

Mackay Coasts and Communities

Coastal Management Guidelines

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CARING
FOR
OUR
COUNTRY



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1 INTRODUCTION

Mackay Regional Council area covers approximately 320 kilometres of mainland coastline from the O’Connell River in the north to the southern boundary of Cape Palmerston National Park (Figure one). The coast is characterised by a diverse range of natural features including sandy beaches, rocky headlands, rainforests, woodlands and grasslands, extensive intertidal flats, and substantial areas of coastal wetlands (Environmental Protection Agency, 2004).

Population growth and other development in the Mackay region is placing increased pressures on coastal resources, and limiting the resilience of the system to respond to fluctuations in the natural environment. Competing residential, commercial, tourism, and recreational uses threaten to degrade the natural values of Mackay’s coastal environment and the outlying Great Barrier Reef World Heritage Area.

The Coastal Management Guidelines aim to restore beaches, dunes and coastal wetlands in the Mackay region to a condition which is as close as possible to natural, whilst allowing for appropriate recreational access and use. Development has been allowed within the erosion prone area along many parts of the Mackay coast, and has resulted in detrimental impacts on natural coastal process and a transfer of erosion problems (Environmental Protection Agency, 2004). The removal of pre-existing approved infrastructure or development is not considered within the scope of these Guidelines. The focus of the Coastal Management Guidelines is on managing coastal areas to achieve a balance between competing interests; and on rehabilitating, maintaining and protecting the natural areas that remain along the coast.

Mackay Regional Council’s Coastal Management Guidelines will provide a framework for management decisions and activities for land under Mackay Regional Council jurisdiction in the coastal zone. The coastal zone is defined as “coastal waters and all areas to the landward side of coastal waters in which there are physical features, ecological or natural processes or human activities that affect, or potentially affect, the coast or coastal resources” (*Coastal Protection and Management Act, 1995, s 15*).

This document is not intended to provide a detailed account of physical coastal processes in the Mackay region or provide site-specific recommendations. The implementation of the Coastal Management Guidelines will be determined on a site-specific basis using the required detailed information on which to base coastal management decisions. Implementation of the Coastal Management Guidelines will be undertaken over a suitable timeframe, on a prioritised basis, and as resources become available. Appendix A provides a conceptual model for implementation of the Coastal Management Guidelines.

The aim of this document is to:

- Identify the key conservation and management issues in the coastal zone in the Mackay region; and
- Establish Coastal Management Guidelines to guide future management decisions and activities for coastal land under Mackay Regional Council jurisdiction.

Figure 1: Mackay Regional Council coastal extent



2 CONSERVATION AND MANAGEMENT ISSUES

Conservation and other management issues have been identified from Sarina Shire Beaches Management Guidelines for Coastal Zones (Tucker, Cooper, von Fahland, 2006), the *State Coastal Management Plan 2001*, and field observations. Issues to be considered include:

- Native vegetation
- Public access
- Wildlife
- Cultural heritage
- Erosion
- Climate change

The relevance and scope of the issues to be addressed by the Coastal Management Guidelines are discussed below.

2.1 Native vegetation

The presence and condition of native vegetation is a critical component in maintaining and restoring the environmental values of coastal systems. Native vegetation stabilises sediments, provides critical habitat, and ensures water quality is maintained (McLachlan and Brown, 2006; WetlandCare Australia, 2008). Factors to be considered in assessing native vegetation on the Mackay coast include zonation, non-native species, vegetative and other waste dumping, and remnant vegetation type.

2.1.1 Vegetation zonation

Coastal vegetation occurs in distinct zones across the landscape dependent on physical characteristics of the environment such as exposure to salt spray, wind strength, moisture content/ hydrology, and soil nutrient status.

Three zones of vegetative cover are identified for coastal sand dunes (Beach Protection Authority of Queensland, 1981):

1. A pioneer zone with primary stabilising plants consisting mostly of herbaceous species;
2. A woodland (or scrub) zone with secondary stabilising plants consisting of shrubs, vines, stunted trees and a few associated herbs; and
3. A forest (or heath) zone with tertiary stabilising plants composed of trees (or coastal heath).

Batianoff and Franks (1997) identify important additions in Mackay's coastal vegetation zonations including:

- Mangrove zone in front of low energy coasts;
- Strand thickets occasionally occurring in front of the *Casuarina* woodland zone; and
- Landward zone of *Corymbia tessellaris-Banksia integrifolia* open forest with beach scrub elements occurring along moderately high energy coasts.

Three zones of vegetation are similarly identified for coastal wetlands (WetlandCare Australia, 2008):

1. Riparian/ fringing;
2. Emergent; and
3. Aquatic.

The presence of natural vegetation zonation is an indication of a functioning coastal ecosystem, and is critical in stabilising sand and soils, protecting against erosion, and providing the best opportunity for resilience to disturbance (Beach Protection Authority of Queensland, 1981; WetlandCare Australia, 2008).

Coastal sand dunes, in particular, have suffered the loss of vegetation zonation owing to mismanagement. An ‘esplanade’ is a public area along the shoreline above the high water mark designated as ‘road’ under the *Land Act (1994)* and under management of Local Government (Tucker *et al.*, 2006). Esplanades include the area between property boundaries and the high tide mark. In many cases, this area has become an extension of neighbouring lawns and gardens, being maintained by local residents beyond their property boundary. Dune vegetation cannot tolerate activities such as mowing, topsoiling and overfertilising which reduce the recruitment and establishment of native species and often results in a monoculture of garden couch (Beach Protection Authority of Queensland, 1981; Tucker *et al.*, 2006). The establishment of Council parks and recreational areas has dealt a similar fate to dune vegetation zonation.



2.1.2 Non-native vegetation

Numerous weeds and non-native species have been recorded on Mackay beaches, headlands and adjacent coastal wetlands (Batianoff and Franks, 1997).

Non-native species compete with native vegetation, reduce biodiversity, and generally detract from the environmental and aesthetic values of coastal ecosystems (Tucker *et al.*, 2006; WetlandCare Australia, 2008). Declared weeds such as Lantana (*Lantana camara*), prickly pear (*Optunia strica*) and Singapore daisy (*Sphagneticola trilobata*) are present in the coastal zone and require immediate action for removal under the *Land Protection (Pest and Stock Route Management) Act, 2002*. Environmental weeds such as Guinea grass (*Megathyrsus maximus*) and couch (*Digitaria eriantha*) are also present and are well known for dominating areas and excluding native species (Tucker *et al.*, 2006).

Non-native vegetation may also alter flow regimes of coastal wetlands and change the fire regime of coastal ecosystems by increasing fuel loads and raising the frequency and intensity of fires. Impacts from fire include a reduction in area of vegetation, loss of biodiversity and loss of connectivity between remnants and other vegetation communities. Other fire-related impacts may include loss of soil and nutrients, increased erosion

and run-off, the propagation of weeds, and threats to life and property (Ecosystem Conservation Branch, 2007; WetlandCare Australia, 2008).

2.1.3 Waste dumping

Waste dumping and litter in the coastal zone is unsightly, detrimental to vegetation, and poses a threat to wildlife (McLachlan and Brown, 2006).

The dumping of garden waste such as grass clippings, palm fronds and coconuts in coastal ecosystems can lead to the introduction of non-native and/ or weed species and smothering of native vegetation. Sandy substrates do not benefit nutritionally from the application of mulch and a mulch layer will not prevent sand erosion (Beach Protection Authority of Queensland, 1981). Rather, the best and most effective retention of sand on beaches is through the bonding of roots from an established corridor of native plants and grasses (Tucker *et al.*, 2006).

Illegally dumped residential and building material in coastal systems can contribute to pollutants via leaching and creates a public nuisance for the Regional Council and other management organisations with a responsibility for cleaning it up.



Figure 5: Example of garden and vegetative waste smothering the foredune vegetation.



Figure 6: Example of illegally dumped waste in salt marsh and mangrove communities creating a public nuisance and potentially contributing to pollutants via leaching. Photo by Matt Bloor.

2.1.4 Remnant Vegetation

Remnant vegetation refers to “the small ‘remaining’ areas of naturally occurring vegetation and their natural systems left over from major changes in the environment” (Cooper, Turnbull, Kingston, Hall, Champion, 2001, p. 13). Maintenance and condition of remnant vegetation is particularly important in maintaining biological processes that support a diverse range of native flora and fauna.

Queensland’s *Vegetation Management Act (1999)* uses a Regional Ecosystem classification system to describe remnant vegetation communities and to provide their conservation status. Across the Mackay Whitsunday region “virtually all foreshore Regional Ecosystems are either ‘endangered’ or ‘of concern’ and almost half have a lower than desired (at least 10%) representation within protected areas” (Ball, 2008). The presence, condition and conservation status of remnant vegetation will be considered in the management of the coastal zone.

Legislation providing protection to remnant vegetation in the coastal zone include the Federal *Environment Protection and Biodiversity Conservation Act (1999)*; Queensland’s *Vegetation Management Act (1999)*, *Water Act (2000)*, and *Fisheries Act (1994)*; and Mackay Regional Council’s Local Law 68 (Parks and Reserves).



Figure 7: Remnant microphyll vine forest on coastal dunes (Regional Ecosystem 8.2.2) is listed as ‘critically endangered’ by federal legislation.



Figure 8: ‘Of-concern’ remnant vegetation Casuarina open forest to woodland with Spinifex dominated ground layer on foredunes (Regional Ecosystem 8.2.1).

2.2 Public access

Mackay’s coastal environments are regularly used by local residents and visitors. Designated access points for pedestrians and vehicle access for boat launching are provided at many locations, however, there are also many unauthorised access points in the region.

Uncontrolled access to beaches, dunes, and coastal wetlands by vehicles and pedestrians can lead to the destruction of coastal vegetation, reduced vegetative cover, and increased erodability and compaction (Tucker *et al.*, 2006; WetlandCare Australia, 2008). Vehicle and pedestrian traffic can also displace nesting turtles, shorebirds and other coastal wildlife, or destroy their habitats (Environment Australia, 2003; Harding and Milton, 2003; McLachlan and Brown, 2006).

To reduce erosion and destruction of coastal vegetation, pedestrian access is recommended to be restricted to designated points with appropriate infrastructure and signage provided. Similarly, vehicle access to coastal dunes and wetlands should be limited to designated points and all other vehicular traffic be prohibited unless specifically approved by Mackay Regional Council.



Figure 9: Example of designated pedestrian access through dunal vegetation to beach.



Figure 10: Example of unrestricted pedestrian and vehicle access causing erosion and damaging vegetation.

2.3 Wildlife

The Mackay coast provides habitat for a variety of significant wildlife.

Shorebirds are a group of wader birds that utilise coastal foreshores, mudflats, wetlands and lagoons. The Mackay region is the fifth most important area in Queensland for shorebirds, and is among the 25 most important sites for shorebirds in Australia (Tucker *et al.*, 2006). Nine species of shorebirds, including the bar-tailed godwit, grey-tailed tattler, greater sand plover, whimbrel, lesser sand plover, eastern curlew, great knot, pied oyster catcher and sooty oystercatcher, are supported by the Mackay area in internationally significant numbers. Disturbance from vehicle, boat and pedestrian traffic, and unrestrained dogs is documented as one of the major threats to shorebirds in the Mackay region, and can lead to a loss of vital feed and resting time (Harding and Milton, 2003).

All sandy beaches in the Mackay region are considered potential nesting sites for marine turtles. Of the world's seven species of marine turtles, six are found in the waters of the Great Barrier Reef. Mackay and District Turtle Watch Association maintain records of nesting turtles and hatchlings, with the majority of mainland nesting records being for the Flatback turtle (*Natator depressus*). Small numbers of the Green turtle (*Chelonia mydas*) and Loggerhead turtle (*Caretta caretta*) have also been recorded. All marine turtles are listed as 'vulnerable' under Queensland legislation (*Queensland Nature Conservation Act, 1992*) and 'vulnerable' (*Natator depressus* and *Chelonia mydas*) or 'endangered' (*Caretta caretta*) under federal legislation (*Environment Protection and Biodiversity Conservation Act, 1999*). Current threats to nesting turtles include light pollution, recreational disturbance, beach traffic, faunal predation, erosion or deposition environments, and loss of habitat (Environment Australia, 2003).

Other endangered, vulnerable, rare, or near threatened species that also utilise beach, foreshore and coastal wetland habitats include:

- Northern quoll (*Dasyurus hallucatus*), 'Endangered' Nationally; *Environment and Biodiversity Conservation Act 1999*;
- False water rat (*Xeromys myoides*), 'Vulnerable' in Queensland; *Queensland Nature Conservation Act 1992*, and Nationally; *Environment Protection and Biodiversity Conservation Act 1999*;
- Coastal sheath-tail bat (*Taphozous australis*), 'Vulnerable' in Queensland; *Nature Conservation Act 1992*;
- Beach stone curlew (*Esacus magnirostris*), 'Vulnerable' in Queensland; *Nature Conservation Act 1992*;
- Rusty monitor (*Varanus semiremex*), 'Rare' in Queensland; *Nature Conservation Act 1992*; and
- Variety of migratory bird species (listed under *Environmental Protection and Biodiversity and Conservation Act 1999*, *Japan-Australian Migratory Bird Agreement*, and *China-Australia Migratory Bird Agreement*).

Common threats to such species include clearing, fragmentation and declining condition of habitat (including inappropriate fire regimes), disturbance and predation by feral animals, disturbance by recreational users, and inappropriate use of boats and vehicles.

Essential Habitat mapping is used by Queensland state agencies to identify vegetation in which a species that is endangered, vulnerable, rare, or near threatened has been known to occur (Department of Natural Resources and Water, 2008). (Note: Rare category is due to be phased out by 2010). Where available this mapping should be used to identify high value habitat areas and potential threats.



Figure 11: Green turtle (*Chelonia mydas*) on Mackay beach.

Figure 12: Shorebirds on Mackay beach.

2.4 Cultural heritage

Aboriginal people have lived off the land and sea in the Mackay region for thousands of years by managing and utilising natural resources. The Traditional Owner groups in the project area are Gia, Koinjmal, Ngaro and Yuibera. The people used coastal areas for hunting, gathering and cultural purposes and today maintain a strong interest in the natural environment (Mackay Whitsunday Natural Resource Management Group Inc, 2005).

In the beach and foredune environment, “Aboriginal fish traps are one of the most tangible physical reminders of traditional Aboriginal culture” (Ball and Bernard, 2007, p. 1). These structures represent a direct link to pre-European Aboriginal culture and provide opportunities for relearning Traditional cultural links and management of land and sea country (Ball and Bernard, 2007). Twenty-five fish traps have been identified across the Mackay Whitsunday region and are protected under Queensland legislation (*Aboriginal Cultural Heritage Act, 2003*).

Shell middens, engravings, and sites of significance identified by Traditional Owners should also be recognised and maintained through coastal management activities.

Threats to cultural heritage sites include pressures of development and increased population densities, damage by vehicles and human disturbance, vandalism, anchoring of small vessels, tidal and storm actions, sedimentation and mangrove encroachment (Barker and Bernard, 2007; Ball and Bernard, 2007). Coastal Management Guidelines will consider threats to fish traps and other cultural heritage sites and seek to incorporate Traditional Owner recommendations to retain cultural values.



Figure 13: Fish trap at Finlaysons Point. Photo by Matt Bloor.



Figure 14: Fish trap north of Midge Point. Photo by Samarla Deshong.

2.5 Erosion

Sandy beaches are subject to natural erosion and accretion cycles caused by the impacts of wind, wave and currents on open coastlines. “The maintenance of natural coastal processes is generally considered to be the most beneficial method of maintaining a stable beach profile over the longer term” (Environmental Protection Agency, 2006a).

Erosion prone areas refer to “the width of the coast that is considered to be vulnerable to coastal erosion and tidal inundation over a 50-year planning cycle” (Environmental Protection Agency, 2007, p. 43). Ensuring that erosion prone areas remain in a natural condition to allow coastal processes to occur unhindered provides the best opportunity for managing shoreline erosion and retaining environmental values. Along many parts of the Mackay coast, development has been allowed within the erosion prone area. Subsequent threats to property from eroding beaches has in some cases led to the construction of protective rock walls, impacts on natural coastal processes, and a transfer of erosion problems (Environmental Protection Agency, 2004). Although property protection remains an issue, these hard engineering structures are expensive, are not always the most effective option, and can further exacerbate the erosion or be damaging to adjacent areas of the coastline (Environmental Protection Agency, 2004, 2006a).

In some situations, the retention or rehabilitation of native vegetation and improved management of public access will provide improved stability of the dune system (Environmental Protection Agency, 2006a). Native vegetation plays an important role in the formation and stabilisation of coastal areas with the root systems of native species more suited to stabilising coastal areas (Tucker *et al.*, 2006). Dune vegetation cannot prevent direct wave erosion; but it can prevent wind erosion, build up sand dunes to reduce the extent of erosion events, and reduce wave erosion where dense vegetation exists (Beach Protection Authority of Queensland, 1981). Erosion prevention activities related to dune health and stabilisation, using local native vegetation, are recommended for all coastal areas.

Shoreline Erosion Management Plans (SEMPs) are the Environmental Protection Agency’s preferred method for local governments to address shoreline erosion issues at the local level (Environmental Protection Agency, 2006b). SEMP provide the required detailed understanding of underlying coastal processes and develop and evaluate erosion management strategies, and should be prepared for priority erosion areas.



Figure 15: Erosion has occurred in some areas where native vegetation has been removed. Photo by Lisa Kermode.



Figure 16: Rock walls have been erected along portions of Mackay beaches to combat erosion.

2.6 Climate Change

Climate change projections for Australia include increased temperature, sea level rise, changing rainfall patterns and more frequent and intense extreme climatic events (Australian Greenhouse Office, 2007). Predicted impacts on the beach, foredune and coastal wetland environments include increased vulnerability of beach and dune systems due to coastal erosion, shoreline recession, and saltwater intrusion (*State Coastal Management Plan, 2001*).

The Mackay region is one of the most vulnerable sections of the Queensland coast in terms of storm tide inundation (Harper, 1998 cited in Environmental Protection Agency, 2004). The maintenance of a well vegetated dune system provides the best protection against sea level rise, shoreline erosion and storm surge events (Australian Greenhouse Office, 2007). Salt marsh areas are important for estuarine food chains, provide habitat for marine and terrestrial organisms, balance nutrients and organic matter, and provide hydrologic support (Dale, Knight, Breitfuss, Radke, Rogers, 2008). Urban development in the Mackay region may lead to limited opportunities for migration of these salt marsh communities as sea level changes and mangrove encroachment occurs, leading to their loss.

Coastal Management Guidelines will seek to address climate change issues through promoting the maintenance of well-vegetated dune systems, and identifying potential buffer zones of coastal vegetation to allow for migration of salt marsh and salt flat communities as tidal inundation occurs.



Figure 17: Margin between salt marsh and mangrove communities. Photo by Matt Bloor.



Figure 18: Local example of urban encroachment bordering salt marsh communities. Photo by Matt Bloor.

3 COASTAL MANAGEMENT GUIDELINES

Coastal Management Guidelines to address conservation and management issues have been adopted from Sarina Shire Beaches Management Guidelines For Coastal Zones (1; with some variations made to text) (Tucker *et al.*, 2006), Management Plan for Traditional Aboriginal Fish Traps in the Mackay Whitsunday Region (2) (Ball and Bernard, 2007), and expert opinion. Coastal Management Guidelines are listed under their respective issues.

3.1 Native vegetation

Vegetation zonation

- a. Rehabilitate and/ or revegetate coastal ecosystems on Esplanade and Council tenure with local native species. Plant manageable sized areas and use appropriate species to reinstate vegetation zonation. (1)
- b. Reduce the extent of maintained lawns and request the removal of private gardens and belongings from Esplanades and Reserves over a suitable time period, and encourage local native vegetation to re-establish in their place.
- c. Encourage local native grasses to colonise in selected areas of maintained Esplanade. (1)
- d. Restrict maintenance of lawned areas to designated Council parks and designated fire breaks adjacent to private properties. (1)
- e. Utilise available legislation to protect existing native vegetation on Esplanade and Reserve tenure as required.

Non-native vegetation

- f. Remove non-native species from Esplanades and coastal Reserves and continue management until the seed stock is depleted or native vegetation has established to compete with weed regrowth. The removal of non-native species requires a staged approach, removing young species first, and tackling control areas at a pace which can be maintained. Non-native vegetation which plays a visible role in sand dune stabilisation should not be removed until alternative vegetation is established. (1)
- g. Re-establish local native vegetation to replace removed weeds over a suitable timeframe. (1)
- h. Manage fuel loads of non-native vegetation to reduce the fire threat for fire-sensitive coastal vegetation.
- i. Educate coastal communities on local weed species and promote the use of local native species in residential gardens.

Waste dumping

- j. Remove non-native vegetative waste, garden waste, and other debris dumped in the coastal zone. (1)
- k. Educate coastal communities on requirements to dispose of garden waste and other debris at designated Council refuse sites, and enforce local laws and penalties for illegal dumping as required.

Remnant vegetation

- l. Identify remnant vegetation of high conservation value and management requirements of these areas.
- m. Consider rehabilitation and/ or revegetation to achieve connectivity between fragments, implementation of buffer zones to reduce edge effects, and weed control measures.

- n. Consider use of Land for Wildlife, Nature Refuges, other Conservation Covenants, or change to protected area tenure to improve management and protection measures.

3.2 Public access

- a. Provide suitable beach access points for pedestrians, and locate associated parking and recreational areas away from foredunes. Beach access points are to be no closer than 200 metres in urban residential areas and as determined by Mackay Regional Council. (1)
- b. Consider fencing of inland Esplanade boundaries to define tenure and designate access points. Fencing will be used as a tool to aid protection and reestablishment of coastal vegetation, subject to council's maintenance ability. (1)
- c. Audit current beach accesses and signage and rationalise, upgrade or repair any degraded infrastructure. (1)
- d. Ensure all vehicles are restricted to designated access points and all other vehicular traffic be prohibited unless specifically approved by Mackay Regional Council. (1)
- e. Review vehicle access for launching boats, and rationalise or improve where necessary. (1)

3.3 Wildlife

- a. Install interpretive signage in coastal areas where important wildlife, such as shorebirds and turtles, are present. (1)
- b. Ensure dunes are stable and adequately vegetated to preserve beach structure and therefore habitat suitability. (1)
- c. Review, and modify where necessary, lighting and beach access to minimise or avoid negative impacts on wildlife. (1)
- d. Educate coastal communities on requirements to restrain domestic animals and enforce local laws and penalties as required.
- e. Consider implementing buffer zones and/ or managing access to high priority wader roosts with records of high disturbance.
- f. Consider implementation of feral animal control programs where there is evidence of disturbance or impacts on native wildlife.
- g. Identify mapped Essential Habitat and management requirements of these areas.

3.4 Cultural Heritage

- a. Install interpretive signage to mark presence and significance of fish traps, or other cultural heritage sites, where appropriate, in consultation with Traditional Owners. (2)
- b. Use fencing to restrict vehicle access to the foreshore and manage access to significant sites. (2)

3.5 Erosion

- a. Rehabilitate and/ or revegetate dunes with local native species to regulate erosion and accretion processes.
- b. Use fencing to restrict inappropriate access and direct pedestrians and vehicular traffic to designated access points.
- c. Develop Shoreline Erosion Management Plans, or other research as required, to understand coastal processes and develop and evaluate erosion management strategies, in priority erosion areas.

3.6 Climate Change

- a. Rehabilitate and/ or revegetate dunes with local native species to maintain or reinstate a well-vegetated dune system to protect against the predicted impacts of climate change.
- b. Identify potential buffer zones of coastal land to allow for migration of salt marsh and salt flat communities.

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Coastal Management Guidelines

Mackay Regional Council’s policy statement on coastal management for coastal land under Council jurisdiction.

