rapid response.<br>– NAQS surveillance (eg. animal health, exotic fruit fly trapping, exotic insect surveys, weed and exotic plant disease surveys).<br>– Queensland Tropical Public Health Unit monitoring activities (eg. mosquito trapping).<br>– Maintaining quarantine awareness in residents and environmental health officers. |

## 4.2 Sea

### 4.2.1 Sea Resources

| **Social, cultural and heritage** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **PNG pipeline and other seabed infrastructure** | ➢ Changed movement of sand banks<br>➢ Oil spills<br>➢ Inappropriate infrastructure development<br>➢ Lack of community input into planning and decision making on use of marine resources<br>➢ Lack of survey and protection of cultural and heritage sites | • Local loss of sea life and habitats<br>• Potential damage from ruptured pipes – major destruction of seabed life<br>• Impact on traditional marine sites<br>• Poor decision making affecting local values<br>• Unintended disturbance of cultural and heritage sites | – Marine resources are used in a sustainable manner that is aligned with the values, aspirations and customs of traditional owners | – Establish strong channels of communication between proponents, agencies with legislative responsibilities for ensuring approvals processes are satisfied, the TSRA/ICC and affected communities.<br>– Establish a marine spatial information system to inform decision making at the regional and local level.<br>– Provide supporting cultural, environmental and heritage information for the TSRA Major Infrastructure Program.<br>– Encourage negotiation of appropriate compensation packages that support land and sea management priorities and provide local employment opportunities. |
| **Pollution** | ➢ Marine debris, rubbish and spillages<br>➢ Derelict fishing gear<br>➢ Land-based pollution | • Damage to reefs – cultural considerations and location<br>• Unclean and unsafe coastlines and inner-reefs<br>• Hazards to boating and swimming | – Mitigating the impacts of marine debris, pollution from local shipping and boating activities, and minimising land-based pollution in the region<br>– Improving the information base, including through monitoring and raising awareness of the impacts of marine debris | – Carry out initial surveys of marine debris on Torres Strait shorelines to determine the extent of the problem in the region.<br>– Reduce the causes of marine debris, pollution and rubbish within the Torres Strait region.<br>– Establish a community program for removing debris and recording the composition and probable origin of the debris as in the Gulf of Carpentaria Ghost Nets Program.<br>– Investigate whether solid waste disposal systems in the Torres Strait can deal with the large volumes of plastic debris that may be |

| | | | | |
|---|---|---|---|---|
| | | | | collected.<br>– Monitor and control nutrient levels at sewage outfalls.<br>– Determine adequacy of marine waste management approaches within the region and improve facilities and practices if necessary, in collaboration with MSQ and PCQ. |

**Linkages to other processes:**
– MARPOL
– *EPBC Act 1999* (Cth) and Threat Abatement Plan for Marine Debris
– *Australian Maritime Safety Authority Act 1990* (Cth)
– *Protection of the Sea (Prevention of Pollution by Ships) Act 1983* (Cth)
– *Queensland Transport Operations (Marine Pollution) Act 1995* (Qld)
– *Queensland Fisheries Act 1994* (Qld)
– SPREP
– TSRA Major Infrastructure Program
– Ports Corporation Queensland – Port of Thursday Island Oil Spill Contingency Plan
– Queensland Transport – Torres Strait Contingency Action Plan
– Carpentaria Ghost Nets Project
– Clean up Australia Days – Clean Beach Days

| **Shipping** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Impacts of shipping** | ➢ Impacts on home reefs and channels (international and domestic) from shipping<br>➢ Increased vessel sizes<br>➢ Increased volume of traffic due to local and regional developments<br>➢ Unsurveyed waters, particularly in the | • Loss of habitat/seabed features<br>• Shipping accidents (groundings) and potential loss of vessels/life | – Marine resources are used in a sustainable manner that is aligned with the values, aspirations and customs of traditional owners<br>– Maintain the current safety record of shipping transiting the Torres Strait | – Develop a handbook for managing shipping incidents using CRC research outputs.<br>– Survey uncharted waters.<br>– Monitor channels including impact of shipping activities (IMPS, sediment movements).<br>– Support regional implementation of the National System for the Prevention and Management of Marine Pest Incursions.<br>– Communicate to Torres Strait regional communities, management authorities, |

**Linkages to other processes:**
– Great Barrier Reef and Torres Strait Shipping Plan
– IMO, AMSA, CRC Torres Strait
– National Tidal Facility

| | | | | |
|---|---|---|---|---|
| | north-western area of the Torres Strait Protected Zone<br>➢ Changed seabed characteristics and sea level due to climate change<br>➢ Gaps in tidal monitoring | | | vessel operators and aquaculture operators concerning measures for preventing the spread of biofouling pests.<br>– Raise awareness of marine pest issues among Torres Strait Region communities and communicate the objectives of the National System.<br>– Improve oceanographic (eg wave height, tide) monitoring of the major shipping channels.<br>– Provide support to Australian Maritime Safety Authority regulations and initiatives to manage shipping incidents.<br>– Identify areas at potential risk from ballast water discharges so the discharges can be managed better under Commonwealth and State legislation. |

| **Water quality** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Heavy metals** | ➢ Lack of ongoing monitoring<br>➢ Contaminants and wash from Fly River into Torres Strait and recommendations not followed up<br>➢ Lack of baseline measures for water quality and marine system health | • Health problems for Torres Strait Islanders<br>• Build-up of excessive heavy metals in sediments and food chain leading to stresses on marine life | – Ensure that heavy metal levels do not exceed natural levels and where found to do so seek remedial measures | – Establish baseline indicators against which to measure marine water quality and marine system health, building on the baseline study by the CSIRO where required.<br>– Establish a cost-effective and regionally appropriate monitoring program for heavy metals and other pollutants in the marine environment. |
| **Pollution** | ➢ Oil spills<br>➢ Bilge pumping, effluent discharges and anti-fouling from | • Changed chemistry of seawater leading to stresses on marine life<br>• Death or injury to marine | – Minimise pollution outflows, including sewerage, into the marine environment<br>– Minimise pollution from shipping | – Support the implementation of regional waste management programs, including recycling of non-biodegradable and toxic materials, with assistance from the EPA. |

| | | | | |
|---|---|---|---|---|
| | ships<br>➢ Marine debris | life due to toxic material in water<br>• Health problems for Torres Strait Islanders | and fishing operations | – Upgrade or maintain port facilities to handle shipping wastes (fishing gear, plastics, oil etc), with assistance from PCQ.<br>– Support PCQ to implement waste and pollution control programs for the port of Thursday Island.<br>– Provide support to AMSA regulations and initiatives to manage shipping incidents. |

**Linkages to other processes:**
- MARPOL
- *Environment Protection & Biodiversity Conservation Act 1999* (Cth)
- *Australian Maritime Safety Authority Act 1990* (Cth)
- *Protection of the Sea (Prevention of Pollution by Ships) Act 1983* (Cth)
- *Queensland Transport Operations (Marine Pollution) Act 1995* (Qld)
- *Queensland Fisheries Act 1994* (Qld)
- SPREP
- Ports Corporation of Queensland – Port of Thursday Island Oil Spill Contingency Plan
- Queensland Transport – Torres Strait Contingency Action Plan
- Torres Strait Baseline Study (CSIRO)
- CRC Torres Strait
- Marine & Tropical Science Research Facility

### 4.2.2 Sea Biodiversity

| **Ecosystem health** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Lack of information** | ➢ Lack of information on ocean processes, such as currents, tides and chemistry<br>➢ Lack of information on ecological and biological connectivity | • Activities are undertaken without good knowledge of ecosystem impacts leading to subsequent problems such as:<br>o Changed tidal and current flows leading to disturbance of sediment movements<br>o Changed water chemistry leading to stresses on | – Key ecosystem information gaps to support natural resource management are addressed<br>– Information from research into ecosystem processes is made available in a way that is understandable and useable to those making decisions | – Research and monitor ocean processes (currents, tides, chemistry) that support marine life and livelihoods.<br>– Support CRC Torres Strait and subsequent research programs within the Torres Strait.<br>– Put in place an information management regime that makes available key ecosystem information to assist decision making (eg GIS). |

| | | | | |
|---|---|---|---|---|
| | | marine species and habitats<br>o Changes to trophic structures leading to disappearance of species from an area | | |

Linkages to other processes:
- CRC Torres Strait
- Marine & Tropical Science Research Facility
- Torres Strait Strategic Marine Research Plan 2005–2010

| | | | | |
|---|---|---|---|---|
| **Introduced marine pests**<br><br>***PI** | ➢ International shipping ballast water discharges in breach of AQIS guidelines, and biofouling<br>➢ Yachts moving from the South Pacific and Coral Sea into the Timor Sea<br>➢ Fishing vessels operating in international waters, including traditional fishers vessels from Indonesia and PNG<br>➢ Illegal foreign fishing vessels, including those that are apprehended and detained within the region<br>➢ Barge services operating from Cairns to areas in the Torres Strait and Gulf of Carpentaria to ensure the supply of goods to remote communities<br>➢ Small vessels used for personal transport between Torres Strait outer islands<br>➢ Australian naval and customs vessels providing border patrol and enforcement | • Introduction of marine pests in the Torres Strait leading to displacement of native species and loss of biodiversity<br>• Loss of marine species used for sustenance by Torres Strait Islanders | – Control or manage all exotic marine pests and decrease their impact on marine biodiversity and marine health | – Support for the coordinated implementation of the National System for the Prevention and Management of Marine Pest Incursions in the Torres Strait region in collaboration with AQIS.<br>– Support AQIS in undertaking environmental and port monitoring for marine pests to complement national initiatives on monitoring, in an effort to meet national standards. |

**Possible linkages to other processes:**
- National System for the Prevention & Management of Marine Pest Incursions
- Northern Australia Quarantine Strategy (AQIS)
- Ports Corporation of Queensland
- CRC Torres Strait
- Marine & Tropical Science Research Facility
- Torres Strait Strategic Marine Research Plan 2005 - 2010

| Marine species | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Traditional fishing and hunting** | ➢ Little information available on many species of cultural importance<br>➢ Ensuring harvest is sustainable, both within the Torres Strait and adjacent waters<br>➢ Minimising impacts of other activities on traditional fishing and hunting, such as take by illegal fishing boats | • Loss of species, both locally and regionally<br>• Loss of traditional knowledge<br>• Loss of food source for people | – Where necessary, improve the long-term population viability and stability of species that are of cultural significance<br>– Improve stakeholder understanding, capacity and skills to better manage priority marine species including ecology, populations and threats | – Investigative study and participatory action research to understand the impacts on traditional fishing of infrastructure, moorings, and other marine and coastal developments.<br>– Community-based monitoring of:<br>- hunting impacts<br>- marine debris<br>- seagrass habitats.<br>– Identification of at-risk species through scientific studies and participatory action research with regional communities.<br>– Regular communication and liaison with TSRA Fisheries Coordinator and AFMA staff in relation to Community Fisher Group priorities and PZJA processes.<br>– Support community education and awareness raising activities in relation to traditional fishing and hunting practices, including facilitating the recording appropriate information for the benefit of communities.<br>– Support the development of community management plans, particularly for dugong and turtle, and the broader implementation of the RAPTS.<br>– Enhance international cooperation and engagement in respect to traditional hunting and fishing in the TSPZ through Treaty mechanisms and improved community consultation.<br>– Support the development of appropriate compliance and enforcement procedures at the community level following the development and implementation of community management plans for traditional fishing and hunting. |

**Linkages to other processes:**
- NAILSMA Cross-regional Dugong & Turtle Project
- Regional Activity Plan for Torres Strait (RAPTS)
- PZJA Processes & the Community Fisher Group
- Treaty Meeting Cycles & Treaty Visits
- National Partnership Approach for the Sustainable Harvest of Turtles & Dugongs in Australia
- Daru Dugong & Turtle Workshop
- CRC Torres Strait Community Catch Monitoring Project in the Kaiwalagal Region

| | | | | |
|---|---|---|---|---|
| **Rare and endangered species** | ➢ Pressure on marine turtles and dugong<br>➢ Lack of information about other species<br>➢ Illegal foreign take of vulnerable species<br>➢ Marine debris – habitat threat for nesting turtles when washed ashore, risk of entanglement in nets, amenity issues<br>➢ Injury and fatalities to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris<br>➢ Boat strikes and fatalities<br>➢ Disturbance of habitat and breeding grounds from human activities<br>➢ Loss of nesting sites, predation and disruption of nesting activities<br>➢ Predation of turtle nest sites by feral pigs and dogs<br>➢ Global warming (loss of habitat, changed water temperature and ocean circulation patterns) | • Loss of species from the Torres Strait resulting in reduced local biodiversity and potential extinction of species<br>• Impact on Torres Strait people where species have cultural significance<br>• Trophic imbalances causing depletion of other species | – By appropriate management actions, ensure that no further marine species become threatened<br>– Assist in the recovery of those species that are threatened | – Determine the regional status of national and state species listed under environmental legislation and instigate appropriate management actions as required.<br>– Support appropriate programs for monitoring and recovery such as national and state recovery and threat abatement programs.<br>– Identify and determine the status of culturally important species and instigate appropriate management actions as required. |
| **Commercial fisheries** | ➢ Uncertainty and confusion regarding integration of initiatives with fisheries management regime | • Duplication of efforts<br>• Lack of coordination and integration | – To ensure that initiatives under this Strategy align with and articulate with fisheries management processes and avoid duplication | – Support for improved coordination and communication between the TSRA and AFMA staff.<br>– Opportunities to participate in PZJA processes where initiatives relate to commercial and traditional fisheries, including dugong and turtle management. |

**Possible linkages to other processes:**

– *Environment Protection & Biodiversity Conservation Act 1999* (Cth)
– *Nature Conservation Act 1992* (Qld)
– *Torres Strait Treaty*
– *Torres Strait Fisheries Act 1984* (Cth)

| Marine habitats | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Disturbance of garden bottom and coral reefs** | ➢ Damage when harvesting rock lobster<br>➢ Dredging and cutting reefs to allow for barge landing sites<br>➢ Increasing human populations in the region and associated development pressures<br>➢ Damage to critical habitat areas from trawling, anchors, moorings, pipelines, shipping accidents and other resource uses<br>➢ Sea temperature rises due to global warming<br>➢ Marine pests<br>➢ Lack of enhanced protection of critical habitat areas | • Loss of food and shelter for animals<br>• Local and regional loss of biodiversity<br>• Coral bleaching and other habitat changes through increased cyclonic activity, storm surges and so on | – Protect significant habitats used by marine species, in particular habitats that are associated with species that are threatened and/or of commercial and/or cultural significance | – Investigative study and participatory action research into the impacts on traditional fishing of infrastructure, moorings and other marine and coastal developments.<br>– Identify critical habitats for biodiversity and protect and rehabilitate habitats.<br>– Modify human activities such as trawling, anchoring, reef gleaning, etc to reduce damage to habitats (including through raising awareness).<br>– Establish and maintain fixed mooring facilities. |
| **Seagrass** | ➢ Barge landings cause scarring<br>➢ Boat discharge<br>➢ Damage to critical habitat areas from trawling, anchors, moorings, pipelines, shipping accidents and other resource uses<br>➢ Natural seagrass die-back<br>➢ Marine pests<br>➢ Global warming | • Loss of food source and nursery areas for marine species leading to a decrease in these species<br>• Loss of biodiversity<br>• Decrease in nutrient recycling leading to reduction in productivity | – Protect significant habitats used by marine species, in particular habitats that are associated with species that are threatened and / or of commercial and/or cultural significance | – Establish design standards for infrastructure.<br>– Monitor seagrass health and extent.<br>– Support research into climate change impacts on seagrass habitats.<br>– Provide increased protection for seagrass areas known to be of importance for significant marine species (eg dugong, turtle, prawns, tropical rock lobster).<br>– Modify human activities such as trawling, anchoring, walking on seagrass beds, etc to reduce damage to habitats (including through raising awareness). |

## 4.3 People

### 4.3.1 *Ailan Kastom*

| **Cultural heritage** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Lack of recording of sites and places**<br><br>**Damage to sites and places of cultural heritage significance**<br><br>**Lack of formal management**<br><br>**Failure to implement and enforce legislation** | ➢ Older people passing away<br>➢ Damage to cultural places<br>➢ No government officers in region<br>➢ Poor understanding of legislative requirements<br>➢ Lack of financial and technical support | • Loss of significant places and features<br>• Breaches of legislative requirements | – Ensure *Ailan Kastom* (Island Custom) is protected and reflected in natural resource management decisions<br>– Ensure that culturally significant places and features of the marine and terrestrial environment are appropriately recorded and protected | – Community mapping of significant cultural places and landscape and natural features of significance, with support from TSRA and the MTSRF.<br>– Support for cultural heritage protection initiatives to be developed at the regional and community level, including through seeking funding from NRM for employment of a Torres Strait Cultural Heritage Officer.<br>– Support for greater linkages between PBCs, the Native Title Office and the Land and Sea Management Unit. |
| **Divergent views about the environment**<br><br>**Loss of traditional knowledge**<br><br>**Erosion of culture**<br><br>**Displacement of indigenous languages**<br><br>**Lack of mapping and/or recording**<br><br>**Inappropriate school curricula**<br><br>**Traditional knowledge undervalued** | ➢ Older people passing away<br>➢ Loss of traditional knowledge<br>➢ Lack of technical support<br>➢ Inappropriate research methodologies | • Loss of traditional knowledge, skills and practices<br>• Disruption of traditional lifestyles | – Ensure *Ailan Kastom* (Island Custom) is protected and reflected in natural resource management decisions<br>– Enable and encourage learning about the natural and cultural (both Indigenous and non-Indigenous) environment and best practice resource management | – Community mapping of significant cultural places and landscape and natural features of significance, with support from TSRA and the MTSRF.<br>– Traditional ecological knowledge recording initiatives.<br>– Community environmental monitoring initiatives, including of significant habitats, coastal erosion processes, sea and fresh water quality, or other issues of interest to communities.<br>– Exchange visits to other land and sea centres in northern Australia.<br>– Initiatives to assist the transfer of knowledge between generations.<br>– Support for incorporation of traditional local ecological knowledge in the school curricula, including through visits to schools by Elders and traditional owners, excursions, and greater interactions with rangers and Land and Sea Management Unit staff. |

**Linkages to other processes**

– TSRA Development Plan 2005-2008
– NAILSMA Traditional Ecological Knowledge Project
– Land & Sea Centres across Northern Australia
– ANU-CAEPR & Monash University
– Gab Titui Cultural Centre
– Cultural Heritage Grants Programs
– *Torres Strait Cultural Heritage Protection Act 2003* (Qld)

| Community | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Lack of awareness** | ➢ Need for improved awareness and understanding of what is needed and realistically achievable in communities | • Lack of community interest in land and sea management<br>• Project failure | – Awareness, planning and negotiation of outcomes with communities should be a key part of all land and sea management strategies and processes | – Community consultation workshops.<br>– Identification of needs and priority planning. |
| **Planning** | ➢ Need for local and regional land and sea planning | • Uncoordinated approach to land and sea management | – Address local and regional planning issues and align land and sea management with communities' existing plans and priorities | – Detailed analysis of land and sea planning needs of the entire region. |
| **Communication** | ➢ Possible low levels of communication and cooperation between communities | • Difficult to coordinate land and sea management on a regional basis | – Improved coordination between and among communities on a regional basis with respect to land and sea management initiatives | – Devise land and sea management communication strategy<br>– Support for greater linkages between PBCs, the Native Title Office, and the Land and Sea Management Unit, including through the employment of a project officer to support PBC engagement in land and sea management<br>– Regular workshops and information sessions at a local, cluster and regional level |
| **Conflict** | ➢ Potential for disagreement between TOs and other local and regional organisations | • Lack of cohesive approaches to management<br>• Social division | – Ensure potential risks to delivery of land and sea management initiatives are identified prior to implementation | – Design and implement risk management strategies<br>– Consultation with PBCs and the Native Title Office to identify existing and potential conflicts<br>– Conflict resolution training for Land and Sea Management Unit staff<br>– Conflict resolution training for PBC and Island Council members |

| | | | | |
|---|---|---|---|---|
| **Employment** | ➢ Lack of sustainable employment in land and sea management | • Community frustration at lack of meaningful employment opportunities<br>• Failure to deliver environmental outcomes | – Ensure major land and sea management projects provide for meaningful community employment opportunities where possible and enhance the socio-economic base of communities | – Identification of relevant land and sea management opportunities at the regional and local level.<br>– Support for sourcing outside funding for positions. |
| **Inappropriate tourism opportunities** | ➢ Community concern about inappropriate cultural and ecotourism initiatives<br>➢ Lack of support for developing appropriate tourism initiatives | • Erosion of *Ailan Kastom*<br>• Offence to communities<br>• Impacts on natural systems from increased visitation | – Ensure *Ailan Kastom* is respected in tourism planning and operations<br>– Ensure tourism does not result in negative impacts on islands, reefs, and seas<br>– Encourage community-owned and operated tourist ventures that are ecologically and culturally appropriate | – Rigorous social and environmental assessment of all proposed tourism ventures.<br>– Support for development of viable ecological and cultural tourism ventures on islands where community interest and support exists. |
| **Science and research** | ➢ Inadequate feedback to communities<br>➢ Inadequate consultation or negotiation with communities about research proposals and outcomes | • Lack of community interest in and disengagement with research programs<br>• Hostility to researchers<br>• No application of research outcomes at local level | – Ensure that communities are involved in the design and implementation of research where possible and that research outcomes are negotiated with communities<br>– Encourage collaborative research programs of interest and relevance to communities | – Community rangers to play a role in facilitating improved communication between scientists and communities.<br>– Cross-cultural training and awareness raising programs for scientists.<br>– Negotiation and consultation between scientists and communities in relation to all aspects of research programs.<br>– Delivery of timely, plain English summaries of research and, where possible, provision of advice to communities in terms of dealing with implications of research findings. |

| | | | | |
|---|---|---|---|---|
| **Health** | ➢ Community health inextricably linked to land and sea management issues<br>➢ Community health linked to employment and standards of living<br>➢ Inadequate communication of health implications to communities | • Poor health leads to reduced capacity of local staff and communities<br>• Threats from cross-border movement of diseases and pests<br>• Ongoing community concern over heavy metal contamination of food sources | – Community health and wellbeing should be regarded as integral to land and sea management in the development and implementation of initiatives<br>– Health and quarantine issues should be reflected in land and sea policies and programs | – Identify health issues and threats.<br>– Support meaningful and holistic community engagement in land and sea management, with the support of technical staff employed in the Land and Sea Management Unit and community rangers.<br>– Provide for meaningful and sustainable employment opportunities in relation to all major land and sea management initiatives.<br>– Assist with dissemination of research results concerning heavy metal contamination of food sources to enable communities to modify consumption practices appropriately. |
| **Water supply** | ➢ Carrying capacity of islands contingent on sources of potable water | • Possible threats to long-term viability of island communities | – Sustainable water management principles and processes should be reflected in all land and sea management programs and initiatives | – Prioritise hydrological surveys and improvements to water supply systems.<br>– Develop community education programs about the importance of water conservation and management. |
| **Population change** | ➢ Improved water supplies and infrastructure<br>➢ High birth rates | • Possible threats to long term viability of island communities<br>• Depletion of island and marine resources | – Demographic issues and pressures should be reflected in all land and sea management policies and programs | – Study of population dynamics and carrying capacity of islands and the marine environment. |

### 4.3.2 Capacity

| **Regional capacity** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Institutional support and coordination**<br><br>***PI** | ➢ Currently no regional staff in place to support regional implementation of land and sea initiatives | • Implementation failure<br>• Lack of coordination | – Provision of core operational and project facilitation funding to enable the implementation of initiatives in a coordinated way throughout the region | – Establishment within TSRA of a Land and Sea Management Unit, including staff with technical and project management expertise, and an ability to work with Torres Strait Islander and Aboriginal communities to support land and sea management planning and implementation of activities. |
| **Technical support** | ➢ Lack of suitably qualified technical staff residing in the region | • Implementation failure<br>• Inappropriate projects<br>• Lack of support | – Provision of adequate technical support and assistance to communities by regional staff and visiting and agency staff to enable community land and sea management aspirations to be addressed appropriately | – Recruitment of appropriately qualified technical staff to work within the Land and Sea Management Unit on a regional basis.<br>– Provision of administrative support to the Land and Sea Management Unit.<br>– Support TSRA Board in making informed decisions on NRM and the delivery of the NHT program in the region.<br>– Support for delivery of relevant training to key staff in the Land and Sea Management Unit, as well as for community rangers employed on the outer islands and NPA.<br>– Support for mentorship and traineeship programs to enable Torres Strait Islander and Aboriginal people to participate in land and sea management activities.<br>– Improved access to tertiary courses in land and sea management related disciplines for Torres Strait Islander and Aboriginal students through provision of scholarships and internship programs. |

| Local capacity | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Local planning** | ➢ Absence of local land and sea management plans for each island | • Lack of integration of land and sea management with other community priorities | – Alignment of land and sea management policies and programs with local community issues, priorities and needs<br>– Development of local land and sea management plans for all communities in the Torres Strait region | – Regional staff employed to provide appropriate facilitation and technical support for the development of local-level land and sea management plans.<br>– Community rangers employed on outer islands to facilitate the development and implementation of land and sea management plans at the local level.<br>– Regional staff employed to assist local communities to access external funding to implement initiatives identified in local land and sea management plans. |
| **Implementation and coordination**<br><br>***PI** | ➢ Lack of funding to employ community rangers | • No dedicated positions on outer islands to develop or implement projects | – Support for the employment of community land and sea rangers to ensure the appropriate coordination of land and sea initiatives at the local level and act as a conduit between communities and regional staff | – Provision of support for the employment of community land and sea ranger positions.<br>– Provision of training for land and sea rangers in marine ecology, cultural and natural resource management, and other related disciplines.<br>– Hosting of regional workshops, forums and exchange visits to enable land and sea rangers to share knowledge and ideas and enhance regional cooperation. |
| **Monitoring** | ➢ Lack of environmental monitoring at the local level | • Lack of response to existing and emerging threats | – Encourage community-level monitoring of environmental issues | – Capacity-building and training initiatives, in collaboration with the MTSRF.<br>– Demarcation of roles and responsibilities across the region and on the part of agencies, possibly through a workshop or forum.<br>– Support for the design and implementation of community monitoring initiatives, including of significant habitats, coastal erosion processes, sea and fresh water quality, or other issues of interest to communities. |

| | | | | |
|---|---|---|---|---|
| **Sustainable employment** | ➢ Short term positions<br>➢ Lack of funding for positions | • Limited funding for dedicated environmental positions | – Provision of meaningful and sustainable employment for Torres Strait Islander and Aboriginal communities in land and sea management | – Provision of support for the employment of community land and sea ranger positions.<br>– Encourage government agencies and external funding bodies to include in project budgets a component for employing a dedicated position locally. |
| **Resourcing** | ➢ No funding for PBCs | • Limited ability to fulfil land management aspirations | – Appropriate resourcing and support to enable native title holders to engage with land and sea management initiatives | – Support for greater linkages between PBCs, the Native Title Office, and the Land and Sea Management Unit, including through the employment of a project officer to support PBC engagement in land and sea management. |
| **Technical support** | ➢ Lack of suitably qualified technical staff at the local level<br>➢ Lack of suitably qualified technical staff residing in the region<br>➢ Infrequent visits to the outer islands by technical and agency staff | • Implementation failure<br>• Inappropriate projects<br>• Lack of support for communities<br>• Lack of community ownership of initiatives | – Provision of adequate technical support and assistance to communities by regional staff and visiting and agency staff to enable community land and sea management aspirations to be addressed appropriately | – Recruitment of appropriately qualified technical staff to work within the Land and Sea Management Unit on a regional basis, and to support community land and sea rangers in undertaking local activities.<br>– Employment, training and technical support and advice to be provided for community land and sea rangers on the outer islands.<br>– Visits to outer islands and workshops for training, education and information sharing between regional staff and community rangers.<br>– Funding for the employment of local-level project officers, or community rangers, via collaborative arrangements between PBCs and island councils, possibly using CDEP top-up funding. |

**Linkages to other processes:**
- TSRA Development Plan 2005-2008
- TSRA Corporate Plan
- Community development plans

### 4.3.3 Institutional Environment

| **Governance** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Pan-Strait policy coordination**<br><br>***PI** | ➢ Lack of regional coordination of agency policies and programs<br>➢ Uncertainty and confusion regarding integration of initiatives with fisheries management regime | • Ineffective delivery of government services and programs and limited community uptake<br>• Community scepticism and confusion over agency roles and responsibilities<br>• Duplication of efforts or failure to address issues | – Enhance regional coordination of natural resource management policies and programs through improved communication within agencies and between agencies, regional representative bodies and communities | – Promote this Strategy and the role of the Land and Sea Management Unit within TSRA as possible mechanisms for external agencies and entities to align their efforts with community and regional priorities.<br>– Develop a communication strategy in relation to land and sea management initiatives in the region.<br>– Encourage improved liaison and provision of support by relevant government agencies, with coordination assistance to be provided through the Regional Facilitator on an as-needs basis.<br>– Relevant Commonwealth and State agencies administering environmental legislation to inform TSRA of the outcome of all EIS and approvals processes within their jurisdiction affecting the Torres Strait region. |
| **Regional capacity limitations**<br><br>***PI** | ➢ Insufficient staff to facilitate improved coordination<br>➢ Infrequent visits to outer island communities<br>➢ Inappropriate timeframes for community consultation | • Lack of coordination and awareness of community issues and aspirations<br>• Difficulties progressing projects in line with community needs and consultation processes<br>• Inability to support communities to develop feasible proposals and acquittal requirements | – Regional capacity is enhanced through the employment of additional technical and project management staff to support community-based land and sea management in a coordinated way | – Support for the establishment and ongoing operation of a Land and Sea Management Unit within TSRA to assist in coordinating agency efforts and in meeting community aspirations and needs for land and sea management on a regional basis.<br>– Support for regular visits by Land and Sea Management staff to communities to facilitate meetings, consult with traditional owners and local institutions, assist in developing community plans and proposals, implementing projects and meeting acquittal requirements. |

| | | | | |
|---|---|---|---|---|
| **Cape York** | ➢ Regional NRM boundary inconsistent with TSRA governance arrangements<br>➢ Need for integration with neighbouring NRM regional activities | • Risk of NPA communities perceiving that they are not adequately engaged in regional initiatives<br>• Lack of integration with Cape York NRM processes | – Ensure that land and sea management initiatives that affect resources shared by Cape York and Torres Strait communities are supported by appropriate communication and liaison activities. | – Regular updates to TSRA Board, including members for Seisia and Bamaga, to ensure that NPA issues and initiatives are integrated with broader regional land and sea management arrangements.<br>– Development of a communication strategy to guide communication and liaison between the Land and Sea Management Unit in TSRA and Cape York communities and bodies. |
| **Cross-border and Treaty issues** | ➢ Lack of thorough consultation with traditional inhabitants over shared natural resource issues<br>➢ Confusion over status of rights of PNG traditional inhabitants residing in the Torres Strait | • Failure to address underlying issues<br>• Ineffective decision-making processes<br>• Lack of policy and program coordination<br>• Unrealistic expectations<br>• Community disharmony and tensions between Torres Strait Islanders and PNG residents and visitors to the region | – Improved levels of communication and cooperation between traditional inhabitants of Torres Strait and the Western Province of PNG | – Support for greater community consultation and participation in the Treaty cycle through the TSRA mechanisms for representing Torres Strait Islander interests and issues.<br>– Support for traditional inhabitant delegates to seek input from, and provide information from Treaty meetings to, constituents.<br>– Workshops and exchange visits between Torres Strait Islanders and Papua New Guineans in the Western Province of PNG in relation to shared natural resource management issues.<br>– Improved processes for developing, coordinating and implementing bilateral initiatives in PNG through effective communication between TSRA, DEH's International Unit, DFAT and AusAID.<br>– Investigation of structural adjustment and sustainable economic development opportunities for Western Province communities to be commissioned by the relevant agencies. |

**Possible linkages to other processes:**

- Torres Strait Treaty & Treaty Meeting Cycles
- Department of Foreign Affairs & Trade
- Department of Immigration, Multicultural & Indigenous Affairs
- Customs
- Defence
- Protected Zone Joint Authority
- PNG Engagement Project and DEH's International Unit
- Australian Youth Ambassadors for Development Program
- AusAID & Other Bilateral Initiatives

| | | | | |
|---|---|---|---|---|
| **Foreign fishing activities**<br><br>***PI** | ➢ Lack of monitoring of traditional fishing activities occurring in the Western Province<br>➢ Illegal netting of dugongs, sharks and turtles by foreign vessels<br>➢ Transferable exotic diseases | • Loss of species<br>• Public health risks | – Improved regional monitoring and reporting of foreign fishing activities to relevant authorities.<br>– Improved response procedures and provision of feedback to regional institutions and communities on detection and/or detention of vessels. | – Coordinated agency efforts to address armed foreign fishing vessels through improved detection and response procedures.<br>– Employment of community land and sea rangers to undertake coastal and marine surveillance and monitoring activities. |

| **Education** | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Skills shortages**<br><br>**Access** | ➢ Environmental studies are not in school or TAFE curricula<br>➢ Lack of capacity and knowledge on the part of teachers | • School children with no understanding or appreciation of issues<br>• Lack of skills in chemistry and maths and inability to pursue tertiary studies in NRM-related fields | – Ensure that school and community education programs include a land and sea management component and are relevant to the Torres Strait<br>– Encourage more Torres Strait Islander and Aboriginal students to undertake tertiary courses in relevant fields | – Develop education kits about Torres Strait land and sea issues for incorporation in the school and TAFE curricula.<br>– Invite Elders to attend schools and accompany students on excursions to cultural and natural places of significance.<br>– Promote the importance of students undertaking maths and science subjects to enter tertiary courses in NRM-related fields, including through JCU bridging courses.<br>– Offer scholarships to Aboriginal and Torres Strait Islanders to undertake tertiary studies in cultural and natural resource management. |

**Linkages to other processes:**
– NAILSMA Study Assistance Program
– James Cook University Bridging Programs – SciTAC (Science Tertiary Access Course)

| Science and research | | | | |
|---|---|---|---|---|
| ***Issue*** | ***Problems*** | ***Threats*** | ***Management Objectives*** | ***Possible Initiatives*** |
| **Negotiated research programs** | ➢ Academic research with limited practical application<br>➢ Failure to negotiate research processes with communities<br>➢ Inappropriate communication protocols<br>➢ Confusion over intellectual property rights | • Lack of community engagement in research<br>• Offence to communities<br>• Hostility towards researchers<br>• Reluctance to share information with researchers | – Ensure that, wherever possible, communities are involved from the inception of the research process, including the development of proposals, negotiation of research outcomes and intellectual property rights, where relevant. | – Strong engagement with and ongoing provision of technical support for the Land and Sea Management Unit within TSRA by the MTSRF in terms of research priorities, processes and outcomes.<br>– Support for the employment of a Research Liaison Officer within the Land and Sea Management Unit with financial support from the MTSRF.<br>– Encouragement of researchers to liaise with staff in the Land and Sea Management Unit in relation to all research of relevance to land and sea issues being conducted in the Torres Strait to enhance coordination of information and align research efforts with regional and community priorities. |
| **Research feedback** | ➢ Inadequate provision of feedback to communities by researchers | • Lack of community understanding of implications of research<br>• Limited practical application of research outcomes | – Ensure researchers follow appropriate communication protocols with communities. | – Develop communication protocols for research in the Torres Strait with support from the MTSRF.<br>– Encourage researchers to follow communication protocols, including through provision of plain English feedback to communities on completion of research and advice about implications. |
| **Lack of dissemination** | ➢ Inadequate dissemination of government-commissioned reports to communities | • Lack of community understanding of implications of reports<br>• Limited practical application of report findings | – Ensure relevant agencies follow appropriate communication protocols with communities and adequately disseminate information throughout the region. | – Encourage government agencies to ask the TSRA/ICC whether assistance is required in disseminating reports or important information to communities to enhance the effectiveness of consultative efforts. |

| | | | | |
|---|---|---|---|---|
| **Replication** | ➢ Duplication of research programs over time | • Waste of government resources and researchers' and communities' time and effort | – Encourage the retention of key staff to enable continuity of program delivery and minimise replication of research and other processes. | – Support improved information management on a regional basis.<br>– Encourage researchers to liaise with Land and Sea Management Unit staff to discuss research priorities and needs. |
| **Information management** | ➢ Lack of a coordinated data management system for the Torres Strait<br>➢ High turnover of regional staff | • No central reference library<br>• Failure to update references and information<br>• Loss of information, data and reports<br>• Loss of institutional knowledge | – Improved information management, coordination and sharing between government agencies in the Torres Strait, regional entities and communities. | – Support for the establishment of a reference library within the Land and Sea Management Unit, including employment of an Information Manager.<br>– Encourage researchers to provide copies of reports and research findings to Land and Sea Management Unit staff. |

# 5.0 IMPLEMENTATION

The Torres Strait Regional Authority has been requested by Ministers to implement this Strategy. Significant institutional reform will be required, as activities associated with on-ground implementation and capacity-building will have to be pioneered by the TSRA in delivering this program. TSRA has extensive grant administration experience in the Torres Strait region and plays a key role in regional policy and program coordination, though service delivery and project implementation have not previously been functions performed by the TSRA in the region.

One of the priority outcomes for the Trust program is to build the capacity of the region for NRM by developing community understanding of natural systems, project management skills and the ability to leverage funding from a variety of sources. In order to achieve these outcomes, implementation of the Strategy will require a holistic community development approach which addresses capacity issues at the regional and local level, and develops both institutional and community capacity.

The funding available under the Trust Extension will not be sufficient to enable TSRA to deal with all environmental issues in the Torres Strait region in the timeframe over which the program will be implemented. However, the purpose of the Strategy is to guide decision-makers and communities in terms of the possible initiatives that may be undertaken to address some of the more pressing short-term issues using Trust funds. Importantly, the Strategy is also intended to assist government agencies and other entities with environmental responsibilities or roles in the region to align their activities and work programs with the priorities identified in this Strategy.

## 5.1 Land and Sea Management Unit

To enable the effective implementation of projects under the Strategy, and to sustain processes and outcomes beyond the funding cycle of the Trust, the TSRA intends to establish a Land and Sea Management Unit. This Unit will require additional skilled staff to coordinate program delivery and meet acquittal requirements, and support communities to develop and undertake local land and sea management projects identified as priorities.

Using funding available under the Trust as seed funding to catalyse land and sea management and coordination in the region, it is envisaged that the Unit will also engage with programs such as Landcare, Envirofund and the cross-regional Dugong and Marine Turtle Management Project. With the support of the Regional Facilitator, the Unit will also engage with other agencies delivering complementary initiatives in the region.

It is intended that this Strategy will be used to leverage additional funding from non-government and philanthropic organisations to enable the implementation of unfunded aspects of the Strategy. Ideally, the Unit would continue to operate as a self-sustaining and relatively independent arm of the organisation well into the future.

To support the activities of the Land and Sea Management Unit, the TSRA will need to collaborate with a range of different entities based within and outside of the region, including:

- Queensland and Australian Government funding bodies and approval agencies
- Queensland and Australian Government agencies with environmental functions, responsibilities and legislative obligations
- Torres Shire Council and the outer island community councils

- Native title prescribed bodies corporate
- Island Coordinating Council Infrastructure Support Unit
- consultants capable of delivering projects
- education and training service providers
- schools and community organisations.

The following delivery mechanisms may be appropriate, depending on the nature, scale and duration of projects, and the relationship with project proponents:

- allocation of funding through the TSRA Board for certain regional priority management activities
- provision of funding for the land and sea management components of Island Council development plans
- devolved grants
- expressions of interest called from suitable proponents
- commissioning specialist work, including consultancies
- developing formal partnerships, including with research organisations.

## 5.2 Risks to delivery

The consequence of poorly structured and inappropriate government intervention in Indigenous communities is usually project failure. Therefore, it is vital that the processes to implement the Trust in Torres Strait be designed to integrate with existing institutional arrangements for delivery of programs and services to island communities.

Managing the risks associated with devolved grants to proponents with varying levels of corporate governance and experience will require significant human resources to mentor, monitor, educate and negotiate.

Community-based NRM is a relatively new concept for the TSRA Board and operational staff. It will be necessary to develop the capacity of these key stakeholders whilst simultaneously implementing the Strategy.

Due to the transitional arrangements affecting island councils as they prepare to move into the local government regime, and the review of the role of the ICC and TSRA regarding service delivery arrangements, a degree of flexibility needs to be built into the future institutional arrangements for the delivery of the NRM program through TSRA.

The important role of PBCs as the recognised holders of native title land needs to be accommodated through mutually acceptable arrangements with island councils, including memoranda of understanding and indigenous land use agreements. Timeframes for negotiating with native title holders and reaching agreement need to be factored into project milestones.

## 5.3 Criteria for assessing projects

The TSRA will be required to assess project proposals and commission works against the framework of the Strategy. Recognising this, the NRM Reference Group developed a set of criteria to offer TSRA to assist in the implementation phase. The criteria developed for assessing project proposals are also useful for providing guidelines in the development of the proposals by proponents.

Three types of project proposals are likely to emerge and the criteria mix may need to be adjusted according to the type of project being considered. The types of projects are those that:

- increase the knowledge base for land and sea management
- improve processes and capacity for land and sea management
- involve on-ground actions.

*The following criteria are recommended as generic criteria to be used in considering project proposals for implementation:*

- supports natural systems
- achieves Natural Heritage Trust program objectives
- addresses priorities
- owned by the community
- builds capacity
- ease of implementation
- probability of success
- sound technical basis
- involves partnerships
- aligns with other initiatives
- avoids duplication.

In more detail, these criteria are:

*Supports natural systems*

- Are we working with or against nature?

*Achieves Natural Heritage Trust program objectives*

Can the project demonstrate that it will achieve one or more of the following:

- Protect biodiversity
- Improve sustainable natural resource use
- Build capacity
- Preserve cultural heritage and traditional knowledge.

*Addresses priorities*

- Does the project substantially address one or more priority issues in the Strategy?

*Owned by the community*

- Does the project have community acceptance, involvement and ownership from its inception?
- Does it reflect broader community aspirations and is it consistent with the community development plan?

*Builds capacity*

- Does the project build the understanding and capacity of local people to manage the region's natural resources?

*Ease of implementation*

- Is there sufficient capacity, resourcing and support to implement the project?
- Are the resources for project management, monitoring and evaluation clearly identified?

*Probability of success*

- What is the probability of success over the agreed timeline?
- What is the viability and feasibility of the project over the short and longer term?

*Sound technical basis*

- Does the project have a sound technical basis?

*Involves partnerships*

- Does the project develop or improve partnerships?

*Aligns with other initiatives*

- Does the project complement existing council, state and Commonwealth agency compliance activities, priority projects and plans?

*Avoids duplication*

- Is the work being done by someone else?

# APPENDIX 1

## LIST OF REFERENCES

### Land


Environmental Protection Agency. 2004. *Erosion on Torres Strait Islands: Inspection of Warraber, Poruma (Coconut), and Masig (Yorke) Islands.* Draft Report.

Environment Science & Services (NQ). 1994. *Torres Strait Vegetation Review and Mapping.* Consultancy report prepared for the Island Coordinating Council.

Freebody, K. 2002. *Identification of Terrestrial Areas with Biodiversity Significance in the Torres Strait Region: A Report to Prioritise Areas for Vegetation Mapping for Strategic Planning Purposes.* Consultancy report prepared for the Island Coordinating Council.

Hart, D.E. 2004. *The Importance of Sea-Level in an Inter-Tidal Reef Platform System, Warraber Island, Torres Strait.* Ph.D. Thesis. Australian Research Council, Wollongong University, Wollongong.

Jacobs, D. 1996. *Torres Strait Waste Stream Analysis.* Queensland Department of Environment, Far Northern Region.

Maunsell Australia Pty Ltd. 2003. *Torres Strait Outer Islands Regional Waste Management Strategy*. Consultancy report prepared for the Island Coordinating Council.

Wannan, B., and Buosi, P. 2003. *Vegetation Mapping & Environmental Values of Mer and Moa Islands*. Consultancy report prepared for the Island Coordinating Council, Natural Resource Assessments Pty Ltd, Cairns.


### Sea


Andrews, G. 1993. *Literature Review of Torres Strait Marine Resources*. Whitsunday District Office, Queensland Department of Environment and Heritage, Airlie Beach

Australian Government 2003. *Identification and protection of special areas and particularly sensitive sea areas: Extension of existing Great Barrier Reef PSSA to include the Torres Strait Region*. Submitted to the UN Marine Environment Protection Committee, 49th Session.

CRC Reef Research Centre 1994. *Great Barrier Reef and Torres Strait Shipping Study, Volume 2 – Inner/Outer Route Risk Assessment.*

Dews, G. J. and Harris, A. 1995. 'Monitoring Islander seafood catches in the Torres Strait' in G.C. Grigg, P.T. Hale and D. Lunney (eds), *Conservation Through Sustainable Use of Wildlife*. Centre for Conservation Biology, The University of Queensland, St Lucia, pp. 145-150.

Environment Australia (2003) *Draft Information paper on biological resources shared between Australia, PNG & Indonesia*.

Great Barrier Reef Shipping Review Steering Committee 2001. *Review of ship safety and pollution prevention measures in the Great Barrier Reef.*

Haines, A.K., Williams, G.C. and Coates, D. (eds) 1986. *Torres Strait Fisheries Seminar, Port Moresby, 11-14 February 1985*. Australian Government Publishing Service, Canberra.

Harris, P. 2001. *Environmental management of Torres Strait: a marine geologist's perspective*. Geological Society of Australia Special Publication 21, pp 317-328.

IRC Environment. 2005. *Risk Assessment of Potential Seabed Exploration and Exploitation of Minerals and Petroleum in the Torres Strait.* Consultancy report prepared for the National Oceans Office.

Johannes, R.E., and MacFarlane, J.W. 1991. *Traditional Fishing in the Torres Strait Islands*. CSIRO Division of Fisheries, Hobart.

Kiessling, I. 2003. *Finding Solutions: Derelict Fishing Gear and Other Marine Debris in Northern Australia*. Report prepared for the National Oceans Office and Department of Environment and Heritage, Hobart.

Kwan, D., Dews, G., Bishop, M. and Garnier, H. 2001. 'Towards community-based management of marine resources in Torres Strait' in R. Baker, J. Davies, J. and E. Young, (eds.) *Working on Country: Contemporary Indigenous Management of Australia's Lands and Coastal Regions*, Melbourne: Oxford University Press, Melbourne, pp. 214-230.

Kwan, D. and Smyth, D. 2005. *NAILSMA Dugong & Marine Turtle Project Regional Activity Plan for Torres Strait (RAPTS).* Proposal prepared for the Torres Strait Regional Authority.

Lawrence, D. and Dight, I.J. 1991. 'The Torres Strait baseline study: environmental protection of a tropical marine environment in northern Australia' in O. T. Magoon, L. T. Tobin, H. Converse, V. Tippie and D. Clarke (eds), *Coastal Zone '91 : Proceedings of the Seventh Symposium on Coastal and Ocean Management, Long Beach, California, July 8-12, 1991*. American Society of Civil Engineers, New York, Volume 2, pp. 1125-1139.

*Marine Strategy for the Torres Strait 1998.* Island Coordinating Council, Thursday Island.

Mulrennan, M., Hanssen, N. and Island Coordinating Council 1994. *Marine Strategy for the Torres Strait – Policy Directions*, Canberra.

National Oceans Office. 2004. 'Key Species: A Description of the Key Species Groups in the Northern Planning Area'. *National Oceans Office Background Paper*, National Oceans Office, Hobart.

National Oceans Office. 2004. 'Snapshot of the Northern Planning Area'. *National Oceans Office Description Paper*, National Oceans Office, Hobart.

Neil, K.M., Hilliard, R., Clark P. and Russell B. 2005. A situation and gap analysis of IMS, vectors, nodes and management arrangements for the Northern Planning Area: an independent report undertaken for the National Oceans Office Branch of the Department of the Environment and Heritage by CRC Reef USR and MAGNT, Australian Government Department of the Environment and Heritage, Parkes ACT.

Pitcher, R., Condie, S. and Ellis, N., et al. 2004. *Torres Strait Seabed & Water-Column Data Collation, Bio-physical Modelling and Characterisation*, Project No. NOOC2003/010, Report prepared by CSIRO Marine Research for the National Oceans Office, Hobart.

Staples, J. 1992. 'Islands at risk: Torres Strait', *Habitat Australia*, 20(2), 26-30.

Taranto, T.J. and Pitcher, C.R. 2004. *Torres Strait AFMA Research Report and Data Archive*, AFMA Project No. R02/1193, CSIRO Marine Research, Cleveland.

*Torres Strait Contingency Action Plan: Torresplan.* Maritime Safety Queensland.

*Torres Strait Strategic Marine Research Plan 2005 – 2010.*

Wasaga , E. 2003. *Torres Strait & Northern Peninsula Area Business Profile*. Torres Strait Regional Employment Committee.

## People

Arthur, W.S. 1990. 'Sustainable development: possibilities and limitations to indigenous economic development in the Torres Strait', in D. Lawrence and T. Cansfield-Smith (eds.) *Sustainable development for traditional inhabitants of the Torres Strait region*, Workshop Series No. 16, Great Barrier Reef Marine Park Authority, Townsville, pp.17.

Arthur, W.S. 1991. 'The implications of the CDEP scheme for the economic development and employment of Islanders in the Torres Strait', *Australian Aboriginal Studies*, No. 1, 25-38.

Arthur, W.S. 1991. 'The prospects for employment equity in remote areas: the Torres Strait Case', in J.C. Altman (ed) *Aboriginal employment equity by the year 2000*, Research Monograph No. 2, Centre for Aboriginal Economic Policy Research, The Australian National University, Canberra, pp.14.

Arthur, W.S. 1996. 'Torres Strait Islanders', in J.C. Altman and J. Taylor (eds.) *The National Aboriginal and Torres Strait Islander Survey 1994: Findings and Future Prospects*, Monograph No. 11, Centre for Aboriginal Economic Policy Research, The Australian National University, Canberra, pp.8.

Arthur, W.S. 1997. 'National Aboriginal and Torres Strait Islander Survey 1994', *Torres Strait Islanders Queensland*, ABS Cat. No. 4179.3, Australian Bureau of Statistics/CAEPR, Canberra, pp.35.

Arthur, W.S. 1999. 'Towards a comprehensive regional agreement: Torres Strait', In Edmunds, M. (ed.) *Regional Agreements: Key Issues in Australia*, Volume 2, Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra, pp.17.

Arthur, W.S. 2001. Current developments in the Pacific: Autonomy and identity in Torres Strait, a borderline case? *The Journal of Pacific History*, 36(2), pp 215-224.

Arthur, W.S. and McGrath, V. 1989. *Torres Strait Development Study, 1989*, Australian Institute of Aboriginal Studies, Canberra.

Arthur, W.S. and McGrath, V. 1990. *Torres Strait Development Study 1989*, Report prepared for the Island Coordinating Council, Australian Institute of Aboriginal Studies, Canberra.

Arthur, W.S. and Taylor, J. 1995. 'The comparative economic status of Torres Strait Islanders in Torres Strait and mainland Australia', *Australian Aboriginal Studies*, 1995 No. 1, 18-29.

Arthur, W.S., Hughes, J.P., and McGrath, V. 2004. 'Careers and Aspirations: Young Torres Strait Islanders, 1999-2003'. *CAEPR Discussion Paper No.259*, CAEPR, ANU, Canberra.

Beckett, J. 1987. *Torres Strait Islanders: Custom and Colonialism*. Cambridge University Press, Cambridge.

Beckett, J. 1999. 'Torres Strait Islanders', in R.B. Lee and R.H. Daly (eds) *The Cambridge Encyclopedia of Hunters and Gatherers*. Cambridge University Press, Cambridge, pp.358-362.

Community Development Plans for all Outer Island Communities.

Davis, R. (ed.) 2004. *Woven Histories, Dancing Lives*. Aboriginal Studies Press, Canberra

Fitzpatrick, J.M. 2001. 'The Torres Strait Islanders of Australia', in J.M. Fitzpatrick (ed.) *Endangered Peoples of Oceania: Struggles to Survive and Thrive*. Greenwood Press, Westport, Connecticut, pp. 213-231.

Fourmile, H. 1996. *Making Things Work: Aboriginal and Torres Strait Islander Involvement in Bioregional Planning.* Consultancy report prepared for the Department of Environment, Sport and Territories, Canberra.

Governance Partners Australia. 2005. *Review of the Torres Strait Treaty Natural Resource Management Governance Arrangements.* Consultancy report prepared for the Department of the Environment & Heritage and the Department of Agriculture, Fisheries & Forestry.

Kung, J. 2002. *An Economic Appraisal of a Ranger Programme on six Torres Strait Islands.* Queensland Department of Primary Industries, Queensland Fisheries Service, Brisbane.

Laffan, J.M. 1991. 'The Torres Strait Treaty and the Environment: Sustainable Development for Traditional Inhabitants of the Torres Strait Region', in *Proceedings of the Torres Strait Baseline Study Conference*. Great Barrier Reef Marine Park Authority.

Lawrence, D. 1994. 'Customary Exchange Across Torres Strait', *Memoirs of the Queensland Museum*, 34(2), 241-446.

Lawrence, D., and Cansfield-Smith, T. (eds.) 1991. *Sustainable Development for Traditional Inhabitants of the Torres Strait Region*. Proceedings of the Torres Strait Baseline Study Conference, Kewarra Beach, Cairns, Queensland, 19-23 November 1990. Great Barrier Reef Marine Park Authority, Townsville.

Lumb R.D. 1981. 'Legal aspects of the Torres Strait Treaty', in Boyce PJ & MWD White, *The Torres Strait Treaty: A Symposium.*

McNiven, I.J., and Hitchcock, G. 2004. 'Torres Strait Islander marine subsistence specialisation and terrestrial animal translocation', in McNiven, I.J., and Quinnell, M. (eds.) 2004. Torres Strait Archaeology and Material Culture. Memoirs of the Queensland Museum (Cultural Heritage Series) 3(1), 105-162.

McNiven, I.J., and Quinnell, M. (eds.) 2004. Torres Strait Archaeology and Material Culture. Memoirs of the Queensland Museum (Cultural Heritage Series) 3(1).

Menham, G., and Skehill, S. and Young, P. 2002. *A Fair Share of the Catch: Torres Strait Treaty Independent Advisory Panel Report.* Torres Strait Protected Zone Joint Authority.

Nietschmann, B. 1989. 'Traditional Sea Territories, Resources and Rights in Torres Strait' in J. Cordell (ed.) *A Sea of Small Boats*, Cultural Survival Inc., Cambridge, Massacusetts, pp. 60-93.

Office of Economic and Statistical Research. 2004. *A Socio-Economic Overview of the Northern Planning Area*. Report prepared for the National Oceans Office, Hobart.

Office of Economic and Statistical Research 2004. *Local Government Area Profile: The Torres Strait Region*.

Report of the House of Representatives Standing Committee on Aboriginal and Torres Strait Islander Affairs on Greater Autonomy for Torres Strait Islanders. 1997. *Government Response to Torres Strait Islanders: A New Deal.*

Sanders W., and Arthur, W.S. 2001. *Autonomy rights in Torres Strait: from whom, for whom, for or over what?* CAEPR. Discussion Paper No. 215.

Seebohm, K., and Morvell, G. 1998. 'Towards and integrated sustainable development management system for Torres Strait'. *Australian Geographical Studies*, 36(1), pp 82-93.

Walker, D. (ed.) 1972. *Bridge and Barrier: The Natural and Cultural History of Torres Strait*. Australian National University, Canberra.

Woodroffe, C.D., Kennedy, D.M., Hopley, D., Rasmussen, C.E. and Smithers, S.G. 2000. 'Holocene reef growth in Torres Strait.' *Marine Geology* 170, 331-346.

Torres Strait Regional Authority Annual Reports, 1994 – 2004/5

Torres Strait Regional Authority Development Plan 2004 – 2008