

**BURNETT MARY REGION  
NATURAL RESOURCE MANAGEMENT PLAN**

**COASTAL AND MARINE DEVELOPMENT  
TECHNICAL PAPER**

Prepared for:

**BURNETT MARY REGIONAL GROUP FOR  
NATURAL RESOURCE MANAGEMENT INC.**

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## 1.0 INTRODUCTION

### 1.1 BACKGROUND

The Burnett Mary Regional Group for Natural Resource Management Inc (BMRG) is preparing a regional natural resource management plan (NRM Plan) under the auspices of the National Action Plan for Water Quality and Salinity and the Natural Heritage Trust. The region (see Figure 1.1) covers the catchments of the:

- Mary, Kolan, Burnett, Auburn, Boyne, Elliott, Gregory, Isis and Burrum Rivers, and
- Baffle and Barambah Creeks.

The regional boundary also extends offshore to include Fraser Island, Great Sandy Strait and adjacent coastal and marine areas. The following local governments have areas of coastline (including rivers with tidal movement) within the region:

- Miriam Vale Shire,
- Burnett Shire,
- Bundaberg City,
- Isis Shire,
- Hervey Bay City,
- Maryborough City,
- Tiaro Shire, and
- Cooloola Shire.

This Technical Paper on Sustainable Development of Coastal and Marine Areas is one of a series of technical papers that are intended to provide input into the preparation of the regional NRM Plan. The technical papers are based on the following six primary regional assets and associated themes:

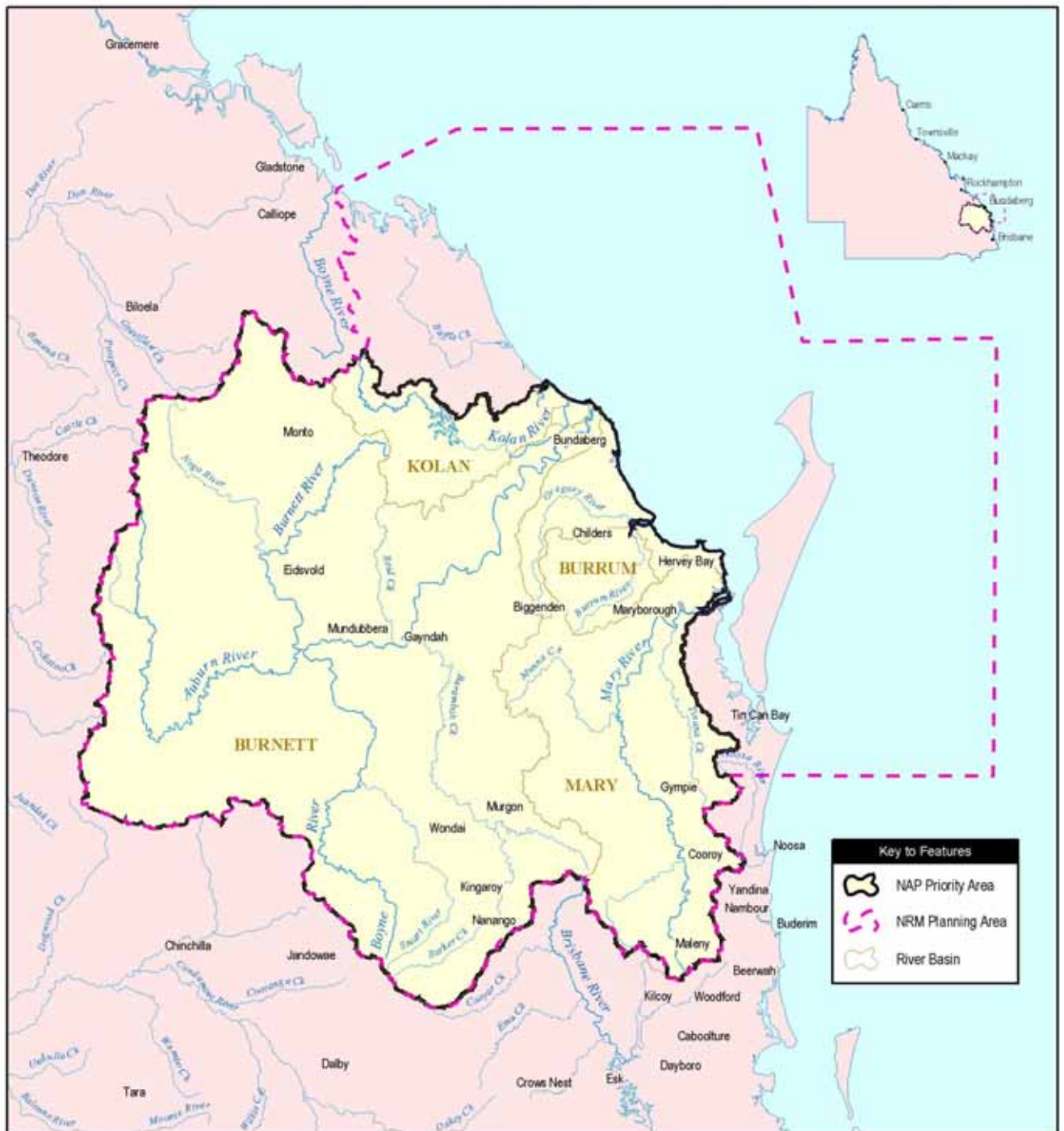
#### 1. **Biodiversity**

- a. Coastal and marine biodiversity
- b. Freshwater biodiversity
- c. Terrestrial biodiversity

#### 2. **Coastal and Marine Resources**

- a. Sustainable development of coastal and marine areas
- b. Sustainable utilisation of coastal and marine resources

FIGURE 1.1: MARY BURNETT REGION



### **3. Land Resources**

- a. Landscape management and infrastructure
- b. Sustainable primary production

### **4. Lifestyle and People**

- a. Community development
- b. Knowledge, research, education and training

### **5. Natural and Cultural Heritage**

- a. Indigenous cultural heritage
- b. Natural and Cultural Heritage (Non-indigenous)

### **6. Water Resources**

- a. Water Infrastructure and Use
- b. Water Quality – Estuarine and Marine
- c. Water Quality – Fresh

## **1.2 TERMS OF REFERENCE**

The guidelines for development of Regional NRM Plans and Regional Investment Strategies require consideration of the 'full range' of relevant natural resource management issues across terrestrial, freshwater, coastal, estuarine and marine ecosystems. The primary intent of this Technical Paper on sustainable development of coastal and marine areas is to summarize and interpret the existing knowledge base to provide information on:

- coastal and marine values (and where possible the significance of these values),
- threats to values by type and location (both current and likely future),
- an initial assessment of risk, taking into account both threats and likely consequences,
- suggested performance targets (short and medium term) consistent with long term aspirations,
- the identification of management needs and the extent to which current management arrangements meet these needs,
- the identification of unmet management needs and critical information gaps,
- suggestions for priority actions and possible implementation mechanisms,
- an initial assessment of the implications (social, economic, cultural and environmental) of priority actions, and
- provision of inputs into the regional monitoring and evaluation program.

The methodological approach is illustrated in Figure 1.2.

The terms of reference require that technical papers should be concise and objective. They are to be written in a style that is understood by the general reader and approximately 5,000 words in length (excluding References and Appendices).

In the preparation of this paper, the term 'coastal' has been interpreted to include the following land zones as defined in the delineation of Queensland's Bioregional Ecosystems (Sattler and Williams, 1999):

- Land Zone 1 – Quaternary marine deposits, subject to periodic inundation by saline or brackish marine waters. Includes mangroves, salt pans and offshore tidal flats. Soils are predominantly saline muds or solonchaks.
- Land Zone 2 – Quaternary coastal dunes and beaches. Includes associated degraded dunes, sand plains, swales, dune lakes and swamps, as well as coral and sand cays. Soils are predominantly siliceous or calcareous sands, podzols or peats.

This definition includes the coastal sand masses of the Great Sandy Region (including Fraser Island). However, it should also be noted that where necessary (eg to include consideration of activities that may have a direct input on coastal values) the definition of 'coastal' may be extended beyond Land Zones 1 and 2. Marine areas include waters, seabed and associated biota extending out to the boundary of the Burnett Mary Region (see Figure 1.1). The northern end of the marine region also includes the southernmost area of the Great Barrier Reef Marine Park and in particular Boulton, Hoskyn, Lady Fairfax, Lady Musgrave and Lady Elliott Reefs.

Quite clearly there are areas of overlap between the technical papers. In this Technical Paper, the approach to threats and values attempts to be comprehensive. However, in developing responses and actions (for example in relation to water quality, water resources management and cultural heritage) reference may be made to technical papers that deal specifically with these themes.

### **1.3 SOURCES OF INFORMATION**

This Technical Paper is based on existing knowledge. The primary information sources have been published reports and papers (see selected bibliography in Chapter 6.0). Where necessary, direct follow-up with agencies and community groups has been undertaken. Limited field inspections of some coastal areas have been undertaken as part of this project. The report also relies on the past experience of the author who has worked extensively over coastal and marine parts of the region over the past 20 years.

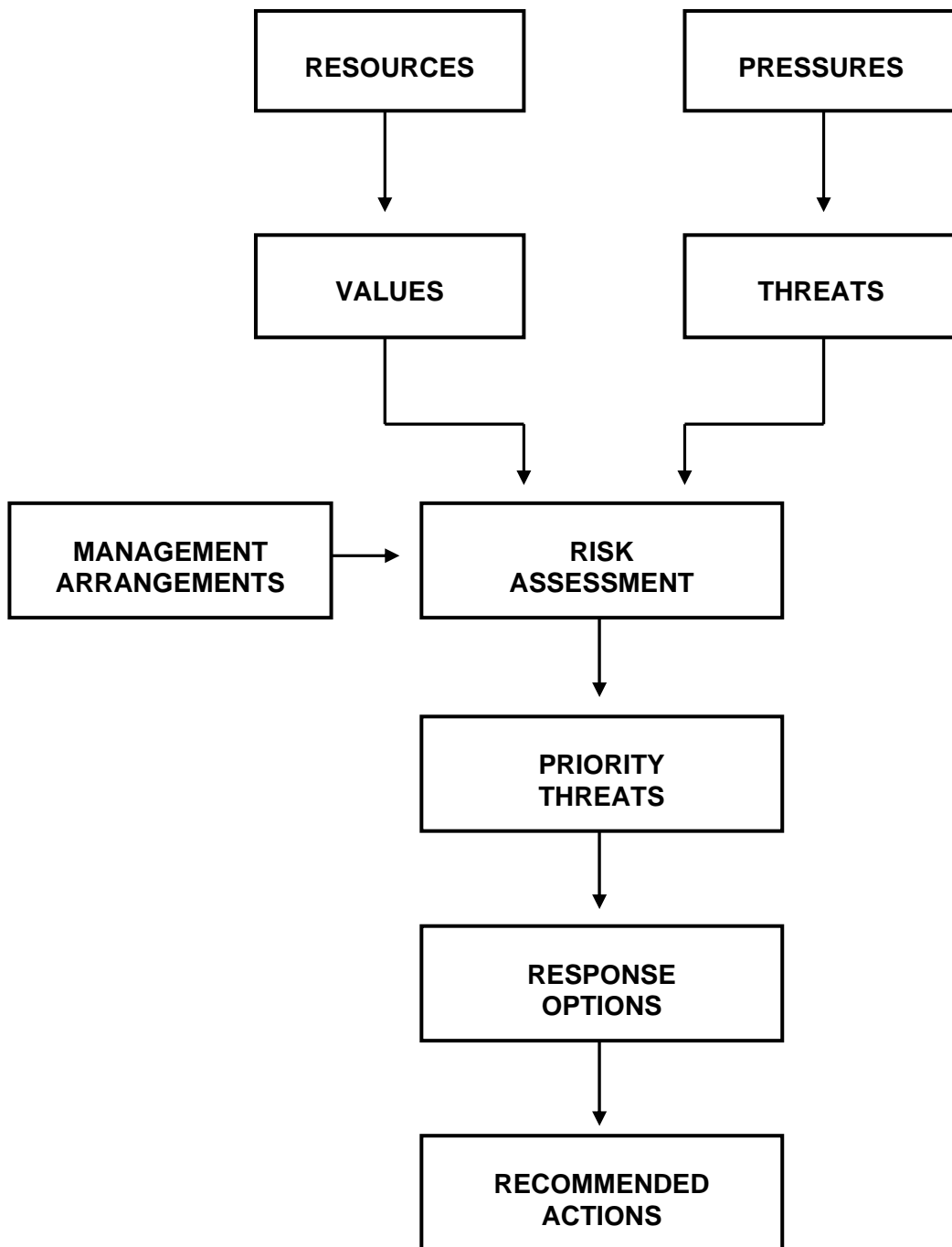


FIGURE 1.2: METHODOLOGY

#### **1.4 ACKNOWLEDGEMENTS**

Preparation of this Technical Paper would not have been possible without the professional and timely assistance provided by officers of the Burnett Mary Regional Group for Natural Resource Management Inc. Special thanks are extended to Deborah Scott, Kris Kristensen and Sue Sargent.

Collection of information was greatly assisted by officers from the Environmental Protection Agency; Dept. of Natural Resources and Mines; Dept. of Local Government, Planning, Sport and Recreation; Dept. of Primary Industries and Fisheries; Queensland Transport; and several of the coastal Councils within the region. Feedback provided on draft reports by the BMRG Technical Advisory Group is also gratefully acknowledged.

## 2.0 COASTAL AND MARINE VALUES

### 2.1 REGIONAL OVERVIEW

All or part of the coastal and marine sections of the Burnett Mary Region are included and described within:

- the Tweed-Moreton (TMN), Shoalwater Coast (SCT) and Mackay-Capricorn (MCN) Marine Regions as described in Version 3.3 of the Interim Marine and Coastal Regionalisation for Australia (IMCRA Technical Group, 1998),
- the Wide Bay Coast regional description contained in the Queensland State Coastal Management Plan (Environmental Protection Agency, 2001),
- the Coastal Wetland Resources Assessment from Round Hill Head to Tin Can Inlet (Bruinsma and Danaher, 2000),
- the reports of the Commission of Inquiry into the Conservation, Management and Use of Fraser Island and the Great Sandy Region (see for example Fraser Island Commission of Inquiry 1990a,b),
- the Nomination of the Great Sandy Region for Inclusion in the World Heritage List (Hemmings and Sinclair, 1984),
- the Beach Protection Authority's report into the Hervey Bay Beaches (BPA, 1989),
- the Overview of the Scenic Resources of the Queensland Coast (EDAW Aust., 1997),
- reports of the Wide Bay 2020 Regional Planning Project (see for example Natural Resources and Non Urban Environment Working Group, 1997), and
- the Discussion Paper regarding the proposal to develop and declare the Great Sandy Marine Park: Northern Section (Environmental Protection Agency, 2002).

The regional coastline extends from the mouth of the Boyne River (Tannum Sands) in the north to the Cooloola Coast in the south and includes Fraser Island. Including islands, the total length of coastline is approximately 1,500 kms. Of this total length, approximately 500 kms of coastline consists of beaches and dunes.

As noted in Environmental Protection Agency (2001: p81), the regional coastline includes:

*'landforms ranging from high-energy surf beaches to extensive sheltered embayments and estuarine areas. Large dunal formations are represented by the Cooloola area and Fraser Island, while areas such as Tin Can Bay, Great Sandy Strait and Hervey Bay contain extensive mangrove stands, mudflats and seagrass beds. Scenic rocky headlands are also well represented by sites such as Round-Hill Head, Bustard Head, Burnett Heads, Elliott Heads, Indian Head and Waddy Point.'*

Fraser Island provides protection from ocean waves for most of the mainland coastline. Wave action predominates along the Cooloola coast and gradually increases as the coastline becomes more exposed to the north. In the lee of Fraser Island, coastal features are mainly tidally dominated (Beach Protection Authority, 1989). Tides within the region are mainly semi-diurnal (ie. two high and low tides per day). Maximum tidal ranges are between 2.2 and 4.7 metres.

Coastal sediments that are transported and deposited along the coastline arise from fluvial, continental shelf and shoreline sources (Beach Protection Authority, 1989). Fluvial sediments are mainly supplied by the Mary and Burnett Rivers. The Mary River is the main source of sediments to Great Sandy Strait. Sediment supplied by the Burnett River is subject to both wave and tidal currents – these sediments are sorted with sand being supplied to beaches to the north.

The continental shelf supplies sediments in two ways. Firstly, in Great Sandy Strait, Pleistocene sands are reworked to form tidal deltas. Secondly, north of Burrum Heads, wave activity transports sand landwards onto beaches. The principal shoreline source of sediments is from erosion along the western shoreline of Fraser Island (Beach Protection Authority, 1989).

Erosion and accretion of coastal sediments are naturally occurring processes in the region. These processes become ‘problems’ where, for example, they threaten inappropriately located coastal development or fill navigation channels. Most erosion ‘problems’ within the region are associated with:

- movement of river and creek mouths (eg. at the mouth of the Burrum River, Beelbi Creek (Toogoom), Kolan River and Theodolite Creek),
- erosion caused by stormwater drainage (eg. at Urangan and at beaches west to Pialba), and
- realignment of coastlines in response to tidal currents and storm erosion (eg. at Urangan and Kellys Beach).

As a result of past development practices, there are sections of the coastline where urban development has occurred in erosion prone areas and in areas subject to storm surge inundation. In some locations, seawalls and revetments have been constructed to protect private property. Examples may be found at Burrum Heads, Toogoom, Scarness and Urangan.

As described in Table 2.1, there are two main types of coastal landscapes in the region. These are 'low intensity coastal plains' and 'major peninsula and island groups'.

**TABLE 2.1: COASTAL LANDSCAPES**

| <b>COASTAL LANDSCAPE TYPE</b>     | <b>DESCRIPTION</b>                                                                                                                         | <b>OCCURRENCE IN BURNETT MARY REGION</b>                                                                                                                                     |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Low Intensity Coastal Plains      | Gently undulating lowlands and plains with a range from rural to low intensity townships and urban areas to semi-natural and natural areas | <ul style="list-style-type: none"> <li>- Cooloola</li> <li>- Mary River Plain</li> <li>- Burnett River Basin</li> <li>- Baffle Creek</li> <li>- Seventeen Seventy</li> </ul> |
| Major Peninsula and Island Groups | Significant peninsulas and island(s) that have strong visual links with the mainland coast                                                 | <ul style="list-style-type: none"> <li>- Great Sandy Region (including Fraser Island, Cooloola coast and Inskip Peninsula)</li> </ul>                                        |

Source: EDAW Aust., (1997)

Coastal wetland resource assessments undertaken by the Dept. of Primary Industries (QDPI, 2000) have divided the coastline from Round Hill Head to Tin Can Inlet into the following three sub-regions based upon the exposure to wind and wave energy and the corresponding extent of coastal vegetated wetland community development:

- The most sheltered area containing the largest area of coastal wetlands and intertidal flats extends northward from Tin Can Inlet, through Great Sandy Strait and up to the Burrum River. The sand mass of Fraser Island shelters this area from open ocean wave action.
- The coastline from Burrum Heads to Round Hill Head is more exposed. In this section of the study area, coastal wetland communities have established in the protected estuaries of creeks and rivers. These estuaries also provide the most extensive intertidal flats along this section of coastline.
- The eastern shoreline of Fraser Island and the mainland to the south from Bullock Point to Double Island Point is exposed to open ocean wave action. With the exception of seasonal lagoons, no suitable environments for the establishment of coastal wetland communities exist in this section of the coastline.

The regional coastline is subject to cyclone activity between December and April inclusive. Three notable cyclones (Dinah, Daisy and Simon) have passed close to Hervey Bay since 1960. The Beach Protection Authority has estimated that storm surge levels could be as high as 3.17 metres and 3.5 metres above AHD for 1 in 50 and 1 in 100 year events respectively.

## 2.2 SUMMARY OF VALUES

A summary of regional coastal and marine values is provided in Appendix 1 under the headings of:

- geomorphological values,
- coastal and marine habitat values,
- species of conservation significance,
- cultural heritage values,
- economic values,
- landscape and scenic amenity values,
- recreational values, and
- knowledge values.

This information confirms the importance of the regional coastline and adjacent marine areas across the entire suite of values. It also confirms that high natural values extend across all coastal and marine areas.

At the same time, it is also possible to identify a number of key coastal and marine areas that stand out by virtue of their intrinsic special natural resource values. These key areas for Regional NRM Planning include:

- **The reefs of the southern Great Barrier Reef.** Boulton Reef and Hoskyn, Fairfax and Lady Musgrave Islands and Reefs are the southernmost reefs and islands of the Bunker Group. Further south, Lady Elliott Island is a vegetated shingle cay with a drying platform reef.
- **Rodds Bay.** An extensive mangrove area with a variety of different mangrove zones. One of only two estuaries in the Tannum Sands to Round Hill Heads area where *Cerriops tagal* var. *tagal* occurs. High fisheries productivity and important habitat for a variety of commercial and recreational fish, prawn and crab species.
- **Pancake Creek.** A relatively undisturbed and productive estuarine area with a coral reef near its mouth that is of scientific interest and of considerable local habitat value.
- **Seventeen Seventy/Agnes Waters.** This area includes the Round Hill Creek estuary and covers areas of mangroves, seagrass, samphire and claypan. It is also included by virtue of the high scenic amenity of this section of coastline.
- **Baffle Creek estuary.** The mouth of Baffle Creek and other associated catchments of the Baffle Basin are identified as the only near pristine estuaries in south-east Queensland.

The area is a mosaic of saltmarshes, freshwater swamps, coastal sand dunes and mangrove communities. It was identified as part of a 'key coastal area' in Stanton and Morgan (1977).

- **Woongarra Coast.** The Woongarra coast between Burnett Heads and Elliott Heads is home to the most southerly coastal fringing coral reefs on the eastern Australian mainland. Coral reefs (both hard and soft coral) are found adjacent to most rocky foreshores. These reefs support a high diversity of nudibranchs (colourful marine snails without shells). They also support a wide variety of fish species due to their close proximity to nursery areas such as estuaries and wetlands. These reefs are recognised as providing some of Australia's best shore-dive sites.
- **Burrum River mouth.** This site includes the extensive intertidal flats at the mouth of the Burrum River together with the mangrove and saltflat systems in adjacent estuaries. The major habitat types include seagrass beds, mangrove low forests, saltmarsh, sandflats exposed at low tide, beach ridges and closed heath communities. The area is habitat for at least 21 species of migratory birds and it is an area where several plant species approach their geographical limit.
- **Wide Bay Military Training area.** The training area covers almost all of the catchments of Kauri, Teebar and Snapper Creeks. The estuaries of these creeks contain mangrove forests, claypans and salt flats. Seagrass beds are located just offshore and freshwater wetlands are extensive. The site is noted for its avian fauna (250 species of birds recorded). It is also habitat for Ground Parrots and the Water Mouse (formerly False Water Rat).
- **Hervey Bay.** The entire Hervey Bay area is of special conservation value by virtue of:
  - the diversity of marine fauna,
  - populations of migratory shorebirds,
  - its dugong population, and
  - its role as a resting area for Humpback Whales and their calves on their southward migration.
- **Great Sandy Strait.** The entire Great Sandy Strait (including Tin Can Bay) is listed as a Ramsar wetland. It is the largest area of tidal swamps within the south-east Queensland bioregion and is one of only three double-ended sand passage estuaries in Queensland. The Strait is an exceptionally important feeding ground for migratory shorebirds. It provides feeding grounds for dugong and turtles and is an important nursery and feeding ground for prawns and fish. The mangrove communities represent a transition between temperate and tropical fauna.

- **Great Sandy Region.** This area includes both Fraser Island and the Cooloola sandmass. The Region contains the oldest and largest number of independent coastal dune systems recorded in the world. It contains the world's largest and highest perched dune lakes and a wide variety of intact vegetation and habitat types. Fraser Island is listed as a World Heritage Area.

## 2.3 CONDITION AND TRENDS

Limited information on the condition and trend of coastal and marine resources is available in a number of publications including Zeller (1998), Queensland Government (2003) and reports prepared as part of the Wide Bay 2020 regional planning study ([www.wb2020.qld.gov.au](http://www.wb2020.qld.gov.au)).

Some key points that emerge from this material are that:

- Seagrass beds and their dependent fauna are extremely susceptible to inflows of sediment from the mainland. More than 1,000 sq km of seagrass meadows were lost in Hervey Bay in February 1992 following two large floods in the Mary and Burrum Rivers (Preen 1993). As a consequence, the population of dugongs in the area decreased from an estimated 1466 individuals in 1988 to 92 in late 1992 (Marsh and Corkeron, 1997).
- The total area of mangroves and saltmarshes is relatively stable.
- There is believed to be evidence of deterioration in some of the fringing reefs on the Woongarra coast due to discharges of stormwater and/or treated sewage effluent.
- Estimates of loggerhead turtle numbers at Mon Repos 'show a decrease in the rate of decline'. This is believed to be due to the introduction of turtle exclusion devices (TEDs) on trawlers and the proclamation of the Woongarra Marine Park.
- Counts of migratory humpback whales in Queensland waters and Hervey Bay indicate increasing population numbers.

## 2.4 SIGNIFICANCE OF VALUES

Appendix 1 shows that the coastal and marine areas of the Burnett Mary region possess:

- a package of ecological values associated with geomorphology, coastal and marine habitats and species of special conservation significance,
- a package of cultural heritage values associated with both indigenous and non-indigenous settlement and activity,
- a package of economic values associated with tourism, transport, commercial fishing, aquaculture and other resource extraction activities,
- a package of values associated with landscape and scenic amenity,

- a package of values associated with water and shore-based recreation, and
- a package of knowledge values associated with education and research.

An indication of the relative significance of these values is provided in Table 2.2.

**TABLE 2.2: SIGNIFICANCE OF VALUES**

| <b>CATEGORY OF VALUE</b>    | <b>LEVEL OF SIGNIFICANCE</b>      |
|-----------------------------|-----------------------------------|
| Ecological values           | Of International significance     |
| Cultural heritage values    | At least of State significance    |
| Economic values             | At least of State significance    |
| Landscape and scenic values | At least of National significance |
| Recreational values         | Of National significance          |
| Knowledge values            | Of International significance     |

**Source:** Compilation by Author, based on information presented in Appendix 1.

## **2.5 PROTECTION OF VALUES**

There is widespread recognition within all levels of government, and within the community at large, of the coastal and marine values of the region. This recognition has led to a wide range of management instruments aimed at protecting these values. Such instruments include:

- the listing of the Great Barrier Reef region and Fraser Island as World Heritage properties,
- the listing of Great Sandy Strait (including Tin Can Bay) as a Ramsar Wetland,
- the Gazettal of seven 'Management A' and nine 'Management B' Fish Habitat Areas along this section of coastline,
- the gazettal of Dugong Protection Areas in Rodds Bay and Hervey Bay – Great Sandy Strait,
- the enactment of the Great Barrier Reef Marine Park over reefs in the northern section of the region,
- the enactment of two Queensland Marine Parks over the Woongarra Coast and eastern Hervey Bay – there is a current proposal to considerably extend the extent of Queensland Marine Parks in the region,
- closure of areas to particular types of fishing under Queensland Fisheries legislation, and
- a number of Protected Areas (National Parks and Conservation Parks) covering most of the Great Sandy Region and several coastal/estuarine areas on the mainland coast.

### 3.0 REGIONAL NATURAL RESOURCE TARGETS

#### 3.1 NATIONAL FRAMEWORK

The National Framework for NRM Standards and Targets sets out the principles and requirements for standards and targets. In so far as coastal and marine development is concerned, the national natural resource outcomes of most relevance are:

*Outcome 2: Biodiversity and the extent, diversity and condition of native ecosystems are maintained or rehabilitated.*

*Outcome 3: Populations of significant species and ecological communities are maintained or rehabilitated.*

*Outcome 4: Ecosystem services and functions are maintained or rehabilitated.*

*Outcome 5: Surface and groundwater quality is maintained or enhanced.*

*Outcome 6: The impact of threatening processes on locations and systems which are critical for conservation of biodiversity, agricultural production, towns, infrastructure and cultural and social values, is avoided or minimised.*

#### 3.2 STATE COASTAL MANAGEMENT TARGETS

Coastal management targets for the State of Queensland are contained in the 2001 State Coastal Management Plan (a statutory instrument prepared under the *Coastal Protection and Management Act 1995*). The State Coastal Plan sets out the following vision statement for Queensland's coast:

*'Queensland's coast – the dynamic strip that straddles land and sea – is recognised as a precious part of our landscape, and government, industry and community work together to understand its natural systems, protect and rehabilitate important areas and ensure that our activities and settlements are sustainable.'*

The Plan also contains a set of ten coastal management outcomes. Amongst these outcomes are the following that apply directly to natural resource management:

- use and development of the coastal zone occurs in an ecologically sustainable manner,
- the coast is managed to allow for natural fluctuations to occur including any that occur as a result of climate change and sea level rise and provide protection for life and property,
- water quality in the coastal zone is maintained at a standard that protects and maintains coastal ecosystems and their ability to support human use,
- coastal ecosystems, including their ecological processes, opportunities for survival, biological diversity and potential for continuing evolutionary adaptation are maintained, enhanced and restored,

- coastal management is coordinated and integrated across all levels of government and within the community, and
- research programs, and data and information collection and management focus on, support and enhance effective coastal management.

### 3.3 REGIONAL TARGETS

#### (i) Aspirational targets

Aspirational targets describe the desired condition of natural resources in the longer term (20-50 years). Aspirational targets for natural resource management in the Wide Bay region have been developed and adopted as part of the Wide Bay 2020 regional planning project. These aspirational targets are:

- *The use and management of natural resources balances the needs of a growing population in accordance with the principles of ecologically sustainable development.*
- *The environment has been protected and enhanced as a result of planning ahead and encouraging best environmental management practices.*
- *Sound natural resource management practices have safeguarded the quality of our productive soils, air and water, and maintained the biodiversity of ecosystems.*
- *The wise use of natural resources such as land, water, forests, minerals and fisheries contribute to the prosperity of the region.*

Within the existing statutory and policy planning frameworks, there does not appear to be a specific aspirational target for regional coastal and marine assets. A suggested aspirational target for the NRM regional plan is as follows:

**‘Natural resources and ecological processes that are better understood and appreciated with intrinsic values undiminished by the direct or indirect effects of human activity.’**

#### (ii) Resource condition targets

Some resource condition targets for coastal and marine assets are contained in existing regional planning and management documents. For example, the Wide Bay 2020 Regional Growth Management Framework contains more specific regional aspirations (objectives) for specific coastal and marine assets. These objectives include:

- **Beaches and Dunes** – to ensure beach and dune environments are protected and that natural processes which maintain them are appropriately managed.
- **Wetlands** – to preserve significant wetland areas to maintain their important environmental, economic and community values.
- **Estuaries and Bays** – to preserve and enhance the recreational and biologically productive qualities of estuaries and bays.
- **Native Wildlife** – to protect native wildlife and maintain their natural habitats.

In a similar fashion, the 1994 Management Plan for the Great Sandy Region (Fraser Island and the Cooloola sandmass) includes a set of desired outcomes for 2010 that address a range of natural resource management issues.

The existing resource condition targets, while comprehensive in scope and extensive in number, do not (by and large) meet NRM guidelines for resource condition targets of being 'specific, time-bound and measurable' (Anon, 2004). For this reason, a new set of suggested resource condition targets has been developed for the sustainable development of coastal and marine areas. These targets are presented in Table 3.1 for each category of natural resource value.

**TABLE 3.1: SUGGESTED RESOURCE CONDITION TARGETS**

| <b>NATURAL RESOURCE VALUE</b>        | <b>INDICATIVE RESOURCE CONDITION TARGET</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Geomorphological                     | <ul style="list-style-type: none"> <li>• No additional development in erosion prone areas except for temporary or relocatable structures used for safety and/or recreational purposes.</li> <li>• Natural coastal processes and fluctuations are to be allowed to continue except where there is a demonstrated risk to life and/or property.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Coastal and Marine Habitats          | <ul style="list-style-type: none"> <li>• No nett loss of estuarine and marine habitats due to coastal and marine development.</li> <li>• Water quality – see Estuarine and Marine Water Quality Technical Paper.</li> <li>• No reduction in density or species composition of seagrass beds due to coastal and marine development.</li> <li>• Populations of marine pest species are not established in the region.</li> <li>• No threats to the ecological values of perched lakes on Fraser Island and the Cooloola sandmass due to coastal and urban development.</li> <li>• Ecological risk assessment undertaken for all coastal parks and esplanades and remedial actions commenced in high priority areas within 2 years.</li> <li>• Protection of highest value freshwater wetlands within 5 years.</li> <li>• Management plans in place for all freshwater wetlands within 10 years.</li> </ul> |
| Species of Conservation Significance | <ul style="list-style-type: none"> <li>• No nett loss of feeding or roosting habitat for migratory shorebirds due to coastal and urban development.</li> <li>• No behavioural changes to migrating humpback whales.</li> <li>• No additional risks to nesting turtles from coastal and marine development.</li> <li>• Risk assessment undertaken for boat strikes on marine turtles and dugong and management measures in place within 2 years.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## 4.0 PRESSURES AND RISKS

### 4.1 INTRODUCTION

The purpose of this chapter is to outline the nature of pressures that are being, or are likely to be placed on coastal and marine natural resources in the region. For pressures that are the immediate focus of this technical paper, a preliminary risk assessment is undertaken to gauge immediate and likely future threats to natural resource values at a regional level.

### 4.2 COASTAL AND MARINE DEVELOPMENT PRESSURES AND THREATS

The first step in the risk assessment process is to identify links between:

- development pressures, and
- potential threats (i.e. changes to ecosystems or processes that could potentially affect natural resource values).

The broad categories of development and use that have been considered are:

- water resources development,
- coastal urban development (including industry),
- riverine and beach extractive industries,
- marine infrastructure,
- boating and shipping,
- beach and dune access, and
- aquaculture.

Threats that could potentially arise from each development/use category are derived in Appendix 2. In total, the following 23 potential threats to coastal and marine values have been identified:

#### **Hydraulic**

- Changes to natural runoff patterns
- Changes to salinity regimes
- Changes to tidal drainage patterns
- Changes to wave and current regimes

**Physical**

- Direct loss of habitat
- Changes to sediment deposition patterns and rates
- Erosion due to increased rates of surface water runoff
- Shoreline erosion
- Physical disturbance of shoreline
- Changes in sand mobility and erosion
- Physical damage to corals
- Barriers to fish passage

**Water Quality**

- Increased suspended solids or turbidity
- Changes to water quality including nutrient and organic enrichment
- Acid runoff resulting from untreated exposure of acid sulfate soils

**Introduced Pests**

- Introduction and spread of terrestrial pest species
- Introduction of marine pests

**Wildlife Interactions**

- Collisions with marine mammals and turtles
- Behavioural changes to fauna
- Direct fauna mortality

**Other**

- Introduction of litter (eg. plastic bags)
- Changes to temperature regimes from coastal development (eg. discharges from industry)
- Introduction of new genetic material

Although not a direct consequence of coastal and marine development in the region, there are potential longer term threats associated with global climate change. These threats may manifest themselves by way of:

- increasing sea levels,
- increasing sea temperatures, and/or
- increasing storm and cyclone activity.

Possible climate-related changes to coastal environments in Australia are discussed in CSIRO (2002). These changes include increased coastal erosion; inundation of low-lying coastal settlements; disruption to transport and other essential infrastructure; modifications to estuarine ecosystems; and more frequent episodes of coral bleaching and possible death of corals. As Walsh (2004) notes:

*‘Even though the effects of global warming may take several decades to become apparent, this is within the design lifetime of much coastal infrastructure. Moreover, the economic and cultural value of the Australian coastline is such that long-term planning and adaptation is necessary to preserve it, or at least to avoid unacceptable changes.’*

For these reasons, threats associated with global warming have also been included in the risk assessment.

### **4.3 EXISTING MANAGEMENT ARRANGEMENTS**

Prior to undertaking the risk assessment, it is necessary to be aware of the arrangements that are in place to manage activities and/or threats. Where there are early warning systems, appropriate regulatory controls and effective on-ground presence, potential threats may not result in high levels of risk.

An overview of existing management mechanisms for coastal and marine development is provided in Appendix 3. The existing management regime is characterised by:

- Marine and estuarine areas that are subject to a wide variety of management controls – these include marine parks and associated zoning plans, declared fish habitat areas, dugong protection areas, fisheries closures under the *Fisheries Act 1994*, marine safety laws, marine pollution laws, protection of marine plants and protection of wildlife and habitats. The statutory management controls are supported by a raft of policy documents.
- Management of terrestrial development is increasingly being dealt with under the *Integrated Planning Act 1997* and the associated Integrated Development Assessment System (IDAS). Planning Schemes are required to coordinate and integrate State and regional matters – this includes matters raised in the State Coastal Management Plan and the Wide Bay 2020 Regional Growth Management Framework. The use of IDAS to provide a vehicle for more integrated and coordinated decision-making is proceeding. Coastal approvals associated with the operation of the *Coastal Protection and Management Act 1995* are now integrated into IDAS.
- Several excellent examples of on-going partnership and community-based management approaches are in place in the Region. In addition to the sterling work of catchment management groups in the Region, coastal management is being greatly assisted through programs such as the Hervey Bay Dugong and Seagrass Monitoring Program, the Woongarra Marine Park Monitoring and Education Project and the Marine Turtle Volunteer Program.

Despite the obvious coastal management ‘successes’ in the Region, investigations undertaken and discussions held during the preparation of this Technical Paper have revealed some areas where there is scope for improved and/or expanded management. The most pressing of these are discussed below.

- **Regional Coastal Management Plan (RCMP).** Although it is understood that the Environmental Protection Agency plans to proceed with a RCMP for the Wide Bay Coast, no commitment to timing has been given. It is the view of the author that the combination of extremely high coastal and marine values, coupled with accelerating development pressures, provides a strong case for embarking on the development of the RCMP as a matter of some priority. Although the Regional NRM Plan cannot directly affect the timing of the RCMP, it does have the capacity to assist in information collection and analysis and to help facilitate planning in key areas for subsequent inclusion in the RCMP.
- **Coastal Management Districts.** Coastal management districts are declared under the *Coastal Protection and Management Act 1995*. They identify areas requiring special development controls and management practices. The coastal management district in the Wide Bay area currently comprises all land below ordinary high water at spring tides plus land within an erosion prone area or a coastal management control district under the repealed *Beach Protection Act 1968*. While the existing district adequately covers coastal areas prone to erosion, there has not been a systematic assessment of coastal resources to fully identify key coastal sites and/or areas that require special management arising from ecological values and/or other threats. The Environmental Protection Agency may therefore not be in a position to properly fulfil its responsibilities as a concurrence agency for certain types of development in coastal management districts or for issuing coastal protection notices under the *Coastal Protection and Management Act 1995*.
- **Local Government Planning Schemes.** Under the *Integrated Planning Act 1997*, the specification of ‘desired environmental outcomes’ (DEOs) is a ‘key element’ of a local government planning scheme. However, the Act also stipulates that DEOs can only be identified for the planning scheme area. This means that planning schemes cannot be ‘driven’ by the need to protect downstream estuarine and marine values, since estuarine and marine areas do not fall within the planning scheme area. This is a particular issue for the Burnett Mary region where there are particularly high estuarine and marine values that should be explicitly recognised as key elements of planning schemes. It is recognised that planning scheme provisions can be developed to help protect these values – there is a requirement for example to consider the State Coastal Management Plan. However, this does not explicitly place the protection of estuarine and marine values ‘up front’ as a key ‘driver’ of the planning scheme. In addition, to be consistent with the principals and practices of integrated catchment management, downstream values should be explicitly

acknowledged, recognised and integrated in the preparation and operation of local government planning schemes.

- **Management capability.** Discussions held during the preparation of this Technical Paper have revealed that while there is an extensive bundle of statutory and policy management mechanisms, there are concerns amongst planning and operational staff that there is a need for an increased 'on-ground' management presence in the Region. This is perceived to be an important and growing issue generated to a large degree by rapid population growth and increasing development pressures in coastal areas.

#### 4.4 PRELIMINARY RISK ASSESSMENT

The results of the preliminary risk assessment are shown in Table 4.1. The analysis is based upon the Risk Assessment Table contained in Appendix 4. In determining risk, consideration has been given to:

- the probability of occurrence of the threat,
- the likely consequences for different types of values, and
- the effectiveness of existing management arrangements to either reduce the probability of occurrence or mitigate the consequences.

For the purposes of determining actions that might be included in the NRM Regional Plan, the focus is on 'extreme' and 'high' risks, where:

- extreme risk means that immediate action is required, and
- high risk means that management attention is needed.

The specific threats that may lead to 'high' and 'extreme' risks are listed in Table 4.2. Also listed in Table 4.2 are primary causes of these threats. They represent, in the opinion of the author, areas where there is a prima facie case that management needs are not adequately being met at the present time.

**TABLE 4.1: PRELIMINARY RISK ASSESSMENT**

| NATURE OF THREAT                                       | PROBABILITY OF OCCURRENCE                  | LIKELY CONSEQUENCES FOR |                     |                                              | ASSESSED LEVEL OF RISK |
|--------------------------------------------------------|--------------------------------------------|-------------------------|---------------------|----------------------------------------------|------------------------|
|                                                        |                                            | Geomorphological Values | Biodiversity Values | Species of Special Conservation Significance |                        |
| <b>HYDRAULIC</b>                                       |                                            |                         |                     |                                              |                        |
| Changes to natural runoff patterns                     | Moderate under existing arrangements       | Minor                   | Major               | Moderate                                     | High Risk              |
| Changes to salinity regimes                            | Unlikely under existing arrangements       | Insignificant           | Moderate            | Minor                                        | Low Risk               |
| Changes to tidal drainage patterns                     | Unlikely under existing arrangements       | Minor                   | Moderate            | Minor                                        | Low Risk               |
| Changes to wave and current regimes                    | Unlikely under existing arrangements       | Minor-moderate          | Moderate            | Minor                                        | Low Risk               |
| <b>PHYSICAL</b>                                        |                                            |                         |                     |                                              |                        |
| Direct loss of habitat                                 | Almost certain under existing arrangements | Minor                   | Moderate-Major      | Moderate-Major                               | Extreme Risk           |
| Changes to sediment deposition patterns and rates      | Likely under existing arrangements         | Minor                   | Major               | Moderate-Major                               | High Risk              |
| Erosion due to increased rates of surface water runoff | Likely under existing arrangements         | Minor                   | Minor-Moderate      | Minor-Moderate                               | High Risk              |
| Shoreline erosion                                      | Likely under existing arrangements         | Minor                   | Minor               | Minor                                        | High Risk              |

**TABLE 4.1: PRELIMINARY RISK ASSESSMENT (CONTINUED)**

| NATURE OF THREAT                                                    | PROBABILITY OF OCCURRENCE                  | LIKELY CONSEQUENCES FOR |                     |                                              | ASSESSED LEVEL OF RISK |
|---------------------------------------------------------------------|--------------------------------------------|-------------------------|---------------------|----------------------------------------------|------------------------|
|                                                                     |                                            | Geomorphological Values | Biodiversity Values | Species of Special Conservation Significance |                        |
| Physical disturbance of shoreline                                   | Moderate under existing arrangements       | Minor                   | Minor               | Minor                                        | Moderate Risk          |
| Changes in sand mobility and erosion                                | Moderate under existing arrangements       | Minor                   | Minor               | Moderate                                     | Moderate Risk          |
| Physical damage to corals                                           | Unlikely under existing arrangements       | Moderate                | Moderate            | Moderate                                     | Low Risk               |
| Barriers to fish passage                                            | Unlikely under existing arrangements       | Insignificant           | Moderate            | Moderate                                     | Moderate Risk          |
| <b>WATER QUALITY</b>                                                |                                            |                         |                     |                                              |                        |
| Increased suspended solids or turbidity                             | Almost certain under existing arrangements | Insignificant           | Major               | Major                                        | Extreme Risk           |
| Changes to water quality including nutrient and organic enrichment  | Almost certain under existing arrangements | Insignificant           | Major               | Major                                        | Extreme Risk           |
| Acid runoff resulting from untreated exposure of acid sulfate soils | Unlikely under existing arrangements       | Insignificant           | Major               | Major                                        | High Risk              |
| <b>INTRODUCED PESTS</b>                                             |                                            |                         |                     |                                              |                        |
| Introduction and spread of terrestrial pest species                 | Likely under existing arrangements         | Insignificant           | Moderate            | Moderate                                     | High Risk              |
| Introduction of marine pests                                        | Unlikely under existing arrangements       | Insignificant           | Major               | Major                                        | High Risk              |

TABLE 4.1: PRELIMINARY RISK ASSESSMENT (CONTINUED)

| NATURE OF THREAT                                        | PROBABILITY OF OCCURRENCE                  | LIKELY CONSEQUENCES FOR |                     |                                              | ASSESSED LEVEL OF RISK  |
|---------------------------------------------------------|--------------------------------------------|-------------------------|---------------------|----------------------------------------------|-------------------------|
|                                                         |                                            | Geomorphological Values | Biodiversity Values | Species of Special Conservation Significance |                         |
| <b>WILDLIFE INTERACTIONS</b>                            |                                            |                         |                     |                                              |                         |
| Collisions with marine mammals and turtles              | Almost certain under existing arrangements | Insignificant           | Minor               | Moderate                                     | High Risk               |
| Behavioural changes to fauna                            | Moderate under existing arrangements       | Insignificant           | Minor               | Major                                        | High Risk               |
| Direct fauna mortality                                  | Moderate under existing arrangements       | Insignificant           | Minor               | Moderate                                     | Moderate Risk           |
| <b>OTHER</b>                                            |                                            |                         |                     |                                              |                         |
| Introduction of litter (eg. plastic bags)               | Almost certain under existing arrangements | Insignificant           | Minor               | Moderate                                     | High Risk               |
| Changes to temperature regimes (from urban development) | Rare under existing arrangements           | Insignificant           | Moderate            | Moderate                                     | Moderate Risk           |
| Introduction of new genetic material                    | Unlikely under existing arrangements       | Insignificant           | Moderate            | Moderate                                     | Moderate Risk           |
| <b>GLOBAL CLIMATE CHANGE</b>                            |                                            |                         |                     |                                              |                         |
| Increasing sea levels                                   | Likely under existing arrangements         | Minor                   | Moderate(?)         | Moderate(?)                                  | High Risk(?)            |
| Increasing sea temperatures                             | Likely under existing arrangements         | Insignificant           | Moderate(?)         | Major(?)                                     | High to Extreme Risk(?) |
| Increasing storm and cyclone activity                   | Not known                                  | Minor                   | Not known           | Not known                                    | Not known               |

TABLE 4.2: PRIORITY THREATS

| CLASS OF RISK | NATURE OF THREAT                                                    | PRIMARY CAUSES OF THREAT                                                                                                                                     |
|---------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Extreme       | Direct loss of habitat                                              | <ul style="list-style-type: none"> <li>coastal urban development, including industry</li> <li>public access to foreshore esplanades and parklands</li> </ul> |
|               | Increased suspended solids or turbidity                             | <ul style="list-style-type: none"> <li>stormwater runoff</li> </ul>                                                                                          |
|               | Changes to water quality including nutrient and organic enrichment  | <ul style="list-style-type: none"> <li>stormwater runoff</li> <li>sewage disposal from commercial and recreational vessels</li> </ul>                        |
| High          | Changes to natural runoff patterns                                  | <ul style="list-style-type: none"> <li>coastal urban development, including industry</li> <li>dams and barrages</li> </ul>                                   |
|               | Changes to sediment deposition patterns and rates                   | <ul style="list-style-type: none"> <li>stormwater runoff</li> <li>dams and barrages</li> </ul>                                                               |
|               | Erosion due to increased rates of surface water runoff              | <ul style="list-style-type: none"> <li>stormwater runoff</li> </ul>                                                                                          |
|               | Shoreline erosion                                                   | <ul style="list-style-type: none"> <li>construction in erosion prone areas</li> <li>public access to foreshore areas</li> </ul>                              |
|               | Acid runoff resulting from untreated exposure of acid sulfate soils | <ul style="list-style-type: none"> <li>coastal urban development, including industry</li> </ul>                                                              |
|               | Introduction and spread of terrestrial pest species                 | <ul style="list-style-type: none"> <li>public access to foreshore areas</li> </ul>                                                                           |
|               | Introduction of marine pests                                        | <ul style="list-style-type: none"> <li>ballast water</li> <li>visiting yachts</li> </ul>                                                                     |
|               | Collisions with marine mammals and turtles                          | <ul style="list-style-type: none"> <li>boating activity</li> </ul>                                                                                           |
|               | Behavioural changes to fauna                                        | <ul style="list-style-type: none"> <li>dogs disturbing shorebirds</li> <li>whale watching</li> <li>noise from commercial and recreational boating</li> </ul> |
|               | Introduction of litter (eg. plastic bags)                           | <ul style="list-style-type: none"> <li>stormwater runoff</li> <li>litter from boats</li> </ul>                                                               |
|               | Increasing sea levels                                               | <ul style="list-style-type: none"> <li>global climate change</li> </ul>                                                                                      |
|               | Increasing sea temperatures                                         | <ul style="list-style-type: none"> <li>global climate change</li> </ul>                                                                                      |

Some of these threats are already being addressed or are subject to proposed management changes that will see them addressed. In particular:

- The introduction of increased monitoring, improved management systems and the Australian Ballast Water Decision Support System is helping to deal with threats associated with the introduction of marine pests. Funding of \$3.87 million through the Natural Heritage Trust has recently been announced to develop a national system to manage introduced marine pests.
- The proposed extension of Queensland Marine Parks over the waters of Great Sandy Strait and Hervey Bay will, in association with provisions under the *Transport Operations (Marine Safety) Act 1995*, provide much improved opportunities to manage boating activities that reduce the risks of collisions with marine mammals and turtles. Extensions of existing marine parks will also provide improved regulatory control over the disturbance of shorebirds by dogs.
- Introduction and application of the State Planning Policy on Planning and Managing Development Involving Acid Sulfate Soils (SPP 2/02) has provided mechanisms to effectively manage risks associated with exposure of acid sulfate soils.
- Recent amendments to the marine sewage provisions of the *Transport Operations (Marine Pollution) Regulation 1995* have provided improved mechanisms for managing the discharge of wastewater from vessels.

The threats posed by dams and barrages (changing surface water runoff and introducing barrier(s) to fish passage) are discussed further in the Technical Paper on Water Infrastructure and Use.

## 5.0 PRIORITY ACTIONS

### 5.1 INTRODUCTION

The purpose of this Chapter is to put forward a program of priority actions that could potentially be included as part of the investment strategy to be prepared under the Regional NRM Plan. The emphasis in selecting priority projects has been placed on filling gaps or meeting unmet needs at the regional level.

It should be noted that it is not the role of Regional NRM Plans to fund planning and management that is the direct responsibility of State and local government agencies. The emphasis is on more informed and integrated decision-making. The approach taken in this paper, in the main, is to identify priority actions that will add knowledge, build capacity, inform, facilitate, give direction to and generally improve decision-making capabilities.

### 5.2 PRIORITY ACTIONS

On the basis of the preliminary risk assessment and the identification of priority threats, the following priority actions are suggested for consideration in the NRM Investment Strategy:

- roost site assessment and mapping,
- ecologically-based coastal management districts,
- marine infrastructure planning,
- improved foreshore parkland and esplanade management,
- improved stormwater management,
- coastal management plan for Woongarra coast,
- DEOs for IPA Planning Schemes,
- marine litter awareness raising, and
- climate change scenario planning.

Further details on each of these proposed actions is provided in Table 5.1. The contributions that each action can potentially make to reducing risks associated with each priority threat are shown in Table 5.2.

Further assessments of each proposed action are provided in the pro-formas at the end of this Chapter.

**TABLE 5.1: PRIORITY ACTIONS**

| <b>SUGGESTED PROJECT</b>                        | <b>RATIONALE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Roost Site Assessment and Mapping               | <ul style="list-style-type: none"> <li>• Important high tide roost sites for migratory shorebirds have not been adequately identified or assessed.</li> <li>• There are pressures for coastal urban development that are impinging upon roost sites.</li> <li>• Better information needs to be available to the development industry and development assessment system to ensure that the values of roost sites are adequately considered in the planning for, and assessment of, development applications.</li> <li>• This extends and feeds into an existing NHT project being managed by the WWF that is intended to deliver a planning tool to better integrate shorebird information into local and State government decision-making.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Ecologically-based Coastal Management Districts | <ul style="list-style-type: none"> <li>• Coastal Management Districts are an important means of ensuring that coastal values are integrated into development assessment processes.</li> <li>• EPA (as lead agency for coastal management) is a concurrence agency under IPA for certain development applications within coastal management districts.</li> <li>• Within the Burnett Mary region, coastal management districts are primarily based upon erosion prone areas.</li> <li>• Ecologically-based boundaries are intended to be an output from the regional coastal management plan – however, preparation of the plan has been deferred and completion will be some years away.</li> <li>• In a coastal area developing as quickly as the Burnett Mary region, it is essential that the full range of coastal management considerations are able to be adequately integrated into development assessment processes – this can only happen if coastal management districts are based on sound ecological knowledge as well physical processes.</li> <li>• There are serious risks in waiting for coastal management districts to be identified as part of the regional coastal planning process – an alternative and faster process is to have them identified and declared by regulation as provided for in Section 54(1)(b) of the <i>Coastal Protection and Management Act 1995</i>.</li> </ul> |

TABLE 5.1: PRIORITY ACTIONS (CONTINUED)

| SUGGESTED PROJECT                                    | RATIONALE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Marine Infrastructure Planning                       | <ul style="list-style-type: none"> <li>• Demand for marine infrastructure such as marinas, boat ramps, boat storage and maintenance and repair facilities is growing.</li> <li>• Proposals are largely being assessed on a case by case basis within individual local government areas.</li> <li>• This is not taking adequate account of regional supply/demand issues and not considering cumulative impacts of infrastructure construction, operation and flow on boating activities.</li> <li>• Regional planning for marine infrastructure was not specifically addressed in the Wide Bay 2020 regional planning study.</li> <li>• There is a strong case for the development of a regional strategy and action plan for the development of marine infrastructure.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Improved Foreshore Parkland and Esplanade Management | <ul style="list-style-type: none"> <li>• Both the Wide Bay 2020 regional planning project and the Hervey Bay Coastal Management Plan have identified that degradation of natural and semi-natural foreshore parklands and esplanades is a major issue that is not being adequately managed at present.</li> <li>• Management issues include encroachment by adjoining landholders, introduction of weeds and 'garden escapes', rubbish dumping, erosion and unmanaged and/or inappropriate access and activities. In addition, there is growing pressure for the removal of trees (eg. <i>Casuarina</i> spp.) that block views or are considered to be 'unsightly'.</li> <li>• There is an urgent need for improved management of natural and semi-natural foreshore parklands and esplanades.</li> <li>• Community involvement in this process is highly desirable.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                           |
| Improved Stormwater Management                       | <ul style="list-style-type: none"> <li>• As coastal urban development continues in the region, increasing amounts of sediment, litter, nutrients, chemicals and hydrocarbons will be discharged into estuarine and marine areas.</li> <li>• This will have potentially serious impacts on intertidal sand and mudflats (feeding areas for migratory shorebirds), intertidal pools, fringing coral reefs, foreshore amenity and general water quality.</li> <li>• Although local governments are required to prepare urban stormwater management plans under the EPP (Water), there are specialised approaches required in sensitive receiving environments as are found along the region's coastline.</li> <li>• This project has two components: <ul style="list-style-type: none"> <li>- a capacity building component to help inform and assist local governments to design, construct and maintain best practice stormwater management programs and devices to ensure that the region's outstanding coastal and marine values are not placed at risk.</li> <li>- a community and industry awareness program to help ensure that individuals, industry and property developers are aware of stormwater issues and encouraged to adopt minimum impact practices.</li> </ul> </li> </ul> |

**TABLE 5.1: PRIORITY ACTIONS (CONTINUED)**

| <b>SUGGESTED PROJECT</b>                    | <b>RATIONALE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Coastal Management Plan for Woongarra Coast | <ul style="list-style-type: none"> <li>• This section of coastline between Elliott Heads and Burnett Heads is an area of extremely high value resulting primarily from its fringing coral reefs, turtle nesting on Mon Repos beach and rocky headlands. It is also an area that is subject to intense coastal development pressure.</li> <li>• While there is an existing Qld. Marine Park (Woongarra M.P.) along this section of the coast, it does not address land-based threats to coastal and marine values.</li> <li>• Specific matters that could be potentially addressed in an integrated way would include: <ul style="list-style-type: none"> <li>- stormwater management,</li> <li>- management of parks and esplanades,</li> <li>- marine infrastructure,</li> <li>- coastal erosion,</li> <li>- scenic amenity, recreation and tourism</li> <li>- rehabilitation.</li> </ul> </li> </ul>                                                                    |
| DEOs for IPA Planning Schemes               | <ul style="list-style-type: none"> <li>• Local government planning schemes prepared under the Integrated Planning Act are 'driven' by desired environmental outcomes (DEO's).</li> <li>• The Act requires that DEO's are developed for the 'planning scheme area' and do not give local governments the flexibility to directly and explicitly recognise the protection of environmental values outside of their boundaries as important drivers of planning schemes.</li> <li>• In the Burnett Mary region, many important environmental values exist in marine areas that are beyond local government boundaries, but in areas that are directly affected by development in these local governments.</li> <li>• There is a strong case that the IPA be reviewed to ascertain if it is possible to amend the Act so that Local governments can base DEO's on the protection of important environmental values that are outside the local government boundary.</li> </ul> |
| Marine litter awareness raising             | <ul style="list-style-type: none"> <li>• Marine litter (eg. plastic bags and discarded fishing gear) is a hazard to wildlife such as turtles and seabirds.</li> <li>• Litter may be discarded from boats, washed from the shore or discharged with stormwater.</li> <li>• Public awareness programs in other areas have helped to raise public awareness and reduce quantities of marine litter.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Climate change scenario planning            | <ul style="list-style-type: none"> <li>• There is considerable scientific agreement that climate change is occurring. Possible implications for the region are increasing sea levels, increasing sea temperatures and increasing storm and cyclone activity. The extent and timing of any such changes at a regional scale are largely unknown.</li> <li>• Implications of changes are not understood and there has been little assessment of coping strategies. Processes of engagement between governments and communities are in their infancy.</li> <li>• There is a need for greater discussion and dialogue on the implications of climate change as an initial stage in the development of informed and intelligent coping strategies. Scenario planning is an appropriate way of providing information and helping to identify implications.</li> </ul>                                                                                                           |

TABLE 5.2: ACTIONS AND RISKS REDUCTION POTENTIAL

| PRIORITY THREAT                                        | EXTENT TO WHICH ACTION CAN POTENTIALLY REDUCE RISK |                                                 |                                |                                             |                                |                         |                               |                                 |                                  |
|--------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|--------------------------------|---------------------------------------------|--------------------------------|-------------------------|-------------------------------|---------------------------------|----------------------------------|
|                                                        | Roost Site Assessment and Mapping                  | Ecologically-based Coastal Management Districts | Marine Infrastructure Planning | Foreshore Parkland and Esplanade Management | Improved Stormwater Management | CMP for Woongarra Coast | DEOs for IPA Planning Schemes | Marine Litter Awareness Raising | Climate Change Scenario Planning |
| Direct loss of habitat                                 | Substantial                                        | Substantial                                     | Moderate                       | Moderate                                    | Substantial                    | Substantial             | Substantial                   | -                               | -                                |
| Increased suspended solids or turbidity                | -                                                  | -                                               | -                              | -                                           | Moderate                       | Some                    | Some                          | -                               | -                                |
| Changes to water quality                               | -                                                  | -                                               | Some                           | -                                           | Moderate                       | Some                    | Some                          | -                               | -                                |
| Changes to natural runoff patterns                     | -                                                  | -                                               | -                              | -                                           | Some                           | Some                    | Some                          | -                               | -                                |
| Changes to sediment deposition patterns and rates      | -                                                  | -                                               | -                              | -                                           | Some                           | Some                    | Some                          | -                               | -                                |
| Erosion due to increased rates of surface water runoff | -                                                  | -                                               | -                              | -                                           | Some                           | Some                    | -                             | -                               | -                                |
| Shoreline erosion                                      | -                                                  | Some                                            | Some                           | Some                                        | Some                           | Moderate                | -                             | -                               | -                                |
| Introduction and spread of terrestrial pest species    | -                                                  | -                                               | -                              | Substantial                                 | -                              | -                       | -                             | -                               | -                                |
| Introduction of litter                                 | -                                                  | -                                               | -                              | Some                                        | Some                           | -                       | -                             | Substantial                     | -                                |
| Effects of climate change                              | Some                                               | Some                                            | Some                           | -                                           | -                              | -                       | -                             | -                               | Substantial                      |

**PROJECT NUMBER:** CMD 01

**TITLE:** ROOST SITE ASSESSMENT AND MAPPING

**OUTPUT CATEGORIES:** Investigations (RA.3), Information (CB. 0), Awareness Raising (CB.1), Decision Support (RA.2)

**ASSET TYPE RELEVANCE:** Coastal & Marine Biodiversity  
Sustainable Development of Coastal & Marine Areas  
Knowledge, Research, Education & Training

| <b>TASK DESCRIPTION</b>                                                                                  | <b>TIMELINE</b> | <b>COST ESTIMATE</b> |
|----------------------------------------------------------------------------------------------------------|-----------------|----------------------|
| Scoping and networking.                                                                                  | 1 month         | \$5,000.00           |
| Review of existing information re roost sites – location, species, numbers.                              | 2 months        | \$8,000.00           |
| Field surveys of roost sites to update and fill information gaps.                                        | 2 months        | \$15,000.00          |
| Mapping of roost sites from air photos in a format that is compatible with local government GIS systems. | 2 months        | \$10,000.00          |
| Workshopping with local government planning staff and EPA regional staff re application of information.  | 1 month         | \$5,000.00           |
| <b>TOTAL</b>                                                                                             | 8 months        | \$43,000.00          |

### **ECONOMIC AND SOCIAL IMPLICATIONS**

This project may constrain some development in sensitive coastal areas. However, it is just providing IDAS with better and more accurate information to help ensure that the intent of IPA is realised.

**PROJECT NUMBER:** CMD 02

**TITLE:** ECOLOGICALLY-BASED COASTAL MANAGEMENT DISTRICTS

**OUTPUT CATEGORIES:** Information (CB. 0), Decision Support (RA.2), Improved Planning Practice (P.1)

**ASSET TYPE RELEVANCE:** Coastal & Marine Biodiversity  
Sustainable Development of Coastal & Marine Areas  
Water Quality – Estuarine & Marine

| <b>TASK DESCRIPTION</b>                                                                                                                                                                                                                                                                   | <b>TIMELINE</b> | <b>COST ESTIMATE</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------|
| Scoping and establishing consultation mechanisms.                                                                                                                                                                                                                                         | 2 months        | \$10,000.00          |
| Undertake analysis of coastal resources, values and threats to identify areas requiring special development controls and management practices – this should draw upon information held by government agencies, researchers, industry and relevant community groups. Map draft boundaries. | 5 months        | \$40,000.00          |
| Undertake consultation regarding proposed boundaries and amend as appropriate.                                                                                                                                                                                                            | 3 months        | \$25,000.00          |
| Distribute information to local governments and relevant State government agencies and community groups. Conduct workshops to discuss how information can best be integrated into decision-making.                                                                                        | 2 months        | \$15,000.00          |
| <b>TOTAL</b>                                                                                                                                                                                                                                                                              | 12 months       | \$90,000.00          |

### **ECONOMIC AND SOCIAL IMPLICATIONS**

This project may constrain some development in sensitive coastal areas. However, it is just providing IDAS with better and more accurate information to help ensure that the intent of IPA is realised.

It is bringing forward an urgently needed part of the proposed Regional Coastal Management Plan.

**PROJECT NUMBER:** CMD 03

**TITLE:** MARINE INFRASTRUCTURE PLANNING

**OUTPUT CATEGORIES:** Information (CB. 0), Facilitation (CB.2), Decision Support (RA.2), Investigations (RA.3)

**ASSET TYPE RELEVANCE:** Sustainable Development of Coastal & Marine Areas

| <b>TASK DESCRIPTION</b>                                                                                                                                                                                                       | <b>TIMELINE</b>  | <b>COST ESTIMATE</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|
| Scoping and establishing consultation mechanisms, taking into account strategic directions contained in the Wide Bay Integrated Transport Plan, the Great Sandy Region Management Plan and the State Coastal Management Plan. | 2 months         | \$10,000.00          |
| Determination of need for future marine infrastructure such as marinas, boat harbours, marine services, ferry terminals and boat ramps.                                                                                       | 3 months         | \$20,000.00          |
| Identify and assess alternative locations taking into account all environmental, social, economic and cultural heritage factors.                                                                                              | 3 months         | \$25,000.00          |
| Develop draft strategy for future marine infrastructure planning.                                                                                                                                                             | 2 months         | \$10,000.00          |
| Undertake consultation regarding draft strategy and amend as appropriate.                                                                                                                                                     | 3 months         | \$20,000.00          |
| Work with local governments and State agencies to ensure that strategy is integrated into Planning Schemes and Works Programs.                                                                                                | 2 months         | \$10,000.00          |
| <b>TOTAL</b>                                                                                                                                                                                                                  | <b>15 Months</b> | <b>\$95,000.00</b>   |

### **ECONOMIC AND SOCIAL IMPLICATIONS**

Will provide a higher degree of certainty to the industry and the community. Will avoid case-by-case assessment of applications and put forward an integrated regional approach.

**PROJECT NUMBER:** CMD 04

**TITLE:** IMPROVED FORESHORE PARKLAND AND ESPLANADE MANAGEMENT (natural and semi-natural areas)

**OUTPUT CATEGORIES:** Information (CB. 0), Awareness Raising (CB.1), Facilitation (CB.2), Investigations (RA.3), vegetation Rehabilitation (GW.4), Pest Plant Control (GW.6), Soil Management (GW.11)

**ASSET TYPE RELEVANCE:** Terrestrial Biodiversity  
Sustainable Development of Coastal & Marine Areas  
Landscape Management & Infrastructure

| TASK DESCRIPTION                                                                                                                            | TIMELINE                                                                                                                                             | COST ESTIMATE |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Scoping and networking.                                                                                                                     | Timelines and costs will depend upon individual circumstances of local governments, nature and extent of issues and scope for community involvement. |               |
| Undertake audits of all natural and semi-natural foreshore parklands and esplanades – determine values, condition and threats.              |                                                                                                                                                      |               |
| Prepare remediation plans, strategies and priorities. Determine potential for community involvement.                                        |                                                                                                                                                      |               |
| Commence implementation of on-ground works – may include rubbish removal, weed control, erosion control, revegetation, access control, etc. |                                                                                                                                                      |               |
| Implement improved monitoring, surveillance and enforcement activities.                                                                     |                                                                                                                                                      |               |
| <b>TOTAL</b>                                                                                                                                | To be determined                                                                                                                                     |               |

### ECONOMIC AND SOCIAL IMPLICATIONS

Increased community awareness of foreshore values and improved community 'ownership' of foreshore parks and esplanades. Less encroachment by adjoining property owners.

Increased costs may have to be borne by ratepayers.

**PROJECT NUMBER:** CMD 05

**TITLE:** IMPROVED STORMWATER MANAGEMENT

**OUTPUT CATEGORIES:** Information (CB. 0), Awareness Raising (CB.1), Facilitation (CB.2), Skills and Training (CB.3), Improved Planning Practice (P.1)

**ASSET TYPE RELEVANCE:** Coastal & Marine Biodiversity  
Sustainable Development of Coastal & Marine Areas  
Water Quality – Estuarine & Marine

| TASK DESCRIPTION                                                                                                                                                                                                                    | TIMELINE                                                                                                                                             | COST ESTIMATE |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Scoping and consultation arrangements.                                                                                                                                                                                              | Timelines and costs will depend upon individual circumstances of local governments, nature and extent of issues and scope for community involvement. |               |
| Development of best-practice stormwater management principals and techniques based on the particular values of receiving environments and associated flora and fauna.                                                               |                                                                                                                                                      |               |
| Provision of on-going advice and assistance to local governments to facilitate application of best-practice relevant to individual circumstances and context. Information to be integrated into Council Stormwater Management Plan. |                                                                                                                                                      |               |
| Development of programs and materials to help inform and educate industry, developers and the general public.                                                                                                                       |                                                                                                                                                      |               |
| Conduct of awareness raising programs                                                                                                                                                                                               |                                                                                                                                                      |               |
| Evaluation of programs and improvement                                                                                                                                                                                              |                                                                                                                                                      |               |
| <b>TOTAL</b>                                                                                                                                                                                                                        |                                                                                                                                                      |               |

### ECONOMIC AND SOCIAL IMPLICATIONS

Raised community awareness of issues. Extra costs to ratepayers and industry in achieving best practice.

**PROJECT NUMBER:** CMD 06

**TITLE:** COASTAL MANAGEMENT PLAN FOR WOONGARRA COAST

**OUTPUT CATEGORIES:** Information (CB. 0), Awareness Raising (CB.1), Decision Support (RA.2), Improved Planning Practice (P.1), Integrated Planning (P.2)

**ASSET TYPE RELEVANCE:** Coastal & Marine Biodiversity  
Sustainable Development of Coastal & Marine Areas  
Landscape Management & Infrastructure  
Water Quality – Estuarine & Marine

| TASK DESCRIPTION                                                                                                                                                                                                                                                                      | TIMELINE  | COST ESTIMATE |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------|
| Scoping and consultation arrangements, including engagement with Burnett Shire and Bundaberg City Councils, Environmental Protection Agency, Central Queensland University, local community groups and residents, recreational users and the local development and tourism industries | 1 month   | \$10,000.00   |
| Assessment of values                                                                                                                                                                                                                                                                  | 1 month   | \$ 5,000.00   |
| Assessment and development pressures – existing use, tenure, commitments, planning controls                                                                                                                                                                                           | 1 month   | \$ 5,000.00   |
| Risk assessment to determine management needs, eg. coastal erosion, stormwater management, habitat protection, treatment of wastewater, public access, visual and amenity issues, etc.                                                                                                | 2 months  | \$10,000.00   |
| Objectives for the Woongarra Coast                                                                                                                                                                                                                                                    | 1 month   | \$ 5,000.00   |
| Draft Management Plan including strategies, actions and responsibilities                                                                                                                                                                                                              | 2 months  | \$10,000.00   |
| Consultation on draft Plan and amendment as appropriate                                                                                                                                                                                                                               | 2 months  | \$10,000.00   |
| Implementation mechanisms                                                                                                                                                                                                                                                             | 1 month   | \$ 5,000.00   |
| <b>TOTAL</b>                                                                                                                                                                                                                                                                          | 11 months | \$60,000.00   |

## ECONOMIC AND SOCIAL IMPLICATIONS

Increased management costs/resources to be borne by ratepayers. More stringent conditions for developers.

**PROJECT NUMBER:** CMD 07

**TITLE:** DEOs FOR IPA PLANNING SCHEMES

**OUTPUT CATEGORIES:** Decision Support (RA.2),  
Improved Planning Practice (P.1)

**ASSET TYPE RELEVANCE:** Coastal & Marine Biodiversity  
Sustainable Development of Coastal & Marine Areas  
Water Quality – Estuarine & Marine

| <b>TASK DESCRIPTION</b>                                                                                                                                                | <b>TIMELINE</b> | <b>COST ESTIMATE</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------|
| Scoping and consultation with Dept. of Local Government, Planning, Sport and Recreation; the Regional Organisation of Councils; and the Planning Institute, Australia. | 2 months        | \$10,000.00          |
| Legal opinions on current interpretation of Act and potential to have DEOs that apply to values outside of the planning area                                           | 2 months        | \$10,000.00          |
| Preparation of cabinet submission                                                                                                                                      | 2 months        | \$10,000.00          |
| Amendment to Act, most likely in association with other amendments at an appropriate time                                                                              | ?               | ?                    |
| <b>TOTAL</b>                                                                                                                                                           | 6+ months       | \$30,000+            |

### **ECONOMIC AND SOCIAL IMPLICATIONS**

None likely – this project is intended to formalise and clarify the intent of IPA.

**PROJECT NUMBER:** CMD 08

**TITLE:** MARINE LITTER AWARENESS RAISING

**OUTPUT CATEGORIES:** Awareness Raising (CB.1)

**ASSET TYPE RELEVANCE:** Coastal & Marine Biodiversity  
Sustainable Development of Coastal & Marine Areas

| <b>TASK DESCRIPTION</b>                           | <b>TIMELINE</b> | <b>COST ESTIMATE</b> |
|---------------------------------------------------|-----------------|----------------------|
| Scoping and consultation arrangements             | 2 months        | \$10,000.00          |
| Review of similar programs elsewhere              | 1 month         | \$5,000.00           |
| Development of communication strategies and tools | 2 months        | \$10,000.00          |
| Preparation of communication materials            | 2 months        | to be determined     |
| Initiate and undertake awareness raising program  | 3+ months       | to be determined     |
| Evaluate results                                  | 1 month         | \$5,000.00           |
| <b>TOTAL</b>                                      | 11+ months      | to be determined     |

### **ECONOMIC AND SOCIAL IMPLICATIONS**

Greater awareness of adverse effects of marine litter. Changed behaviour of individuals.

**PROJECT NUMBER:** CMD 09

**TITLE:** CLIMATE CHANGE SCENARIO PLANNING

**OUTPUT CATEGORIES:** Investigations (RA.3), Information (CB.0), Awareness Raising (CB.1), Decision Support (RA.2)

**ASSET TYPE RELEVANCE:** Coastal & Marine Biodiversity  
Sustainable Development of Coastal & Marine Areas

| <b>TASK DESCRIPTION</b>                                                 | <b>TIMELINE</b> | <b>COST ESTIMATE</b> |
|-------------------------------------------------------------------------|-----------------|----------------------|
| Scoping and networking                                                  | 2 months        | \$10,000.00          |
| Identification of scenario elements, drivers and critical uncertainties | 2 month         | \$20,000.00          |
| Description of alternative future states and generation of scenarios    | 4 months        | \$30,000.00          |
| Identification of challenges and implications                           | 2 months        | \$15,000.00          |
| Generation of coping strategies                                         | 2 month         | \$15,000.00          |
| <b>TOTAL</b>                                                            | 12 months       | \$90,000.00          |

### **ECONOMIC AND SOCIAL IMPLICATIONS**

This project will initiate community and government dialogue on this important issue. It will result in better informed communities and governments. Some of the possible coping strategies may constrain the type and extent of future development in at risk areas.

## 6.0 SELECTED BIBLIOGRAPHY

- Australian State of the Environment Committee (2001), Australian State of the Environment 2001. Dept. of the Environment and Heritage, Canberra.
- Baffle Creek Catchment Management Group Inc. (2001), The Baffle Creek Catchment Strategy.
- Beach Protection Authority Queensland (1989), Hervey Bay Beaches: A Detailed Study of Coastline Behaviour along the Mainland Beaches of Hervey Bay, South-east Queensland.
- Beumer J., Carseldine L. and Zeller B. (1997), Declared Fish Habitat Areas in Queensland. Fish Habitat Management Operational Policy Series: Supplement to FHMOP 002, Qld. Dept. of Primary Industries.
- Brodie J. and Hillman S. (1995), Coastal runoff and the Great Barrier Reef Region. Paper presented to the First Workshop of the UNEP EAS-35 Project: Integrated Management of Watersheds in Relation to the Management and Conservation of Coastal and Marine Areas in the East Asian Seas Region.
- Bruinsma C. and Danaher K. (2000), Queensland Coastal Wetland Resources: Round Hill Head to Tin Can Inlet. Qld. Dept. of Primary Industries, Information Report QI99081, Brisbane.
- Buckley Vann Town Planning Consultants (1996), Great Sandy Region: Discussion Paper on Planning Issues and Options for the Preparation of Town Planning Scheme Controls. Prepared for Queensland Department of Environment.
- Burnett Catchment Care Association Inc. (2002), The Burnett Catchment Strategy.
- Burnett Mary Regional Group for Natural Resource Management Inc. (nd), Annual Report 2003.
- Burnett Mary Regional Strategy Group (2001), A Strategic Framework for Natural Resource Management and the Maintenance of Biodiversity in the Burnett Mary Region.
- Coastal Wide Bay Regional Vegetation Management Committee (2003), Draft Coastal Wide Bay Regional Vegetation Management Plan. Dept. of Natural Resources and Mines, Nambour.
- Cooloola Conservation Working Group (1995), Tin Can Bay Foreshore Management Plan: Volume 1.
- CSIRO (2002), Climate Change and Australia's Coastal Communities, [www.dar.csiro.au/publications/](http://www.dar.csiro.au/publications/)

- Driscoll P.V. (1993), Survey of waders in the Great Sandy Strait, south-eastern Queensland, Australia. *The Stilt*, No. 22. Bulletin of the Australian Waders Study Group of the RAOU.
- EDAW Australia (1997), A View of the Coast: An overview of the scenic resources of the Queensland coast. Report prepared for the Coastal Management Branch, Qld. Dept. of Environment.
- Elphinstone G., Watson P. and Aitken R. (1998), Soil Acidity Management Plan for the Mary River Catchment. Queensland NSAP Working Party.
- Environment Australia (2001), A Directory of Important Wetlands in Australia, Third Edition.
- Environment Science and Services (1987), Review of Capricorn-Bunker Marine Park Zoning Plan and Investigation of Tidal Lands and Tidal Waters of Queensland Within and Adjacent to the Great Barrier Reef Marine Park – Capricorn Section for Declaration as a Marine Park: Volume 1 – Background Information. Prepared for Qld. Premier's Department.
- Environment Science and Services (1997), Preliminary Study of Potential Impacts on the Great Barrier Reef World Heritage Area from Coastal Urban Development. Report prepared for the Great Barrier Reef Marine Park Authority in association with North Queensland Local Government Association, Central Queensland Local Government Association and Qld. Department of Environment.
- Environmental Protection Agency (2003a), State of the Environment Queensland 2003.
- Environmental Protection Agency (2003b), State of the Environment Queensland 2003: Implementing the Legislation.
- Fraser Island and Great Sandy Region Commission of Inquiry (1990a), Initial Discussion Paper.
- Fraser Island and Great Sandy Region Commission of Inquiry (1990b), Final Discussion Paper, Vols. 1 – 4.
- Fraser Island and Great Sandy Region Commission of Inquiry (1991), Final Report.
- Gaus C., O'Donohue M. and Connell D. (2004), An Assessment of Risks to Dugongs from Exposure to Dioxins. Paper presented at the Catchment to Reef Conference: Water Quality Issues in the Great Barrier Reef Region, 9-11 March 2004, Townsville.
- Haynes D. and Brodie J. (2004), Great Barrier Reef Water Quality Ecosystem Monitoring: Future Directions and Management Approaches. Paper presented at the Catchment to Reef Conference: Water Quality Issues in the Great Barrier Reef Region, 9-11 March 2004, Townsville.

Hemmings L. and Sinclair J. (1984), Nomination of the Great Sandy Region for inclusion in the World Heritage List. Report prepared for the Australian Conservation Foundation.

Hervey Bay City Council (2001), Hervey Bay Coastal Management Plan.

IFAW (2004), From Whalers to Whale Watchers: The growth of whale watching tourism in Australia. Report prepared by Economists @ Large & Associates.

IMCRA Technical Group (1998), Interim Marine and Coastal Regionalisation for Australia: An ecosystem-based classification for marine and coastal environments, Version 3.3. Environment Australia, Canberra.

Joint State and Commonwealth Steering Committee (2003), Draft Guidelines for Developing a Regional Natural Resource Management Plan and Regional Investment Strategy in Queensland: Version 1.

Kleinhardt FGI Pty Ltd (2002), Tourism and Recreation Values of the Daintree and Fraser Island. Report prepared for the Australian Tropical Research Foundation.

Land Resource Assessment and Management Pty Ltd. (2004), State of the Region Study – Version 3. Report prepared for the Burnett Mary Regional Group for Natural Resource Management Inc.

Lee Long W.J., Coles R.G., Miller K.J., Vidler K.P. and Derbyshire K.J. (1992), Seagrass Beds and Juvenile Prawn Fish Nursery Grounds: Water Park Point to Hervey Bay, Queensland. Qld. Dept. of Primary Industries, Information Series QI92011.

Limpus C.J., Currie K.J. and Haines J. (2003a), Marine wildlife stranding and mortality database annual report 2002. Dugong. Queensland Parks and Wildlife Service, Conservation Technical and Data Report.

Limpus C.J., Currie K.J. and Haines J. (2003b), Marine wildlife stranding and mortality database annual report 2002: II Cetacean and pinniped. Queensland Parks and Wildlife Service, Conservation Technical and Data Report.

Longstaff B.J. and Dennison W.C. (2004), Light Requirements of Seagrasses in North-east Australia. Paper presented at the Catchment to Reef Conference: Water Quality Issues in the Great Barrier Reef Region, 9-11 March 2004, Townsville.

Marsh H. and Corkeron P. (1997), The Status of the Dugong in the Great Barrier Reef Marine Park. In State of the Great Barrier Reef World Heritage Area, GBRMPA, pp. 231-247.

- McKenzie L.J. and Campbell S.J. (2003), Seagrass Resources of the Booral Wetlands and the Great Sandy Strait. Qld. Dept. of Primary Industries, Information Series QI03016.
- McKenzie L.J. et al (2000), Post-flood monitoring of seagrasses in Hervey Bay and the Great Sandy Strait, 1999. Qld. Dept. of Primary Industries.
- McKergow L., Brodie J., Prosser I., Hughes A., Furnas M. and Hunter H. (2004), Sources of Sediment and Nutrient Exports to the Great Barrier Reef. Paper presented at the Catchment to Reef Conference: Water Quality Issues in the Great Barrier Reef Region, 9-11 March 2004, Townsville.
- Natural Resources and Non Urban Environment Working Group (1997), Natural Resources Technical Paper. Report prepared for the Wide Bay 2020 Regional Planning Project.
- Office of Economic and Statistical Research (2000), Wide Bay Region Regional Economic Report. Queensland Office of the Government Statistician.
- Office of Economic and Statistical Research (2003), Local Government Area Profile: The Burnett-Mary Region. Queensland Office of the Government Statistician.
- Office of Economic and Statistical Research (2003), Queensland Regional Profiles 2003: Wide Bay-Burnett Statistical Division.
- Preen A. (1993), Extensive loss of seagrass and dugongs from Hervey Bay. *Bulletin of the Australian Littoral Society*, **16(2)**: 2-3
- Queensland Government (1994), Great Sandy Region Management Plan. Fraser Implementation Unit, Dept. of Environment and Heritage.
- Queensland Parks and Wildlife Service (2000), Marine Protected Areas in Queensland: A draft planning framework.
- Queensland Parks and Wildlife Service (2002), Proposal to develop and declare the Great Sandy Marine Park (Northern Section): A discussion paper.
- Queensland Transport (2002a), Wide Bay Integrated Transport Plan.
- Queensland Transport (2002b), Trade Statistics for Queensland Ports for the 5 Years Ending 30 June 2002. Rail, Ports and Freight Division, Queensland Transport.
- Queensland Transport (nd), Towards a Queensland Port Network Strategy: A Discussion Paper. Rail, Ports and Aviation Division, Queensland Transport.

- Saenger P. and Pitts D.J. (1997), Protecting the Values of Coastal Ecosystems: Draft Planning Guidelines. Report prepared for the Dept. of Environment, Brisbane.
- Schaffelke B., Waterhouse J. and Christie C. (2001), A Review of Water Quality Issues Influencing the Habitat Quality in Dugong Protection Areas. Research Publication No. 66, Great Barrier Reef Marine Park Authority, Townsville.
- Stanton J.P. and Morgan M.G. (1977), The Rapid Selection and Appraisal of Key and Endangered Sites: The Queensland Case Study. School of Natural Resources, Uni of New England, Armidale.
- Udy, J., Longstaff B. and Pantus F. (2004), Monitoring Marine Ecosystem Health: Novel Approaches from S.E. Queensland, Australia. Paper presented at the Catchment to Reef Conference: Water Quality Issues in the Great Barrier Reef Region, 9-11 March 2004, Townsville.
- Vang L. (2002), Distribution, abundance and biology and Group V humpback whales *Megaptera novaeangliae*: A review. Queensland Parks and Wildlife Service, Conservation Management Report.
- Walsh K. (2004), Climate Change and Coastal Response: A theme report from the Coast to Coast 2002 National Conference. CRC for Coastal Zone, Estuary and Waterway Management.
- Ward T., Butler E. and Hill B. (1998), Environmental Indicators for National State of the Environment Reporting: Estuaries and the Sea. State of the Environment (Environmental Indicator Report), Dept. of the Environment, Canberra.
- Waycott M. and Duke N. (2004), Research Needs and Strategies for Future Interpretation of Seagrass and Mangrove Status and Trend. Paper presented at the Catchment to Reef Conference: Water Quality Issues in the Great Barrier Reef Region, 9-11 March 2004, Townsville.
- Wide Bay Regional Planning Advisory Committee (1998), Wide Bay 2020 Regional Growth Management Framework.
- Wilson C. and Tidsell C. (2003), Conservation and economic benefits of wildlife-based marine tourism: sea turtles and whales as case studies. *Human Dimensions of Wildlife*, 8:49-58.
- Windle J. and Rolfe J. (2003), Opportunities for Change in the Sugar Industry: Results from a survey of sugarcane growers in Sarina, Mackay, Proserpine, Childers and Bundaberg districts. Central Queensland University.

WWF Australia (2004), Shorebird Conservation Project – Terms of Reference: Great Sandy Strait planning tool for shorebirds.

Zann L.P. (1996), The State of the Marine Environment Report for Australia: Technical Summary. Ocean Rescue 2000, Dept. of the Environment, Sport and Territories, Canberra.

Zeller B. (1998), Queensland's Fisheries Habitats: Current Condition and Recent Trends. Qld. Dept. of Primary Industries, Information Series QI98025

**APPENDIX 1**

**COASTAL AND MARINE VALUES**

| CATEGORY OF VALUE           | COMPONENT     | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                   | KEY SITES OR AREAS                                                                                                                                                                                                 | REFERENCES                                                                                                          |
|-----------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Geomorphological            | Dunal systems | Fraser Island and the Cooloola coast contain the oldest and largest number of independent coastal dune systems in the world. It contains at least eight major dune systems with the world's longest and most complete age sequence of coastal sand dune systems.                                                                                                                                                                              | Fraser Island and Cooloola coast in their entirety                                                                                                                                                                 | Hemmings and Sinclair (1984); Environmental Protection Agency (1994), Fraser Island Commission of Inquiry (1990a,b) |
|                             | Hydrology     | The Fraser Island and Cooloola Sandmasses contain massive freshwater aquifers. Estimates of capacity are between 10-20 million ML with some 6 million ML stored above sea level. This gives rise to extensive systems of spring fed streams and the most numerous, most diverse, largest and highest system of perched lakes in the world. The mainland coast includes a diverse mixture of interconnected estuarine and freshwater wetlands. | Fraser Island and Cooloola sandmass                                                                                                                                                                                | Fraser Island Commission of Inquiry (1990a,b)                                                                       |
|                             | Tidal deltas  | Great Sandy Strait is one of the few passage landscapes in Australia. Fraser Island blocks the outflow from major mainland rivers and forms a 'double-ended' estuary characterised by shifting patterns of mangroves, sandbanks and mud islands.                                                                                                                                                                                              | Great Sandy Strait                                                                                                                                                                                                 | Environmental Protection Agency (1994)                                                                              |
| Coastal and Marine Habitats | Mangroves     | There are 13 species and 17,500 ha of mangroves between Round Hill Head and Tin Can Inlet. Closed <i>Rhizophora</i> forest is the dominant community. The mangrove communities stabilise shorelines, trap sediments and take up nutrients. They are important contributors to primary productivity and provide habitat for a variety of juvenile fish species, as well as crabs and birds.                                                    | Rodds Harbour, Pancake Creek, Jenny Lind Creek, Middle Creek, Round Hill Creek, Baffle Creek, Kolan River, Elliott River, Burrum River, Mary River, Susan River, Great Sandy Strait, Kauri Creek and Tin Can Inlet | Bruinsma and Danaher (2000), Environment Science and Services (1987)                                                |

| CATEGORY OF VALUE                          | COMPONENT                    | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | KEY SITES OR AREAS                                                                                                                                                                                           | REFERENCES                             |
|--------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Coastal and Marine Habitats<br>(continued) | Saltmarshes and saltpans     | There are 5,454 ha of saltpan/saltmarsh habitat between Round Hill Head and Tin Can Inlet. Saltmarshes provide roosting sites for migratory shorebirds and may provide nutrient fluxes at highest tides.                                                                                                                                                                                                                                                                                                                       | This habitat type is found throughout the region with the greatest proportion occurring in Great Sandy Strait                                                                                                | Bruinsma and Danaher (2000)            |
|                                            | Seagrasses                   | The extensive seagrass beds in Hervey Bay and Great Sandy Strait are major nursery grounds and areas of high primary production. There are seven species of seagrass present. They provide feeding grounds for dugong and marine turtles.                                                                                                                                                                                                                                                                                      | Hervey Bay and Great Sandy Strait                                                                                                                                                                            | Bruinsma and Danaher (2000)            |
|                                            | Reefs                        | <p>The coral reefs of the region are the most southerly coastal fringing coral reefs on the eastern Australian mainland. They support a high diversity of nudibranchs (colourful marine snails without shells). An unusual reefal area occurs in the Pancake Creek estuary near Bustard Head. Small areas of hard and soft coral also occur near Tinnanbar.</p> <p>The region also includes the several reefs of the Bunker Group at the southern extremity of the Great Barrier Reef Marine Park and World Heritage Area.</p> | <p>Pancake Creek estuary, Burnett Heads to Elliott Heads, Woodgate, Woody Island, Round Island, Two Mile Reef and near Tinnanbar</p> <p>Boult, Hoskyn, Lady Fairfax, Lady Musgrave and Lady Elliott Reef</p> | Environmental Protection Agency (1994) |
|                                            | Intertidal sand and mudflats | Extensive intertidal sand and mudflats are found along the coastline, and particularly in Great Sandy Strait. Some are non-vegetated while others are colonised by seagrass or algal beds. The intertidal flats support a high biodiversity and biomass of benthic invertebrates; help to sustain productive fisheries; and provide important feeding grounds for migratory shorebirds.                                                                                                                                        | Great Sandy Strait and southern part of Hervey Bay                                                                                                                                                           | Bruinsma and Danaher (2000)            |

| CATEGORY OF VALUE                          | COMPONENT           | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | KEY SITES OR AREAS                                                                                                                                                                  | REFERENCES                                                                             |
|--------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Coastal and Marine Habitats<br>(continued) | Freshwater wetlands | The perched lakes on Fraser Island and the Cooloola Sandmass are the world's most diverse, largest and highest system of perched lakes. Seasonal freshwater wetlands are found behind beaches and estuaries on the mainland coast and parts of Fraser Island.                                                                                                                                                                                                                                            | Throughout coastal parts of the region                                                                                                                                              | Hemming and Sinclair (1984)                                                            |
|                                            | Sandy beaches       | Extensive ocean-exposed sandy beaches are found along the Cooloola coast and the eastern coastline of Fraser Island.<br><br>Less exposed sandy beaches are found along more sheltered sections of the mainland coastline.                                                                                                                                                                                                                                                                                | Cooloola coast, northern and eastern coasts of Fraser Island<br><br>Tannum Sands, Eurimbula Beach, Rules Beach, Moore Park Beach, Kelly's Beach, Woodgate Beach, Hervey Bay Beaches | Fraser Island Commission of Inquiry (1990a,b)<br><br>Beach Protection Authority (1989) |
| Species of Conservation Significance       | Shorebirds          | Great Sandy Strait is one of three significant roosting and feeding areas for transequatorial migratory shorebirds in eastern Australia. The region regularly supports in excess of 20,000 migratory shorebirds, with maximum counts of up to 20,000 shorebirds. Key species of international significance under JAMBA and CAMBA include Eastern Curlews, Grey-tailed Tattlers, Lesser Sand Plovers, Terek Sandpipers, Whimbrels, Bar-tailed Godwits, Pied Oystercatchers, Greenshanks and Grey Plovers. | Great Sandy Strait and Hervey Bay                                                                                                                                                   | Driscoll (1993)                                                                        |
|                                            | Dugong              | Dugong are found throughout most of Hervey Bay and Great Sandy Strait. In 1999, it was estimated that there were 1,500 and 2,000 dugong in Hervey Bay, making this area the most important dugong population in eastern Queensland south of Cape York. Dugong are listed as vulnerable under the <i>Nature Conservation (Wildlife) Regulation Act 1994</i> .                                                                                                                                             | Great Sandy Strait and Hervey Bay                                                                                                                                                   | Environmental Protection Agency (2002), Environmental Protection Agency (2003)         |

| CATEGORY OF VALUE                                | COMPONENT                       | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | KEY SITES OR AREAS                                                                                                                                                                                                                            | REFERENCES                           |
|--------------------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Species of Conservation Significance (continued) | Cetaceans (whales and dolphins) | Hervey Bay is a resting site for humpback whales migrating south to Antarctica. Immature humpbacks enter the Bay first in late July followed by mothers and calves in September. It is estimated that approximately 30% of the Australian east coast migratory population enter Hervey Bay each year. Humpback whales are listed as vulnerable under the <i>Nature Conservation (Wildlife) Regulation Act 1994</i> . Three species of dolphin (common, bottlenose and Indo-Pacific hump-back) are found in the region. | <ul style="list-style-type: none"> <li>• Whales – eastern Hervey Bay, esp. Platypus Bay</li> <li>• Dolphins – throughout the area with one feeding site at Tin Can Bay</li> </ul>                                                             | IFAW (2004), Vang (2002), EPA (2002) |
|                                                  | Marine Turtles                  | All six species of marine turtles that inhabit Queensland are found along the coastline of the Burnett Mary region. Great Sandy Strait is an important feeding area for juvenile turtles while Mon Repos is the largest mainland loggerhead turtle rookery in the Southern Hemisphere. Three of the turtle species are classified as 'endangered' and three are classified as 'vulnerable' under the <i>Nature Conservation (Wildlife) Regulation Act 1994</i> .                                                       | <ul style="list-style-type: none"> <li>• Great Sandy Strait is a key feeding area. Mon Repos beach is the principal nesting site</li> </ul>                                                                                                   | EPA (2002)                           |
|                                                  | Other                           | <ul style="list-style-type: none"> <li>• Endangered Grey nurse sharks migrate through coastal waters of the region</li> <li>• The vulnerable Ground Parrot</li> <li>• The vulnerable Water Mouse (formerly False Water-rat)</li> </ul><br><ul style="list-style-type: none"> <li>• Several species of acid frogs</li> </ul>                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• Wolf Rock near Double Island Point</li> <li>• Wallum heath on Fraser Island and parts of the mainland (eg. near Tin Can Bay)</li> <li>• Wallum wetlands on Fraser Island and the mainland</li> </ul> | EPA (2002)                           |

| CATEGORY OF VALUE | COMPONENT                    | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | KEY SITES OR AREAS                                                         | REFERENCES |
|-------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------|
| Cultural Heritage | Aboriginal cultural heritage | Evidence of Aboriginal occupation of coastal parts of the region dates back at least 5,500 years. Aboriginal people harvested the sea as well as the land. They gathered pipis and cast nets for mullet and other fish. Dugong were harvested and there are also reports of porpoise meat being used as a food source. Coastal areas and many marine animals were of importance, both spiritually and as a source of food. A large number of recorded archaeological sites remain along the coastline. They include shell middens, stone-walled fish traps, ceremonial bora rings, stone artefact scatters and burial sites. There are currently four native title claims over coastal areas within the region.                    | At least 450 cultural heritage sites are known from the Great Sandy Region | EPA (1994) |
|                   | European cultural heritage   | Seventeen Seventy was the original landing place of Captain Cook in Queensland in May 1770. In the mid-late 1800s, Maryborough was an important port for trade in wool, timber, sugar and supplies for the Gympie goldfields. The remains of jetties, wharves, sawmills and timber camps provide evidence of important logging, fishing, mining and other primary industries. There are historic lighthouses and numerous shipwreck sites of heritage significance. There is contemporary heritage significance associated with the cessation of mining and logging on Fraser Island. There are also historical features associated with Pacific Island (Kanaka) involvement with agriculture during the 19 <sup>th</sup> century. | Key sites occur throughout coastal areas. More than 150 sites are known.   | EPA (1994) |

| CATEGORY OF VALUE | COMPONENT | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | KEY SITES OR AREAS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | REFERENCES                                                                   |
|-------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Economic Values   | Tourism   | Coastal areas of the region are the focus of a strong nature-based tourism sector. The region attracts more than 9 million visitors per annum and employs more than 300,000 persons. The total direct expenditure attributable to tourist activities at Fraser Island, Mon Repos and whale watching in Hervey Bay has been estimated as being approximately \$150 million per annum.                                                                                                                                                                                                                                                                                                                                                                                                        | Key attractions include: <ul style="list-style-type: none"> <li>• the beaches and rainforest of Fraser Island (360,000 visitors per annum),</li> <li>• whale watching in Hervey Bay (66,000 visitors per annum),</li> <li>• turtle watching at Mon Repos (24,000 visitors per annum),</li> <li>• the beaches of the Cooloola coast,</li> <li>• the coastline and fringing reefs around Bargara,</li> <li>• the coastline of Hervey Bay, and</li> <li>• the townships of Seventeen Seventy and Agnes Waters.</li> </ul> | Kleinhardt FGI Pty Ltd (2002), Wilson and Tisdell (2003), IFAW (2004)        |
|                   | Transport | Marine Transport is a key part of the region's overall transport infrastructure. Access to Fraser Island is only available by barge and ferry services departing from Urangan, River Heads and Inskip Point. Access to the southern Great Barrier Reef is provided from Seventeen Seventy and Bundaberg. The Port of Bundaberg is located near the mouth of the Burnett River. Total throughput in 2002 was 554,000 tonnes with the principal commodities being sugar, petroleum products and molasses. The occasional cruise ship enters Hervey Bay during the whale watching season. Marine facilities are provided at Burnett Heads, Bundaberg Port, central Bundaberg, Urangan, Maryborough and Tin Can Bay. There are 46 coastal boat ramps in the region with a capacity of 82 lanes. | Marine transport, for commercial and recreation purposes, is of economic importance throughout the region.                                                                                                                                                                                                                                                                                                                                                                                                             | Qld Transport (2002), Qld Transport (2004), EPA (1994), Qld Transport (n.d.) |

| CATEGORY OF VALUE            | COMPONENT                       | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                | KEY SITES OR AREAS                                                                                                                                                                                                                                                                                                  | REFERENCES                                                |
|------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Economic Values (continued)  | Commercial fishing              | The Hervey Bay area supports an important trawl fishery for prawns and scallops. Blue swimmer, spanner and mud crabs are taken commercially. There is an active net fishery with the principal target species being sub-tropical species such as mullet, bream, whiting, tailor, gar, spotted and school mackerel. Trawling and line fishing are undertaken at the southern end of the Great Barrier Reef. | Commercial fishing occurs in most areas not subject to total or seasonal closures. Key areas include: <ul style="list-style-type: none"> <li>• Hervey Bay for trawling, and</li> <li>• Great Sandy Strait and Hervey Bay for crabbing.</li> <li>• Southern Great Barrier Reef</li> </ul>                            | Bruinsma and Danaher (2000)                               |
|                              | Aquaculture                     | There are 4 existing pond aquaculture facilities in coastal parts of the region. They have a combined pond area of approximately 60 ha and grow Karuma and Black Tiger prawns. Trial projects are underway for sea scallops and beche-de-mer in Hervey Bay and Great Sandy Strait. The sea scallop project involves the development of a scallop hatchery at the Port of Bundaberg.                        | Existing prawn farms are located at Baffle Creek, Littabella Creek and the Elliott River. Interest has been expressed in additional farms adjacent to the Kolan and Burrum Rivers; and Beelbi and Maaroom Creeks. The sea scallop and beche-de-mer trial projects are located in Hervey Bay and Great Sandy Strait. | Ross Lobegiger (pers com.)                                |
|                              | Other resource extraction       | Other resource extraction activities include aquarium fish collecting and bait collecting.                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• aquarium fish collecting occurs on some fringing coral reefs</li> <li>• bait collecting occurs on tidal sand and mudflats adjacent to major population centres and popular fishing areas</li> </ul>                                                                        | -                                                         |
| Landscape and Scenic Amenity | Level 1 Scenic Quality          | The region contains coastal areas that are highly outstanding and distinctive by virtue of: <ul style="list-style-type: none"> <li>• exceptional or unique statewide, national or international aesthetic values, and</li> <li>• high visual quality for landform, landcover and waterform.</li> </ul>                                                                                                     | Great Sandy Region                                                                                                                                                                                                                                                                                                  | EDAW Aust. (1997); Environmental Protection Agency (2001) |
|                              | High Scenic Management Priority | The region contains coastal areas of high scenic value that are low in abundance and in urgent need of scenic planning and management.                                                                                                                                                                                                                                                                     | Seventeen Seventy                                                                                                                                                                                                                                                                                                   | EDAW Aust. (1997); Environmental Protection Agency (2001) |

| CATEGORY OF VALUE | COMPONENT   | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                          | KEY SITES OR AREAS                                                                                                                  | REFERENCES                                     |
|-------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Recreation        | Water-based | Water-based recreation is an extremely popular activity in coastal waters of the region. In 1996, there were more than 12,000 private craft registered in the region. The principal recreational activities are line fishing, spear fishing, crabbing and diving.                                                                                                                                                                                                    | Recreational boating is undertaken throughout the estuaries and coastal waters of the region                                        | -                                              |
|                   | Shore-based | Shore-based recreation is a major activity on the foreshores, beaches, esplanades and other coastal parklands of the region. Principal activities include fishing, camping, caravanning, picnicking, walking and various organised sporting and community events. Motorised beach access is permitted along the beaches of the Cooloola sandmass and the eastern side of Fraser Island. Facilities for clubs and organisations are often located on foreshore lands. | Cooloola coast, eastern side of Fraser Island, within and adjacent to all coastal mainland settlements                              | -                                              |
| Knowledge         | Education   | The region contains outstanding educational values across a wide range of landforms and habitats.                                                                                                                                                                                                                                                                                                                                                                    | Southern Great Barrier Reef Marine Park, Fraser Island and Cooloola sandmass, coastal estuaries and beaches, Great Sandy Strait     | Fraser Island Commission of Inquiry (1990 a,b) |
|                   | Research    | The region lies in a transition zone between temperate and tropical habitats and faunas – it has a high diversity of marine organisms and shorebirds. The evolutionary history of the sandmasses are of great scientific interest. Populations of whales and dugongs are the subject of ongoing research.                                                                                                                                                            | Southern Great Barrier Reef Marine Park, Fraser Island, Great Sandy Strait, coastal estuaries, fringing reefs and Cooloola sandmass | Fraser Island Commission of Inquiry (1990 a,b) |

## **APPENDIX 2**

### **DEVELOPMENT PRESSURES AND THREATS**

| CATEGORY OF DEVELOPMENT OR USE | EXTENT AND TRENDS IN REGION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | POTENTIAL THREATS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | REFERENCES                                                        |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Water Resources Development    | <p>There are 300 rivers and streams in the Burnett Mary region with 244 dams and weirs. The total capacity of dams and weirs is approximately 1.5 million ML. Additional water resources projects are under construction and/or planned in the Burnett River catchment.</p> <p>Tidal barrages on the Burnett, Mary and Kolan River have reduced upstream penetration of tides. Fishways have been incorporated into the barrages to help provide passage for native fish species.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• changes to natural drainage patterns</li> <li>• changes to sediment deposition patterns and rates</li> <li>• barriers to fish passage</li> <li>• changes to salinity regimes</li> <li>• changes to tidal drainage patterns</li> </ul>                                                                                                                                                                                                                                                                                                                                    | EPA (2003A), LRAM (2004), Zellar (1998)                           |
| Coastal Urban Development      | <p>The population of the Wide Bay-Burnett Statistical Division is projected to grow from 236,500 in 2001 to 358,100 by 2026 – an increase of 51%. Most of the growth will be located in coastal areas of the region and in particular Hervey Bay City, Burnett Shire and Cooloola Shire. In the region as a whole, the existing and designated residential land supply is believed to be adequate to accommodate population growth to at least 2016. However, from a coastal protection and management point of view, a particular issue is the pressure for urban development at what up until recently had been small coastal ‘villages’. This is particularly noticeable at Seventeen Seventy/Agnes Waters, Burrum Heads, Toogoom, Poona, Tinnanbar, Boonooroo, Tin Can Bay, Rainbow Beach and Cooloola Cove. In the period from June 2002 to June 2003, approximately 90% of regional growth took place in the seven coastal local government areas. Hervey Bay is experiencing rapid growth in tourist accommodation with apartments and resort accommodation now tending to overshadow traditional caravan park accommodation.</p> | <ul style="list-style-type: none"> <li>• direct loss of habitat</li> <li>• changes to natural drainage patterns</li> <li>• increased suspended solids or turbidity</li> <li>• changes to water quality including nutrient and organic enrichment</li> <li>• exposure of acid sulfate soils</li> <li>• erosion due to increased rates of surface water runoff</li> <li>• shoreline erosion</li> <li>• changes to coastal esplanades and parklands</li> <li>• introduction of litter (eg. plastic bags)</li> <li>• introduction of plant and animal pest species</li> <li>• increased noise and lighting</li> </ul> | OESR (2003), Wide Bay Regional Planning Advisory Committee (1998) |

| CATEGORY OF DEVELOPMENT OR USE          | EXTENT AND TRENDS IN REGION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | POTENTIAL THREATS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | REFERENCES            |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Extraction of Sand and Gravel Resources | There are a number of small-medium sand and/or gravel extraction operations on creeks and rivers. There has been some extraction of sand from beaches but this is a relatively minor activity. Sand and gravel extraction does not appear to be growing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• changes to sediment deposition patterns and rates</li> <li>• increased suspended solids or turbidity</li> <li>• shoreline erosion</li> <li>• direct loss of habitat</li> </ul>                                                                                                                                                                                                                                                                                                                                                                   |                       |
| Marine Infrastructure                   | The only major trading port in the region is at Bundaberg. The port's entrance channel has recently been deepened and widened. Major expansion of port infrastructure is unlikely in the foreseeable future although trading volumes and ship movements may increase. Population and tourist growth is bringing with it pressures for additional marinas, small craft harbours and boat ramp capacity. Areas that have been identified as potential sites for new and/or expanded small craft facilities include Tin Can Bay, Carol Point, Hervey Bay and Toogoom. Maintenance dredging is undertaken as required at the Port of Bundaberg and small craft boat harbours.                                                                                                                 | <ul style="list-style-type: none"> <li>• physical disturbance of shoreline</li> <li>• direct loss of habitat</li> <li>• changes to sediment deposition patterns and rates</li> <li>• changes to tidal drainage patterns</li> <li>• increased suspended solids or turbidity</li> <li>• changes to water quality including nutrient and organic enrichment</li> <li>• shoreline erosion</li> <li>• changes to coastal esplanades and parklands</li> <li>• introduction of litter (eg. plastic bags)</li> <li>• changes to temperature regimes</li> <li>• changes to wave regimes</li> </ul> | Qld. Transport (2002) |
| Boating and Shipping                    | <p>Between 40 and 50 ships visit the port of Bundaberg each year and the occasional cruise ship enters Playtpus Bay during the whale watching season. Shipping movements are expected to remain relatively stable. Bundaberg is also a 'first port of call' for customs and quarantine clearing of visiting small craft. With regional population growth and increasing tourism development in the region, visits by overseas vessels are likely to increase.</p> <p>Existing ferry services to Fraser Island are expected to continue on the current routes with relatively stable patronage. The commercial whale watching fleet appears to have stabilised, but growth is expected in tourist cruises to the southern Great Barrier Reef and estuarine areas such as Baffle Creek.</p> | <ul style="list-style-type: none"> <li>• introduction of marine pests</li> <li>• collisions with marine mammals and turtles</li> <li>• behavioural changes to fauna (eg. noise sensitive marine mammals)</li> <li>• shoreline erosion</li> <li>• changes to water quality including nutrient and organic enrichment</li> <li>• introduction of litter (eg. plastic bags)</li> <li>• direct loss of habitat (eg. dredging navigation channels)</li> <li>• increased suspended solids or turbidity that can reduce light penetration and affect marine plants</li> </ul>                    |                       |

| CATEGORY OF DEVELOPMENT OR USE | EXTENT AND TRENDS IN REGION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | POTENTIAL THREATS                                                                                                                                                                                                                                                                                               | REFERENCES                          |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Beach and Dune Access          | <p>Vehicular access is currently permitted on and along the coastline of the Cooloola sandmass and the ocean beach at Fraser Island. Aircraft landing also occurs on the ocean beach at Fraser Island. Beach access for vehicles is also permitted in parts of the Burrum Coast National Park. Under the Great Sandy Region Management Plan, vehicular access to beaches will remain, although some existing beach areas will be closed.</p> <p>Increasing coastal development has resulted in growing pressures on coastal parks and esplanades within and adjacent to urban areas. Public access by vehicles, pedestrians and neighbouring landowners is causing erosion and deterioration of vegetation and habitats.</p> | <ul style="list-style-type: none"> <li>• physical disturbance of shoreline</li> <li>• direct loss of habitat (eg. for shorebirds)</li> <li>• changes in sand mobility and wind erosion</li> <li>• introduction of plant and animal pest species</li> <li>• introduction of litter (eg. plastic bags)</li> </ul> | Qld. Government (1994), ES&S (1997) |
| Aquaculture                    | <p>There has been interest expressed in further development of pond aquaculture. Locations of interest include Baffle Creek, Littabella Creek and the Elliott River. Trial aquaculture projects are currently underway for sea scallops and beche-de-mer. These may progress to commercial enterprises. Investment in aquaculture has recently been adversely affected by the appreciation of the Australian dollar.</p>                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• physical disturbance of shoreline</li> <li>• direct loss of habitat</li> <li>• changes to water quality including nutrient and organic enrichment</li> <li>• introduction of new genetic material</li> </ul>                                                           | Ross Lobegiger (pers com.)          |

## **APPENDIX 3**

### **OVERVIEW OF EXISTING MANAGEMENT MECHANISMS**

- **International Treaties and Agreements**
- **Acts and Regulations**
- **Policy Mechanisms and Statutory Instruments**
- **Community Partnerships and Initiatives**

**TABLE 1: INTERNATIONAL TREATIES AND AGREEMENTS**

|                                                        |                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| United Nations Convention on the Law of the Sea (1982) | <ul style="list-style-type: none"> <li>• Convention recognises security of Australian access to natural resources in its exclusive economic zone combined with the obligation to prevent marine pollution and preserve the marine environment.</li> </ul>                           |
| Ramsar Convention                                      | <ul style="list-style-type: none"> <li>• Convention on Wetlands of International Importance Especially as Waterfowl Habitat provides the framework for intergovernmental cooperation in the protection and sustainable use of wetlands.</li> </ul>                                  |
| CAMBA                                                  | <ul style="list-style-type: none"> <li>• Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds in Danger of Extinction and Their Environment. It lists 81 species of migratory birds.</li> </ul> |
| JAMBA                                                  | <ul style="list-style-type: none"> <li>• Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and Their Environment. Similar commitments to CAMBA.</li> </ul>                          |
| World Heritage Convention                              | <ul style="list-style-type: none"> <li>• Convention Concerning the Protection of the World Cultural and Natural Heritage.</li> </ul>                                                                                                                                                |
| CITES                                                  | <ul style="list-style-type: none"> <li>• Convention on International Trade in Endangered Species of Wild Fauna and Flora. Species identified as endangered are listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth).</li> </ul>            |
| United Nations Convention on Biological Diversity      | <ul style="list-style-type: none"> <li>• Convention seeks to conserve biological diversity, the sustainable use of its components, and fair and equitable sharing of benefits arising from using genetic resources.</li> </ul>                                                      |
| London Sea Dumping Convention                          | <ul style="list-style-type: none"> <li>• Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.</li> </ul>                                                                                                                                         |
| MARPOL                                                 | <ul style="list-style-type: none"> <li>• International Convention for the Prevention of Pollution by Oil from Ships.</li> </ul>                                                                                                                                                     |

**Source:** Environmental Protection Agency (2003a)

**TABLE 2: ACTS AND REGULATIONS**

|                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environment Protection and Biodiversity Conservation Act 1999 | <ul style="list-style-type: none"> <li>• provides for the protection and management of World Heritage Properties; RAMSAR wetlands; internationally protected migratory species; nationally threatened plant and animal species and ecological communities; and Commonwealth marine areas</li> </ul>                                                                                                                                                                                                                                                                                                                                           |
| Great Barrier Reef Marine Park Act 1975                       | <ul style="list-style-type: none"> <li>• provides for the establishment of Commonwealth marine parks within the Great Barrier Reef Region</li> <li>• provides for the use of marine park zoning plans and other mechanisms to manage activities within marine parks</li> <li>• provides for the management of aquaculture in the catchment of the GBR Region</li> </ul>                                                                                                                                                                                                                                                                       |
| Integrated Planning Act 1997                                  | <ul style="list-style-type: none"> <li>• sets out a framework to integrate planning and development assessment in a manner that is ecologically sustainable</li> <li>• provides for the preparation of planning schemes and other local planning instruments by local governments</li> <li>• establishes an integrated development assessment system (IDAS)</li> </ul>                                                                                                                                                                                                                                                                        |
| Coastal Protection and Management Act 1995                    | <ul style="list-style-type: none"> <li>• requires the preparation of a State Coastal Management Plan and provides for the preparation of regional coastal management plans</li> <li>• provides for the declaration of coastal management districts and erosion prone areas</li> <li>• establishes mechanisms for coastal protection</li> <li>• establishes mechanisms for the allocation of quarry materials and preparation of dredge management plans</li> <li>• sets out procedures to be followed when the chief executive of the Environmental Protection Agency is designated as an assessment manager or concurrence agency</li> </ul> |
| Marine Parks Act 1982                                         | <ul style="list-style-type: none"> <li>• provides for the declaration of multiple use marine parks in Queensland waters</li> <li>• provides for the preparation of zoning plans to manage use and entry</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Fisheries Act 1994                                            | <ul style="list-style-type: none"> <li>• provides for the protection and management of fisheries habitat and marine plants</li> <li>• provides for the management of commercial and recreational fishing in Queensland</li> <li>• provides for the management of aquaculture</li> </ul>                                                                                                                                                                                                                                                                                                                                                       |

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transport Infrastructure Act 1994                | <ul style="list-style-type: none"> <li>• sets out a framework that allows and encourages integrated planning and efficient management of transport infrastructure</li> <li>• provides for the management of ports and strategic port lands</li> <li>• provides for the preparation of waterways management plans</li> </ul>                                                                                                                            |
| Transport Operations (Marine Safety) Act 1994    | <ul style="list-style-type: none"> <li>• establishes a duty of care with respect to water transport</li> <li>• provides for the registration and licensing of private and commercial vessels and their operators</li> <li>• provides for the establishment of speed limits, pilotage, surveys and the issue of authorities for aquatic events and buoy moorings</li> <li>• provides for the reporting and investigation of marine incidents</li> </ul> |
| Transport Operations (Marine Pollution) Act 1995 | <ul style="list-style-type: none"> <li>• provides for the prevention and control of pollution from vessels</li> <li>• provides for the management and disposal of sewage and garbage generated on vessels</li> </ul>                                                                                                                                                                                                                                   |
| Environmental Protection Act 1994                | <ul style="list-style-type: none"> <li>• establishes a general environmental duty of care</li> <li>• provides for the licensing and management of environmentally relevant activities</li> <li>• provides for the preparation of environmental protection policies for noise, water, air and waste</li> </ul>                                                                                                                                          |
| Vegetation Management Act 1999                   | <ul style="list-style-type: none"> <li>• establishes a framework for the control and management of clearing of native vegetation on freehold and State-owned lands</li> <li>• provides for the development of codes for assessing clearing applications under the <i>Integrated Planning Act 1997</i></li> </ul>                                                                                                                                       |
| Nature Conservation Act 1992                     | <ul style="list-style-type: none"> <li>• establishes a framework for developing and implementing an integrated conservation strategy for Queensland</li> <li>• provides for the declaration and management of protected areas</li> <li>• provides for the protection of native wildlife and its habitat</li> </ul>                                                                                                                                     |

**TABLE 3: POLICY MECHANISMS AND STATUTORY INSTRUMENTS**

|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 25 Year Strategic Plan for the Great Barrier Reef World Heritage Area                                         | <ul style="list-style-type: none"> <li>provides strategies for managing and preserving the Great Barrier Reef World Heritage Area up to the year 2020</li> <li>contains 5 and 25 year objectives for eight broad strategy areas</li> </ul>                                                                                                                        |
| Wide Bay 2020 Regional Growth Management Framework                                                            | <ul style="list-style-type: none"> <li>provides a framework for the sustainable use and development of the Wide Bay region until the year 2020</li> <li>contains a regional vision and objectives, principles and actions for key topics including the coastal environment</li> </ul>                                                                             |
| Burnett/Mary Regional Strategic Framework for Natural Resource Management and the Maintenance of Biodiversity | <ul style="list-style-type: none"> <li>provides a comprehensive guide to the Strategic actions required for the effective management and conservation of the natural resources and biodiversity of the region</li> <li>identifies and prioritises natural resource and biodiversity issues and provides a broad strategic approach to their resolution</li> </ul> |
| Great Sandy Region Management Plan                                                                            | <ul style="list-style-type: none"> <li>documents the values/context of the Great Sandy Region</li> <li>identifies outcomes for the Region and sets out management purposes and strategies</li> <li>provides a framework for integrated decision-making</li> </ul>                                                                                                 |
| Great Barrier Reef Water Quality Protection Plan                                                              | <ul style="list-style-type: none"> <li>identifies actions, mechanisms and partnerships to assist in halting and reversing the decline in water quality entering the Reef</li> <li>the focus of actions is on relatively low cost measures to encourage good planning and to assist in the implementation of best management practices</li> </ul>                  |
| National Plan to Combat Pollution of the Sea by Oil and other Noxious and Hazardous Substances                | <ul style="list-style-type: none"> <li>provides for the integration of Commonwealth, State and oil industry resources to respond to, manage and clean up spills of oil and other polluting substances</li> </ul>                                                                                                                                                  |
| Queensland State Coastal Management Plan                                                                      | <ul style="list-style-type: none"> <li>represents a 'whole of government' approach to the management of the coastal zone in Queensland</li> <li>establishes a long-term vision for the coast</li> <li>deals with 10 topic areas and for each sets out how the coast is to be managed to achieve the vision</li> </ul>                                             |
| State Planning Policy for Planning and Managing Development involving Acid Sulfate Soils                      | <ul style="list-style-type: none"> <li>establishes the need for more active management of acid sulfate soils</li> <li>specifies development outcomes to be achieved and how consideration of acid sulfate soils is to be incorporated into planning schemes and development assessment</li> <li>includes a set of technical guidelines</li> </ul>                 |
| Strategy for the Conservation and Management of Queensland Wetlands                                           | <ul style="list-style-type: none"> <li>identifies values of wetlands and threats to these values</li> <li>provides a State-wide policy framework for the protection and management of wetlands in Queensland</li> </ul>                                                                                                                                           |

**TABLE 3: POLICY MECHANISMS AND STATUTORY INSTRUMENTS (CONTINUED)**

|                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategy for the Conservation and Management of Queensland Wetlands | <ul style="list-style-type: none"> <li>identifies values of wetlands and threats to these values</li> <li>provides a State-wide policy framework for the protection and management of wetlands in Queensland</li> </ul>                                                                                                                                                                                                                                                                                            |
| Environmental Protection (Water) Policy                             | <ul style="list-style-type: none"> <li>aims to regulate human impacts on the environment in order to protect Queensland's waters in accordance with the object and requirements of the <i>Environmental Protection Act 1994</i></li> <li>establishes water quality criteria and objectives and requirements for 'special waters'</li> <li>requires local governments to prepare and implement environmental plans for sewage management, trade waste management and urban stormwater quality management</li> </ul> |
| Fish Habitat Management Operational Policy FHMOP001                 | <ul style="list-style-type: none"> <li>sets out Dept. of Primary Industries and Fisheries procedures for permit applications, assessment and approvals associated with removal of protected marine plants</li> </ul>                                                                                                                                                                                                                                                                                               |
| Fish Habitat Management Operational Policy FHMOP002                 | <ul style="list-style-type: none"> <li>sets out Dept. of Primary Industries and Fisheries procedures for permit applications, assessments and approvals to perform works or related activities in a declared Fish Habitat Area</li> </ul>                                                                                                                                                                                                                                                                          |
| Fish Habitat Management Operational Policy FHMOP004                 | <ul style="list-style-type: none"> <li>sets out Dept. of Primary Industries and Fisheries procedures for the provision of fisheries comments on dredging, extraction and spoil disposal activities</li> </ul>                                                                                                                                                                                                                                                                                                      |
| Fish Habitat Management Operational Policy FHMP005                  | <ul style="list-style-type: none"> <li>provides information on Dept. of Primary Industries and Fisheries requirements for mitigation and compensation where fish habitat loss is proposed</li> </ul>                                                                                                                                                                                                                                                                                                               |
| Local Government Planning Schemes                                   | <ul style="list-style-type: none"> <li>all coastal local governments have, or are in the process of finalising, planning schemes under the <i>Integrated Planning Act 1997</i></li> <li>these schemes identify desired environmental outcomes; incorporate State and regional matters; and include measures to facilitate the achievement of desired environmental outcomes</li> </ul>                                                                                                                             |
| Port of Bundaberg Land Use Plan                                     | <ul style="list-style-type: none"> <li>The Land Use Plan is prepared under the provisions of the <i>Transport Infrastructure Act 1994</i></li> <li>it identifies strategic port land; future strategic port land; and current and proposed uses of such land</li> </ul>                                                                                                                                                                                                                                            |
| Hervey Bay Coastal Management Plan                                  | <ul style="list-style-type: none"> <li>a plan prepared by Hervey Bay City Council to provide strategic direction for sustainable use of the coastal zone</li> <li>the Plan sets out management goals, objectives and strategies and presents a series of implementation recommendations</li> </ul>                                                                                                                                                                                                                 |
| Marine Park Zoning Plans                                            | <ul style="list-style-type: none"> <li>The Great Barrier Reef, Hervey Bay and Woongarra Marine Parks all have zoning plans in place to manage access and use</li> </ul>                                                                                                                                                                                                                                                                                                                                            |

**TABLE 4: COMMUNITY PARTNERSHIPS AND INITIATIVES**

|                                                        |                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The Burnett Catchment Strategy                         | <ul style="list-style-type: none"> <li>• the goal is to coordinate and instigate community awareness and effort to maintain and improve an ecologically sustainable Burnett Catchment River Basin</li> <li>• the Strategy prioritises required actions within nine key issues of community concern</li> </ul>                            |
| Baffle Creek Catchment Strategy                        | <ul style="list-style-type: none"> <li>• the strategy sets out desired outcomes of the catchment</li> <li>• it provides strategic actions and priorities for each of seven themes</li> <li>• one of these themes is estuary and marine issues</li> </ul>                                                                                 |
| Mary River Catchment Strategy                          | <ul style="list-style-type: none"> <li>• the aim is to promote, within the community and through interested sectors, a common view of a sustainable and productive catchment</li> <li>• eight key issues of community concern are identified</li> <li>• strategies and actions are developed with priorities being identified</li> </ul> |
| Hervey Bay Dugong and Seagrass Monitoring Program      | <ul style="list-style-type: none"> <li>• this community-based monitoring program commenced in 1997 to assist in the mapping and monitoring of seagrass habitats</li> <li>• volunteers have been trained and 31 long-term monitoring sites established</li> </ul>                                                                         |
| Woongarra Marine Park Monitoring and Education Project | <ul style="list-style-type: none"> <li>• the project is a partnership between Central Queensland University and the Australian Marine Conservation Society</li> <li>• the program includes monitoring of water quality, corals and tidal pools; providing assistance to school groups; and raising of community awareness</li> </ul>     |
| Tin Can Bay Foreshore Management Plan                  | <ul style="list-style-type: none"> <li>• a project of the Cooloola Conservation Strategy</li> <li>• identifies threats to, and management options for, the foreshores of Tin Can Bay</li> <li>• objectives and management actions are presented</li> </ul>                                                                               |
| Mon Repos Marine Turtle Volunteer Program              | <ul style="list-style-type: none"> <li>• a local volunteer program that is run as part of the ongoing management and monitoring of marine turtles at Mon Repos Conservation Park and neighbouring beaches</li> </ul>                                                                                                                     |

## **APPENDIX 4**

### **RISK ASSESSMENT TABLE**

**Based upon: Standards Australia and Standards New Zealand (nd), HB143:1999: Guidelines for Managing Risk in the Australian and New Zealand Public Sector**

**TABLE TO DETERMINE THE LEVEL OF RISK**

|                    | <b>Consequences</b>        |                    |                       |                    |                           |
|--------------------|----------------------------|--------------------|-----------------------|--------------------|---------------------------|
| <b>Likelihood</b>  | <b>Insignificant<br/>1</b> | <b>Minor<br/>2</b> | <b>Moderate<br/>3</b> | <b>Major<br/>4</b> | <b>Catastrophic<br/>5</b> |
| A (almost certain) | H                          | H                  | E                     | E                  | E                         |
| B (likely)         | M                          | H                  | H                     | E                  | E                         |
| C (moderate)       | L                          | M                  | H                     | E                  | E                         |
| D (unlikely)       | L                          | L                  | M                     | H                  | E                         |
| E (rare)           | L                          | L                  | M                     | H                  | H                         |

Legend:

E: extreme risk: immediate action required

H: high risk: management attention needed

M: moderate risk: management responsibility must be specified

L: low risk: manage by routine procedures